

the world of
68' micros

Support for Motorola Processors

August 1994

Vol. 2 Number 1

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*Bring on the dancing
 girls and clowns...
 We celebrate our first
 full year in print!*

\$ OSK on the CHEAP! \$
as inexpensive as it can get

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the world of 68' micros

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The editor speaks...

F.G. Swygart

Welcome to the first issue of our second year! The first year went along about as expected. I plan on supporting the CoCo and OS-9/OSK for many years to come!

Early on, I promised to let everyone in on the business aspects of publishing this magazine. Well, I don't keep profits and expenses separate from the other FARNA Systems products, so I can't really tell you how profitable the magazine itself has been. What I can tell you is that FARNA Systems as a whole made just under \$800.00 in profit for the 1993 calendar year. Now this isn't bad at all! Counted as business expenses were various computer upgrades (both the DOS based layout machine and the CoCo) and trips to the Chicago and Atlanta CoCoFests... around \$2000.00 in expenses. So I'm pleased with these figures for now, though I do expect them to grow. Around \$11,000.00 flowed through FARNA during 1993, and I expect at least \$15,000.00 to flow through this year.

How is the magazine itself doing? Well, we started back in August of 1993 with 97 paid subscriptions. As of the last issue, 275 magazines were sent out. That's a 200% increase in a year- very good in my book! The original goal was to double subscriptions between August 1993 and January 1994 (which was easily accomplished) and to add at least that many more by the end of the publishing year (which was nearly accomplished)... or a 200% increase over the first year. Seems we've come close enough to making that! Now it depends on you, the readers... how many will renew subscriptions? How many "stray" CoCo and OS-9 users can we locate? Will we be able to break into the industrial market?

It would be nice to add another 100 to the subscription base by the end of 1994. I don't know if this can be done... that would put us at 375-400 subscribers. We are still growing, so maybe that's not such a far off goal after all. But I think the saturation point for OS-9/OSK hobby users is going to be from 400-500 subscribers-- we'll just have to wait and see, maybe (hopefully?) I'm wrong.

The last issue was a little late... about a week. Sorry about that! The CoCoFest was the cause, that and a minor problem at the printers, which may have been avoided had I got my copy in sooner! It seems he has a problem with his machines every time I get in and want to get the magazines back as soon as possible, but they always run great when I get things in early! And no, it isn't on purpose, I'm in the shop behind the counter and helping most of the time I'm there, so I'm not getting the run around.

Unfortunately, this issue may be a little later than I expected also. I took my vacation time over the summer, plus I have a grand parent on the verge of leaving this world. But you should have received this issue within a week of the usual time... the "usual time" being plus or minus one week of the cover date.

Speaking of cover dates, beginning with this issue there will be no more "dates" on the cover... just the month and year. You will receive your issue during the month on the cover, or the first week of the following month!

< 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

I'm trying to get my OSK v2.3 from Cumana (Atari-ST) talking to my SCSI drives. They're connected to ICD's host adaptor as SCSI IDs #0 & #2. They work 100% just fine with Atari TOS/GEM and ICD's drivers (v6.2.3 currently). But OSK gives me "Not Ready" errors on some files especially large ones. And OSK doesn't like to do a "physical" format. But the STHD driver from Cumana (Reccoware) can see the drives and report their correct SCSI info (via FORMAT and FREE).

When I posted this plea for help a couple of months ago, one person in Germany suggested I patch STFD (not STHD?) at offset \$8E0 to make it \$20 or more. Without any further details than that, I didn't do this (for obvious reasons!). So here's the IDENTs on these as delivered by Cumana:

Header for: stfd
Module size: SCC6 #3270
Owner: 0.1
Module CRC: \$A3FDB2 Good CRC
Header parity: \$1E39 Good parity
Edition: \$15 #21
Ty/La At/Rev \$E01 \$A001
Permission: \$555 —e-r-e-r-e-r
Dev Drv, 68000 obj, Sharable,
System State Process

Header for: sthd
Module size: \$A9C #2716
Owner: 0.1
Module CRC: \$C45E91 Good CRC
Header parity: \$1E46 Good parity
Edition: \$1F #31
Ty/La At/Rev \$E01 \$A000
Permission: \$555 —e-r-e-r-e-r
Dev Drv, 68000 obj, Sharable,
System State Process

Then Cumana told me they'll do some more testing—I haven't heard back from them at all for 2 months almost. (I've stopped calling/faxing them since my phone bill grew to over \$140 one month—effectively doubling the price of this package!)

The two drives are a Seagate ST277N and a CDC 96-meg, and both are very reliable. ICD's partitioning software can even make the partition info AHDI-compatible. And it almost works with OSK.

I'm also still inquiring on how to buy G-or-K-Windows for this Cumana flavor of OSK. V2.3's "console" driver does support a Get/SetStat call to deliver the address of the screen memory, so I'd think we'd be able to run a window/gfx package

I'm about to give up, folks. I'm already

hugely miffed how the CoCo/L2 support has withered. I want to write some MIDI packages (for Atari ST OSK) but I need gfx & windows! If there's no GW/KW for Cumana, just say so! I'll ask Cumana to give me my money back and you'll never hear from me again! This is getting way too expensive for a home hobbyist!

Paul Seniura (from Oklahoma City)
paulseniura@delphi.com

Paul, I'm looking for someone now who can write a definitive article or two about running OSK on the Atari ST series. My first suggestion would be to make a floppy boot disk then make the changes the fellow from Germany suggested. And maybe try this with STHD also. You can always reverse the patches later, though you should probably make another boot without the changes also.

If anyone has any suggestions for Paul, please let him know! If you don't have access to Delphi or Internet e-mail, send your response to "68' micros" and I'll pass the info along. I would like to eventually include an Atari ST OSK column. I have recently found Internet addresses for some European contacts, so I'll be making inquiries over there, maybe I can find some users!

I have also heard that some different operating systems have been ported to the Amiga... anyone know about a port of OS-9? Maybe it would be a good idea, now that Amiga 500 and 1000 machines are pretty low priced...

I finally got time to try my disk drive. Definitely a step above cassette. I tried to load the flight simulator and I got "***** 255 24 8", or some such nonsense on continuous scroll. What do you suppose this means? I checked the drive out and don't suspect it or the CoCo 2. The move to Korea screwed up my monitor, so I'll have to get it replaced before I start to do much. Some more questions: What is the top memory ceiling on the CoCo 2? Will DigiTech Sound Pro and Mind Games work on a CoCo 2? Can a hard disk be added to the CoCo 2? Also, I remember hearing that the Pistol Grip joystick for the CoCo 3 wouldn't work on the two. Can it be modified?

Dan Concepcion
80 FS
PSC #2 Box 171
APO AP 96264-0171

1) Problem loading flight simulator. The

"***** 255 24 8" indicates that the disk is OS-9. Put it in and type "DOS" to boot the run-time version of OS-9 that is on the disk. You don't need to boot OS-9 first, just pop the disk in and type DOS. This works with ANY Tandy OS-9 game or program. And of course it will start the OS-9 operating system itself also. You can run the programs from OS-9 once it is booted by typing "chd/dx;chx/dx/cmds" then the name of the program (found with dir/dx/cmds). The "x" will be the drive the program disk is in... /d0 or /d1.

The first thing to try with intermittent disk errors (though this was not the case!) is to clean the edge connectors on both ends of the controller with a pencil eraser. This will make them bright and shiny again! You will have to remove the screw in the center under the label and snap the case apart to get to all of the contacts. A little tuner cleaner or WD-40 in the connector on the CoCo won't hurt anything either.

2) The CoCo 2 can only really use 64K. There have been 128 and 256 K memory schemes made (they bank switch in 32 or 64 K segments), but they never caught on. I have an article on adding 512K to the CoCo 2 (actually a Dragon 64, but very similar) that will act in the same manner as the 512K upgrade in the CoCo 3. This doesn't mean that all CoCo 3 512K programs will run though! This particular upgrade will only work with OS-9 Level II, which requires a few patches, I believe.

3) Yes, a hard drive can be added to any CoCo, but can be relatively expensive. See my ad for the Ken-Ton SCSI controller, the last two issues and this one for articles concerning hard drive systems.

4) As far as I know, the pistol grip joystick works the same as any other CoCo joystick, so should work with any model CoCo. The only difference is that only one button would be active in a CoCo 1 or 2.

5) Mind Games will run on a CoCo 2, but not from the RAM disk. DigiTech Pro requires a CoCo 3 with 512K.

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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.

OS9/68000 on the cheap!

F.G. Swygart

Can you get an OSK system for under \$1000.00? Sure you can!

Some time ago I mentioned something about building an OSK system for under \$1000. My original intent was to gather the pieces together and sell a kit with just enough mark-up to cover expenses. There just didn't seem to be enough interest for me to purchase at least five sets of components at one time and turn them around within 30 to 60 days. In other words, I'd need paid orders for at least five systems in order to make the idea cost effective for myself as well as purchasers. I did start some research though, and I'm going to share the outcome with you now.

Selecting A Motherboard

Basically, a cost effective OSK system can be assembled using almost any motherboard that has a version of OSK ported to it. The most popular boards are the PT68K series, as they are lower cost than the Hazelwood (sold by Frank Hogg Labs [FHL] as the KiX series) and Computer Design Services boards. The primary reason is that the PT68K series is used in several industrial systems, and Peripheral Technology accepts their older boards for trade-in credit when a user upgrades. This creates a supply of used, tested, guaranteed motherboards at a substantial savings. The majority of these boards are 10MHz PT68K2 models, not the newer 16MHz PT68K4.

The Computer Design Services CD68X20-25 is also a good choice if something more powerful than the PT68K is needed. The CDS board is similar to the PT68K, except that it uses the sixteen bit PC/AT type bus instead of the eight bit PC/XT bus. Any card that works in the PT68K will also work in the CDS board. Of course any used motherboard with OS-9 available would be acceptable, including the Hazelwood TC-70 or an MM/1. There are several different considerations depending on your choice, so from here we diverge into two different routes.

PT68K and CDS Motherboards

Regardless of the system chosen, you will need a PC/clone type case, power supply, and keyboard. You will also need at least one 3.5" drive (720K or 1.44MB). Since you need everything about a PC but the motherboard, why not buy an entire PC? You'll be discarding the motherboard, so a surplus 8088 or 80286 system will do just fine. There are many currently on the market at bargain prices, and you should be able to pick one up for no more than the prices of the individual components.

The PT68K and CD68x20 systems were

designed to use nearly all eight bit (XT) PC type components. You can use an existing monochrome or CGA color monitor and card, and most likely the hard drive controller - provided it is WD-XTGEN compatible (90% of XT HD controllers are, but be prepared to spend the extra \$35-50 just in case). An IDE hard drive can be used, but the eight bit card must be purchased from Peripheral Technology or Delmar Co., as the drivers are guaranteed to work with only a certain brand of card. A combination mono/CGA card WILL NOT work with the PT68K or CDS video drivers.

If purchasing a system with a VGA monitor for a PT68K or CDS board, the monitor card MUST use the Tseng Labs ET4000 or Oak 037 chip sets. The Oak card (256K) will support up to 800x600x16 colors, the Tseng Labs cards 1024x768x256 colors. After a look through Computer Shopper and Nuts & Volts, I found several companies advertising Tseng Labs cards by name. Many of the cheap 256/512K 800x600 cards use the Oak 037 chip set, but ASK! I only found one company advertising an Oak eight bit card by name. Some of the sixteen bit cards will also work in an eight bit slot- they have auto sensing circuitry that detects the expanded bus. Again- ASK! If the system with monitor price is good, go ahead and buy it even if the VGA card can't be used. As long as you save a few bucks...

The PT68K and CDS68x20 will easily fit in ANY case designed for a standard XT size motherboard (8.5"x12"), including many compact cases. If you buy a used system in a compact case, it will most likely have an adapter card that plugs into one of the motherboard slots and provides three or more horizontal expansion slots. If you buy the case separate, make sure the adapter board comes with the case or is available from the supplier.

The floppy drive controller is integrated with the PT68K and CDS motherboards (supports up to 720K drives on the PT68K, 1.44MB on the CDS). The 1.2MB drive in most AT systems will be of no use with a PT68K board, but the 360K drive in an XT is usable. At least one 720K 3.5" drive is mandatory, as that is what OS-9/68000 is distributed on.

The color XT system from Maxim and the PT68K2 motherboard are the items I would have used for a kit system under \$1000 (see price listings). This provides one with a CGA monitor and card, 20MB hard drive & card, case and power supply, and an 84 key

keyboard for \$299- all the parts needed for a "starter" system except the motherboard. One can always start with this system and upgrade the monitor later. If a terminal system will be used, the monitor isn't necessary. In that case, the IBM 5170 from Midwest (\$209) might be a better buy. It doesn't include a monitor, but has a larger hard drive, power supply, case, and 101 key keyboard. An eight bit hard drive controller will be needed, however. The same components would work well with a CD68x20 motherboard.

KiX, MM/1, and TC-70

If you will be using the KiX, TC-70, or MM/1 boards, buying a surplus/used PC system isn't as cost effective. Only the case, power supply, and keyboard would be usable. Check local computer stores for good buys on used components, and possibly a used/surplus CPU unit with no monitor or hard drive. I didn't find any such systems advertised, but several of the surplus companies have them available, so call.

FHL's MGA card can drive a standard VGA monitor but a .28 dot pitch monitor is recommended. The MGA has a PS/2 style keyboard connector, so an adapter will be necessary for a standard keyboard. These are easily obtainable for under \$5 at most computer supply stores. One other thing to consider about the MGA card- its size. This is a full length card (13"x4"), so a standard size XT or AT desktop or a tower style case is needed for a KiX console system. The TC-70 also needs the full size case. A compact case will work with a KiX or TC-70 IF you know you will be using a terminal system for some time and don't require any of the expansion cards. The KiX motherboard itself is only 8.7" square. The MM/1 was designed for a "slimline" or compact size case, so a full size desktop case is not necessary or even desirable, unless you need the space for drives.

The MM/1 and TC-70 both use a Sygnetics VSC video chip which requires an analog RGB monitor as used with the CoCo 3. The only inexpensive monitor I know of that is readily available is the Commodore 1084 or 1084S (the "S" model has two internal speakers). Built by Magnavox for Commodore, this unit is are-badged 1CM135. This is a CGA resolution monitor that has RGB-A, RGB-I (IBM CGA) and composite inputs. Only four colors can be displayed at one time in CGA mode, but 64 can be displayed in analog mode. resolution also

appears much better than CGA in analog mode, close to EGA in comparison. Check Commodore publications and computer dealers for used Commodore 1084 and 1084S monitors (the "S" version has dual [stereo] speakers). These are badge engineered by Magnavox for Commodore. Other Commodore models used with the Amiga are useable, but have a larger dotpitch and won't be as clear. Older Magnavox 8CM515 monitors are similar to the 1CM135.

The KiX, TC-70, and MM/1 are all designed to use a SCSI type hard drive, so no controller is necessary. All floppy drives up to 1.44MB are supported, and at least one 3.5" drive is needed (distribution media for OS-9/68000 is 3.5" 720K). The KiX will also support the latest 2.88MB floppy drives.

Where to Buy?

I've included a list of several surplus systems with different hardware combinations. Don't forget to check local sources! If you live near a big city, there are usually several dealers who have surplus and/or trade-in equipment they are willing to make good deals on. If there are others in your area wanting to build similar systems, get together and have one person arrange a deal for several items at the local dealer's. They are more willing to cut an extra couple bucks for larger buys!

It is suggested that you decide what you want on your system, make a list of the necessary components, then find a surplus system with the majority of the desired items. After that, make a list of the other items needed. If you buy a surplus system from a dealer, send that dealer the list of other components needed and ask for a price on all.

Well, in a nut shell, that's it! See the following listings for prices and suppliers. If anyone has any comments to add, please send them in.

Recommended "basic" system:

PT68K2 motherboard w/OSK, C	\$498.00
Maxim Color XT System	\$299.99
Case & PS	
20MB Hard Drive & Controller	
360K drive	
Keyboard	
ACT Service	
3.5" 720K/1.44MB floppy	\$25.00
Misc. cables, shipping, etc. (est.)	\$75.00
TOTAL:	\$897.99

The above system will run any software written for an OS-9 terminal system, but WILL NOT run G-Windows. G-Windows requires 400x600 minimum resolution monitor. Since G-W is graphics oriented, the PT68K4, CDS68X20, or KiX is really

necessary for a G-W system.

Recommended G-Windows Systems:

PT68K4	KiX/20
motherboard w/OSK, C	
\$598.00	\$699.95
PT IDE controller	
\$59.00	N/A
ACT Service	
80MB IDE drive (est. - call)	
\$140.00	N/A
VGA monitor	
\$120.00	\$120.00
Oak VGA card (est. - call)	
\$40.00	N/A
1.44MB floppy drive	
\$35.00	\$35.00
Crazy Bob's 80MB SCSI 3.5" drive	
N/A	\$90.00 (80MB SCSI)
Under The Wire Electronics	
Mid-Tower case & PS, 101 keyboard	
\$45.00	\$45.00
(keyboard est. - call)	
Delmar Co. G-Windows	
\$300.00	N/A
FHL MGA card w/G-Windows	
N/A	\$675.00
Misc. cables, shipping, etc. (est.)	
\$110.00	\$110.00
TOTAL:	
\$1447.00*	\$1734.95*

*Total for a CD68x20 system, which is more comparable speed and power to the KiX/20, would be \$2047.00, or \$2346.00 with Ultra C. A KiX/30-16 would add \$900 (\$2634.95), the KiX/30-33 \$1000 (\$2734.95).

