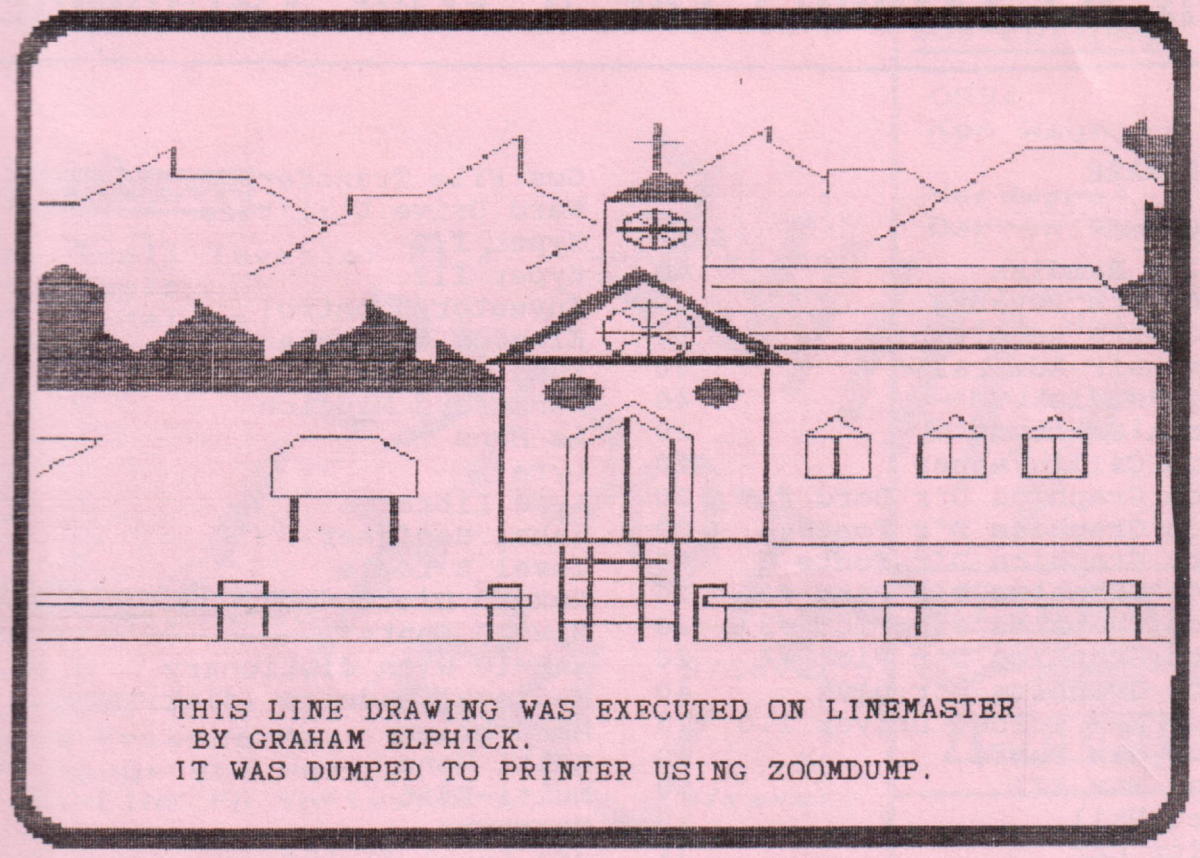
Apr/May 1992 Vol 5. NO.2

COCO LINK

The Color Computer Magazine



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COCO LINK

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COCO LINK

Copyright Notice

FUTURE VIEWS

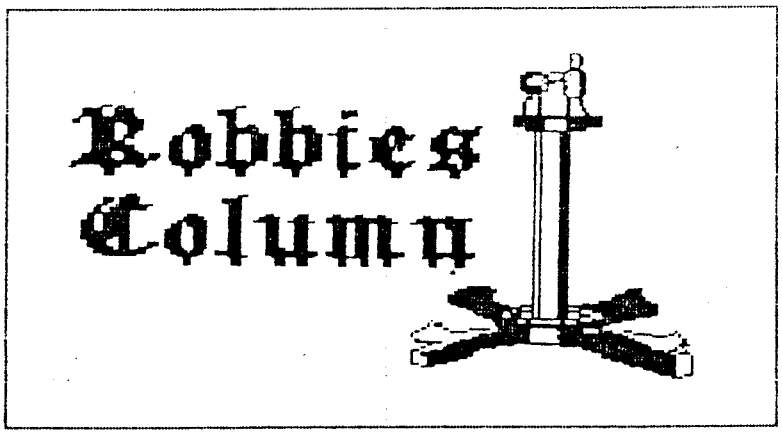
I am the proud owner of an IBM compatible machine as well as my Coco.
Did I hear someone say "We have a traitor in our midst!"..?
It's not true! I haven't abandoned the Coco as this magazine shows. It is still produced using the Coco 3 and Coco programmes. It will continue to do so as long as enough people out there support it.
No, my IBM is not in opposition to the Coco, it is used to further my other computing interests where the Coco is unable to fulfil my needs.

The two main areas of interest to me are the Midi Music scene and Genealogy.
The Coco does not cater for Midi music to the degree of my interest although for those with a passing interest it can be made to perform quite well.
My interest is aimed higher and my goal is to build a complete home studio to record and compose the type of music I like. If anyone is interested in the Midi capabilities of the Coco, I am sure we will be able to formulate an article on the subject.
My other main interest is , as I mentioned, Genealogy. My reasons for ditching the Coco in this instance is mainly to do with a very large data base and the selection of programmes available with the IBM to manuipulate this data.
Again Coco can cater for this subject to a certain degree but when you really get deep into it I am afraid Coco can't handle the very large amounts of information one needs to store. It is possible that with a hard disk attached to your Coco that this would then become feasible but as I do not have a Coco hard drive it was not an option.

So there you have it. My reasons for purchasing one of the dreaded MSDOS machines.

