

AUSTRALIAN OS9 NEWSLETTER

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CONTENTS

OS9	OS9	OS9	OS9	OS9	OS9	OS9	OS9	OS9
OS9								OS9
OS9	Editorial	Page 2						OS9
OS9	CoCo 2 Emulator for the P.C.	Page 3						OS9
OS9	INFO! by Rod Holden	Page 4						OS9
OS9	Sound on the MM/1	Page 5						OS9
OS9	A free UNIX for P.C's	Page 5						OS9
OS9	System upgrades for MM/1	Page 6						OS9
OS9	RS232 on the CoCo	Page 7						OS9
OS9	Computers & Model Railway	Page 8						OS9
OS9	OS-9 Supporting Mags.....	Page 10						OS9
OS9								OS9
OS9	OS9	OS9	OS9	OS9	OS9	OS9	OS9	OS9

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AUSTRALIAN OS9 NEWSLETTER
Newsletter of the National OS9 User Group
Volume 8 Number 4

EDITOR : Gordon Bentzen
SUBEDITOR : Bob Devries

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WHERE TO NOW?

Since the announcement last month that we plan not continue with this newsletter a few members have made contact to express their disappointment.

However, we will not produce a newsletter beyond August 1994 and I expect that this also means an end to the Australian OS9 Usergroup as the Usergroup exists only through the newsletter.

Many of us will of course still be involved in OS-9 in one way or another as OSK continues to grow and new software for the CoCo OS-9 Level II still appears from time to time. I will include the latest membership list in at least one edition before we cease publication so that interested members may keep in touch.

Our decision to stop is simply based on the lack of activity by usergroup members.

Having said that, I was very pleased to receive a package from George McLintock containing a short submission about LINUX, free UNIX software for PC's and a CoCo 2 emulator, also for PC's.

George included a disk which had the necessary emulator files. Thankyou George for your efforts, these submissions will be included. And just for the record George, your .TXT files without CR's suits us just fine.

I also ran the CoCo 2 emulator on my 40meg 386 Messy-Dog machine and it worked just fine. It makes a PC look just like a CoCo 2, but I must admit to having a little trouble remembering the RS-DOS and BASIC command syntax etc.

If we had a CoCo 3 emulator that would allow us to run OS-9 Level II on a PC! That would be great.

Fred Remin, editor of COCO-LINK has also been in touch and we can now advise that COCO-LINK will continue with an OS9 column and this will be a means of keeping up with OS-9 Level II on the CoCo3.

COCO-LINK
100 Whitsunday Drive
KIRWAN QLD 4817

Phone: 077 734 884

A NEW NEWSLETTER

The **CLASSIC COMPUTERS** computer newsletter commenced with a June/July 1994 Issue. This new publication by Nickolas Marentes, is for computer collectors. "Classic Computers is a non profit newsletter aimed at bringing together collectors of early model computer systems so that they may exchange information, ideas, personal experiences and act as a means to locate hard to get computers and components for their collection."

I have a FREE introductory issue which is eight pages of interesting reading. The bi-monthly publication can be obtained by Subscription of A\$8.00 for six issues.

SEND SUBSCRIPTIONS TO:-

Nickolas Marentes
P.O. Box 6551
Upper Mt.Gravatt 4122

CLOSING MESSAGES

Why not request that your message to other OS-9'ers be included in our last couple of editions. Maybe you would like to make in known to our members that you are still active in OS-9, or it may be that you have moved on to other things and would prefer to be left off a published list of members (please let me know).

I will endeavour to meet such requests, but there is not much time left.

Please send your "request" to me, the editor, preferably on disk, 3.5" or 5.25" CoCo OS-9, OSK, MS-DOS and as unformatted text - ASCII file.

Short submissions in hardcopy only are also okay.

Hey! you could even phone.

Until next time, Cheers, Gordon.