OAK VGA CARD:

#420 Oak 512K VGA card \$35.00
 Computer Parts & Pieces
 (800-235-0096)

TSENG LABS ET4000 1MB VGA CARD:

Micro Max \$89
 2700 Avenger Drive
 Virginia Beach, VA 23452
 (804-431-4500)

Compu-Tek International \$95
 805 Business Parkway
 Richardson, TX 75081
 (214-994-0190)

Micro Xperts, Inc. \$79
 6230 Cochran Road
 Solon OH 44139
 (216-498-3330)

Motherboards:

Frank Hogg Labs
 204 Windmere Road
 Syracuse, NY 13205
 (315-469-7364)

KiX/30 -33MHz (new)	\$1699.95
KiX/30 -16MHz (new)	\$1599.95
68030, NO RAM, OSK, K&R C, Basic	
KiX/20 -25MHz (new)	\$699.95
68020, NO RAM, OSK, K&R C, Basic)	
MGA Card	\$399.95
MGA w/ G-Windows	\$599.95
G-Windows	\$299.95
Cable Sets:	
KiX/20 (4 serial ports)	\$99.00
KiX/30 (2 serial ports)	\$89.00

Computer Design Services

2550 Sandy Plains Road, Ste. 320-234
 Marietta, GA 30066
 (404-973-2170)

CD68X20 -25MHz (new)	\$1497.00
68020, NO RAM, OSK, Ultra C	
(subtract \$299 w/o C)	

Peripheral Technology

1480 Terrel Mill Road #870
 Marietta, GA 30067
 (404-973-2156)

PT68K4 -16MHz (used)	\$598.00
68000, 1MB RAM, OSK, K&R C	
PT68K2-10MHz (used)	\$498.00
68000, 1MB RAM, OSK, K&R C	
IDE Hard Drive Controller	\$69.00
8 bit card with drivers for PT68K, CD68X20	

Delmar Co.

P.O. Box 78
 Middletown, DE 19709
 (302-378-2555)

Various components and drivers for PT68K and CDS based systems. Write for price list.

Surplus PC Systems & Components:

Midwest Electronics
 124 12th Avenue South
 Minneapolis, MN 55415
 (612-339-9533)

IBM Model 5170 286 \$209.00
 full size AT case, 1.2MB floppy, 30MB MFM hard drive, 101 keyboard
 Other components- call/write for list

Computers for Less

18021 J Skypark Circle #200
 Irvine, CA 92714
 (714-975-0542)

286 Desktop Computer \$199
 full size AT case & PS, 1.2MB floppy, 101 Keyboard
 ADD: \$100 for 40MB HD; \$99 for VGA

continued on next page

OSK on the Cheap!

(continued from previous page)

Maxim Technology

3930 W. 29th South, Ste. 35

Wichita, KS 67217

(316-941-9883)

XT Color System \$199.99

Case & PS, 84 key keyboard, 20MB HD

CGA monitor \$100

VGA .29 Color Monitor \$179.99 (refurb)

Call/write for list of other items. S&H not included in above prices.

Under The Wire Electronics

(818-797-2569)

Desktop XT Style Case & PS \$25

Slimline Desktop Case & 220W PS \$50

Mini-Tower Case & 200W PS \$25

WD-XTGEN hard drive cards \$22

Alltech Electronics Co.

602 Garrison Street

Oceanside, CA 92054

(619-721-7733)

XT Case & PS \$29.00

Turbo LED & switch, 150W PS, 2 exposed

HH drive bays, 2 internal

Mono card \$9.95

101 Keyboard \$19.00

(call for full list)

ACT Service

(714-669-9874)

Refurbished drives and monitors:

1.44MB \$35

720K \$25

CGA or 640x480 VGA monitor

\$120

ST225 20MB HD \$65

ST251 40MB HD \$129

ST4096 80MB HD \$169

WD-XTGEN controller \$39

HD cable set \$10

Crazy Bob's

50 New Salem Street

Wakefield, MA 01880

(617-246-6767)

80MB SCSI 5.25" hard drive \$89

80MB SCSI 3.5" hard drive \$90

(both refurbished, 90 day guarantee)

The Grapevine Group

3 Chestnut Street

Suffern, NY 10901

(914-357-2424)

Refurbished 1084 & 1084S monitors

(call/write for availability and price)

TriState Computer

650 6th Avenue

New York, NY 10011

(800-433-5199 orders only)

Commodore 1084 Monitors \$199.95

Also contact:

Electronic Materials Recovery, Inc.

3102 W. Thomas #90

Phoenix, AZ 85017

(602-272-3200; BBS 602-272-5300)

and:

Javanco

501 12th Avenue S.

Nashville, TN 37203

(615-244-4444; BBS 615-244-4445)

< 268'm >

```
5 REM RECVPXC.BAS FOR MS-DOS
COMPUTER
```

```
10 INPUT"DESTINATION PCX
PATHNAME";FS
```

```
20 IF FS="" THEN 10
```

```
30 OPEN "O",1,FS
```

```
40 CLOSE
```

```
50 KILL FS
```

```
60 OPEN "O",1,FS
```

```
70 OPEN "COM1:300,N,8,1" AS 2
```

```
80 PRINT:PRINT"TO STOP
RECEIVING, PRESS CTRL-Z ON THIS
COMPUTER,"
```

```
90 PRINT"AND THEN PRESS CTRL-Z
ON THE OTHER COMPUTER":PRINT
```

```
100 PRINT"RECEIVING..."
```

```
110 BS=INPUT$(1,2)
```

```
120 IF INKEY$<>"" THEN 150
```

```
130 PRINT#1,BS;
```

```
140 GOTO 110
```

```
150 CLOSE
```

```
160 PRINT "DONE"
```

```
5 REM PIC>PCX.BAS FOR COCO
```

```
10 PCLEAR4
```

```
20 INPUT"FILENAME (.PIC ASSU-
MED)";FS
```

```
30 OPEN"O",#1,FS+"/PCX"
```

```
40 CLOSE
```

```
50 KILLFS+"/PCX"
```

```
60 OPEN"O",#1,FS+"/PCX"
```

```
70 PRINT#1,CHR$(10);
```

```
80 PRINT#1,CHR$(2);
```

```
90 PRINT#1,CHR$(1);
```

```
100 PRINT#1,CHR$(1);
```

```
110 FORQ=1TO4:PRINT#1,CHR$(0);:
NEXTQ
```

```
120 PRINT#1,CHR$(255)CHR$(0);
```

```
130 PRINT#1,CHR$(191)CHR$(0);
```

```
140 FORQ=1TO53:PRINT#1,CHR$(0);:
NEXTQ
```

```
150 PRINT#1,CHR$(1);
```

```
160 PRINT#1,CHR$(32)CHR$(0);
```

```
170 PRINT#1,CHR$(1)CHR$(0);
```

```
180 FORQ=1TO58:PRINT#1,CHR$(0);:
NEXTQ
```

```
190 LOADMFS+"/PIC"
```

```
200 A=3584
```

```
210 PRINT"PACKING LINES..."
```

```
220 B=PEEK(A):A=A+1:C=C+1:XC=
```

```
XC+1: L=B
```

```
230 IFA>9727THENXC=33:C=C+1:
```

```
GOTO280
```

```
240 B=PEEK(A):A=A+1:C=C+1:XC=
```

```
XC+1
```

```
250 IFB<>L THEN280
```

```
260 IFXC>32 THEN280
```

```
270 GOTO230
```

```
280 IFC>2THEN370
```

```
290 Q=192ANDL:IFQ<>192THEN330
```

```
300 PRINT#1,CHR$(193);
```

```
310 PRINT#1,CHR$(L);
```

```
320 GOTO340
```

```
330 PRINT#1,CHR$(L);
```

```
340 L=B:C=1
```

```
350 IFXC>32THEN440
```

```
360 GOTO230
```

```
370 C=C-1
```

```
380 Q=192+C
```

```
390 PRINT#1,CHR$(Q);
```

```
400 PRINT#1,CHR$(L);
```

```
410 L=B:C=1
```

```
420 IFXC>32THEN440
```

```
430 GOTO230
```

```
440 YC=YC+1:PRINTYC
```

```
450 IFYC=192THEN480
```

```
460 XC=1
```

```
470 GOTO230
```

```
480 CLOSE
```

```
490 PRINT"DONE":SOUND150,10
```

```
500 END
```

Convert CoCo PMODE4 graphics files to PC compatible .PCX files.

Although the CoCo still is my primary computer, I do occasionally venture into the MS-DOS world, particularly to do some desktop publishing. Since I have a large collection of CoCo PMODE4 pictures, I thought it would be great to use them as clip art in my MS-DOS publishing ventures.

The bad news is that the CoCo's PMODE4 picture file format is pretty different from what's found in the DOS world. However, the good news is that it is not very difficult to convert a CoCo picture into a DOS-compatible format. This article and its accompanying programs, PIC>PCX.BAS and RECV-PCX.BAS, explain how to do it.

In the CoCo world, every byte of a PMODE4 picture is saved individually. Every pixel in the original picture occupies a bit of disk space. But in the DOS world, saved pictures are compressed. That is, if a picture has large groups of neighboring bytes that are identical, then not every byte is saved individually. Instead they are saved as a group, which occupies much less disk space.

So the trick is to write a program (such as PIC>PCX.BAS) that takes a PMODE4 CoCo picture file and compresses it in a DOS-like manner. That compressed picture file can be squirted from the CoCo into a DOS computer by way of a null modem cable.

There are a number of picture compression schemes in the DOS world, and the one used by PIC>PCX.BAS is the popular PCX format originally created for the PC PAINTBRUSH graphics program. Consequently, lines 10-60 of PIC>PCX.BAS ask for a CoCo PMODE4 filename (assuming that the extension name is .PIC), and then they open a CoCo disk file with the same name but with a .PCX extension name (If you have PMODE4 files with a non-PIC extension, then change line 190 accordingly).

The first 128 bytes of a PCX file are a header that contains a variety of information about the picture. Lines 70-180 of PIC>PCX.BAS add that information to the beginning of the new CoCo disk file. In case you are curious, the details of those lines are as follows:

Line 70: The manufacturer byte. This identifies the file as a PCX file.

Line 80: The version of PC PAINTBRUSH that made the file.

Line 90: An encoding byte that identifies the compression method used.

Line 100: How many bits are required to represent one picture pixel.

Line 110: Imagine that the picture's pixels can be located by coordinates, somewhat similar to graphing in high school. The minimum X and Y coordinate values are recorded here, two bytes each.

Line 120: The maximum X coordinate. Two bytes.

Line 130: The maximum Y coordinate. Two bytes.

Line 140: 53 bytes of no significance here.

Line 150: Identifies this file as black and white, not color.

Line 160: The number of bytes in one line of the picture.

Line 170: The palette type. Shades of gray versus color.

Line 180: 58 bytes of nothing (padding).

After the formality of the header is dealt with, PIC>PCX.BAS loads the CoCo picture file and begins looking it over, line by line and counting them off on-screen as it does so. Series of identical bytes are saved as a group. Bytes that are different from their neighbors are saved individually.

When a series of identical bytes is discovered, lines 370-430 save them to disk. Two bytes are involved. The second byte is the actual picture byte. The first byte says how many of those picture bytes there are. The first byte stands out from the other bytes in the file by the fact that it is the only byte whose first two bits are both one.

When a unique lone byte is found, lines 290-360 save it to disk. If both of this byte's first two bits happen to be one, then it is saved as a series of one byte. This may seem strange, but it is necessary because any byte that begins with two one-bits is considered to mark a series of bytes.

And that's about all there is to it. When the program says "DONE", you should have a DOS-compatible CoCo picture file on your CoCo disk. All that remains is to squirt it into your DOS computer through a null modem cable.

To get your new PCX file into your

DOS computer, you will need: a terminal program running on your CoCo, the MS-DOS BASIC program RECVPCX.BAS running on your DOS computer, and a null modem cable connecting the two computers' serial ports. One would think that a terminal program running on the DOS computer could replace RECVPCX.BAS, but for some reason I tend to lose bytes that way and end up with unuseable PCX files. Perhaps it is a peculiarity of my software or hardware. You may want to experiment with that.

Of course, the communications settings of both the CoCo and the DOS computer should be the same. I have found 300 baud to be reliable though slow. You may want to experiment with higher baud rates. If you do, then remember to change line 70 of RECVPCX.BAS accordingly. Also, both programs should be set for 8-bit words. Text files can be sent with 7 bits, but graphics require 8 bits. Parity should be off (none). All control characters should be passed. One stop bit.

To actually do the transfer, first run RECVPCX.BAS on the DOS computer. When you type in the destination PCX pathname, you must include the .PCX extension name if you want the new PCX picture file to have an extension name. Get it to the point where it says "RECEIVING". Then, using the CoCo terminal program, transmit your PCX file. This will take several minutes at 300 baud. Finally, when the CoCo is done transmitting, press CONTROL-Z on the DOS computer. Then do the same (possibly CLEAR-Z) on the CoCo. RECVPCX.BAS should say "DONE", and your PCX file now should be successfully transferred.

It is time to have fun using your new clip art library. If your newly converted CoCo picture looks stretched, squashed, or too small when you display it using your DOS graphics program, then that can be fixed readily by using scaling functions that are commonly available with good DOS graphics programs.

(listings on page 6)

James Toth
R.D. 4, Box 230
Punxsutawney, PA 15767

< 268'm >

The Third Annual "Last" CoCoFest...

Colin McKay

Again! A follow-up on last issue's report

This article is a follow-up to the Fest report in the last issue of 268'm. Wherever possible, these are comments from the vendors, listing their overall impressions of the Fest and any new products they had available. Other summaries are based on the information contained in the Fest guide, or from talking to vendors at the Fest.

At my booth (Northern Xposure), sales were strong. From talking to other vendors, the key was clearly having new products available. There seemed to be very few new products for Disk Basic, but there were many new products for OS-9 and OS-9/68K. Games sold well, and there was a great demand for new applications and hardware.

By the time you read this, the Pacific North West CoCoFest, held at the end of June, will be over. Upcoming Fests include the Fifth Annual Atlanta CoCoFest, on 1-2 October 1994, and the Fourth Annual 'Last' Chicago CoCoFest, scheduled for 29-30 April 1995.

THE VENDORS

* indicates vendors also covered in the 15 June issue.

AL DAGES/RC SMITH: Al and RC were back once again, with a ton of gently used hardware and software. They are great sources for used and hard-to-find equipment. 4894 Candlewood Ln/Stone Mountain, GA/30088 (404)469-5111 (Al Dages) (404)469-6601 (RC Smith)

ADVENTURE SURVIVORS: Lin and Nan Padgett were back, with solutions to many popular Color Computer Adventures. Can't make it over a bridge? Lost in a maze? Keep getting squished by an Ogre? Whip out your cellular phone, and give them a call. 24 Perthshire Dr / Peachtree City, GA / 30269 (404)487-8461

BARSOFT: KB-Com, for OS-9, was among the selections being offered at this booth by Dave Barnes. PO Box 281 / Lake Villa, IL / 60046 (708)587-9820

***BLACKHAWK ENTERPRISES, INC.** David Graham, who has obtained the rights to produce the MM/1 (and is now shipping), was present with a variety of hardware and software for the MM/1, including a \$15.00 system software upgrade disk for MM/1 owners with WindIO 52.

Also available were paddle boards, a disk with a variety of Joel Hegberg's MM/1 utilities. A complete point-of-sale system by Stanley Scott which included a barcode scanner, a credit card reader, and inventory control was also demonstrated. This system is in use by a commercial establishment.

Bill Wittman's GCal calendar/scheduling program was also available. PO Box 10552 / Enid, OK / 73706-0552 (405)234-2347

BUDGETWARE: The classic TREK game, for the OS-9 Level II and the MM/1 is now available, featuring digitized sound effects. MM/1 Tiles (Mahjong) and Monitor were also available. An early version of a Wolfenstein-style 3d maze game was also demoed. Box 2422 / Omaha, NE / 68103 (402)342-8805

CHICAGO AREA OS-9 USERS GROUP: Local members graciously made their table available to anyone who wanted to display literature, and spent much of the Fest experimenting with a variety of computer equipment. 10 McCarthy / Park Forest, IL / 60466 (708)747-0117

***COLOR SYSTEMS:** Zack Sessions: "What can I say but FANTASTIC!!! It really helps when a vendor has a new product for sale. Of course this puts pressure on the developers to keep coming up with new stuff. Only thing is that it takes a while to come up with something new, as you well know. More attendance than last year, if that is possible. Seemed that way to me, but I am not privy to the specifics."