We all have computing subjects which are important to us and we must find the best way possible to fulfil them. My advice is to use your Coco to do this until such times as Coco is unable to cater for all your needs. Then is the time to move on. If Coco does all the things that you need of a computer there is no need to look elsewhere.

****



THIS ISSUE

This issue features three important events:-
1) The last part of "The Small Investor" appears in this issue. Why is this an important event you may ask? Well, I hope that even for those not interested in investment, this programme has shown that with a bit of thought and effort it is possible for any of us to write programmes on a wide variety of subjects. It has also helped to show that COCO-LINK is willing to cover this wide variety of subjects.
2) We have received our first submission to COCO-LINK from the USA. This game by Raymond Berney from Washington, is very innovative and enjoyable to play. It is a skillful game with very high educational potential.
Although it is on the longside, (we are only reproducing level 1 of a 3 level game) we felt compelled to include it in COCO-LINK. We will revert to our three column listing format for this long listing.
Hopefully in the future Raymond will give us permission to include the whole three levels on one of our PD Disks.
3) Included in this magazine is an advert and covering letter for a new Coco disk magazine from the USA.
In our usual tradition of trying to be helpful I would suggest that anyone interested in this product contact us here first. Should there be a reasonable response we will try to negotiate to produce the disks here. This would save the recipient considerable in postage ex USA.
Keep in mind that the prices quoted in these ads are in US$ and therefore prices in Australian currency will be higher. Count on from 50% to 60% on top of US price. This is to cover exchange rate etc. This would also depend on what sort of a deal we could arrange.
Again, anyone interested should contact COCO-LINK first for the best possible deal.

In addition to the above we have an article which we hope might help those who are considering moving upwards to a hard disk.

That and much more should keep you occupied for the next couple of months.

****

NEXT ISSUE

Next issue will be based on graphics pictures and programmes. Watch out for George Mc Lintock's Coco 3 Hi-

ges Dump programme, Basic animation by Johanna Vagg and other graphic goodies.
If you want to see you graphic efforts or programmes in print in the next issue then send them in NOW!

We will also have several PD disks in conjunction with this Graphics issue so that is also something to look forward to.

****

MEMBERSHIP LISTS

I have cosidered the question of printing a list of COCO-LINK subscribers. My conclusions are that, with the declining of support for the Coco the time is right for us to help further in linking Coco users together.
To this end we have decided to print a list of those subscribers who wish to be added to such a list. A form is included separately with this magazine and I ask those of you who wish to be represented on the list to return the form as soon as possible.
It is realised that some people may not wish all of their home details included on the list, some may only wish their phone number to appear!
Please fill in only those details you wish to appear on the list.

Again, I stress that only those wishing their names to appear on such a list shoud return the enclosed form.

****

COCO-LINK AND COMMUNICATION

Further to the above, I would like to stress that by compiling a list of subscribers and encouraging the passing of information between individual Cocoists, we do not wish tosee COCO-LINK bypassed in the chain of information that passes between the individuals. (see letter and answer on this subject in the Link-up Columns).

These questions and answers are the lifeblood for our survival in this computer jungle. We need to be in the centre so as all subscribers can be privy to as much information as we can get hold of.

****

CLUB CONTACTS AND BULLETIN BOARDS

The following lists of Club contacts and Bulletin Boards which still cater for Coco are due for review. I would ask all those who would like their club or favourite BBS to confirm that the club or BBS is still operational and who the present contact is.

Only those organisations who send us confirmation of their present status will be included in the list in future issues of COCO-LINK.

CLUB CONTACTS

AMUG.....	Dick Burke	08 296 2995
Basic.....	Johanna Vagg	068 522 943
Brighton.....	N.Winter	07 269 4373
Brisbane North....	M.Webster	07 285 6551
Brisbane S/W.....	Bob Devries	07 372 7816
Geelong.....	Alan Murrells	052 753 065
Moe User Group....	Joseph Hester	051 277 817
.	Ian Taffs	051 275 751
OS9 User Group....	Gordon Bentzen	07 344 3881
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.	Greg McKenzie	059 837 255
.	Gordon Chase	059 711 553
.	Robert Hillis	03 563 3553
Penrith CC Users..	Debbie Collier	047 213 945
Springwood Users..	P.Richardson	047 536 018
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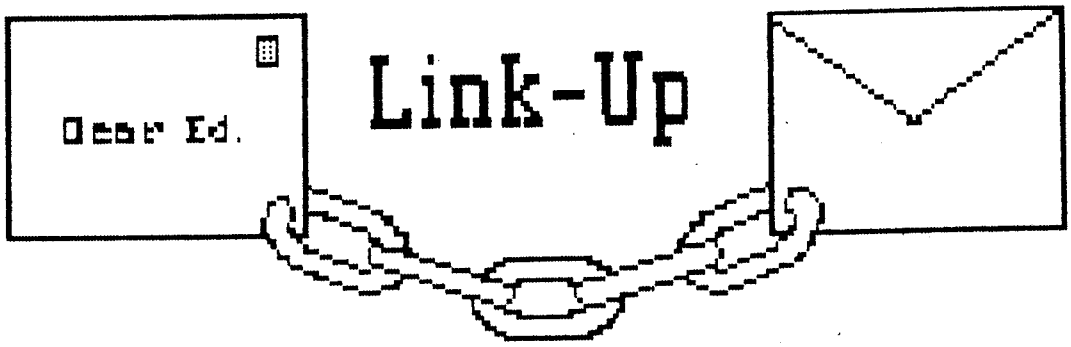
WUG's BBS	Ph.(03)-364-0343

Robbie



Dear Ed,
Thanks for publishing my letter in the last COCO-LINK because I had a pleasant surprise with a reply from George McLintock, who thinks he can help with my printer drivers. To answer my question about HDOS, I am told it was a DOS for hard drives on CoCo's sold in U.S.A.

John McNabb. Boronia. Vic.

****

Dear Ed,
I have just learned to make my own cards now on our computer with the graphics disk, it is a lot of fun, and a lot cheaper than having to buy them.
We saw the reply to our letter in the magazine; we wrote our thanks to Mr Stan Bilazejewski and sent him a Xmas card.