AUSTRALIAN OS9 NEWSLETTER

A COCO EMULATOR ON AN IBM

by: George McLintock

I recently obtained a copy of a "Free Ware" program for an IBM that provides an excellent emulation of a 64K CoCo 2 running on an IBM compatible. It was sent to me by a pen friend in Canada who obtained it from a Bulletin Board in Toronto (Canada). I have posted a copy on the Canberra PCUG BBS in Canberra, and included copies with this note to the Editor and a copy to Robbie in Adelaide. I think it is great and would like to see it widely distributed.

The program provides a full hardware emulation of a 64K CoCo 2 with 4 disk drives. The cassette port is about the only hardware feature not emulated, although it only provides access to a mouse to emulate the joysticks, I would prefer it to use an IBM joystick as well. It includes an emulation of the timer interrupt (at the US 60 cycles per second, rather than our 50, but what the hell), and Level 1 OS9 will run on it OK. I don't have much level 1 OS9 stuff, but a couple of programs I copied across appeared to work OK.

The program includes an emulation of the US style artifacting (which never worked on our PAL TV's), which I didn't like so just turned it off. The graphic emulation appears to work OK for a number of programs that I tried on it, including CoCo Max 2 which is a good test of graphic features

System Requirements:

Requires EGA graphics (VGA OK) and 256K RAM, with a minimum of a 286 at 12 MHz recommended, and a faster processor doing better. It is useable on a 16 MHz 386 SX, and too fast for graphic games on a 66 MHz 486 DX2. (A "slow down" option is provided for these). I expect that a 386-40 or 486 SX-25 should do about CoCo speed or a bit better.

A 360K drive (genuine) is required for formatting CoCo disks on a PC, but once you have a set formatted in this way, a 1.2 Meg drive will read / write to them OK for data transfers between a CoCo and PC. The documentation notes that you probably can't read CoCo disks directly on a PC as you will normally get errors, but when I tried it I found that I've been able to read my CoCo disks directly with my 1.2 Meg drives without any errors.

The emulator does not read a CoCo disk directly, it includes a utility to copy a CoCo disk to a "virtual" CoCo disk which exists as a normal MS-DOS

file that is a binary image of the CoCo disk. With a hard disk and software cache on the PC, this gives extremely fast disk operations with the emulator.

The package includes instructions for transferring data from the CoCo to a PC via a serial port cable, so you can get it working without a 360K drive if you don't have access to one and your PC's 5.25 inch drive won't read your CoCo disks directly. You can also use this procedure to transfer the ROM from a cassette based CoCo, but you would need to get a Disk ROM from somewhere to use the emulators disks.

To use the emulator you must first get a copy of the CoCo ROM from a CoCo and put it on a MS-DOS disk. The package includes a couple of utilities to simplify this process and also describes how you can do it with a serial cable. If you find that your PC will read your CoCo disks directly, and you don't have a 360K drive, the small Basic program included to transfer via the serial port could be easily modified to put the CoCo ROM on a CoCo disk for a direct transfer.

Utilities:

DSKINI is a MS-DOS utility that will format a CoCo disk in a 360K drive on a PC. It is also used to transfer a virtual disk from the PC to a CoCo disk. The transfer of a virtual disk to an existing formatted CoCo disk works OK on my machine with a 1.2 Meg drive, including to floppies formatted by the CoCo. The only bit that doesn't work with my 1.2 drive is an initial format for a CoCo disk.

RETRIEVE is the matching MS-DOS utility to read a CoCo disk in a 5.25 inch drive and copy it to a virtual disk on the PC. But note the comment above about possible problems with using CoCo disks that have not been formatted on a PC, it may not work with all such drives

PORT.BAS is a MS-DOS Basic program to transfer files between virtual disks used by the emulator and normal MS-DOS files.

COCOUTIL is a CoCo program on a virtual disk to provide an automatic procedure for getting a copy of your CoCo ROM to use with the emulator.

These utilities all worked fine for me without any problems. My only complaint is that the disk

AUSTRALIAN OS9 NEWSLETTER

utilities only support single sided 35 track disks. An option to match the quite common 40 track double sided disks would make them perfect.