Zack had K-Windows Chess for the MM/1 available, as well as his X10 Master Control Program for the MM/1 and CoCo3. His older OS-9 game packs and other packages were also available. PO Box 540 / Castle Hayne, NC / 28429 (910)675-1706

***CONNECT:** Rick Uland showed up with a variety of hardware, including his mini-RS232 paks. He mentioned that his FastIO pak, capable of speeds of 57600 bps (and faster) would soon be available. This will mean that proper support of the new high-speed modems will be a reality on the CoCo. 449 South 90th / Milwaukee, WI / 53214 (414)258-2989

***CRYSTAL PALACE BBS:** Nelson Howard was busy showing off the latest incarnation of ACBBS, which now supports RIP (Remote Imaging Protocol) Graphics. This is a text-based script language for displaying on-line graphics. (The RIP standard is freely available on many BBS's. Work has begun on OSK RIP support — any Level II takers?). 2193 D Drive South / East Leroy, MI / 49051 (616)979-9795

DALTRUG: Lee Veal and David Wordell were there representing the Dallas Group. Planet Engine was available, along with a variety of cosmic jewelry, made by Lee's wife. Planet Earth ear-rings, anyone? 8809 Linda Vista / Rowlett, TX / 75088 (214)475-2840 (Evenings)

DELMAR: Ed Gresick was unable to attend, but was represented by Timothy Johns, who, if I'm not mistaken, was the only guy there wearing a tie! (ed.— You're mistaken! So was David Graham!) G-Windows was running on several machines at the show, and literature was available. A preliminary version of Tim's G-Windows terminal program, Magnamaterm, was also shown. PO Box 78 / Middletown, DE / 19709 (302)378-2555

DIGIGRADE PRODUCTIONS: Dave Pellerito: "Finally a vendor am I! Fest after fest it keeps getting better. For the first time I saw it from a developer's view. Let me tell you I'd rather be a regular attendee. I love the fest atmosphere though and that is worth whatever it takes to attend. I opened up with my first product, The Compiler Video Magazine. Everything you'd expect in a quality magazine, with LIVE product demos. I am really excited about this unique new product. I was glad to see so much new software and hardware! Everywhere I turned there was a software solution! And finally I'll be able to pack my Color Computer in a great case. Digigrade is mostly OSK geared but The Compiler Video Magazine has something for everyone." 1325 West Lincoln Hwy / Apt 412-A / DeKalb, IL / 60115 (815)756-7419

DIRT CHEAP COMPUTER STUFF COMPANY: Mark Griffith & Co. were unable to attend due to a scheduling conflict. 1368 Old Hwy 50 East / Union, MO / 63084 (314)583-1168

DISTO: Tony unfortunately was stopped at the border by US Customs, and was unable to attend the Fest. He still has a few 2-Meg boards left, in addition to the rest of the items he normally stocks. Anyone who is interested in a "do-it-yourself" blank board SCII and 4IN1 kit, or an "Everything You Ever Wanted to Know About the 2-Meg Board" booklet should contact Tony. 1710 Depatie / St Laurent, QC / Canada / H4L 4A8 (514)747-4851

***FARNA SYSTEMS / Ken-Ton / Chris Dekker** FARNA was there with a few new items as well as some old. A demo was shown of the "CoCo Family Recorder / OS-9" for Level II. Mention was also made of a new Point of Sale system to be introduced soon. FARNA has also picked up the Ken-Ton dealership, so see them for your hard drive needs. See the 15 June 1994 issue for more details. FARNA - PO Box 321 / Warner Robins, GA / 31099-0321; Chris Dekker - RR #4 / Centreville, NB / Canada / E0J 1H0 (506)276-4841

FAT CAT PUBLICATIONS: Alan Sheltra was unable to attend, although there were rumors that a couple of representatives from the OS-9 Underground were present, taking pictures for an upcoming issue. 4650 Cahuenga Blvd, Ste #7 / Toluca Lake, CA / 91602 (818)761-4135

FRANK HOGGLABORATORIES: Frank Hogg was unable to attend the show, although there was at least one of his KiX machines there. 204 Windemere Rd / Syracuse, NY / 13205 (316)469-7364

GLENSIDE COLOR COMPUTER CLUB OF ILLINOIS: Our host club was busy throughout the fest, solving problems for vendors, selling memberships, and showing an OS-9 Level II point-of-sale system. Thanks, for yet another well-run "Last" Fest. 208 Glen Ellyn Rd #306 / Bloomington, IL / 60108 (708)529-3539

HAWKSOFT: Chris Hawks: "First, it was GREAT (as always) to see new and familiar faces at the "3rd Annual 'Last' Cocofest! These gatherings show that there is still a lot of life left in our community! Enthusiasm ran high, and attendance seemed to be up from last year."

"HAWKSoft was showing only a few new products (as well as the old standbys). For Disk Extended Color Basic, HAWKSoft Home Control. HAWKSoft Home Control allows the old Tandy Plug 'n' Power Controller to be used with the Coco 3. The included Rom-Pak would not run as the graphics modes used were not carried over to the Coco 3. HAWKSoft Home Control is a text based program that allows a Coco 3 to program the controller with 99 separate events controlling up to 256 Plug 'n' Power modules. Once programmed, the controller functions independently of the Coco 3, running your schedule of events. This was our BEST SELLER, and as several buyers remarked 'You should have written this years ago!'"

"For MM/1 users we premiered VCDP the Virtual CDPlayer. (New name. The old name <CDplayer> caused some confusion!) VCDP plays audio CDs on a SCSI CDRom reader, but looks and operates like a component CDPlayer! Also available was a new version of SOUND, our digital sound file recorder/editor/player. SOUND now works with 8SVX sound files and a new version is in the works to support .WAV files." 244 S Randall Rd Suite #172 / Elgin, IL / 60123 (708)742-3084

JOTA PRODUCTIONS: JoTA was representing both itself and Delmar at the Fest. See the Delmar section for more details. PO Box 4657 / Nacogdoches, TX / 75962 (409)560-1876

JWT ENTERPRISES: Jordan Tsvetkoff was busy selling copies of the Up-Times magazine and Nine-Times disk magazine for OS-9. 5755 Lockwood Blvd / Youngstown, OH / 44512 (216)758-7694

KLYSTRONICS: (I have to admit that I have absolutely no idea who these people were, and what the 'inside joke' here is all about. I did try to visit all the booths at the Fest, though. - Colin.)

***NEIL G BROOKINS & CO:** Neil had his Electronic Bible and Concordance program available for a variety of hardware platforms, not just the OS-9/OSK machines. If you need a fast Bible reference, contact them. 491 Bethlehem Pike Apt G-4 / Ft Washington, PA / 19034 (215)542-2348

NORTHERN XPOSURE: The key to success for the vendors is, of course, new products. Towards that end, we had available the just-completed Shanghai: OS-9 port of the Activision Rompak, along with other products that were at the last Atlanta Fest, such as Rusty, Smash!, Thexder: OS-9 and OSTerm 68K for the MM/1.

Two of the authors of Nitro OS-9, Curtis Boyle and Bill Nobel, were also at our booth, and gave two very informative seminars on using Nitro OS-9. They received much valuable feedback from the audience. Also on display was a new 512k SIMM upgrade, which costs less, runs cooler and uses less power than standard upgrades. These are now available. 7 Greenboro Cres / Ottawa, ON / Canada / K1T 1W6 (613)736-0329

THE OS-9 USERS GROUP, INC: Carl Boll: "The Users Group attended the Chicago Fest once again to support OS-9 users in the CoCo/OSK/OS-9000 community once again and held their elections on Saturday night as well while holding a general meeting of the OS-9 Users Group. While there the Group offered memberships and free copies of its newsletter, the MOTD, as well as "official" Microware sandbags (from the flood in 1993) and a white paper from Microware on DAVID (Digital Audio Video Interactive Decoder—software for the set-top boxes mentioned in the 15 March 94 issue of 268'm, p.8). There were officers available at all times to answer questions about the Users Group as well as to accept new membership applications. We hope to be able to offer memorabilia at future shows (such as T-Shirts and such)." 6158 W 63rd St Suite 109 / Chicago, IL / 60638 (312)735-6087

SBUG Andre Lavelle was back, with special prices on Tandy CoCo Software, surplus computer accessories, and other hard-to-find goodies. With a display filling one corner from the floor to (almost) the ceiling, SBUG was hard to miss. 1251 W Sepulveda Blvd #400 / Torrance, CA / 90502-2677 (310)539-9702

STRONGWARE: The Strong's were back, with their collection of games. New was a port of Copy-Cat for the MM/1. Box 361 / Matthews, IN / 46957 (317)998-7558

***SUB-ETHA SOFTWARE:** Lastly (but only because of the alphabet) we have Sub-Etha. Allen Huffman was back with a variety of products for both OS-9 and OSK. CheckBook+ for the MM/1, the Towel disk utility for both OS-9 and OSK, and the OS-9 Multi-boot bootfile selector were among the many products available. PO Box 152442 / Lufkin, TX / 75915 (815)748-6638

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Peripheral Technology Specials

486SLC/33MHz Motherboard w/CPU \$139.00
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CoCo Hard Drives

F.G. Swygart

DISTO's compact SASI/SCSI hard drive controllers.

Disto products have long been heralded as some of the best in the CoCo market. Tony DiStefano has been in the CoCo market for some time now, and his products are good enough that an electronics company in Canada (CRCElectronics) carried the Disto line for a long time (CRC stopped carrying the Disto line in 1992).

Tony was thinking ahead when he first designed his "Super Controller" floppy disk controller in the early eighties. Tandy had introduced the Multi-Pak Interface (MPI) by this time, but Tony had a better idea that allowed more than one device in the cartridge port: the mini-bus.

The Disto mini-bus is an in-line pin connector inside the Super Controller I and II. This allowed a small circuit board to be mounted in the disk controller case, making an MPI unnecessary. One of the more popular items for the mini-bus is a hard disk interface. For those who do use an MPI, a mini-bus adapter board is available. This is simply a PC board that fits an MPI slot and has a mini-bus connector on it.

The Disto hard disk interface (HDI) is available in three forms: the HD II, 3-n-1 (HD, RS-232, RTC), and 4-n-1 (HD, RS-232, RTC, and parallel port). The HD circuitry is the same in all three.

Tony decided to support two types of hard drives: SASI and SCSI. These two interface protocols are very similar. In fact, SCSI is basically an extended SASI interface.

When the Disto HDI was first introduced, there were many hard disk controller boards available as surplus. Most of these were SASI boards, though some supported the SCSI interface. These controller boards were usually mounted in the

hard disk case along with the drive. A cable connected the controller with the computer interface. The hard drive itself was usually an MFM format drive. The controller most often supported two hard drives.

Today, these boards are difficult to find, as they are no longer used in modern PCs. They were mainly used in 1980s CP/M systems and by Tandy with the TRS-80 systems. In fact, the Tandy HDI made for the CoCo was designed to use the 15MB and 35MB TRS-80 drives (the only drives the Tandy drivers would support, which is one reason it was never popular!).

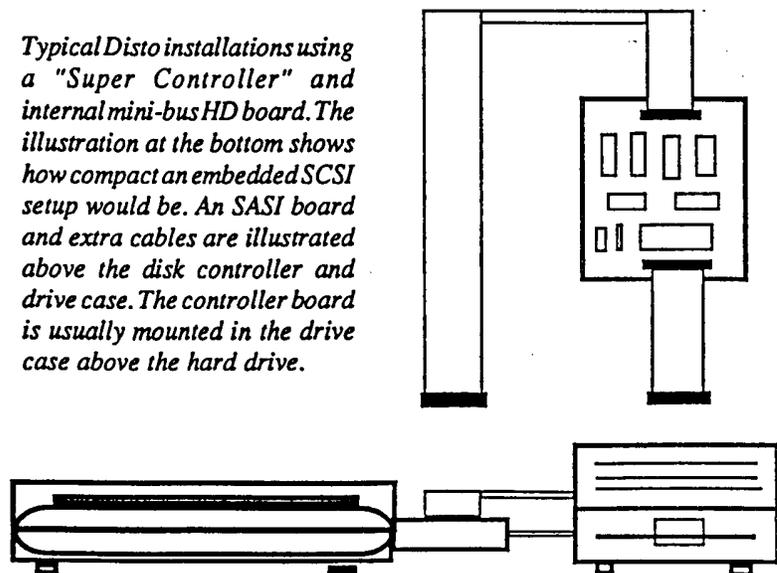
Most drive manufacturers who stood by the SCSI protocol started making the controller part of the drive itself, or "embedded" in the drive. This eliminated the controller board between the drive and computer interface. These drives can be used with the Disto HDI, but only a very basic form of the SCSI protocol is supported, allowing only one embedded controller drive to be connected.

Most SCSI drivers for the CoCo, including the Disto drivers, require an SCSI drive capable of formatting 256 bytes per sector. The only ones known by the author to support this sector size are Rodime 68x series and Seagate "N" series (drive number ends with an "N"; i.e. ST225N) with a ROM revision of 105 or greater (usually manufactured after 1985). One can use a standard PC type drive (512 byte sectors), but the drivers will ignore half of each sector, rendering 50% of the drive capacity useless. If only OS-9 is being used, contact Northern Exposure for Matt Thompson's SCSI-512 driver. This driver works with the Disto, Ken-Ton, and LR-Tech interfaces and formats 512 byte sectors. The entire PC type drive capacity is used, with none being lost.

The Disto HDI is a proven product and very reliable. When used with an embedded SCSI type drive, it is the most compact CoCo hard drive system available.

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Typical Disto installations using a "Super Controller" and internal mini-bus HD board. The illustration at the bottom shows how compact an embedded SCSI setup would be. An SASI board and extra cables are illustrated above the disk controller and drive case. The controller board is usually mounted in the drive case above the hard drive.



NOTE: Although the hard drive and a single floppy are shown mounted in the same case, most users mount two floppies in a case and the hard drive in a separate case, or use a larger case to mount two or more floppies and a hard drive or two.

Upgrading the "512K" Quadram Microfazer Parallel to Parallel Printer Buffers.

One commonly finds at electronic swap meets and flea markets Quadram Microfazer parallel to parallel printer buffers. On opening many of these up, they have two rows of 16 pin DIP sockets. If you populate both rows with 4164 (1 X 64K) DRAMs, they will have a total capacity of 128K. Years ago I picked up one of these for about \$15.

I noticed that the circuit board had silk screened on it the designation "512K buffer". My first assumption was that all I'd need to do was replace the two rows of 64K by 1 DRAMs with two rows of 256K by 1 chips to get 512K capacity. Wrong! The sockets are not wired to support the added address line of the 256K by 1 chips. Indeed, pin 1 (the A8 line) is NOT CONNECTED on the 16 DRAM sockets.

The buffer has an unused 24 pin DIP socket in it. Tracing out what goes to this socket, I found all the address and data lines for the DRAM going to that socket, but none of the lines that went to the *CAS lines of the existing memory chips. Checking further, I found that the *CAS lines on the DRAMs of each bank of 8 chips are hooked to Y0 and Y1 (pins 15 and 14, respectively) of an LS138 address decoder chip. The three ADDRESS lines that controlled that LS138 (A0, A1, and A2 ... pins 1, 2, and 3 respectively) of that decoder chip were also available on that 24 pin socket. Thus, it seems to me that Quadram had a memory upgrade board that utilized a different address decoder and had socket for extra (perhaps larger size) memory chips. This board, of course, is not available today, and I did not want to put money into it back then when I first got that buffer.

I saw that there were six unused outputs of the LS138 address decoder, and that all three address lines for that decoder were used. Thus, I reasoned, if only one could add extra banks of 8 64K DRAMs, selected using pin *CAS (pin 15) of each bank of DRAM via the unused outputs of that LS138 decoder, perhaps one could add extra memory. I bent out pin 15 (*CAS) of eight 4164 DRAMs and

soldered them piggyback on top of another eight 4164 chips. I then wired together all the pin 15's that were bent up, and wired them to the next pin down (Y2 ... pin 13) of the LS138 decoder used to select the other two rows of memory. I then plugged that row of piggybacked chips in to the lower (bank zero) row of DRAM sockets. I left the 8 original chips in the top (bank 1) row. Bingo! The printer buffer tested out as recognizing 192K of memory.

Years ago, I used this information to VERY VERY VERY VERY tediously upgrade one buffer to a full 512K by making sixteen FOUR CHIP HIGH piggybacked 4164 DRAM stacks. Pretty tedious! Each level of DRAM above the first had all their pin 15's sticking out and wired together, and then wired to one of the outputs of the LS138 that did bank selection. I did this quite a number of years ago, when 256K by 1 chips were the standard memory chip used in PC compatibles and were quite expensive. I had bunches of spare 64K DRAMs even back then, so they were free of charge. This half-megabyte size printer buffer has worked reliably for me for the last 7 years. I use it currently with my HP Laserjet IIP (which, thanks to HP's infinite perversity, CANNOT use ANY of its internal 4 megabytes of memory as a printer buffer!!!!) and my 386DX-40 PC compatible.

More recently, I picked up another identical printer buffer at a swap meet for \$10, complete with 128K of DRAM. At this time, I had lying around many dozens of spare 41256 DRAMs chips, which were now totally "obsolete" and selling for 25 cents each or less on the surplus market. I wanted to upgrade this buffer to 512K, too, but did NOT want to spend the time tediously making sixteen four chip high piggyback modules. Now, the address lines on a DRAM chip each do double duty. During the *RAS cycle, they select one internal address line, and during the *CAS cycle they select another. I had no way to use the added address line of the 41256 chip to select

both *RAS and *CAS addresses. This because I did not have available on the circuit board an additional MULTIPLEXED address line of the sort normally used with DRAM chips. BUT... I COULD make that added address on the 41256 chip high or low during *both* RAS and CAS cycles using one of the address lines that originally went to the LS138 decoder. Thus I could use the 256K DRAMs as IF they were 128K DRAMs, with pin 1 selecting which bank of 64K in the chip was being used, and simply NOT USING half of the chip's available memory.

To do this, I CUT the three traces that went to pins 1, 2, and 3 of the LS138 chip. I then jumpered the line that formerly went to pin 3 of the LS138 so that it went to pin 2. I jumpered the line that formerly went to pin 2 of the LS138 so that it went to pin 1. I then GROUNDED pin 3 of the LS138. I wired together all of the pin 1's of the 16 DRAM sockets (they were formerly NOT CONNECTED!), and connected them to the line that formerly went to pin 1 of the LS138.