L.A. & S.A. Cooper. Leichardt. N.S.W.

****

Dear Ed,
My CGDP was ordered via November SOS, I have got both the program and manual and have a backed up the program. I am using the copy version.
I have started testing the program and have found that what's there, against what I believe should be there, are not the same.
I have checked most of the problems on the copy against the version of CGDP sent, and found the problems are still there.

The problems are:-

(1) The PICSET1 picture collection page 59 of the manual is not displayed when asked for via the SELECT PICTURE #1 or #2.
The PICSET1 label is displayed on the Picture Selection Window, but all the pictures are just lines and dots.
I have checked #1 and #2 options, and PICSET1.PIC on the disk directory is the right size.
The only pictures I get are the VDU and keyboard and the printer, which are the two demo pictures.

(A) Are the pictures on the disk, and how do I get the Program to load them?

(B) Were the pictures not put on the disk, and was it by error, or did I buy the Program without them included in the price?

(C) Do I ask for a replacement, and from who, and how, and what do I do to get them to replace the disk.

(2) On the Greeting Cards area of the Program, the Space Shuttle and USA Man are displayed on the inside page; the two pictures are the two demo pictures.
The VDU, keyboard and the printer are displayed on the cover area, and also they are the two demo pictures for that part.

(A) I am not able to get any other pictures, and when I try I get just the same lines and dots as in the PICSET1.

(B) I also cannot get the cover picture for the inside page and vice versa.

(3) The fonts are all listed and are the right size on the disk directory, but only the BOLD and LIGHT are working.
When fonts options A or B are pressed the fonts on the disk are loaded up, the same happens, only two fonts are able to be used.

I am using the C.G.D.P. on a CoCo 3 with DDOS2 (from A.P.D. for use with CoCo2). Two double sided disk drives using side 0 for C.G.D.P.
Copy of C.G.D.P. in drive 0 backup by normal backup command.
Drives set at 40 tracks with speed of about 6

I hope you can help me fix the above problems, as the C.G.D.P. looks like a great Program to work with on a CoCo 3.
If I have made a mistake as to what should be happening with C.G.D.P. and everything as it should, I am deeply sorry for wasting your time.
I am hopeful of a reply from you very soon.

Simon Hutchinson Nth. Dandenong. Vic.

I have already replied to Simon suggesting that he get in touch with the distributers of the programme. I have found that most US distributers are quite prepared to help out or replace if the product was faulty when received.
I also have had a few extra thoughts on the matter and wonder if it is possibly a problem caused by his DOS. We use several DOD versions at COCO-LINK and have found on several occasions that certain programmes will only work with RS-DOS and that set at Tandy's normal 35 tracks.
I would suggest that Simon tries the C.G.D.P on a friend's Coco using RS-DOS
As a matter of interest, there were three other C.G.D.P programmes sent out at the same time as Simons. I have

had no correspondence regarding the programme. Maybe one of our other users can help out Simon.

****

Dear Ed.
Tandy followers may be interested to know that I have a Radio Shack Model 100 laptop (1983 vintage I think) connected through a modem to the newspaper computer of our Ipswich Provincial Daily. As a country Correspondent, I can get my stories straight in to the sub-editors screen in a few minutes flat.

Mal McLauchlan Boonah. Qld

****

Dear Ed.
Could you send the enclosed letter on to the writer of "WORLD TIMES" (COCO-LINK Vol.5 No.1).
I would like to suggest, as other writers have done, that perhaps when a program is submitted to the magazine, the writer could enclose his/her name and address so that any questions concerning the submission could go straight to them.

Malcolm Reid Ingleburn NSW

The subject of whether a correspondant or submitter of material to the magazine wishes to have their name and address published has been covered fairly well over the past few magazines and again in this one (See Robbies Column).
I must point out that by corresponding direct to the writers of published programmes you deny other readers of the knowledge of the question asked and the further knowledge of the answer given. These questions and answers play a large part in the furtherance of the computing skills of many of our readers.
I would not like to think that publishing a list of subscribers names etc. will deny COCO-LINK this very important area of interesting material for the magazine.

****

Dear Ed.
I would like to request a little information before I outlay my hard earned cash.
1) DATA WINDOWS 1.1 I have been searching for a really good database. Briefly, what I want to do is catalogue all my music. Firstly, I want to store the name of each record or cassette album I have. With that I want to record the name of the artist/s and every song on the album. I want to be able to enter the name of a song and have the programme tell me where that song is located. Of course features such as wild cards would also be handy. I have several other applications in mind for it also. Can DATA WINDOWS do this? If not, do you know of a database which will?
2) LEVEL II TOOLS, TOOLS II, UTILITIES package. Could you please provide me with a list of the contents of these disks and if possible, short descriptions. Do the disks come with instructions?
3) MVBANNER. Does it print in color on the CGP220?
Thanks in advance for your help. I await answers so as I can order the programmes.

Bob Barker Liverpool. NSW

I am sorry to say that we use none of the above programmes and therefore are not in a position to give you the information you require.. I leave it open to our readers. I am sure that they will be forthcoming with the necessary information.

****

Dear Ed,
Thank you for answering my letter. What a real joy it was to also get a copy of COCO-LINK MAGAZINE along with your letter! After reading just the cover mentioning that you are starting the magazine's fifth year, I know that you are very serious about supporting your fellow (and lady) Coco Users throughout Australia.
My hardware system includes a 512k Coco 3, 2 double-sided disk drives with Disto Mini-controller, NX-1000 B&W printer with Metric Industries S-P interface, Deluxe Joystick and 1-button Coco mouse. Major software that I use: CoCoMax III, Telewriter-128, VIP Speller 1.1. VIP Speller only marks the wrong words, I have to use a separate checker (Franklin SA-95 Spelling Ace) to correct them.
I can answer some of the questions asked in the Feb/Mar 1992 issue of COCO-LINK:
To John McNabb- HDOS is an operating system offered by Hard Drive Specialists. There never was a Coco3 version of JDOS. Owl-Ware acquired the rights to JDOS from J&M Systems. There was a very detailed article about hard drives and how to connect them in the March 1989 USA RAINBOW.