Using the Emulator

There is probably not much else to say here. It operates in the same way as a CoCo 2, with the same 32 character text screen that looks great on a VGA monito, as does the PMODE graphic screens.

There are all sorts of options available with a very professional presentation. For example, when you want to mount a virtual disk, you get a list of all such disks in the current directory, from which you can select one by moving the cursor to highlight the one you want, and press enter. You can also get a list of virtual disks in any other DOS directory by a Windows style of drive / directory selection.

The emulator includes a first rate debugger which

would make it much easier to develop programs on the emulator rather than an actual CoCo. I recently completed a fairly complex bit of Assembler programming on the CoCo which would have been much easier to do if I had had a copy of this emulator 6 months ago.

This version for the CoCo 2 is freeware (ie no registration fee required). The author mentioned that he may do a shareware version (registration around \$25) for a CoCo 3 emulator if there is sufficient interest. So if you like this one, and would like a CoCo 3 version, drop him a line and say so.

Some of you may know that I've been working on a CoCo 3 emulator myself, but my objective does not extend to the very professional and full hardware emulation that Jeff Vavasour has achieved with this CoCo 2 version.

George McLintock.

```
IIIIII NNNN NN FFFFFF 000000 !!
II NN NN NN FF 00 00 !!
II NN NN NN FFFF 00 00 !!
II NN NN NN FF 00 00 !!
II NN NN NN FF 00 00
IIIIII NN NNNN FF 000000 oo
```

By Rod Holden

Hi, and welcome to Info, this is a substitute for the OZ9 BBS as the BBS no longer is operating due to the lack of response from OS9 Members. I am still submitting articles to let members know what is still available from the library. All requests should be directed to Bob Devries as I will no longer be the Librarian due to personal reasons. This is your Ex-Sysop letting you know what type of software is available, please read on;

Park/Unpark Utility Documentation (C) 1988 Bruce Isted

This program may be freely distributed as long as the copyright notices remain intact and the source, binary, and documentation files remain together. It may not be sold for profit, individually or as part of a commercial package without the prior written permission of the copyright holder.

Syntax: Park [-u] </devname> [</devname>] [...]

Function: Moves the specified drive(s) head(s) to the shipping zone, or alternatively restores them to cylinder zero if the "-u" option is used.

Note: This utility depends on the disk driver having SS.SQD (park head) and SS.Reset (restore head) SetStats implemented. If either or both of these SetStats are not implemented the corresponding function(s) will not work.

Examples: Park /HO [ENTER]
Park /HO /H1 [ENTER]
Park -u /HO [ENTER]
Park -u /HO /H1 [ENTER]

This utility was written after I discovered the Park utility provided in Level 1 Version 02.00.00 COCO OS-9 and the COCO3 OS-9 Level Two Development System has a small bug in it. Normally this causes no problems, but under certain conditions the wrong path may be

AUSTRALIAN OS9 NEWSLETTER

closed which can result in mild problems.

In addition to correcting the aforementioned bug I also added a function which shows up in the "-u" option. This option allows the user to issue a

restore command to the specified drive(s), which may be occasionally useful.

Ex-Sysop
Rod Holden

Sound production on the MM/1

From: kotanski@13.75.DECNET.CERN.CH
Subject: plying mono sound on MM/1

To play stereo sound on MM/1 one sends pairs of signed bytes to the DAC and they are reproduced on the two channels. The actual sending is done either directly by the I\$SetStt SS_Play call or using the cgfx.l C interface function _ss_play. Sometimes you want to play mono sound. The simple programs "playm" and "hdplaym" supplied with MM/1 do this by duplicating each byte and sending it to each channel. These programs look like simple test programs written by the original authors.

This method of playing mono sound is awkward: not only it needs extra processing (byte duplication) but also it needs bigger buffers.