I now had the LS138 wired to select banks of 128K (instead of banks of 64K), and was using what USED to be the low order address select line of the LS138 chip to make the A8 line of the 41256's either high or low, thereby selecting different parts of the 41256 chips for each of the two 64K banks it was to cover. At this point I put 16 41256 chips into the buffer, and found it tested as having a total of 256K of memory. Remember, each 256K chip is actually being used as a "128K" memory chip!

I constructed sixteen modules consisting of one ordinary 41256 chip and one 41256 chip with its pin 15 bent straight up, soldered piggyback on top of the ordinary 41256 chip. I installed all sixteen of these in the two rows of 8 DRAM sockets, and wired together all 8 pin 15's on each of the two banks. I then wired pin 15 from the upper piggyback chips of bank 0 and bank 1 to Y5 and Y4 (pins 13 and 12) respectively of the LS138 decoder chip whose address lines I had already modified. That decoder chip was

now selecting one of four 128K banks of memory. This worked perfectly, and the buffer tested as having 512K of memory. While making up sixteen two-chip piggyback modules is a little tedious, it's NOTHING compared to making sixteen FOUR CHIP HIGH piggyback modules!

NOTES:

If you try to duplicate this, that this make of printer buffer has TWO LS138 chips. You need to work with the one whose pins 15 and 14 are connected to the *CAS pin (pin 15) of each of the two banks of DRAM sockets.

To make the Microfazer self test its memory size: Have the buffer connected

to a working printer, with the printer ON. The Ready and Copy lights should be on, and the Error light should be out. Push down both the RESET and the PAUSE buttons. Then first release the RESET button, then release the PAUSE button. The Copy light will go out, but the Ready light will remain on. The buffer is now testing its memory. After some period of time (as much as 30 seconds if you have 512K of memory in the buffer) it will PRINT to the printer the total amount of memory it finds. It will continue to test memory again and again and print out how much it find until you press the RESET button. IF it has a problem with

its memory, it will print out information indicating what bit of what chip it has a problem with. Note for reference that data bit D0 comes from chip U8 on the board, and that the first memory bank is the one in the MIDDLE (not at the edge of) the board.

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Comments and questions may be sent in care of 68'Micros or directly to Dr. Goodman at:
1633 Bayo Vista Avenue
San Pablo, CA 94806
E-mail: martygoodman@delphi.com

LATE BREAKING NEWS!

From: Chris Burke <burke@mdd.comm.mot.com>
Subject: Burke & Burke Update
To: Multiple recipients of list COCO <COCO@pucc.princeton.edu>

Burke & Burke has moved, and has not yet reopened for business.

People who have ordered from Burke & Burke in the last three months without receiving their order should assume either:

- a) the order was lost in the move (this applies to verbal and mail orders)
- b) the order is in storage (this applies only to mail orders).

These orders will not be shipped until Burke & Burke reopens or makes alternative arrangements for order fulfillment. Burke & Burke is not processing new or old orders at this time.

No outstanding checks or money orders have been cashed. List subscribers with questions about a specific check or money order sent to Burke & Burke should enquire via private email.

Burke & Burke regrets any inconvenience that this move has caused list subscribers.

Regards,
Chris Burke

Editor: Well, all I can say is that it's about damned time he decided to let someone know something! This was posted on the CoCo Listserv in mid June of 1994. I know TO MANY people who have been trying to get in touch with B & B for at least a year with little or no success! I don't know if anyone should feel good about this belated contact or not... optimism only goes so far!

Joint Press Release: Sub-Etha Software and Blackhawk Enterprises, July, 1994

Sub-Etha Software and Blackhawk Enterprises are pleased to announce additional free software being included with all new MM/1 computer systems.

Sub-Etha's flexible CheckBook+ program will now be included with all new MM/1 computer systems. CheckBook+ is an advanced checkbook balancing program to help out with your finances. Made popular on the Color Computer, CheckBook+ can not only balance your checkbook, but also help you visualize it with many different types of graphs. Search and sort your checkbook database easily, on any field!

Joel Mathew Hegberg has written several public domain programs for the MM/1 computer system, which are available on many information services. Now, he has compiled a collection of his most popular public domain software into a new disk called -Joel Mathew Hegberg+s MM/1 P.D. Anthology Diskette,+ which will be included with all new MM/1 computer systems. Programs which will let you: play popular MOD song files, display a graphical clock, play games, vocally announce the time, display VEF picture files, several screen savers, and much more!

Sub-Etha Software's immensely popular MiniBanners multi-line banner program will also now come standard with all new MM/1 systems. With over

30 fonts included, MiniBanners allows you to create exotic text banners on ANY printer you may own. We even include a font preview program for MiniBanners' fonts.

BlackHawk Enterprises and Sub-Etha Software are pleased to make this software available to new MM/1 owners to help them get started with their computer right away. Existing MM/1 owners who wish to obtain Joel's P.D. Anthology may obtain it through BlackHawk Enterprises for a \$12.50 media/copying/shipping fee. Existing MM/1 owners who wish to obtain CheckBook+ or MiniBanners for K-Windows may obtain it through Sub-Etha Software for \$12.50 (\$10.00 media/copying + \$2.50 S&H). Addresses are listed below.

Sincerely,

Allen C. Huffman, Sub-Etha Software
Joel Mathew Hegberg, Sub-Etha Software
David Graham, BlackHawk Enterprises

BlackHawk Enterprises
P.O. Box 10552
Enid, OK. 73706
(405) 234-2347

Sub-Etha Software
OSK/Midwest Division
936 North Twelfth Street
DeKalb, IL. 60115-2516
(815) 748-6638

Decisions on using OS-9000 in a real-time data gathering environment

One of the side benefits of editing a magazine, even a small specialized one such as "68' micros", is that you can qualify for some of the free trade magazine subscriptions. Unfortunately, almost all are heavily PC (MS-DOS) related. One or two do sometimes mention Motorola processors and the OS-9 (or related) environments. "Personal Engineering & Instrumentation News" (PE) is one of them.

PE is published mainly for "scientists and engineers who use personal computers as technical productivity aids." Among the subjects which may appear in a given issue are operating systems for engineering and scientific applications and embedded controller articles.

In the March 94 issue an article entitled "Realtime criteria dictate design of blood tester" described an automated blood testing system designed by Sanofi Diagnostic Pasteur Inc. (Chaska, MN). The system utilizes a 386SX processor board, several 16 bit I/O cards, and the OS-9000 operating system from Microware.

Why OS-9000?

First, I'll answer another question-- the answer leading directly to why OS-9000 was used. Why not MS-DOS, especially since an Intel 386 processor is used?

The blood testing system must implement many test steps in a short period of time. The test procedures involve a mixture of hardware control, software interfacing, and chemistry. Bluntly, all this exceeds the limits of MS-DOS. Real-time DOS kernels (available from third parties as well as MicroSoft) were rejected due to their inadequate support of required I/O services. Unix and Unix-like OSs were also considered, but rejected due to their high system overhead requirements (drive space and memory), general complexity on the user level, and problems that could occur during a possible system crash (such as a power failure). Anyone with large system experience knows that it takes an experienced operator up to an hour to get a Unix or Unix-like system running again even after the simplest crash. This system needed to be fairly easy to use and reliable.

Enter OS-9000. The entire OS and a realtime graphical interface (Rave) fit

neatly into only eight megabytes of system memory. Crash worthiness of OS-9000 was also a critical factor, since OS-9000 doesn't leave data hanging in a buffer-- it goes straight to disk. The multi-user aspect of OS-9000 also helped. The design team uses a terminal to connect to a serial port on the self-contained blood testing unit to make any software upgrades and to examine the software and data if problems occur. This prevents users from inadvertently causing problems (the user lacks "supre user" rights and cannot directly interact with the operating system, just the programmed interface) yet supplies system technicians with easy system access.

Rave

Rave, Microware's graphical interface system, was also a deciding factor in choosing OS-9000. Rave has built-in support for multimedia, realtime graphics, and Kanji, a Japanese alphabet system. Kanji was deemed necessary since the system was targeted for export to Japan.

The software designers had only one problem with Rave-- the lack of easily making fill-in-the-blank data entry blocks on screen. The team had to program their own toolkit to allow making such forms on screen. Rave does support drawing basic objects on screen, but hopefully a "forms" type fill-in-the-blank data entry interface will be added in the future.

I/O Considerations

OS-9000 uses the protected mode of the 386 processor. This prevents individual processes, several of which may be running at one time, from interfering with each other's heap and stack data. This prevents a loose pointer from overwriting another process' data. This situation can be extremely difficult to debug unless the system is caught in the act... something very hard to do! OS-9000, however, facilitates finding such problems by generating an error if a loose pointer occurs. Also, the address ranges of the I/O cards could be easily isolated from other software processes through the I/O drivers.

The software design team found that configuring the overall process architecture was quite a challenge. This was

due in part to a lack of experience in designing multitasking software. The article described multitasking design as "an evolving art rather than a science".

OS-9000 Bug!

This particular application makes extensive use of OS-9000's timing functions. So much so that during development the system would occasionally lock up (as often as once daily) for no immediately recognizable reason. After thoroughly examining their own code, the design team concluded that the problem could be in OS-9000 itself. Microware sent out a development engineer who found and fixed the problem after a couple days work. This particular application apparently stressed OS-9000's timing functions considerably more than before.

Microware tries its best to make researching OS-9000 as simple as possible. If you have any questions concerning running the OS on a 386SX to 486DX processor, then you may be interested in a free booklet. Call Microware at 1-800-475-9000 (408-980-0201 in California) and ask for a copy of "Questions and Answers for Serious 386/PC Users" for more information.

FEATURES OF OS-9000:

- *Kernal is only 53K and ROMable
- *Pre-emptive realtime multitasking
- *Uses Unix I/O and process models
- *Comes with C compiler
- *Runs DOS applications
- *Optional Ethernet & Client/Server Networking
- *Optional Graphics Support for:
 - X Windows
 - OSF/Motif
 - RAVE

PRICE: \$995.00

Microware Systems Corp.
1900 N.W. 114th Street
Des Moines, IA 50325-7077
1-800-475-9000
(408-980-0201 in California)

headline in Microware ad:
**"Friends Don't Let
Friends Run DOS."**

Operating System -Nine

Rick Ulland

This issue, we thrash about in OS-9's security system.

Is that MultiUser or Multi-user?

OS-9 is advertised as a 'multiuser' system, and indeed it is. When most people hear the word, they envision some number of terminals connected to a powerful mainframe someplace. Truly, there are multiple users on this sort of system, but such a vision misses the point.

Multiuser could also refer to the various people who use a given machine by simply sitting at the console at different times. Each deserves a measure of privacy, and the system needs it's own protection. Not everyone has a hard disk full of National Defense projects, but a clever 9 year old working his way through the manual can be the equal of any secret agent were directory structures and system info is concerned. And is he really printing out his essay or running big sister's 'personal notes' through BannerMaker?

OS-9's system isn't exactly foolproof, but it's certainly unique among machines of it's class, and would take at least moderate level hacking to defeat once set up properly. The game is superuser 0 vs. the public. Each public user can create and destroy his own private directories (given the utilities to do so), and has limited access to public directories created by other public users or the superuser. (Limited by how the author set the public attributes). As you've no doubt occasionally cursed, this scheme extends down to individual files. The superuser, of course, runs rough-shod over all of this. Unfortunately, so does OS-9's raw disk access path (as in /d0@). (Shell+ strips the @ out unless you are superuser- bug fixed.)

The level of protection is left to the system administrator (that's you) and depends mainly on what you leave your users. At the least, potentially damaging commands like format need their CMD\$ directory, containing only the programs public users should be running. It depends on the users- there's no reason a super attr command couldn't be written in almost any language and used to defeat your security, but most users won't be that sophisticated.

Remember, private data directories are secured as well. For example, attr won't change a file the user doesn't have access too, and while deldir could wipe out public writable directories, a single private file in

that directory will stop the process.

The main obstacle to implementing OS-9's multiuser features is Tandy's insistence on splitting OS-9 into extra cost modules. To get the required login and optional tsmon modules, you have to buy a DevPak (#26-3032). Tandy still sells the xeroxed Software Assembly devpak for around \$50. Sometimes CoNect has used ones with the binder etc. for around the same price. If you aren't planning any serious programming, this can seem kind of steep. [If anyone knows of a commercial or freeware login that works well, please send info for posting here.]

The part Tandy didn't sell you is the system module that sets user numbers. Anyone who's set up terminals has seen login work, since tsmon (the terminal monitor) hands off to login when a terminal becomes active. It could just as easily jump directly into a shell, like the CoCo's boot does. We can also reverse that idea, and boot directly into login.

The module to change is cc3go. One of it's many powers is that of invoking the first 3 process. Normally, this will be shell i=/1; startup -p; autoex. We want to change this to shell=/1; startup -p; login. Using ded, it's a simple matter to shuffle this around- in ASCII edit mode, overwrite AutoEx with LogIn (space). Cover the i in the phrase i=/1 with another space, exit edit and write/verify. You could change that ugly all-caps boot message while you're in there! Without ded, use secure.mpc (listing follows) to change most non-nitros9 cc3go files. (As always, cc3go may be either a part of os9boot or a executable file on the boot device's root directory)

What this does is start a superuser shell to run startup and login. It can access files and run programs the user account can't, which may be needed by your boot process. This is potentially dangerous, so unlike most shells, this one is mortal- any error will leave the machine with a

dead console and prevent the clever user from erroring out the boot to get around security. Login itself then invokes a more limited user shell, after verifying the user.

An unfortunate side effect is startup can no longer be used to create additional windows at boot, since these windows will belong to the superuser, and even be present before login runs. Any processes ran from startup also have superuser privileges, and should be chained (ex program) else a simple error will leave a superuser owned shell open. If there is any doubt, run procs. Procs only reports the current user's procedures- worry if any user ID 0 show up (unless you are logged in as 0, of course- then procs shows everybody.)

Login uses the file /dd/sys/password. The superuser must create this file, and it should have no public permissions. It's a simple ASCII text file, with each field separated by commas, and each line ending with a carriage return. Which means you can create and maintain password with anything, since most editors and word processors end lines with carriage returns and certainly don't mind commas.

Each user gets a line, which contains the user's name, password, and user number (0 to 65535). Each line also contains a few fields of startup information for this user, including CPU priority, execution and data directories, as well as the initial program to run- usually shell. The complete line looks like this:
UserName,Password,Priority,ExecDir,DataDir,Program

Usernames and passwords can be anything you want (even nothing, if you want) so long as a 32 character length limit is observed. Anon (or anonymous) is commonly used as a limited access account on publicly accessed machines. If one of your user terminals is really a modem, include this account and point it's data and cmds to a special subdir. In this subdir can be further info, a registration program, perhaps access to the mail system. The usual password is foo, but we can skip it entirely.

If the password field is blank (nothing between the commas), login won't ask

for a password for that user name. Usually, login insists the user enter a name, but if there is an account with a blank username field, it will be used if enter is pressed at the Name? prompt. You could give noname, anon, and anonymous the same user number and startup info and catch most folks who wander into login.

The default exec dir and data dir are dot (just a period between the commas). The manual defines them as /d0 and /d0/cmds, but in fact dot will be whatever is listed in cc3go- often patched to be /h0 and /h0/cmds. Make these anything you want. If junior mainly plays Shanghai, you might want to set his account's initial data directory to /dd/usr/games. If the system has a separate user cmds directory, this is the place to chx them.

And then there is priority. Normally, a user gets an initial 128 (with 255 best). A few programs will change this, but on the whole, a user keeps his starting priority, as specified by /dd/sys/password. On systems with user terminal(s) attached, you may wish to reduce this figure some to speed up the console while the terminal is active. A terminal has it's own speed limitations, so even CoCo's get away with this, but keep it reasonable- a priority of 0 can take 5 seconds to respond to a single keypress!

OS-9 identifies files by user number, but login identifies users by name. Multiple lines with the same user number and password can be used to modify the system the user logs into. For example, one name may start MultiVue while another chds to some obscure data directory to run a custom point of sale system. The user could access all of his data files from either login, since both names have the same user number.

MultiVue behaves oddly when ran from login. You can't specify an initial data directory, which isn't real surprising, but it's other habits are downright quirky.

If multistart is given as the program (in /dd/sys/password), the system behaves oddly, creating two separate MultiVues in the same window. The user account gets clobbered by a second iteration running under the superuser's account- not good.

Using gshell itself as program works better. MultiVue will start correctly, and

run under the correct user number. It stays out of private directories and the shells it spawns also belong to the correct user. There is one problem- if you exit MultiVue correctly it doesn't error! The mortal shell we started at boot still exists, since there has been no error, and it still belongs to the superuser. This is the only easy way I can think of to unstack the process que back before login, and even a simple typo will close the hole- but it exists.

I don't have the code, but the patch could be limited to having gshell report an error (perhaps #2) on exiting. Better-gshell chains an immortal shell under the current user number at exit. Anyone game?

Changing Users

From text shells, all one has to do is type login, then log in as the new user. To leave the machine in a neutral state, a user could log into anon or noname before leaving the console. Simply leaving the console sitting at login's Name? prompt isn't good enough- Erroring login would restart the previous users account. Another alternative is an account that runs a screen blanking program. You could draw it in Basic09 and chain login at any keypress. It will have to run as user# 0 however, so be sure to trap errors.

MultiVue is more difficult. The procedure should be exit MultiVue, type login at shell prompt, log in and prepare to click. In practice, this works, but moves through some dangerous territory in the process. For best security, make users start MultiVue themselves (NOT with multistart!)