Raymond Berney Washington USA

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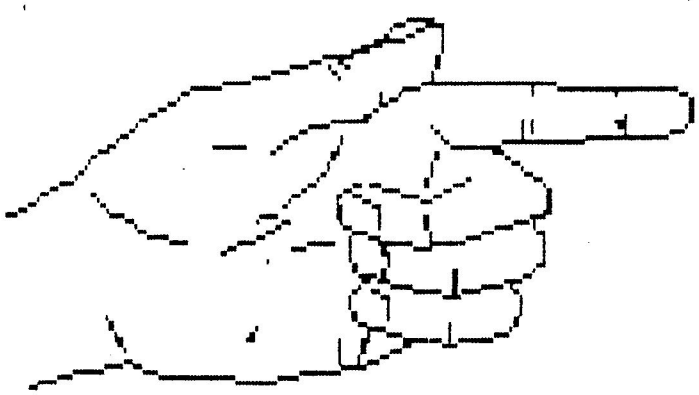
END

****



By Robbie Dalzell

Better BASIC Part 20

World Times Upgrade

The WORLD TIMES listing from the Feb/Mar edition of COCO-LINK left itself open to much inmprovement in the code. It was mentioned at the time of publishing that the code was in its draft mode and could well be improved upon. This article sets out to show one method of reducing the size of the code and in the process improve the action of the programme.

The WORLD TIMES listing makes use of variables to designate individual cities around the world. In the listing there are three separate sections which stand out as in need of improvement. These are:-

Lines 430 to 510
Lines 520 to 690
Lines 760 to 920

The method following entails making the city variables into a DATA statement:-

```
2000 DATA AH,MH etc.
```

Then the above three sections could be put into three single lines as follows:-

```
430 IFY>=30 THEN FOR B=1TO17:READ
    Z$(B):Z=VAL(Z$(B))+1:NEXT:RES
    TORE
520 IFAH>=24 THEN FORB=1TO17:READ
    Z$(B):Z=VAL(Z$(B))-24:NEXT:RE
    STORE
760 IFAM=60 THENFORB=1TO17:READZ$
    (B):Z=VAL(Z$(B))+1:NEXT:RESTO
    RE
```

If you study the three lines you will notice that they are very similar. This means that we can further cut down on memory usage.

In the three lines we have the same code from the THEN statement except for the value added or subtracted from VAL(Z$(B)). Therefore if we make this value into a variable we can then make this similar part of the line into a subroutine as follows:-

```
2010 FOR B=1TO17:READZ$(B):Z(B)=V
     AL(Z$(B))+A:NEXT:RESTORE:RET
     URN
```

Our other three lines should then be changed to read:-

```
430 IFY>-30 THEN A=1:GOSUB2010
520 IFAH>=24 THENA=-24:GOSUB2010
760 IFAM=60 THENA=1:GOSUB2010
```

This then has outlined one method of making WORLD TIMES a better basic coded programme.

There is more that could be done to further shorten and quicken this programme. Why don't you have a go and send us the results. Maybe, if we get enough entries, we could put up a prize for the shortest code which makes WORLD TIMES work as written

Go to it!

END

****

Some useful Hints and Tips appear over the page.

HINTS AND TIPS

1) To make a printout of a disk directory:
POKE111,254:DIR

****

2) The following will centre a title or a string on a line:
xxx PRINT TAB((32-LEN(A$))/2)A$
Where A$ is the string to be centred.

By substituting 40 or 80 for the 32 this line can be used in the Coco 3 Hi-res text screens.

****

3) EXEC44539 waits for a keystroke and can be used as a substitute for:
xxx I$ = INKEY$:IF I$ ="" THEN xxx

****

4) When drawing a straight line it sometimes handier to use the DRAW command instead of LINE. It uses less memory and lets you DRAW any colour without the COLOR command.

****

5) You can get true lower case letters in the 32 width mode with POKE &H95C9,&H39: POKE &HFF22,&H34

****

6) The Hi-speed poke for the Coco3 is POKE 65497,0

****

7) The HBUFF command has been found to throw up errors when using more than 2 buffers. These errors occur when using the GET and PUT commands.
The answer to this problem seems to be to add one (1) to each of the first buffers to coincide with the buffer numbers over 2.
EXAMPLE:

	OLD	NEW		
BUFFER No.1	65	+1	=	66
BUFFER No.2	60	+1	=	61
BUFFER No.3	179	+1	=	180
BUFFER No.4	82	82		

****

8) There is a bug in the Coco 3 ROM that handles PALETTE RGB and PALETTE CMP. These two commands restore the palette registers to the default values for your type of monitor. Because of a counter initialised to the wrong value, these commands only restore the first 15 registers. Fortunately it can be fixed with a single poke.

```
POKE &HE649, &H10
```

It is recommended this line be included in all programmes where the PALETTE command is used.

****

9) In the Hi-res text formats on the Coco 3 the PRINT statement does not correctly handle the printing of the tabs, either explicit (as in 'PRINT TAB(8) A$') or implicit (as in 'PRINT A,B')
The following short machine language routine will remedy this problem. It has been programmed to sit in an unused portion of memory so as it does not use up any programming memory.