After a closer look at the sound drivers for MM/1 I found a way of playing mono sound directly: set bit 0 in the option byte to 1 and all the bytes are sent to both channels. Technically speaking, if bit 0 of the option byte is 0, the DMA transfer is of the word type, but if it is 1, it is of the byte type. This code is present both for the 68070 and 68340 drivers and both for playing and recording. I tested it only on MM/1a (68340) and only for playing.

This feature is not documented because we do not have a proper documentation of the K-Windows, but I think it may be useful.

Regards,
Andrzej Kotanski
(kotanski@zeus02.desy.de)

A FREE UNIX FOR PC's

by: George McLintock

I guess we are all aware that versions of Unix are available for Intel 386 plus machines. Until recently I was not aware that you could actually obtain free copies of Unix to run on such machines. There was an article in the Canberra PC Users Group magazine in December last year about LINUX which is a System 4 style Unix for Intel machines that is available free (for the cost of the distribution media etc), and a Linux user group in Canberra.

Following this I decided to at least try it and see how it went. I got my copy on a CD ROM from LaserBaud, which is the InfoMagic UNIX CD-ROM that actually contains 3 different free versions of Unix for PC's, LINUX, 386BSD, and NetBSD. After a discussion with a member of the Linux User Group, I decided to install the SLS release of LINUX.

At this stage, about all I can say is that the installation was reasonably straight forward, and it all appears to work OK. I am still trying to work my way up through the maze and come to grips with what I actually have, and being distracted from this task by

other things I have going as well.

At a fairly superficial level, the basic operating system does not seem that much different to OS9, which is not surprising given the background of OS9. But there is certainly a lot more to it than that, and I am probably limited to some extent by my lack of detailed experience with OS9 anyway. I have brought an introductory type reference book for Unix which even my limited experience with OS9 certainly helps to understand.

I intend to persist, even if it is gradual. But a bit about LINUX, and a couple of paras from the documentation that comes with SLS probably gives a better summary than what I can do myself

"SLS contains 400-500 utilities designed to provide a relatively complete computer operating system for the sophisticated user. It includes programs for compression, text processing, communications, Xwindowing system, program development (Assembler, C, C++, Fortran, Pascal, Lisp, and Pearl), mail,

AUSTRALIAN OS9 NEWSLETTER

spreadsheets, and word processing. Also supported are DOS files, a DOS emulator, SCSI, CDROM's, and TCP/IP. A 387 coprocessor is emulated by the kernel if you don't have one. Full source code for the kernel is also provided with SLS."

"The development environment includes libraries for Unix and Xwindows, a debugger that does full screen (via emacs) with support for core dumps. Shared libraries make the most miserly use of RAM and disk space. FAQ and manual pages document most of the Linux utilities. SLS requires at least 12 Meg of disk space for the minimum install. 90 Meg or more is required for the full system (not including TeX or Interviews). You will need at least 2 Meg of RAM, 4 Meg if you want to compile programs, and 8 Meg to run Xwindows. Note that sometimes you can get by with less, but usually with noticeable performance limitations"

As can be seen, you need a reasonable size machine to run this sort of thing, but it is not prohibitive given the current costs of new machines. Since my own upgrade last year I now have a machine that gives acceptable performance.

The SLS installation requires 30 floppies for the full package (either 1.2 or 1.4 Meg floppies). While this seems a lot, compared with OS2 (21 floppies) and Windows NT (23 floppies) it is quite reasonable, particularly given all the extras that are included. I didn't even try to install from the CD ROM, I simply copied to floppies and used them.

The CD itself cost \$38 which I feel is good value for what is on it. (30 blank floppies cost that sort of money). Apart from the SLS package there are lots of other interesting looking bits and pieces on it that may take me years to even get to look at. Some of the other bits include Prolog, Scheme, and INGRESS DBMS, and others that I don't recognise.

Here in Canberra there is a fairly active LINUX User Group (centered at ANU) that will provide assistance for the novice and others, and I expect that similar groups probably exist elsewhere, possibly based on Universities. For anyone interested in exploring the world of UNIX, it seems a great way to go.