A system set up as outlined above will properly handle multiple users. Other than physically replacing the boot disk, (or hitting the bug) there is no easy way for a normal user to get into the system itself, and each is capable of creating secure directories on the same mass media... in other words, multi-user. If you'd like several folks on-line at the same time, that's up to you.

Stupid System Trick:

Say your kid is logged into a user account under MultiVue, and you need to get into a system or private file. Use s

to open the overlay shell, and run login. What you're logging in is the overlay window itself. From there use attr to unlock the file, or modify it directly. ESC kills the new user with the overlay and we go back to the original user account.

Stupid SysAdm Trick:

Hide the old boot disks.

Startup Fix:

This modpatch file can be used to quickly modify your cc3go. If cc3go is still a part of os9boot, it should be removed. Danger! Any problem will cause the boot to fail. Use a backup!

```
Load cc3go; modpatch cc3.mpc;
save cc3go cc3go.
```

```
cc3.mpc
l cc3go
c b9 41 6c
c ba 75 6f
c bb 74 67
c bc 6f 69
c bd 45 6e
c be 78 20
c d5 69 20
v
```

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Comments and questions may be sent in care of 68' micros or directly to Rick at:

Rick Ulland
449 South 90th
West Allis, WI 53214
E-mail is rickuland@delphi.com

DON'T LET YOUR SUBSCRIPTION EXPIRE!

The last issue on your current subscription is on your mailing label after your name.

If "08/94" is after your name, then the August 1994 issue will be your last...

THAT'S THIS ISSUE!!

The plumber is always the guy played in movies who is synonymous with charging an arm-and-a-leg for his services. Of course, the home-owner in the movie always tries to fix the leaky pipe himself, winds up causing much worse damage, and merely prolongs the inevitable call to the plumber. Wow! Just think of the lesson that is reverberated again and again in the countless movies and television shows which use this premise. They drill the moral, "Fixing pipes is for professionals only...don't try this yourself". Talk about great advertising on behalf of plumbers nationwide!!

So what does plumbing have to do with OS-9? Well, to start off this issue's column I thought I'd discuss OS-9's pipes, and what they can do for you. Instead of carrying water, OS-9 pipes carry data from one process to another (or even back to the same process). Best of all, we can tinker with these pipes without worrying about flooding the property or making any costly calls to your local plumber!

Under OS-9/6809, there is only one type of pipe — "unnamed". Under OS-9/68000, we have both "named" and "unnamed" pipes. Unnamed pipes must be inherited by a child process from a parent process. This makes them a little less flexible than named pipes, which can be accessed by any process that knows the pipe's name. Because of this benefit, I'm going to concentrate on named pipes for this issue.

What are these named couriers of bits good for? Plenty, actually. First, they are great for sending messages from one process to another. In the OSK version of my CheckBook+ program, I used BASIC to code the main program (since that was all I knew at the time I wrote the original code). I wanted to get my hands on the mouse data, to make the program more user-friendly, but I only knew how to do so in C. What did I do to pass the mouse data from the C routine back to the main BASIC program? A named pipe, of course!

Secondly, named pipes are wonderful for broadcasting data to any number of processes. This is the idea I would like to illustrate in this issue. There is also a third use that comes to mind... a temporary storage area, like a ram disk. I'll elaborate more on that in the next issue, as it is an extremely useful concept for installation programs.

Here's the concept behind the source code that I'm including here. Let's pretend we're working in an electronic newsroom, where news headlines come in over a live newsfeed.

The newsfeed will be a named pipe (appropriately named "newsfeed"), and it will be filled by a background process called "headlines". Headlines (listing #1) simply makes up randomly generated headlines and feeds them into the newsfeed pipe.

Next, we need a newsfeed reader program. This could simply be the "list" utility ("list /pipe/newsfeed"), but to make this fantasy a little more realistic I'm including source to a program called "news_reader" (listing #2). This program reads in one headline from the newsfeed pipe, displays it on screen, pauses for 2 seconds, and then repeats the process forever. If you run news_reader when headlines isn't currently running, news_reader will report the newsfeed is down. Additionally, if the newsfeed pipe ever becomes empty (which happens a few seconds after you kill the "headlines" process), news_reader will report the newsfeed has gone down.

What's so neat about this concept? Remember I said "named pipes are wonderful for broadcasting data to any number of processes." So, if you have a multi-window windowing system or a spare terminal hooked up to your computer, simply start the "headlines" program running in the background by typing "headlines&" from the OS-9 shell. Then, run "news_reader" on a couple different windows or terminals and you will see that the headlines program can supply data for all copies of news_reader running. If you kill the headlines program, after a few seconds both news_reader programs will report the newsfeed has gone down. The reason for the delay is the pipe is buffered by 90 bytes, so the news_reader program(s) will continue to run until the pipe has been emptied.

A practical application for this may be a robot program that takes commands from a named pipe and executes them. A management program could be written to send commands to the robot programs via the named pipe. But each command takes time to execute, and in the meantime additional commands from the management program might be piling up in the named pipe. Simply run additional copies of the robot program in the background, and each one will take turns answering the management program's commands. And if one is busy taking care of a previous command, another robot can concurrently grab the next command and execute it.

Listing # 1: headlines.c

```

=====
#include <stdio.h>
#include <modes.h>
#include <errno.h>

/* Below are the words to make random
headlines from... */
/* Feel free to add more if you like. */
char *noun[]=
{
    "The President ",
    "Microwave ",
    "An OS-9 computer system ",
    "Stocks ",
    "Prisoners ",
    NULL
};

char *verb[]=
{
    "dropped ",
    "escaped ",
    "ran ",
    "left ",
    "announced ",
    NULL
};

char *object[]=
{
    "a new software product.",
    "for re-election.",
    "from the county jail.",
    "10 points.",
    "for vacation.",
    NULL
};

int num_nouns,num_verbs,num_objects;
char sentence[80];

main()
{
    int pipepath;

    /* Create the pipe file. */
    pipepath=creat("/pipe/
newsfeed",S_IWRITE);
    if (pipepath== -1)
    {
        fprintf(stderr,"Can't open named
pipe.\n");
        exit(errno);
    }

    /* Count how many nouns, verbs, and
objects. */
    for(num_nouns=0;noun[num_nouns];

```

```

num_nouns++;
    for(num_verbs=0;verb[num_verbs];
num_verbs++);
    for(num_objects=0;object[num_objects];
num_objects++);

    /* This loop will run forever. */
    while(1)
    {
        strcpy(sentence,noun[rand(num_nouns)-
1]);
        strcat(sentence,verb[rand(num_verbs)-
1]);
        strcat(sentence,object[rand(num_objects)-
1]);
        strcat(sentence,"\n");
        writeln(pipepath,sentence,80);
    }
}

static rndval=4444;

/* rand( val ): return a pseudo-random value
between 1 and val.
**      IF val is negative, it is used as a
seed.
*/
rand( val )
int val;
{
    int bit0, bit1, bit14, num, i;

    /* see if -1 */
    if ( val < 0 )
        rndval = -val;

    for ( i = 0; i < 10; i++ )
    {
        bit0 = rndval & 1;
        bit1 = (rndval & 2) >> 1;
        bit14 = bit0 ^ bit1;
        rndval >>= 1;
        rndval |= (bit14 << 14);
    }
    num = rndval % val;
    return( num ? num : val );
}

```

Listing #2: news_reader.c

```

=====
#include <stdio.h>
#include <modes.h>
#include <errno.h>

#define STDOUT 1

char sentence[80];

main()
{
    int pipepath,length;

    /* Attempt to open the pipe file */

```

```

        pipepath=open("/pipe/
newsfeed",S_IREAD);
        if (pipepath==-1)
        {
            fprintf(stderr,"Sorry, the newsfeed is
down!\n");
            exit(errno);
        }

        /* This loop runs forever... */
        while(1)
        {
            /* read the next headline */
            length=readln(pipepath,sentence,80);
            if (length<=0)
            {
                fprintf(stderr,"\n** Sorry, the
newsfeed has gone down! **\n\n");
                exit(errno);
            }

            /* print the headline */
            writeln(STDOUT,sentence,80);

            /* Pause for 2 seconds */
            sleep(2);
        }
}

```

One problem a few MM/1 programmers have asked me about is how to load and play sounds under K-Windows. At first I thought the problem may be playing the sounds, but as it turns out the confusion appears to lie in loading the sound and memory management.

First, let me say I will be assuming the sounds you want to play are in .iff format. Unfortunately, I have been unable to come by the exact file specifications of this format, but I do know the first 40 bytes are header information, while the rest of the file is the raw, digitized sample. Secondly, I will also be assuming you know the sample rate to play back the digitized sample (or can find out by trial-and-error). Somewhere within the first 40 bytes of .iff header data is this information for you, however I cannot seem to find it, and it appears some digitizing programs omit this information. (If anyone knows about the sample-rate information, please drop me a note!) Finally, I assume you are using K-Windows and have the cgfx.1 library with necessary C header files.

C is a great language for this problem since it easily allows dynamic allocation and deallocation (and even reallocation) of memory. This means "memory as you need it" or "memory to order." What our sound-playing program needs to do is allocate memory for the sound, load the sound, play the sound, and finally deallocate the memory. How much memory do we need to allocate?

We have to get the file-size and then subtract the number of header-info bytes. Piece of cake under OS-9! Listing #3 shows how to do this for a stereo sound file. Note that the K-Windows _ss_play() function assumes the data you are playing is in stereo.

Listing #3: playsnds.c

```

=====
#include <stdio.h>
#include <modes.h>
#include <sound.h>

#define STDOUT 1
extern unsigned char *malloc();

unsigned char *sound;
int size;

main(argc,argv)
int argc;
char *argv[];
{
    int dpath,sample_rate;

    if (argc!=2 && argc!=3)
    {
        fprintf(stderr,"PlaySnds <sndfile>
(sample_rate)\n");
        fprintf(stderr," If sample_rate is
omitted, 16000 Hz is used.\n");
        exit(0);
    }

    if (argc==3)
    {
        sample_rate=atoi(argv[2]);
        if (sample_rate<4000 ||
sample_rate>32000)
        {
            fprintf(stderr,"Sample_rate
invalid!\n");
            exit(0);
        }
    }
    else sample_rate=16000; /* default */

    dpath=open(argv[1],S_IREAD);
    size=_gs_size(dpath)-40;

    /* allocate memory */
    sound=malloc(size);
    if (sound==(unsigned char *)NULL)
    {
        fprintf(stderr,"Can't allocate
memory!\n");
        exit(0);
    }

    /* skip past the header bytes */
    lseek(dpath,40,0);

    /* read in the sound data */

```

```
read(dpath,sound,size);
close(dpath);
```

```
/* play the sample */
_ss_play(STDOUT,sound,size,sample_rate,
SND_NOSIG,0);
```

```
/* release memory */
free(sound);
}
```

What if you need to playback a sound not recorded in stereo (mono)? There are now two techniques to play your sound back in mono. The technique that has been used until recently has been to take the mono sound data and convert it to a stereo sample. This is easily accomplished by duplicating each byte of digital sound so each speaker (left & right) is playing the same data. There are some downsides to this technique. First, it takes time to convert the sample. Second, your requested memory buffer must be twice as large as the sample due to the mono-to-stereo conversion. This technique takes just a few changes in the program.

The first change is we need twice the amount of memory to store our sound sample. This can be done by changing the line

```
size=_gs_size(dpath)-40;
```

```
to
size=(_gs_size(dpath)-40)*2;
```

However, although we need twice the amount of memory, we aren't loading twice the amount of sound-data in from the disk file! So, change the read statement from

```
read(dpath,sound,size);
```

```
to
read(dpath,sound,size*2);
```

Next, we need a routine to duplicate each byte of sound data. Since the sound data has been loaded into the beginning of our memory buffer (leaving a gap at the end of our allocated memory), we must work backwards to duplicate the sound data or else our routine will overwrite sound data and become a mess. Add the following lines after the close(dpath) statement.

```
for (ptr1=sound+size/2-1,
ptr2=sound+size-2; ptr1>=sound; ptr1--
,ptr2-=2)
*ptr2=*(ptr2+1)=*ptr1;
```

To get the above lines to work, you will need to add ptr1 and ptr2 to your program's variable lists. They are unsigned character pointers, so define them as:

```
unsigned char *ptr1,*ptr2;
```

Just so you can be sure about the changes, Listing #4 shows the modified source code (without comments).

Listing #4: playsndm.c

```
=====
#include <stdio.h>
#include <modes.h>
#include <sound.h>

#define STDOUT 1
extern unsigned char *malloc();

unsigned char *sound,*ptr1,*ptr2;
int size;

main(argc,argv)
int argc;
char *argv[];
{
    int dpath,sample_rate;

    if (argc!=2 && argc!=3)
    {
        fprintf(stderr,"PlaySndm <sndfile>

        (continued on page 22)
```

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:

Joel Mathew Hegberg
932 N. 12th Street
DeKalb, IL 60115

Delphi : JOELHEGBERG
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The CoCo Registry

The CoCo Community has supported the CoCo well over the last few years. Various clubs and small businesses continue support, but there is a need for some centralization.

Rick Cooper is making an effort to offer some centralization to all CoCo users and vendors. His "CoCo Registry" project is a database of user information that will be available to vendors and the public for a nominal fee of \$15. The database will require an 80 column monitor on a CoCo 3 and at least one disk drive.

Please send Rick a letter thoroughly describing your system. Include model (1,2,3), memory, monitor and drive types, number of drives, organizations/publications you belong/subscribe to (including on-line services), and accessories (printers, joysticks, etc.). Also include a full name, address, phone number, and E-mail address if applicable.

This database can be used by vendors to reach customers and know how many users are out there. Individuals can keep in touch with other users and possibly find others in their area with similar setups.

FARNA Systems and this magazine, as well as all other CoCo supporting publications and most vendors, wholly support this project. I have sent information to Rick from the recent survey cards already, so if you returned your card before 15 June 94, there is no reason to write. If not, please do and make sure your name is in this valuable database!

Send info to:

The CoCo Registry
P.O. Box 276
Liberty, KY 42539

The first issue should be completed by late August this year. I'll keep all posted!

The Great Survey

F.G. Swygert

Results of our reader survey

Well, the results are in! A whopping 37% of all subscribers answered the survey. Typical response to this type of survey is 25%, so "we" did really good! Note that all of the results won't add up to 100%. I added each answer separately then figured the percentage based on the total number of responses. So the percentage shown is the percentage of respondents. Many answered positive to more than one question in an area also (i.e., a person who owns an MM/1, CoCo 3, CoCo 2, and MS-DOS machine).

Survey Results:

Total Respondents: 37% of subscribers

CoCo 2 Users	25% (most are secondary systems)
CoCo 3 Users	57%
Delmar Systems	10%
PT68K	2% (other than Delmar)
MM/1	5%
KiX/30	5%
Intel based	50%
Macintosh	3%
Other	4%

Operating System Usage

	70-100%	41-69%	Under 40%	NONE
Disk BASIC	17%	9%	30%	20%
OS-9 (CoCo)	23%	11%	31%	12%
OS-9/68K	5%	3%	4%	29%
OS-9000	2% (total users)			
G-Windows	7% (total users)			

Primary System Memory

64K	2%
128K	23%
512K	43%
1-5MB	23%
Over 5MB	9%

Types of Drives Used:

	35T/SS	40T/DS	720K 5.25"	720K 3.5"	1.2MB	1.44MB	2.88MB
With Primary Systems	13%	38%	11%	11%	7%	20%	3%
With CoCo	13%	52%	10%	14%	1%	3%	N/A

< 268'm >

Whereas `getchar()` and `printf()` will get characters from the keyboard and print to the screen (the 'standard' input/output), we can ask other functions available in the C-library (and ones we write ourselves) to communicate with a file on disk. Consider the excerpt:

```

1 main(number,name)
2 int number;
3 char *name[];
4 {
5 FILE *fp,*fopen();
6 fp=fopen(name[1],"r");
7 if (fp == NULL) {
8     printf("\nSorry, can't open
%s",name[1]);
9     exit(0);
10 }
11 /* rest of program goes here */

```

The above program is expected to read a file on disk. We compile/link the program, giving it the name read. Then we type: read letter. The arguments to `main()` are the number 2 and the ARRAY of POINTERS (`name[]`) pointing to the strings: read and letter.

```

2 int number;
3 char *name[];

```

We declare the two arguments of `main()` to be `int` and `char *`. In our example, `number` will have the value 2 and `name[0]` will be a pointer to the string read and `name[1]` will point to letter. Now we are ready to begin { our `main()` program

```

2 int number;
3 char *name[];
4 {
5 FILE *fp,*fopen();

```

To open a disk file, we use `FILE` which calls upon the C-library to look after the mechanics of communicating with the operating system in order to access the disk. After `FILE` come two pointers (we know they're pointers because of the * ..right?). Of course, if we intend to use the C-library, we had better #include it!

```

0 #include <stdio.h>

```

`fp` is a pointer variable which points to a `FILE`. `fopen()` is a function which returns a pointer to a `FILE`.

```

5 FILE *fp,*fopen();
6 fp=fopen(name[1],"r");

```

This calls upon the `fopen()` function to open a file. The pointer to the file (which is returned by `fopen()`) is assigned to `fp`. The "r" means that access to the file is for "r"eading (as opposed to "w"riting or "a"ppending). How do we tell `fopen()` the name of the file which we want to open...? `name[]` is an ARRAY of pointers, each

pointing to a string. When we typed read letter, we passed to our `main()` program the two strings read and letter. Now the pointer `name[0]` points to read and `name[1]` will point to the string letter... so we give the name of the file to `fopen()`, namely `name[1]`.

```

6 fp=fopen(name[1],"r");
7 if (fp == NULL) {
8     printf("\nSorry, can't open
%s",name[1]);
9     exit(0);

```

The function `fopen()` is clever. If it can't open the file for some reason (beer-on-the-disk) it returns a `NULL` pointer. We check, in Line 7, IF `fp` is EQUAL (`==`) to `NULL`. If so, we apologize (Line 8) and exit the program (Line 9).

```

7 if (fp == NULL) {
8     printf("\nSorry, can't open
%s",name[1]);
9     exit(0);

```

In Line 8 we `printf` `name[1]` as a `%string` (of course). The `exit(0)` (in Line 9) is new. It will exit our `main()` and return you to the operating system (e.g. DOS). (It also closes any open files). NOTE: We give to `fopen()` the string which `name[1]` points to, and we also give it to `printf()` (namely letter, in this example).

```

1 main(number,name)
2 int number;
3 char *name[]
4 {
5 FILE *fp,*fopen();
6 fp=fopen(*name[1],"r");
7 if (fp == NULL) {
8     printf("\nSorry, can't open
%f",name[1]);
9     exit(0);
10 }
11 /* now we read from the file */
12 char c;
13 while ( (c=getc(fp)) != EOF )
14     printf("%c",c);
15 }

```

Now we declare a `char c` (Line 12) and continually `getc()` from the file which we opened (in Line 6). Reference to this open file is via its file pointer `fp` ... hence we used `getc(fp)` to tell the `getc()` function which file to get the next char from. (`getc()` is in `stdio.h`). We (in this example) `printf()` the `~%char` to the screen, while `c` is NOT EQUAL (`!=`) to the EOF character (which should indicate End Of File ..if all goes well ..).