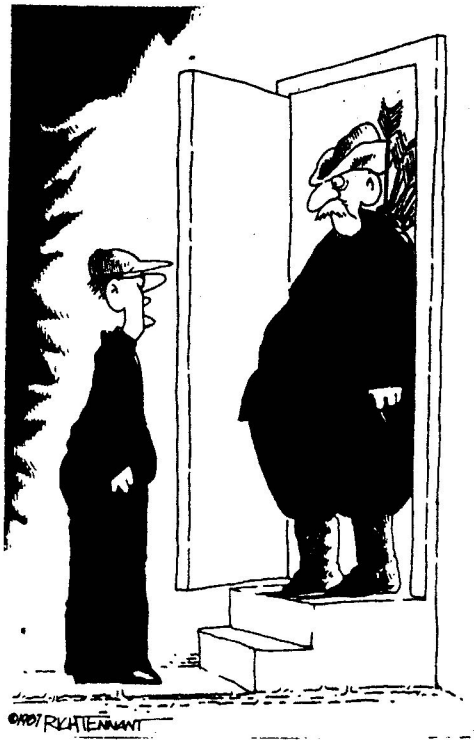
```
100 B=&HF09D:FORX=0 TO 31:READ HX$:
    POKE X+B,VAL("&H"+HX$):NEXT
110 DATA 86,28,D6,E7,26,07,D6,89,C4,
    1F,7E,A3,77,C1,01,26,05,8E,10,
    20,20,04,48,8E,10,40,F6,FE,02,
    7E,A3,7C
120 B=&HA373:POKE B,&H7E:POKE B+1,
    &HF0:POKE B+2,&H9D:POKE B+3,&H12
```

It is recommended that this routine be included in all your programmes that may need it.

****

10) HPRINT statements do not allow a semicolon (;) after the statement, This causes an SN ERROR.

****

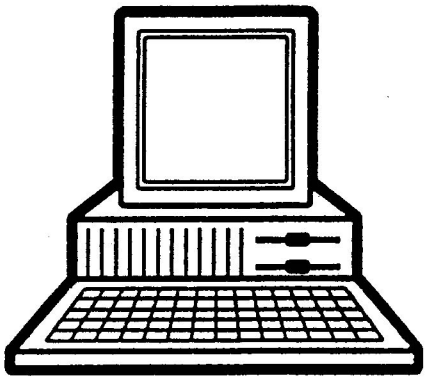


"I WAS TOLD THIS IS WHERE THE APPLE USERS GROUP MEETS."

BRAND NEW!!!

Introducing A Brand New Product For The COCO 3:

COCO FRIENDS DISK MAGAZINE



It's part magazine, part BBS and part shareware! COCO FRIENDS DISK MAGAZINE is dedicated exclusively to those who still enjoy running their COCOs under RS DOS! This new product will rekindle the fire in your COCO computing life. Articles, programs, opinions, reviews, and more presented in a more personal way than you have ever experienced before!

Come and join your COCO friends! Get better acquainted. Share your views and reviews. See never-before seen programs, graphics, and more! You and your COCO deserve it! We'll see that you get it!

If this sounds good to you, I invite you to investigate now. Dive in and get ready to have FUN!! Send $6.00 (check, cash or money order) now. You'll receive the COCO FRIENDS DISK MAGAZINE STARTUP KIT. Browse this shell and give us your input with the built-in ENTRY WRITER. Make any other contribution in the nature of your original work. Send a copy back to RICK'S COMPUTER ENTERPRISE and we'll send you the next issue. (The startup kit and the first issue cost only $6.00)

If you like what you see, become a regular subscriber at the low cost of $30 for 6 issues. If it's not for you...well that's okay, too. There's no further obligation. I think you'll agree, this is an offer you can't refuse!!

Don't put it off. Get in on the ground floor and help keep the COCO community strong!! We'll be expecting to hear from you soon!

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December 19, 1991

Dear CoCo Friend,

There are signs that quite a number of CoCo friends still enjoy using RS DOS on their machines. From comments I have received, these friends feel the world has written them off. My feeling is the CoCo is still the same intriguing useful machine it was five years ago. The facts are that TANDY has quit us, many of the most able programmers are now dedicated to OS9 and RAINBOW is not meeting all their needs.

In response to the apparent need of a new product for these almost forgotten friends, I have created the 'COCO FRIENDS DISK MAGAZINE'. It's part BBS, part magazine, and part shareware in nature. Basically it's a flippie diskette that will contain CoCo 3 programs on one side and a diskette magazine on the other. The contained material will be made up of contributions from it's subscribers. The idea is newly conceived and hardly full grown.

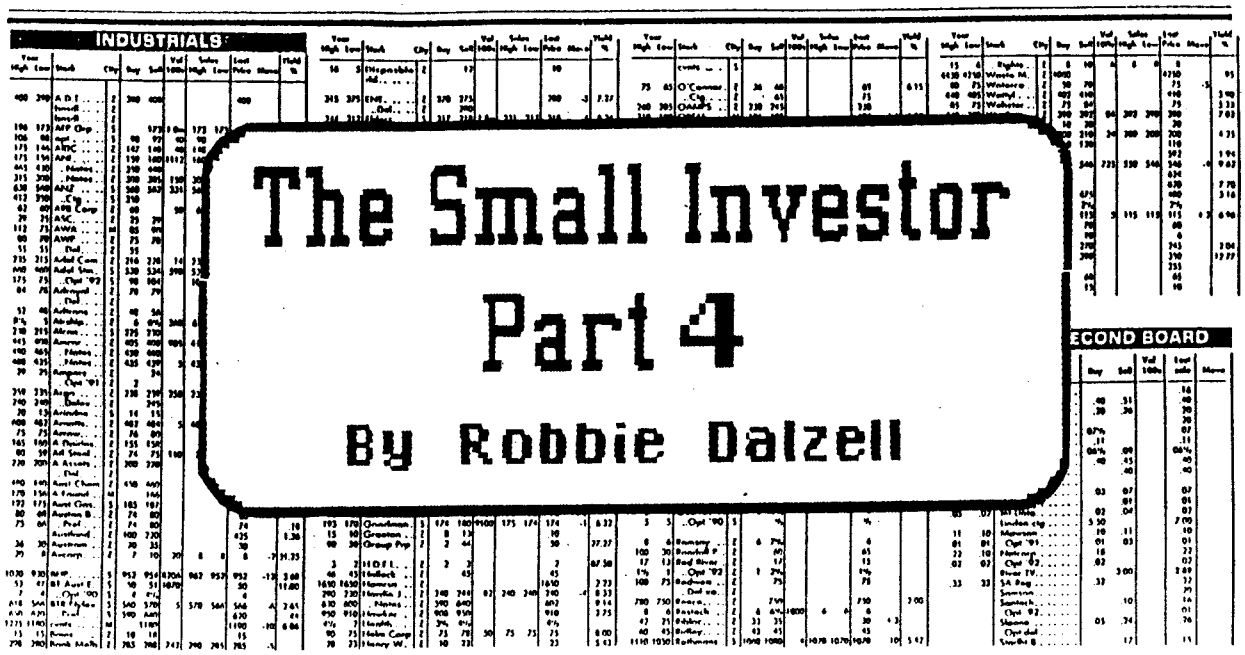
An undertaking of this nature will require the help of all those who desire to keep this aspect of the CoCo alive. I realize that I cannot possibly do this by myself. So, I am contacting the writers and programmers who have been so successful in educating and entertaining us to this point and asking for their assistance. If you feel that such a project is worthwhile, please consider contributing your expertise in the form of an article or program for one of the initial issues. While I don't have the funds to pay for your efforts at this time, I will be most happy to give you a 6 issue subscription for your contribution.