George McLintock

System upgrades available for MM/1

A system upgrade disk is available for \$15.00 from Blackhawk, which contains the following versions of the modules. I've left out some of the descriptors in the interest of brevity. This is a great price, and I highly recommend that everybody purchase the upgrade and get current editions of all the modules. (No, I don't work for Blackhawk, nor am I getting any kickback!)

Blackhawk Enterprises
PO Box 10552
Enid, OK
USA
73706-0552
Phone: +1 405 234-2347

Module	Vers

* Kernel, Init and Clock Modules	
../kernel/kernel	* 83
../kernel/init_3meg	* 20
../kernel/sysgo	* 5
../kernel/tk68901	* 7
../kernel/rtdcdsl287	* 5
* Sequential Character File Manager	

../scf/scf	* 31
../scf/sc68070	* 14
../scf/t0	
../scf/sc68901	* 30
../scf/t1	
../scf/t2	
../scf/sc68681	* 32
../scf/t3	
../scf/t4	
../scf/scp68230	* 7
../scf/p	
../scf/pl	
../scf/null	* 1
../scf/nil	* 3

* Window

../win/windio	* 52
../win/keydrv	* 46
../win/snaddrv	* 3
../win/msdrv	* 8
../win/stdfonts	*
../win/wcf	* 30

* Pipe

../pipe/pipeman	* 35
-----------------	------

AUSTRALIAN OS9 NEWSLETTER

../pipe/pipe	* 2	../rbf/mml.d0	
* Random Block File Manager		../rbf/univ/u0	
../rbf/rbf	* 79	../rbf/ram	* 15
../rbf/rbvccs	* 12	../rbf/r0	* 14
../rbf/scsi_mml	* 25	* PC File Manager	
../rbf/h0		../pcf/pcf	* 24
../rbf/dd.h0		../pcf/hpc0	
../rbf/rb37c65	* 6	../pcf/pc0	

Some technical details about RS232 on the COCO From the Internet COCO List

From: Rick Ulland <RICKULAND@DELPHI.COM>

Let's look at CoCo9 tcom another way- our problem, and advantage, is OS9s rich irq system. Good enough to keep multiple process fairly well connected to real time on (let's be frank) crap hardware (a single irq line?).

However, banging on enough software to figure out all this each and every character does cost some time. This explains those cps figures- when we aren't running irq service, she receives ok. Faster bauds mean we waste less time receiving characters, so there is more time for irq service, and thruput goes up. Think about it.

The mpi design kind of assumes the system can't handle multiple irq driven devices, so it kindly switches a single slot on line. The hack is real simple minded. One is traditional serial slot- if the driver cares at all, it will look at one. So we connect any slot that might have a serial port to one. D_Poll will figure it out later.

Buffers tend to 'stutter' the machines real time response a bit, as an irq call results in a block move of mebbe 16 bytes (they can FI while you F0). This is actually better than running thru the poll routine 16 times....and the big CoCo irqquestion is probably another serial port anyway.

At a real basic level, I always wondered why we make fun of the Commie 64 but use their 'acia' chip. It works about as good as the 64 did- tweak and spin. But one follows the fashion, so CoNects Mini232 usually uses a 6551a, while incorporating a jumper block to do the strange flowflipfix outlined earlier. We are starting to move to 65c51, but early versions had reliabilty problems, so I sell them slowly. (All the ports sold at the fest were 6551a units- no time

to burn in.)

Someone asked how they are put together. Well, the artwork is way fat, and a little jiggly. Almost as though it was done with felt tip and straitedge. This board aint ever doing 4MHz, but it's a nice enuf epoxy tinplatethru and seems to be exactly as flakey as the Tandy.

FWIW, the 16550 doesn't seem to have a problem with anything- stops on a dime, frames nicely, costs three times as much and it's twice as big. Bet I can have it in a \$80 rompak before July.

-ricku

From: "Robert E. Brose II" <bob@os9.jriver.com>
Subject: Re: 9600 baud on the CoCo3

A few comments concerning 9600 and faster on the CoCo3.