How many errors are in the above program? There are four! Line 3 needs a semi-colon!

```

3 char *name[]

```

Line 6 should give `name[1]` to `fopen()`, NOT `*name[1]`.

```

6 fp=fopen(*name[1],"r");

```

Line 8 needs a `%string` format, NOT a `%float`!

```

8     printf("\nSorry, can't open
%f",name[1]);

```

....and we need to #include `<stdio.h>` as Line 0

```

0 #include <stdio.h>
1 main(number,name)
2 int number;
3 char *name[];
4 {
5 FILE *fp,*fopen();
6 fp=fopen(name[1],"r");
7 if (fp == NULL) {
8     printf("\nSorry, can't open
%s",name[1]);
9     exit(0);
10 }

```

Let's begin with this introduction (...same as before, but with bugs removed!) and continue with a program which will read a file on disk and count the number of times the letters 'a' through 'z' occur.

We'll compile/link the program under the name `count` and we will type `count sam` to count the letters 'a'-'z' in a file called `sam`.

```

char c; /* characters from file */
int n[26], i; /* count for each letter */
for (i=0; i<26; i++) n[i]=0; /* counts set to zero */
for (i=0; i<1000; i++) { /* go thru 1000 chars */
    c=getc(fp); /* get a char from file */
    if (c>='a' && c<='z') { /* is it between a & z? */
        n[c-'a']++; /* yes? increment count */
    } /* end of if */
} /* end of for */
printf("\nIn the file %s : ",name[1]);
/* print file name */
for (i=0; i<26; i+=2) /* go thru alphabet */
    printf("\n %c %s %3d %s :
%c %s %3d %s", /* a format string */
    'a'+i, "occurs ",n[i], " times",
/* print letter and */
    'a'+i+1, " occurs ",n[i+1],
times"); /* count for each letter */
} /* end of main() */

```

Here we declare some stuff, notably the ARRAY `n[26]` which will hold the number of times each of the 26 letters from 'a' to 'z' occur ...hence it's an integer ARRAY.

```

char c; /* characters from file */
int n[26], i; /* count for each letter */
for (i=0; i<26; i++) n[i]=0; /* counts set to zero */

```

Here we set all the integers in the ARRAY to 0 ..you can never tell what garbage might be in those memory locations!
for (i=0;i<26;i++) n[i]=0; /* counts set to zero */
for (i=0;i<1000;i++) { /*go thru 1000 chars*/

```
c=getc(fp); /* get a char from file */
if (c>='a' && c<='z') { /* is it between a & z? */
```

Now we go through 1000 characters in the file and getch(fp) each one, giving the file pointer fp to the library function getch() and getting in return a character c which we check to see if it's GREATER or EQUAL to the character 'a' AND (&&) if it's LESS or EQUAL to the character 'z'.

```
for (i=0;i<1000;i++) { /*go thru 1000 chars*/
```

```
c=getc(fp); /* get a char from file */
if (c>='a' && c<='z') { /* is it between a & z? */
```

```
n[c-'a']++; /* yes? increment count */
```

If we get a character between 'a' and 'z' we increment the appropriate member of our ARRAY n[]but how ??

Now c is a (single) byte in memory, containing the 'value' of the character. This 'value' would be 65 for an 'a' and 66 for a 'b', etc. (in ASCII). If the 'value' of the character returned by getch() were 69 (for example) then we must have an 'e' and we would increment n[4] (which holds the number of times an 'e' occurs). BUT, the 'value' of c minus the 'value' of 'a' is 69-65=4... that is, c-'a' has the 'value' 4. So we increment n[c-'a'] (which WILL increment n[4]).

```
n[c-'a']++; /* yes? increment count */
} /* end of if */
} /* end of for */
```

Now we end the if and the for. The numbers in the ARRAY n[] will give us what we want.

```
} /* end of if */
} /* end of for */
printf("\nIn the file %s : ",name[1]);
/* print file name */
```

Now (just for kicks) we print the name[1] of the file we opened...

```
printf("\nIn the file %s : ",name[1]);
/* print file name */
for (i=0;i<=24;i+=2) /* go thru alphabet */
```

Now we go through all 26 letters (and all 26 'counts' stored in the ARRAY n[] but two-at-a-time (which is why we used i+=2 which adds 2 to i each time through the loop.

```
for (i=0;i<=24;i+=2) /* go thru alphabet */
printf("\n %c %s %3d %s :
%c %s %3d %s", /* a format string */
'a'+i, " occurs ",n[i], " times",
```

```
/* print letter and */
'a'+i+1," occurs ",n[i+1],
times"); /* count for each letter*/
```

Now we print each letter as a %character, giving to printf() the numbers 'a'+0, then 'a'+1, then 'a'+2, etc. (meaning, the ASCII 'values' 65 then 66 then 67 etc.). We also print n[0], n[1], n[2] etc., which are the various 'counts' (for an 'a', 'b', 'c', etc.).

```
printf("\n %c %s %3d %s : %c %s %3d %s",
/* a format string */
```

Note that we choose (for variety) to specify a format which says to print: First a %character then a %string then a %decimal (field width 3) then another %string. printf("\n %c %s %3d %s : %c %s %3d %s", /* a format string */

...and we do this TWICE (before we go to a \newline) which is why we increased i by 2 each time through the loop (as in i+=2).

```
printf("\n %c %s %3d %s :
%c %s %3d %s", /* a format string */
'a'+i, " occurs ",n[i], " times",
/* print letter and */
```

```
'a'+i+1," occurs ",n[i+1],
times"); /* count for each letter*/
```

This is one of the TWO printouts on each line of the screen: First the %character (as 'a'+i) then the %string (" occurs ") then the %decimal (n[i]) with field width 3, then the %string " times".

```
'a'+i, " occurs ",n[i], " times",
/* print letter and */
'a'+i+1," occurs ",n[i+1],
times"); /* count for each letter*/
} /* end of main() */
```

...and this (would you believe) is the end of main()! (We really should provide that 4-space indent!)

For the program we just wrote (called count.c, before it was compiled and linked) we get:

```
A>count count.c
In the file count.c :
a occurs 18 times : b occurs 3 times
c occurs 19 times : d occurs 4 times
e occurs 32 times : f occurs 22 times
g occurs 3 times : h occurs 9 times
i occurs 25 times : j occurs 0 times
k occurs 0 times : l occurs 5 times
m occurs 11 times : n occurs 31 times
o occurs 19 times : p occurs 9 times
q occurs 0 times : r occurs 23 times
s occurs 9 times : t occurs 22 times
u occurs 7 times : v occurs 0 times
w occurs 1 times : x occurs 1 times
y occurs 2 times : z occurs 3 times
for (i=0;i<=24;i+=2) /* go thru alphabet */
```

```
printf("\n %c %s %3d %s :
%c %s %3d %s", /* a format string */
'a'+i, " occurs ",n[i], " times",
/* print letter and */
```

```
'a'+i+1," occurs ",n[i+1],
```

```
times"); /* count for each letter*/
```

The mechanism for printing two-to-a-line is awkward (!) We really want to let i go from 0 to 25 and, each time i is exactly divisible by 2, printf a \newline. This 'exact divisibility' can be tested by dividing by 2 and checking if the remainder is zero. To get the remainder, when i is divided by 2, we use: i%2 (which gives this remainder!).

```
for (i=0;i<26;i++) /* go thru alphabet */
if (i%2==0) printf("\n"); /*
newline if i%2==0 */
printf("\n %c %s %3d %s", /* a format string */
```

```
'a'+i, " occurs ",n[i], " times");
/* print letter count */
```

Much nicer code, since we can easily print 3 or 4 to a line by changing the number 2.

That's all folks!
au revoir!

P.J.Ponzo
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< 268'm >

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Basic09 In Easy Steps

Chris Dekker

DECB, Basic09, and MS-DOS Qbasic conversions!

Remember the program listing I gave in the last issue? Did you wonder why the variables had such little meaning/hard to remember names? Well the truth is that I did not write the original program. The original is a MSDOS Qbasic listing I came across in a magazine. I am not sure whether there are actually a lot of this sort of programs out there written in Basic09, but I do know that there are books full (literally) of MSDOS basic programs and I presume a good deal of DECB programs as well that are worth converting to Basic09. So that is what we are going to do this time.

I have included listings of a MSDOS basic and DECB program that will draw the exact same picture as the listing in the last issue (1000 circles in a pattern). In these programs I have kept all variable names equal which makes it easier for you to compare the listings.

The MSDOS program is written in Qbasic. If you use (or have listings) in an older version of MSDOS basic you may have to change some statements. Since the older MSDOS basics look a lot like DECB this shouldn't be a really big problem. Later on we will discuss some of the finer points of the conversion, most notably the screen types and the WINDOW function of Qbasic.

DECB listing:

```
5 POKE 65497,0
10 HSCREEN 4
15 PALETTE 0,0: HCOLOR 1,0
20 P=10:DIM R(P),X(P),Y(P),Z(P)
30 C=.5 :E=SQR(C)
40 FOR I=0 TO P:READ COL(I):NEXT I
50 DATA 0,9,1,10,2,12,4,14,9,1,10,2,12,4,14
60 X=0:Y=1:M=0:G=0:R=C
100 IF G>=P THEN 150
110 M=M+1: G=G+1: GOSUB 200
120 X=X1: Y=Y1: R=E*R
130 X(M)=X2: Y(M)=Y2: Z(M)=G: R(M)=R
140 GOTO 170
150 X=X(M): Y=Y(M): G=Z(M): R=R(M)
160 M=M-1
170 IF M>-1 THEN 100
180 POKE 65496,0:END
200 X1=C*(X-Y+1)-1: Y1=C*(X+Y+1)
210 X2=C*(X+Y-1)+1: Y2=C*(-X+Y+1)
220 X3=320+X1*640/4.8
230 Y3=116-Y1*192/3.6
240 X4=320+X2*640/4.8
250 Y4=116-Y2*192/3.6
260 HCIRCLE (X3,Y3),130*R,COL(G)
270 HCIRCLE (X4,Y4),130*R,COL(G)
280 RETURN
```

Qbasic listing

```
SCREEN 12:CLS
P=10 : DIM R(P),X(P),Y(P),Z(P)
C=.5 : E=SQR(C)
WINDOW (-2.4,-1.2)-(2.4,2.4)
FOR I=0 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
DO
IF G<P THEN
M=M+1 : G=G+1 : GOSUB trafo
X=X1 : Y=Y1 : R=E*R
X(M)=X2 : Y(M)=Y2 : Z(M)=G :
R(M)=R
ELSE
X=X(M) : Y=Y(M) : G=Z(M) : R=R(M)
M=M-1
END IF
LOOP UNTIL M<0
END
trafo:
X1=C*(X-Y+1)-1 : Y1=C*(X+Y+1)
X2=C*(X+Y-1)+1 : Y2=C*(-X+Y+1)
CIRCLE (X1,Y1),R,COL(G)
CIRCLE (X2,Y2),R,COL(G) RETURN
```

I am not going to go through the listings line by line. If you put the three side by side you can see the likeness and differences for yourself. I do however want to draw your attention to a number of things.

First of all you can see that Basic09 has a different way of DIMensioning it's variables. It doesn't take kindly (in fact not at all) to the way you can dimension variables in DECB and Qbasic. You must give it solid numbers to work with. I added the BASE 0 in Basic09 so I could keep the equations inside the program comparable to those in the other programs. This also causes the addition of the 11th record for some variables. If you omit these steps you will keep getting error 55 messages.

I know it seems that Basic09 is unnecessarily picky in these areas but you must keep two things in mind. One is that if you write your own programs you don't have to add a BASE 0 and extra records to make your program work. Secondly once you get your basics straight you will spend a lot less time tracking down errors when debugging your programs.

Now screen types. If you want to convert a graphics program you must first find out what type of screen the original uses, then try to find a screen type that (closely) matches the original and then set up that screen.

Keep in mind that for conversions from

DECB to Basic09 both programs will be running on the same hardware and therefore you only have to match the correct window type to the HSCREEN number. Conversions from MSDOS are a little more difficult since there is a greater variety of screens available some with much higher resolutions. This means that you may have to rewrite some of the formulas. On the other hand the final results usually don't look a whole lot different on a monitor, just don't send them to a laser printer.

Following is a short list of the various screen types you can encounter and how they are defined:

screen	Basic09	DECB
640x192 2 color	type 5	HSCREEN 3
320x192 4 color	type 6	HSCREEN 1
640x192 4 color	type 7	HSCREEN 4
320x192 16 color	type 8	HSCREEN 2
40 column text	type 1	WIDTH 40
80 column text	type 2	WIDTH 80

Qbasic

40/80 column text	SCREEN 0
320x200 16 color	SCREEN 1/7
640x200 16 color	SCREEN 2/8
720x348 2 color	SCREEN 3
640x400 2 color	SCREEN 4
640x350 16/64 colors	SCREEN 9
640x350 2 color	SCREEN 10
640x480 <256K colors	SCREEN 11/12
320x200 <256K colors	SCREEN 13

Whether one or more of these modes is available on an MSDOS computer or not is determined by the graphics adapter installed and/or the amount of memory it has available. It should, however, give you an idea of what type of screen a program expects.

As you may or may not know Basic09 and DECB do not include a WINDOW command. This is a command that is supported by Qbasic and other basics for MSDOS and it is frequently used in graphics programs. So if you don't know what it does it is hard to get the program running.

WINDOW is actually a scaling function. It defines a rectangle that is scaled up or down by basic to fill the entire screen. For instance, you have a program that only outputs values between 0 and 1 for both X and Y (a certain point being defined as X,Y) and you use the following commands: SCREEN 12 : WINDOW (0,0)-(1,1). If the program now generates the values 0,0 a point at 0,0 will be set; however if the program generates the values 1,1 this will be translated into screen coordi-

Basic09 In Easy Steps

Chris Dekker

DECB, Basic09, and MS-DOS Qbasic conversions!

Remember the program listing I gave in the last issue? Did you wonder why the variables had such little meaning/hard to remember names? Well the truth is that I did not write the original program. The original is a MSDOS Qbasic listing I came across in a magazine. I am not sure whether there are actually a lot of this sort of programs out there written in Basic09, but I do know that there are books full (literally) of MSDOS basic programs and I presume a good deal of DECB programs as well that are worth converting to Basic09. So that is what we are going to do this time.

I have included listings of a MSDOS basic and DECB program that will draw the exact same picture as the listing in the last issue (1000 circles in a pattern). In these programs I have kept all variable names equal which makes it easier for you to compare the listings.

The MSDOS program is written in Qbasic. If you use (or have listings) in an older version of MSDOS basic you may have to change some statements. Since the older MSDOS basics look a lot like DECB this shouldn't be a really big problem. Later on we will discuss some of the finer points of the conversion, most notably the screen types and the WINDOW function of Qbasic.