The enclosed diskette contains the shell program of 'COCO FRIENDS DISK MAGAZINE'. The manual which accompanies it explains in some detail how the product works. Try it out and if the project seems worthwhile, please consider becoming a contributor.

Sincerely,

Rick Cooper

National Share Tables



The Small Investor Part 4

By Robbie Dalzell

In This, the fourth part of this series, we will add the routines for printing out the screens generated by The Small Investor. The two screen dumps following were written and provided for adding to the programme by George McLintock.

These screen dumps are of two entirely different natures. The first discussed is a screen dump of the hi-res 40/80 character text screen and the second is a Hi-res graphics screen dump. Of the two, the graphics dump creates the most problems for both the writer and the user of the programme.

As it is possible to use these dumps in many diverse situations, I have decided to include both dumps as originally received from George with samples and full text explaining how the routines work and how to adjust them to suit your particular printer. I will then explain how to add them to the Small Investor.

George's part of the article is required reading as, with so many different printers on the market, you may have to change the code in some aspects to suit your printer.

.SCREEN PRINT PROGRAMS By George McLintock

These are a couple of ML routines which allow you to do a screen dump of any of the high resolution screens for the CoCo 3 (Both text and graphics screens). They are intended to be included as part of a Basic program which produces the text/graphics material on the screen and then calls these routines to produce a hardcopy print of what is displayed. The graphics screen dumps reflect this in that it incorporates all the forground colors from the screen into a single printer color for the dump.

The routines will work with all CoCo 3 screens and with either Tandy or Epson type printers. To minimise set up procedures, they are designed so that the variations required for different types of printers and screens are handled by the Basic program which uses them. The ML routines perform only the basic low level data manipulations required, with all the higher control type logic being handled by the Basic program. The procedures for using the routines are shown in the example programs called SCNPNT1 and 2. Some more details about them follows.

These routines have been set up so that the code is fully relocatable, but the data storage areas are at fixed locations in memory. The data storage areas can be moved with some POKE's to the ML code so they are not permanently fixed. This procedure allows for the maximum flexibility in memory useage for programs of this nature.

When using the CoCo 3 screens, the memory provided for the old CoCo 2 screens is not used, but is still allocated so is therefore available for other uses. The areas involved are 512 bytes for the 32 column text screen starting from Hex 400 and 6K bytes for the PMODE graphic screen, starting from Hex E00 for disk and Hex 600 for tape systems. You can reduce the size of the graphic screen to 1.5K with a PCLEAR 1 command, but you require a special procedure to reduce it to zero. You can use either of these areas for ML routines and data storage etc.

The screen dump routines are provided as DATA statements to be POKE'd into memory for execution. They can also be set up for any of the other standard procedures for handling ML routines. While these are

similar routines, they are quite different in the way they operate, and they are set up here as two separate routines. If you want to, you can combine them into a single routine but they are done this way to allow them to be used independently of each other.

TEXT SCREEN DUMP - IN SCNPNT1

For this one, the demo program puts both ML and data areas in the 32 column text screen area. On the basis that if you want to dump the 40 or80 column screens, you won't be using the 32 column screen

The two parameters required are POKE'd into the cassette file name area.(at Hex 1D1) The start of the ML routine is at M1 (which is &H400 for the demo program). The fixed memory locations used for data are at the following locations. These can be changed by POKE's to these locations

M1 + 8 = Data area to return characters = &h500 here
M1 + 12 = Data area to return attributes = &h580 here
M1 + 15 = Location of parameters = &h1D1 here

All values are two byte integers, ie M+15 contains 1, and M+16 contains &hD1

Parameters are as follows: assume P1 contains the address of the parameters ie P1 = &H1D1 for here

P1 + 0 = Row number to extract (range 0 to 23)
P1 + 1 = Number of characters per row (either 40 or 80)

There is no check on the value of parameters used, but the ML routine 'expects' them to be within the normal range. You can use other values for special purposes. The routine will return the number of bytes as specified by parameter P1+1. The offset address to start extracting from in the text screen is the first parameter multiplied by the second parameter. So if you use parameter 1 = 9, parameter 2 = 20, then with the 40 column screen it will return columns 21-40 from row 4

The results are returned in two adjoining elements in a string array which can be defined as DIM A$(1). The calling sequence is:

```
A$(0) = USR1(A$(0))
```

Where A$(0) contains the characters from the screen for that row, and A$(1) contain the corresponding attribute bytes for the characters in A$(0). If you only want the text then you can simply print A$(0) with code like PRINT #-2, A$(0)

If you want to vary the print style according to the attribute byte then use the following. eg for a DMP-105, to underline text that is underlined on the screen use something like the following

```
10  Q=0: FOR X=1 TO LEN(A$(0)): T =
    ASC(MID$(A$(1),X,1))
20  IF (T AND 64) > 0 THEN IF Q=0 T
    HEN Q=1: PRINT #-2,CHR$(15); 's
    tart underline
30  IF (T AND 64) = 0 THEN IF Q=1 T
    HEN Q=0: PRINT #-2,CHR$(14); 'e
    nd underline
40  PRINT #-2, MID$(A$(0),X,1);NEXT
    X: PRINT #-2
```

A similar type logic can be applied to vary the printer style according to any aspect of the attribute bytes. If you have a color printer, you can change the color of the text printed depending on the forground or background colors in the attribute byte.