- 1) The 6551 garbles the character which is in the transmit register upon transition from ~CTS to CTS (which means going from the stopped condition to the sending is ok condition). I noticed this initially almost 2 years ago when I put a high speed modem on my OS9 bbs and the users were still mostly at 2400 baud. The modem is connected to the CoCo at 9600 baud fixed speed. When someone connects at 2400 baud, the CoCo sends data to the modem at 9600 baud until the modem's buffer fills then the modem turns off CTS until it is emptied out the phone line at 2400 baud. When the modem turns CTS back on, the first char sent by the 6551 is not the char that was put into its transmit buffer. The easy fix for this is to use DSR instead of CTS for the transmit handshake line. Unlike CTS, DSR has a status bit readable from one of the 6551 registers. This allows the driver to avoid putting a character into the transmit buffer

AUSTRALIAN OS9 NEWSLETTER

when it can't handle it. This involves connecting the modems CTS line to the RS232 DSR line and tying the RS232 CTS line true. It also involves a trivial change to the SACIA driver.

- 2) It APPEARS that in OS9, the time required to service an RS232 interrupt doesn't allow the CoCo RS232 to RECEIVE characters at speeds greater than 9600 with a 6551. It's pretty marginal, I've come close to being able to run it at 19200 receiving, it only drops characters once in a while.
- 3) The speed at which the port can run and the throughput are two different subjects. The receive buffer helps on incoming chars. On the transmit side, there is no buffer in SACIA. From what I've heard from others trying to find the throughput limitations, typical speeds with a 6809 are around 600 CPS transmit and 800 CPS receive. Randy Wilson has done A LOT of testing in this area. My figures are similar to these,
- 4) A buffered serial port (16550A) helps a lot in

improving these figures. At the fest, Mark Marlette and Paul Jerkatis were running around 1000 CPS using Paul's SUN and Marks CoCo with Nitros & Randys 16550 Driver. Marks system will talk to a USR 14.4 modem at 57600 baud without dropping chars.

- 5) RSDOS is a different game. Nothing else is going on essentially. You can write a tight asm program and get very good speed to ramdisk. It's always this way with single tasking OS's. If you know the right tricks, you can even get an XT to do 1900 CPS throughput WITHOUT a buffered UART.
- 6) The file do_9600_3.ar in the COCO3/MISC directory on chestnut is a compilation of the efforts of several persons in the OS9 community to get high speed working correctly in OS9L2.

If anyone has any corrections or additions to this, please let me know and I'll add them to the file.

Bob.

Computers and Model Railway

Before I got involved in computers, my main hobby interest was in model railways. I had to give it up because of lack of space, so I took on computers instead (which still takes up a lot of room). Recently I felt that I might be able to use computers with model railways, and with that in mind, I started looking for magazines about model railway. Sure enough, there seems to be quite a lot of computer

equipment being used for controlling railways, and also for things like track layout design. I came across a programme in "Model Railroader" from Kalmbach Inc, written by Bob Fink, which prints out easement curves. An easement curve is the transition from a set radius to a tangential track. I thought I'd pass on the programme, which I re-wrote in Basic09. Bob Devries.

PROCEDURE easement

```
(* Computers in Model Railroading *)
(* --- MODEL RAILROADER MAGAZINE --- *)
(* --- MARCH 1994 --- *)
(* Spiral Easement Designer in QuickBasic (or QBASIC) *)
(* Modified for Basic or Basic-09 for OS-9 operating system *)
(* by Bob Devries, 11th, May, 1994, original by Bob Fink, P.E. *)
(* *)
```

```
DIM d,f,l,r,x:REAL
```

```
DIM totallines:REAL
```

```
DIM printer:INTEGER
```

```
DIM i,z:INTEGER
```

```
DIM strg1$,strg2$:STRING
```

```
PRINT CHR$(12)
```

```
PRINT "Length of Spiral";
```

```
INPUT l
```

```
PRINT "Curve Radius";
```

```
INPUT r
```

```
totallines=l*6
```

```
x=l^2/(24*r)
```