DECB listing:

```
5 POKE 65497,0
10 HSCREEN 4
15 PALETTE 0,0: HCOLOR 1,0
20 P=10: DIM R(P),X(P),Y(P),Z(P)
30 C=.5 :E=SQR(C)
40 FOR I=0 TO P: READ COL(I): NEXT I
50 DATA 0,9,1,10,2,12,4,14,9,1,10,2,12,4,14
60 X=0: Y=1: M=0: G=0: R=C
100 IF G>=P THEN 150
110 M=M+1: G=G+1: GOSUB 200
120 X=X1: Y=Y1: R=E*R
130 X(M)=X2: Y(M)=Y2: Z(M)=G: R(M)=R
140 GOTO 170
150 X=X(M): Y=Y(M): G=Z(M): R=R(M)
160 M=M-1
170 IF M>-1 THEN 100
180 POKE 65496,0: END
200 X1=C*(X-Y+1)-1: Y1=C*(X+Y+1)
210 X2=C*(X+Y-1)+1: Y2=C*(-X+Y+1)
220 X3=320+X1*640/4.8
230 Y3=116-Y1*192/3.6
240 X4=320+X2*640/4.8
250 Y4=116-Y2*192/3.6
260 HCIRCLE (X3,Y3),130*R,COL(G)
270 HCIRCLE (X4,Y4),130*R,COL(G)
280 RETURN
```