To dump a full screen of width 40 use a loop like

```
POKE P1+1,40 'screen width
FOR Y = 0 TO 23 'all rows
POKE P1,Y: A$(0) = USR1(A$(0))
PRINT #-2,A$(0)
NEXT Y
```

GRAPHICS SCREEN DUMP

The demo program (SCNPNT2) is set up to put both ML code and data areas in the CoCo 2 PMODE screen area, on the basis that if you want to dump the CoCo 3 graphic screens you won't be using the PMODE screens

While this screen normally starts at Hex E00 for disk systems, it can move whenever you use a FILES command in a program. In all cases the address of the start of this graphic screen area can be obtained from memory location Hex BA. So the start of the screen, which becomes the start of the ML code is obtained by M2 = PEEK(&HBA) * 256

The parameter area, address in P2, normally starts at a location which is 256 bytes past the start of the ML code, so it is obtained with P2 = M2 + 256. The start of the parameter area MUST be a multiple of 256, and the high order byte of the address is POKE'd into the location M2 + 15. ie POKE M2+15, PEEK(&HBA) + 1. This value is put into the DP register and used to access the data areas. The remaining data areas follow immediately after the parameter area and there must be sufficient space to hold the number of pixils from across the graphic screen. ie 320 + 16for HSCREEN's 1 & 2 and 640 + 16 for the other HSCREENs.

This one requires a number of parameters as follows

P2 + 0 = Number of strings to return
P2 + 1 = Number of bytes per row to extract
P2 + 2 = Number of pixils per byte
P2 + 3 = Number of bits per pixil
P2 + 4 = Number of dots per byte for printer
P2 + 5 = Start of graphic screen in Address space

The value of P2 + 5 is ALWAYS 128 (Hex 80) and of P2+6 is always zero. This sets the start of the graphic screen area for the ML routine, and it is updated by the ML routine automatically. It is set from the Basic program to reduce the size and complexity of the ML routine.

The value in P2 + 4 depends on your printer type. It is 7 for a Tandy type printer (7 dots per column for graphics, with the top dot in column corresponding to low order bit in byte) and 8 for Epson type printers (8 dots per column for graphics, with the top dot in the column corresponding to the high order bit in the byte). The ML routine will return strings to suit the printer type according to this parameter.

The values for the other parameters depend on the HSCREEN to be dumped. They could be derived from the HSCREEN number, but are POKE'd instead. Again to reduce the size and complexity of the ML code. A minimum of two par-

ameters are required (HSCREEN number and printer type), the extra Basic code required to provide the others is less than the ML code required to derive these from the HSCREEN number. These parameters are as follows

```
 Parameter : Hscreen Number
                1  :  2  :  3  :  4
    V(0)  :     2  :  2  :  4  :  4  : Strings required
    V(1)  :    80  : 160 :  80  : 160 : Bytes per row
    V(2)  :     4  :  2  :  8  :  4  : Pixils per byte
    V(3)  :     2  :  4  :  1  :  2  : Bits per pixil
```

These parameters are required at the start of a dump only. If doing morethan one dump of the same screen, then the values in P2 + 5 and P2 + 6 are the only ones which require to be reset. The others are not altered.

The ML routine returns a single row of dots to be printed in Basic strings for each call to the routine. All screens are 192 pixils deep, so the number of calls required to do the complete screen will vary with the printer type. ie 28 for Tandy and 24 for Epson printers.

Assuming you have set the values in V() correctly, the set up required is:

```
DIM A$(V(0) - 1)  'array to return strings in
FOR X = 0 to 6: POKE P2+X,V(X): NEXT X ' set parameters
```

To do a full screen dump for a Tandy printer use code as shown in SCNPNT2, lines 240-310.

To do a dump for Epson type printers, use the code from 410-520.

Some general points:
These routines provide a basic screen print of the graphics screens. Some points to note with graphics screens include:
1) The aspect ratio (height / width ratio of pixils) for the 320 pixil widescreens (HSCREENS 1 & 2) is approximately 1:1, so you would normally print these with the same horizontal dot density as the vertical dot density for your printer. Normally either 60 or 72 dots per inch. Both Tandy and Epsons can be either, depending on the printer model. However,other horizontal densities can be used, and can give a reasonable effect.
2) The aspect ratio of the 640 pixil screens (HSCREEN 3 & 4) is approx 2 high to 1 wide. ie the vertical height is the same as the 320 screens, but the pixils are only half as wide. For Epson printers, you can print these in double density (horizontal density) to get the same ratio as the 320 pixil screens, and to get circles and squares looking right etc.If your printer doesn't have this density use one that is as close as can get.
3) For a 640 dot screen that is mainly text, you get an acceptable result with 80 to 100 dots per inch horizontal, but the graphic shapes tend to be distorted. On Tandy printers, the 100 dots per inch is normally the best you can get for these screens. For Epsons you have a wider range to choose from.

Centering the dump on the page:
In the sample code, I've indicated where you would insert a command to get a left margin to move the dump away from the left margin. eg to center it on the page. To do this, you can either print columns with no dots on, or use a command to move the print head to a specified dot position.

For Tandy printers, the command is

```
CHR$(27) + CHR$(16) + CHR$(X) + CHR$(Y)
```

Which will move the print head to dot position X * 256 + Y.

For Epson printers, the equivalent command is

```
CHR$(27) + CHR$(36) + CHR$(Y) + CHR$(X)
```

Note that the X and Y 's are reversed for Epson type printers. They use the Intel style of integer numbers, while Tandy uses the Motorola style.This command on an Epson assumes a dot density of 60 dots per inch. If printing in some other density then you have to scale the left margin size to suit.