AUSTRALIAN OS9 NEWSLETTER

```
PRINT \ PRINT "Offset X (Curve from tangent) = "; x
PRINT
OPEN #printer,"/p":WRITE
PRINT #printer," Spiral Length: "; l; " inches joining a Radius of: "; r
PRINT #printer,TAB(55); "Actual Offset"
RUN Prntit(printer,"TS",0,"")\ (* print first line *)
RUN Offset(printer,0)
FOR i=1 TO INT(totallines)-1
f=i^3/(1296*r*1)
IF i=totallines/2 THEN
strgl$=" X"
f=x/2
strg2$=""
FOR z=1 TO INT(f*10)
strg2$=strg2$+" "
NEXT z
strg2$=strg2$+"0"
(* Show Mid X/2 offset and Point 0 *)
RUN Prntit(printer,strgl$,f,strg2$)
RUN Offset(printer,f)
ENDIF
RUN Prntit(printer," ",f,"")\ (* Print the rest *)
RUN Offset(printer,f)
NEXT i
f=4*x
RUN Prntit(printer," ",f,"SC")\ (* print last line offset to SC *)
RUN Offset(printer,f)
CLOSE #printer
END
PROCEDURE Prntit
(* Subroutine to print two passed strings with an *)
(* offset amount as blank spaces between them *)
(* also plots the tangent and curve location *)
(* points ( & * ). *)
PARAM printer:INTEGER
PARAM strgl$:STRING
PARAM f:REAL
PARAM strg2$:STRING
DIM x:INTEGER
PRINT #printer," "; strgl$; " ";
FOR x=1 TO INT(10*f)
PRINT #printer," ";
NEXT x
PRINT #printer,"*"; strg2$;
END
PROCEDURE Offset
(* Subroutine to print calculated offsets down a column *)
PARAM printer:INTEGER
PARAM f:REAL
DIM x:INTEGER
PRINT #printer,TAB(60);
PRINT #printer USING "R9.4",f
END
```

COCO and OS-9 Magazines

The following is a list of magazines available for the Colour Computer and OS-9. Anyone wishing to subscribe to one of these, should first find out the cost for Australian subscriptions, and, if desired, the extra cost of airmail postage. A number of the publishers are available on Internet, so maybe I could find out about this.

MAGAZINES	PUBLISHER	COST	ADDRESS
The International OS9 Underground	Alan Sheltra	\$18.00 USA \$23.00 Canada (12 issues) (one year)	Fat Cat Ppublications OS9 4650 Cahuenga Blvd. Ste#7 Toluca Lake, CA 91602 (818)761-4135 (voice) (818)365-0477 (Fax) (818)769-1938 (Modem)
Metamorphosis (Previously the NoName Mmagazine)	Mark Griffith	\$24.00 USA \$32.00 Canada (12 issues) (one year)	Dirt Cheap Computer Stuff 1368 Old Highway 50 East Union, MO 63804 (314)583-1168 (voice)
The World of 68' Micros	Farna Systems	\$23.00 USA \$30.00 Canada (8 issues) (one year)	Farna Systems PB Macros P.O Box 321 Warner Robins, GA 31099-0321 (912)328-7859 (voice)
Up Time	JWT Enterprises	\$15.00 USA \$18.00 Canada (12 issues) (one year)	JWT Enterprises 5755 Lockwood Blvd. Youngstown, OH 44512 (216)758-7694 (voice)
Hardcopy	Rick Cooper	\$30.00 USA \$36.00 Canada (12 issues) (one year)	Rick's Computer Enterprise P. O. Box 276 Liberty, KY 42539 (606)787-5783 (voice)
DISK MAGAZINES	PUBLISHER	COST	ADDRESS
CoCo Friends Disk Magazine	Rick's Computer Enterprise	\$6.00 each \$30.00 for 6 (monthly)	Rick's Computer Entrprise P. O. Box 276 Liberty, KY 42539 (606)787-5783 (voice)
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