Qbasic listing

```
SCREEN 12: CLS
P=10: DIM R(P),X(P),Y(P),Z(P)
C=.5 :E=SQR(C)
WINDOW (-2.4,-1.2)-(2.4,2.4)
FOR I=0 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
DO
IF G<P THEN
M=M+1: G=G+1: GOSUB trafo
X=X1: Y=Y1: R=E*R
X(M)=X2: Y(M)=Y2: Z(M)=G: R(M)=R
ELSE
X=X(M): Y=Y(M): G=Z(M): R=R(M)
M=M-1
END IF
LOOP UNTIL M<0
END
trafo:
X1=C*(X-Y+1)-1: Y1=C*(X+Y+1)
X2=C*(X+Y-1)+1: Y2=C*(-X+Y+1)
CIRCLE (X1,Y1),R,COL(G)
CIRCLE (X2,Y2),R,COL(G) RETURN
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40 column text	type 1	WIDTH 40
80 column text	type 2	WIDTH 80

Qbasic

40/80 column text	SCREEN 0
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720x348 2 color	SCREEN 3
640x400 2 color	SCREEN 4
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Reviews

EDTASM: The 6309 Version

Dennis McMillan

Well, here I am typing away at an article one would never think would be around now since the demise of the CoCo a couple of years ago...

I was one of the early people whom upgraded to the newer Hitachi HD63C09E chip. In case you are wondering this chip was to be a CMOS version of the 6809E chip we all know. But unknown to a lot of people it had some extra goodies that no one knew about, extra registers; copies of the A, B, and D registers, and added the Q register... 32 bits long (puts the A/B/E/F together to get Q). This is a lot like what we had— $A + B = D$, add $E + F = W$. Now put D and W together... 32 bits... not much is it! But put this lot together with a bunch of NEW instructions and you have one VERY powerful chip, adding the fact that some of the original OP codes had been shortened in the amount of how many machine cycles it took that OP code to do its thing. Now if you halve the time it takes to do something and multiply that you end up with a faster chip without changing the clock speed.

The problem that arose was how was one to be able to write a M/L program with what one had. Some kludging of the code had to be done for the Assembler not to have a fit when codes it did not like popped up! Kludge at most, what was needed was an Editor / Assembler that recognized the new codes. Since I used micro Works Editor / Assembler, it had a few problems (Edit... Asm... Error back to Edit...). Having to reload every time was a pain until a friend who had the SAME problem wrote an M/L program that links it and other useful programs into one neat package. Of course, I had also gotten EDTASM from Ratshack. I found EDTASM a pain to use after using the one from micro Works. So easy to use, of course I was pampered.

The other day I was asked if I would look over a new Editor / Assembler patch for the 6309. It arrived in the mail and I duefully dug out (coff) the old copy of my Tandy Disk EDTASM and followed the instructions to patch it for the 6309. You must use the disk version of EDTASM, NOT a patched for disk cartridge version. EDTASM uses a program called "DOS" to load it. Using ADOS-3 Extended you MUST use it, or it will crash. If Disable:Dload <enter> is used first it WILL work fine if you tried to load it directly... a credit to it's author!

This package is worth it! A full copy of the original famous 6309 memo that brought attention to the 6309's extra features is

included as are inserts for the original manual (on disk) giving changes to the parts needing to be changed and the page number where it is to be inserted. One just runs "reader" and a menu give you 3 selections if you want to print it. WARNING! Some of these printouts are LONG... have a full paper bin! A full Table of OP codes is about 15 pages.

Now, I'm not to much of a programmer, and I figure that most of you whom would have EDTASM are, and YOU MUST OWN AND HAVE THE MANUAL as this program is to PATCH the original Disk EDTASM to make it CoCo-3 compatible. YES, it will work on a CoCo-2 if it has the HD63C09E chip in it! You will not be able to list the text files in reader to the screen on a CoCo-2, although it explains this on screen.

Now there are no problems when assembling code using the 6309 specific instructions! No more going from Edit... Asm... Error back to Edit... anymore! And you don't have to put all the CoCo-3 patches in either, they are built into this package. Seeing "HD6309 RESIDENT" pop up on screen is a nice touch. I figure if it does not find it, it don't show. A nice touch if one has more than one CoCo and forgets which one has the 6309 a must has if you dabble in M/L and have the EDTASM Tandy 26-3254 around. Robert Gault's 6309 package is highly recommended by yours truly! ME! If you want to take full advantage of the new and powerful 6309 instructions, this package is well worth the asking price.

The "Cube": A Case for CoCo

F.G. Swygert

Many people have repackaged CoCos in almost every type case imaginable: plywood boxes shielded with aluminum foil, PC cases, and obsolete computer cases (the T2000c and CoCoGo... Tandy 2000 and KayPro portable cases). A couple enterprising groups even marketed converted PC cases or kits to make conversions easier. But none, until now, that I can recall have ever designed a case specifically to house a full CoCo system.

That is just what CoNect's "cube" is: a case designed to hold a CoCo3 (or 2) motherboard, a Multi-Pak Interface, and up to six disk drives (2 5.25" and four 3.5". Other combinations include 4 5.25" or 3 2.5" and 2 3.5". There are four 5.25" bays, but two are oversized to allow 2 3.5" drives in each mounted sideways).

Accessibility is the main hallmark of Rick Ulland's design. Each side of the mini-tower style case is actually a door that swings fully open. Housed inside is an easily removed tray that holds the CoCo motherboard. An MPI (if used) is connected 90 degrees to the motherboard through a very short cable. A

ROMY-16

EPROM EMULATOR

- Emulates ROMS (2716-27010) or RAMs in 8- and 16- bit systems.
- Window/menu driven interface.
- Provides 8 hardware breakpoints for 8-bit systems.
- \$195 (2716-27256) or \$245 (2716-27010), 90 day warranty.
- 15 day money-back guarantee.
- Optional assembler, disassembler, and ROM debugger add \$100.

Universal Microprocessor Simulator/Debugger V2.1

- Simulates Z8, Z80, 64180, 8048, 8051, 8085, 6800, 6801, 6805, 6809, 68HC11, 6303, 6502 & 65C02.
- Assembler, Disassembler, & Windowed Symbolic Simulator. Supports on-board debug through RS232.
- \$100 each CPU (S&H \$8)

6809 Single Board Computer

- Supports 8K RAM, 8K ROM.
- Two 6821 PIAs connect 32 bits of I/O to outside world.
- No jumpers for 2732, 2764, and 6116.
- Two interrupt signals on CPU bus.
- Size is 2.75"x5". \$60 each board.
- For an integrated development system with assembler, disassembler, and on-board debugger please add \$70.

68HC11 Microcontroller Development System

- Eight channel 8-bit A/D converter. 32K ROM and 32K RAM.
- \$120 each SBC, to complete with assembler, disassembler, BASIC interpreter and on-board debugger add \$70

J&M Microtek, Inc.

83 Saman Road, W Orange, NJ 07052
Tel: 201-325-1892 Fax: 201-736-4567

PC type power supply is also enclosed. There are external connections for all possible CoCo peripherals, even a place for the Puppo keyboard adapter if you are lucky enough to have one! To top it all off, a suitcase style handle resides on the top of the system for easy transportation.

Rick will install your motherboard for you, or you can order a complete CoCo 3 in a Cube. That would also be a good time to order those 2MB upgrades, which Rick will install for you! See the CoNect ad in this issue for more details.

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MM/1 Update

David Graham

BlackHawk and the MM/1 in Chicago!

Well, the Chicago Fest was great. I was able to announce that we shipped our first MM/1 in April. We are waiting on Mark Griffith to ship us some boards to fill the remaining 5 orders we have outstanding, and we have an order placed for new I/O boards to replace those sequestered by Incor, as well as new buss cards. It was great to be able to finally put some faces with the names I've communicated with electronically for so long! BlackHawk Enterprises, Inc. was well received, and whoever said folks up North don't understand hospitality surely didn't know what they were talking about!!

The drive up was, well, interesting to say the least. I rode up to the fest with the HOT Express - formed by Sub Etha Software, JOTA Productions, and Digigrade Productions with BlackHawk Enterprises, Inc. tagging along. We packed a 15 passenger van with 7 passengers, and more than enough hardware and software to fill the van! Ask Tim Johns about the portable singularity he used to stuff the van with the things that wouldn't fit but did!! The Express arrived at our rendezvous point about 2 hours late - courtesy of a defect in our navigational computer (a Kix/30, I believe!), and we were working on making up for lost time when the fire occurred.

Shortly after we entered the toll road to Tulsa, we encountered a pair of ladies whose car had caught fire. Tim Johns, designated hero, promptly pulled us to a screeching halt - told those of us closer EXACTLY where to find the fire extinguisher, and used it to put the fire out. After taking a message to phone in for the stranded couple, we restaled our vehicle, and went to hypervelocity. In no time at all, we made our contact, and were on our way. Carefully avoiding irritating truckers, (I wonder why Al Huffman is so sensitive about this?), we flew through Missouri and Illinois and reached the Fest site at about 10am, in spite of continued defects in our navigational computer. Next time we'll get a slower one, as fast ones simply get you lost faster!!

So, we unpacked everything, and set up the computers, and Friday evening we talked shop, and showed off our new things to each other. Joel Hegberg has done some REALLY neat things to WriteRight!, and has plans for more.

Friday evening and Saturday morning I met to many new people to ever remember! Carl Boll, Al Dages, John Donaldson, Andre LaVelle, Tony Podraza, William L. Wittman, Jr., Stanley Scott, Brian Kitt, Bruce Gerst, Mike Knudsen, the Hawke family, Neil Brookins, Zack Sessions, Ken Scales, Colin McKay, Malcomb Cleveland, Carl Kreider, John Strong, Don Adams, Frank Swygert and many many more!! Every one was great! Carl Boll and Frank Swygert brought me a huge load of the original CoCo joysticks to assure there would be plenty for MM/1 users. And Al Huffman picked up two terminals for his CoCo.

Saturday I sold a lot of copies of KTerm 2.0 - our new terminal program. Thanks to John Donaldson (VAXELF) for his timely programming efforts and his help at the booth, where he proved a most helpful and vigilant customer service tech! I was glad he was there. I also addressed the OS-9 Open Forum, hosted by John Strong - Thanks John! There I talked to about 30 OS-9er's who seemed pretty interested in what we were doing with the MM/1. So - I told them!! We presently have a new design for the Input/Output board and 8 megabyte memory bus cards at the manufacturers in Chicago. On sending cash I'll have new boards (bare) in about 2-3 weeks. I'm still looking for a board stuffer, and have received a few calls. I intend to make that selection very carefully, after the problems with Incor. I have 6 systems sold, and Mark Griffith is providing board sets for them. These 6 systems, one of which has shipped, are providing my capital for future production. Mark is planning to ship me 2 system board sets this week, provided both his Volkswagen Rabbits don't break down and strand him again! I also discussed why BlackHawk Enterprises,

Inc., did not buy Interactive Media Systems, Inc., and why we will not be filling orders taken by IMS before its demise - even if they had been paid for. We quite simply could not take on that level of debt. Did I mention that Al Huffman bought two terminals for his Color Computer?

Sunday was full of important stuff too. Those developers present agreed to form an association to further software development efforts and get more and better products to market. Our thanks to Scott Griepentrog, of STG for providing an FTP site, and private mailing list for developers. This site is already enabled, developers who missed this-- please contact me!! We hope to speed software development for OSK systems by sharing some code, experiences, and other development efforts. Hopefully you will soon see more software-- courtesy of the OS-9 Developers Association

Also, BlackHawk at long last released the sound drivers for the 68340 upgrade card. Unfortunately, the fast sound PAL option to the upgrade turns out not to be optional at all if you want to record with a 68340! But at least I have some of these PAL chips in stock, ready to ship at \$10 each including S/H. Also, we were selling Ultimuse/K version 10.0.0, and we have MIDI boards in stock, of which we sold two at the fest! Dinner at Ghengis Khan - Mongolian barbecue was great, 27 attended and we had a blast!

Sunday night we drove to St. Louis. After two nights of two hours of sleep, the floor in the Motel 6 was extremely comfortable. I talked quite a bit to Al Huffman, who for some reason kept mentioning that he had bought two terminals for his Color Computer. I wonder why??

< 268'm >



BlackHawk
Enterprises, Inc.
Supporting the
MM/1...
now and in the future!

Micro News

Remember the ads for GIMIX 6809 and 68000 OS-9 computers in really old Rainbows? I believe they last appeared in the mid 1980s. One might think that they went out of business, but that isn't so! GMX (3223 Arnold Lane, Northbrook, IL 60062 ; phone 708-559-0909) is still around and well!

I recently received a deck of advertising postcards from an engineering magazine publisher. One of the cards (the ONLY OS-9 or 68000 related card) was from GMX. Their latest is an AT size motherboard with a plug-in CPU module. The board has up to 256MB of RAM, IDE hard drive interface, floppy drive interface (up to 2.88MB), two 16550 serial ports, parallel port, and real-time clock built in. Processors supported include the 68030, 68040, and Intel 486. There will be CPU boards for the 68060, PowerPC, and Pentium later. OS-9/680x0, OS-9000, Windows NT, and MS-DOS are supported. The CPU modules have Flash EPROMs for wasy firmware updates. If you need a really high performance, flexible system, give GMX a call!

SCSI System from Northern Xposure) the ROM revision doesn't matter.

I've been trying to get someone to write an article or provide detailed information about running OS-9 on the Atari ST series computers for some time. I still haven't found anyone or enough information, but I DO have the source for Atari ST OS-9. The ST version of OS-9 is available from:

Cumana Ltd.
Pines trading Estate
Broad Street, Surrey GU3 3BH
ENGLAND
Phone 011-44-483-503121
Fax 011-44-483-503326

Here's a little tip if you are experiencing problems with your Disto real-time clock. In some systems, the clock appears to reset itself on every powerup. Mine did this, so I have some files with the year 1957 and up on them!

The first thing to check is the battery voltage. If it is under 2.9 volts, that could be the problem.

I received the following letter from Dorsett Educational Services:

"Dear Editor:

I recently purchased Dorsett Educational Systems, and moved it to California. We still produce educational programs for the Radio Shack Color Computer and would like to reacquaint ourselves with old customers and make new friends. enclosed please find our recent catalog of educational software.

We offer the same quality educational software, but with some new wrinkles coming; interactive disk technology (multimedia) and new advanced teaching machines. Plus Talk/Tutor videotapes.

Our Talk/Tutor programs feature full time live instruction, together with continuous student interaction. In addition there is companion text on the screen to assist the hearing impaired.

Of course we still offer the portable tutoring machines and associated programs, that have been so successful in the past years, and are

ters" (cassettes) long.
Dorsett Educational Systems
408 Mission Drive
Camarillo, CA 93010
800-654-3871

To all NitrOS9 owners: Due to a conflict of interest, NitrOS9 will no longer be supported, or developed officially by Gale Force Enterprises. The responsibility has been accepted by Bill Nobel and Curtis Boyle. You will receive better support from them than from Gale Force and you should see a better product in the future. Updates will not be available through Gale Force or through Kzin in the future. The authors of the package will be glad to answer any of your questions and fix up any problems you may be experiencing.

My understanding is the installation method previously implemented will no longer be in use. I suspect online updates will no longer be available because of this. Please contact the authors for details regarding this.

Utilities previously included in the package will no longer be provided with the package, but will be available on many of the OS-9

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).

The Radio Shack Consumer Mail Center (CMC) has almost every package made for the CoCo available. Ask any Radio Shack dealer if you can see the Consumer Mail Center catalog. This is usually a green binder. The catalog can't leave the store, however. If you have any trouble with the dealer, call CMC directly at 1-800-433-2024. They may let you order with a credit card, or send it to the nearest store for you. Make sure you have the catalog number of the item wanted and store number of the nearest RS. The prices are usually lower than the last catalog.

Looking for a 256 byte sector capable hard drive for your CoCo? Get a Rodime 65x (where x is any other number) drive or a Seagate with ROM revision 104 or greater. The Seagate drives will be made after 1980. When ordering a rebuilt Seagate, ask specifically if the ROM revision is 104 or higher and let the dealer know that it will be returned if it isn't. If you are using 512 byte sector drivers (such as

The timing seems to vary greatly on a lot of CoCo 3 systems also. If the battery checks okay, you need to do a little hack. Cut the trace that goes to pin 10 of the MSM6242 clock chip. Install a jumper wire between pins 10 and 18. This will prevent the clock from being set. To change the time, one will need to reverse the modification. It is best to use a double pole, double throw switch wired to connect pins 10 and 18 while breaking the connection between the trace and pin 10 and the reverse. If the clock needs resetting, throw the switch!

Sub-Etha Software has updated the following programs: Towel disk utility V1.01 (added more features), MultiBoot V1.03 (bug fixes), and Atlanta Adventure V1.02 (internal changes, image compression). Users of Multi-Boot should contact Sub-Etha for the *FREE* maintenance upgrade. Other updates available for \$5. See Sub-Etha ad for further info and address.

still being introduced to new areas, such as inner-city vocational assistance training programs.

We are especially interested in working with non-profit organizations that are helping the disadvantaged.

If any of your readers writes to us asking for a catalog, we will send a sample program free (just mention "the world of 68' micros"). I would really appreciate your assistance in helping me get Dorsett back into business.

David L. Peterson, President"

All of the programs are interactive and on cassette. The voice portions are recorded voices on the cassette tape that play under computer control. The programs were originally written for the CoCo 2, and may use artifact colors... I'm not sure about that, will have to write Mr. Peterson and find out. Remember all those CoCo 2 systems I located? Well, a LOT of them are still available...

Each Dorsett course costs \$59.00 plus \$5 S&H and California tax for residents. The course are 16" chap-

BBS' for free.

Sorry for any inconvenience this may cause you and I hope you will enjoy using the NitrOS9 package. I know I'll never return to stock OS-9! *Wes Gale*

We also have news of new items from Northern Exposure (NX). See their ad in this issue for an address and other products:

1. NX now stocks NitrOS-9.

2. NX is pleased to announce that it is now selling the 512k SIMM upgrade developed by the Toronto Color Computer Club. This upgrade uses two 256k SIMMs. The biggest

advantages of this upgrade are the reduced power consumption, and the resulting reduction in heat produced.

3. After many years of rumors about its availability, the port to OS-9 of the Activision Shanghai RomPak is now available. This version requires no special modules or boot module patches, and is compatible with both stock OS-9 and NitrOS-9.

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.



FARNA Systems

Software, Books, and Hardware for all OS-9/OSK Systems!

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Warner Robins, GA 31099

Phone 912-328-7859

Internet: dsrfox@delphi.com

CoCo DECB Software:

CoCo Family Recorder - \$17.50
Genealogy program for CoCo 3. Requires 2 drives, 80 col. monitor.
NEW! OS-9 Version - \$32.50

DigiTech Pro - \$12.50

Sound recorder for CoCo3. Record any sound for easy play-back in your BASIC or M/L programs.

ADOS: Support for double sided drives, 40/80 tracks, faster formatting, much more!

Original (CoCo 1/2) - \$15.00

ADOS 3 (CoCo 3) - \$25.00

Extended ADOS 3 - \$30.00 (ADOS 3 req., RAM drives, support for 512K-2MB)

ADOS 3/Ext. Combo - \$50.00

Mind Games - \$7.50

Collection of 9 classic games. Run from included RAM disk w/512K.

Cross Road II - \$7.50

Simple Tic-Tac-Toe, but with amazing sound and graphics! Sound recorded with Digi-Tech.

Space Intruders - \$14.50

Looks just like Atari's classic "Space Invaders"! CoCo 1/2 and 3.

Donut Dilemma - \$14.50

Climb, jump, and ride elevators to top of Donut factory to shut it down! 10 levels. CC 1,2,3.

Rupert Rythm - \$14.50

Collect Rupert's stolen notes, then work our correct sequence. Great action adventure! Get Space Intruders, Donut Dilemma, and Rupert Rythm for only \$33.50! Save \$10!

CoCo OS-9 Software:

Patch OS-9 - \$7.50

Automated program installs most popular/ needed patches for OS-9 Level II. 512K and two 40T/DS (or larger) drives required. (128K 135T users can install manually- state 35T.)

OS-9 Point of Sale - \$62.50

Maintain inventory, print invoices, customer catalog, etc. Multi-user capable under Level II. Supports ASCII terminals. Basic09 required. Simple menu driven interface.

Books:

Tandy's Little Wonder - \$22.50

140 page softbound book with history and technical info for all CoCo models. Schematics, peripherals, upgrades, modifications, repairs, much more- all described in detail! Vendors, clubs, BBSs also listed.

OS-9 Quick Reference Guides Level II (Revision 2) - \$7.50

68K (based on 2.3) - \$10.50

Get that bulky manual off your desk! These handy QRGs have all the most needed information in a 5.5"x 8.5" desk-top size. Includes command syntax, error codes, special keys functions, etc.

CoCo Hardware:

DigiScan Video Digitizer - \$150

Capture images from VCR, camcorder, or TV camera. No MPI required- uses joystick ports. CoCo Max3, Max 10, Color Max 3 compatible. Special order- allow 90 days for delivery. Send \$75 deposit.

Ken-Ton SCSI Hard Drive System and Components

Complete, ready to run, "plug and play" 85MB system. Top quality drive, case, and ps. Send how much space for DECB, OS-9 --- \$550.00
"No-Drive" Kit: controller, drivers for OS-9, RGB-DOS in ROM, 2 pos. "Y" cable, and drive cable (specify type). Seagate N series drive with ROM rev. 104 or greater needed. --- \$250.00

Controller only ----- \$135.00
OS-9 Drivers ----- \$25.00
RGB-DOS (for DECB access) ----- \$35.00
"Y" cable, \$30 for two position, \$40 for three.
Drive cables - specify direct to drive or SCSI case type connector ----- \$30.00

Add \$2.50 S&H per order. Canada add \$4.00; Overseas \$7.00

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Type Setting and Printing: We can prepare professional looking typeset manuals, books, booklets, catalogs, and sales flyers for you - we can print or you reproduce as needed from a master set! Very reasonable prices - inquire!

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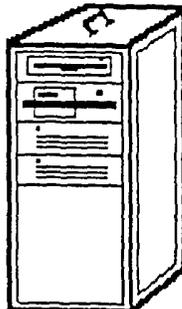
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449 South 90th Street
Milwaukee, WI 53214
E-mail: rickuland@delphi.com

NEW PRODUCT: The Cube

This tower enclosure was designed specifically for the CoCo and peripherals, even an MPI if desired! Four drive bays, two will hold a pair of 3.5" drives sideways. Easy access, carry handle mounted on top!



Mini RS-232 Port: Don't let the name fool you! This is a full featured serial port, supporting the signals needed for flow control as well as the basic 4. Jumper blocks allow readdressing or swapping DSR/DCD. No custom cables or hardware widgets needed here! Y cable users will need to add \$9.95 for a power supply. **\$49.95**

Hitachification: CoNect will install a Hitachi 63B09E CPU and a socket into your CoCo. Machine MUST be in working condition! The 68B09E will be returned unharmed. 90 day limited warranty. Chip and installation only **\$29.95**

REPAIRS: We can repair most damaged CoCos, even those with bad traces where a 68B09 was removed. Costs vary with damage. Bad 68B09 sockets repaired for only **\$40!** Inquire BEFORE sending your computer.

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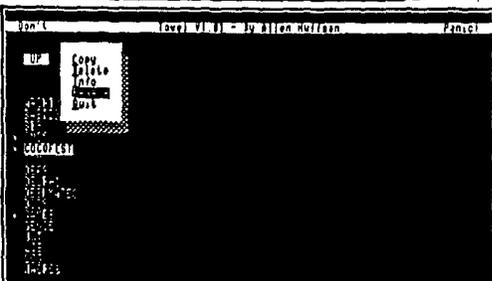
Soviet Bloc - Called the best Tetris(tm)-like game by many, this is a bigger version of the now-classic falling shapes puzzle game. RS-DOS Req: CoCo 3, Joystick/Orchestra-90 Pak optional _____ **\$19.95**

GEMS - "Columns" of colors fall as you change the order of the colors. Match three in a row, column, or diagonal at the bottom and those colors disappear. Sounds simple, doesn't it? RS-DOS Req: CoCo 3, Joystick/Orchestra-90 Pak optional _____ **\$24.95**

Copy Cat - Simon says "match the sequence of tones as the colored diamonds flash". Great for building memory skills. RS-DOS Req: CoCo 3 _____ **\$ 9.95**
OSK Req: MM/1 or 100% K-Windows Systems _____ **\$14.95**

HFE (Hprint Font Editor) - A fantastic editor for those HPRINT fonts with lots of options. Create your own character set which you can LOADM and use in your own programs. Also creates and edits fonts compatible with MiniBanners! RS-DOS Req: CoCo 3, Joystick optional _____ **\$19.95**

Font Collection - A collection of 18 useable HPRINT or MiniBanners fonts. (Importable to OS-9 for use with MiniBanners09 as well!) RS-DOS Req: _____ **\$ 9.95**



Towel! V1.01 by Allen Huffman - NEW VERSION! A program no intergalactic hitchhiker should be without! Use mouse or keyboard hot-keys to perform common disk and file commands from pull-down menus. Tag multiple files for Copy, Delete, Rename, etc., and even point 'n click a Backup, Cobbler, Dcheck, or whatever. User definable menu for custom options. Runs under the EthaWin interface (included) on a high-speed text screen. All commands/colors configurable. OS9 Req: CoCo 3, OS-9 Level 2 _____ **\$19.95**

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- Full Turn of the Screw - book with all Tony DiStefano's Rainbow articles, January 1983 to July 1989 - \$20
- Complete Schematic Set - all DISTO product schematics except 2MB upgrade - \$20

Include \$2 S&H for book or schematics. Hardware S&H is \$4.50 for one item, \$6.50 two or more. Certified check or International Money Order only!

Running low on some items- please call for availability!

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Sub-Etha Originals:

MultiBoot V1.03 by Terry Todd & Allen Huffman - Type "DOS" and bring up a list of up to sixteen OS9BOOT files! No more floppy swapping. A serious must-have for intense OS-9 users. OS9 Req: CoCo 3, OS-9 Level 2 _____ **\$19.95**

1992 CoCoFest SIMULATOR V1.02 by Allen Huffman - NEW VERSION now uses compressed graphics and has scoring. Take a walking tour of the '92 Atlanta CoCoFest with this graphics adventure. 16-level digitized photos of the event and a text parser (ie, "get the box of disks") to let you interact. Runs on a 640x192 graphics screen. OS9 Req: 512K CoCo 3, OS-9 Level 2, 500K+ of Disk Space _____ **\$ 9.95**
OSK Req: MM/1 or 100% K-Windows System _____ **\$14.95**

Write-Right by Joel Mathew Hegberg - Featureful word processor for the MM/1 with what you would expect from a "real" word processor. What you see is what you get! _____ **\$54.95**

Etha-GUI by Joel Mathew Hegberg - A neat program launcher for the MM/1 which includes handy desktop utilities like a phone dialer and nifty screen savers...even a trash can. Point and click icons to run programs. _____ **\$34.95**

Quality OS-9 Software from

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NEW! K-Windows Chess for MM/1

Play chess on your MM/1.....\$24.95

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Call or write for a free catalog! Demo disks also available.
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Summertime is "off" season for a lot of CoCoists. If you are one of those, look forward to new releases and upgrades this fall. If you use your CoCo all year 'round, the following titles are currently available:

- CoCoTop version 1.0 \$24.95
- CoCoTop version 1.1 \$19.95
- CoCoTop 1.1 + Tools 3 \$34.95
- OScopy/RScopy \$10.00
- TOOLS 3 version 1.1 \$29.95
- Quickletter version 2.0 \$19.95
- Accounting level 2 \$34.95
- Investing level 2 \$24.95
- Level II graphics 1.2 \$34.95

upgrades only \$5.00 (return original disk)

Shipping+handling: US/Canada \$3.00 all others \$5. Prices in US dollars Send cheque or money order NO COD'S. Call or write for Canadian dollar prices. Mention the name of this magazine in your order and you will receive a free bonus disk!

C. Dekker ... User-friendly Level II Programs!
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Phone 506-276-4841



EDTASM6309 Version 2.02 ----- \$35.00
This is a major patch to Tandy's Disk EDTASM to support Hitachi 6309 codes. Supports all CoCo models. CoCo 3 version uses 80 column screen, 2MHz. YOU MUST ALREADY OWNTANDY'S DISK EDTASM TO MAKE USE OF THIS PRODUCT. It WILL NOT work with a disk patched cartridge EDTASM.

CC3FAX ----- \$35.00
Extensive modification to WEFAX (Rainbow, 1985) for 512K CoCo 3. Uses hi-res graphics, holds full 15 min. weather fax image in memory. Large selection of printer drivers. Requires shortwave receiver and cassette cable (described in documentation)

HRSDOS ----- \$25.00
Move programs and data between DECB and OS-9 disks. Supports RGB-DOS for split DECB/OS-9 hard drives. No modifications to system modules (CC3Disk or HDisk) required.

DECB SmartWatch Drivers ----- \$20.00
Access your SmartWatch from DECB! New function added to access date/time from BASIC (DATES). Only \$15.00 with any other purchase!

RGBOOST ----- \$15.00
Make the most of your HD6309 under DECB! Uses new 6309 functions for a small gain in speed. Compatible with all programs tested to date! Only \$10.00 with any other purchase!

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Add \$4 shipping & handling per order

The UPGRADE National Disk Magazine

Don't listen to me...
From Dan Maguire (Orange Park, FL), who joined recently:
"I am writing to let you know I am very impressed with the MI&CC UPGRADE disk... I was blown away by your (or should I say our) club library. .. Now I am a proud member. I pledge my support."

If you want support, we're here "for you!"
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Include your Phone & System information

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Working to support OS-9 Users

Membership includes the Users Group newsletter, MOTD, with regular columns from the President, News and Rumors, and "Straight from the Horse's Mouth", about the use of OS-9 in Industrial, Scientific and Educational institutions.

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The OS-9 Users Group, Inc.
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OS-9 Level II Color Computer 3 Software

NitrOS-9 v1.20 Call or write for upgrade info or new purchase procedure. Requires Hitachi 6309 CPU	\$29.95
Shanghai:OS-9 Introductory price	\$25.00
Send manual or RomPak to prove ownership	
TheXder:OS-9 Send manual or RomPak to prove ownership	\$29.95
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Rusty Launch DECB/ECB programs from OS-91	\$20.00
Matt Thompsons SCSI System v2.2 'It flies!'	\$25.00
256/512 byte sectors, multipak support	

Disk Basic Software

Color Schematic Designer v3.0 New lower price	\$30.00
Oblique Triad Software	<i>Write for catalogue</i>

Color Computer 3 Hardware

Hitachi 6309 CPU (normally 'C' model, may be 'B')	\$15.00
SIMM Memory Upgrade Runs Cooler! 512k	\$44.95
0K	\$39.95
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OSTerm 68K v2.2 External transfer protocol support	\$50.00
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Upgrade from TasCOM (Send TasCOM manual please)	\$30.00

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Last Issue's "microdisk"

I got a complaint about not having a directory for "microdisk" any more. I told this person the reason was that it was just too difficult to get the complete contents of the disk ready before printing, since some items were added right at the deadline. Not to be thwarted, this person had a suggestion: print the last issues "microdisk" directory in the next issue. A problem and a suggested solution... that's what I like!

Disk BASIC Side:

NMI.SRC
NMI.BAS
6309SPD.SRC

OS-9/OSK Side:

LHA211c.lzh
LHA211c.doc
Diskcat.lzh
Lha
xlh
kysns.c
showtime.c
keyb_signal.c

Lha and xlh are the executables for the LHA file compression/decompression protocol. Load these into memory to explode the two .lzh files. Typing "lha" alone will bring up a help file. LHA is more efficient than AR, and will be used in the future. Most users will just need to explode the LHA doc file.

microdisk is \$6 per issue (US). See inside front cover for other prices.

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Provides a 68020 running at 25 MHz, up to 128 MBytes of 0 wait-state memory, SCSI and IDE interfaces, 4 serial and 2 parallel ports, 5 16-bit and 2 8-bit ISA slots and much more. The SYSTEM V builds on the design concepts proven in the SYSTEM IV, providing maximum flexibility with inexpensive expandability. Now available at 33 MHz.

AN OS-9 FIRST - the MICROPROCESSOR is mounted on a daughter board which plugs onto the motherboard. This will permit inexpensive upgrades in the future when even greater performance is required.

G-WINDOWS benchmark performance index is 0.15 seconds faster with a standard VGA board than a 68030 running at 30 MHz with ARTC video board (85.90 seconds vs 86.05 seconds).

Or, for less demanding requirements, the

SYSTEM IV

The perfect low cost, high-quality and high performance OS-9 computer serving customers world-wide. Designed for and accepted by industry. Ideal low-cost work-station, development platform, or just plain fun machine. Powerful, flexible, and inexpensively expandable. Uses a 68000 microprocessor running at 16 MHz.

Both computers provide flexible screen displays in the native mode with the optional VGA card.

Eight text modes are supported: 40 x 24, 80 x 25, 80 x 50, 100 x 40, 132 x 25, 132 x 28, 132 x 44, and 132 x 60. Foreground, background, and border colors are user selectable from up to 16 colors.

Eleven graphics modes are supported: 640 x 200 x 16, 320 x 200 x 256, 640 x 350 x 16, 640 x 350 x 256, 40 x 480 x 16, 640 x 400 x 256, 800 x 600 x 16, 640 x 480 x 256, 1024 x 768 x 16, 800 x 600 x 256, and 1024 x 768 x 256

Text and graphics modes may be selected by a utility provided, MODESET, by software using SetStt calls, or by termcap entries. In the text mode, the screen responds to standard VT100 control sequences. The full character set from Hex 20 through Hex FF is supported in the text modes up to and including 100 characters wide. The upper 128 characters follow the 'IBM Character Set 2' popular with many terminals and printers. These may be displayed on the screen by using the 'Alt' key and one or two other keys (software permitting).

Optional G-WINDOWS provides three screen resolutions: 640 x 480 x 256, 800 x 600 x 256, or 1024 x 768 x 256. You can have two full size 80 x 25 windows with room to spare. Or, a window as large as 122 x 44 using the large fonts or one over 180 x 70 using the small fonts

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