Dumps with black background:
If you want to produce a screen dump with a black background, then use POKE M2 + &H46 , &H26. This changes a BEQ instruction to a BNE which reverses the dots on for a dump. If doing these on an Epson type printer note that you may have to include a delay loop to prevent the print head overheating. Tandy printers protect themselves from this, but not all Epson compatable printers do.

Older Epson type printers:
Some older Epson type printers will not accept the "*" form of graphics command. For these you have to use the "K" or "L" form. If you use the "*" version, they will start doing page feeds until you turn them off. I understand that the DMP-132 in IBM compatable mode has this problem. I don't know about the DMP-106. If you are not aware, IBM compatable is essentially Epson compatable for graphics, with some minor variations in some control codes.

Excluding parts of the screen:
The strings returned by the ML routine are normal Basic strings and can be treated as such. If you want a dump of the centre of the 640 pixil screens on printers that do only 576 dots per line, then need to exclude32 dots from both ends. To print these, after the extraction which gives4 strings, use code like

```
PRINT #-2, MID$(A$(0),33); A$(1
); A$(2); LEFT$ (A$(3),128);
```

Note that for Tandy printers you require the ';' on the end to prevent an 'extra' line feed. The Tandy printers will do an automatic LF if you print a column in the last dot position in a line. For Epson type printers, exclude the ';' at the end of the print line. For these, you require a separate CR to get a LF and move the print head back to the start of the next line. If doing this with an

Epson, you also have to adjust the number of columns to print in graphics mode. ie the number inC$
To exclude rows from the top and bottom of the screen you can extract them into strings and simply not print them to exclude them. This will exclude rows from the top in groups of 7 or 8 pixils. To exclude individual rows of pixils from the top of the screen, you can adjust the values poked into P2 + 5 and P2 + 6 so as to start the dump from any screen memory location.

Other Options:
There are other options you can apply with these routines, but I won't cover them here. If you are interested in this sort of variations, I suggest you obtain a copy of my full screen dump programs which provide a wider range of options with supporting text descriptions. These programs will be issued as a PD disk with the April/May issue of COCO-LINK.

George McLintock

ADDING THE ROUTINES TO THE SMALL INVESTOR

Hi-res text screen dump.
This routine has been added to the Small investor in lines 11000-11040 and the accompanying data in lines 58000-58020
When a Fundamental Analysis page for a company has been produced you will be asked if you require a dump of the page. A 'Y' will direct to the dump routine which accesses the ML routine in memory using the USR function. The page will then be printed.

Hi-res graphics screen dump.
This routine has been added to the Small Investor in lines 8000 - ? and the accompanying data in lines 58030 - 58090.
The routines for both Tandy and Epsom printers have been left in to try to cover as much ground as possible. The main problem being that so many different printers use so many different codes for the same thing that it becomes impossible to cover all angles.
Please note the line ? which states put 7 for Tandy and 8 for Epsom. Set this variable to your requirements before you start. The default is set at 7 for Tandy.

Should you find that one or the other of these routines works OK for you, it is an easy job to remove the unwanted lines as each routine is clearly REMmed.
Any problem encountered with these screen dumps may have to be dealt with in an individual manner, but again I stress that reading the above article by the author of the routines should help most people overcome any problems encountered.

The appropriate lines have been added to the Technical Analysis screens to facilitate the dumping of the screens.

The following listing shows all the additions and alterations to existing code needed to include these screen dump routines into The Small Investor.

EPILOGUE
This then completes our Small Investor programming project. It must be realised that this programme only skims the surface of programming for stock market investment. There are obviously many more ways of helping to control investment strategy.

```
10 'CALLED SCNPNT1 - TO DEMO USE
 OF SCREEN DUMP OF 80 COL TEXT S
CREEN
20 ' LIST PROGRAM TO HAVE SOMETH
ING ON SCREEN
30 ' BY GEORGE MCLINTOCK. 7 LOGA
N ST. NARRABUNDAH ACT 2604
40 '
50 M1=&H400: GOSUB 1000 'SET UP
ML CODE STARTS AT &H400 TEXT SCN
 32 COL
60 DEFUSR1 = M1 'ENTRY POINT
70 DIM A$(1) 'ARRAY TO RETURN CH
ARACTERS
80 T=&H1D1 'FOR PARAMETERS
90 POKE T+1,80 'FOR 80 COLUMN SC
REEN
100 FOR X = 0 TO 23 'DO ROW BY R
OW
110 POKE T,X 'SET ROW NUMBER IN
PARAMETER TABLE
120 A$(0) = USR1(A$(0)) 'EXTRACT
 IT
130 PRINT #-2,A$(0); 'AUTOMATIC
CR WITH TANDY PRINTER AT 80 COLS
140 NEXT X
150 STOP
160 '
990 'SET UP ML
1000 LN=58000:FOR X=0 TO 58 STEP
 25: IF X < 49 THEN N=25 ELSE N=
8
1010 B=0:FOR Y=0 TO N-1:READ A$:
 T=VAL("&H"+A$): B=B+T
1020 POKE M1+X+Y,T: NEXT Y: READ
 A$: IF B <> VAL("&H"+A$) THEN P
RINT "ERROR IN LINE NUMBER";LN:
STOP
1030 LN=LN+10: NEXT X
1040 RETURN
58000 DATA 1A,50,86,36,B7,FF,A4,
CE,5,0,10,8E,5,80,FC,1,D1,E7,84,
EF,2,30,5,E7,84,B40
58010 DATA 10,AF,2,8E,80,0,4D,27
,5,3A,3A,4A,26,FB,A6,80,A7,C0,A6
,80,A7,A0,5A,26,F5,A96
58020 DATA 86,3C,B7,FF,A4,1C,AF,
39,420
```

```
10 'CALLED SCNPNT2 - TO DEMO USE
 OF SCREEN DUMP OF HSCREEN 1 AND
 TANDY PRINTER
20 ' THE GOSUB AT 900 JUST PUTS
SOMETHING ON SCREEN TO DUMP
30 ' BY GEORGE MCLINTOCK. 7 LOGA
N ST. NARRABUNDAH ACT 2604
40 '
45 CLEAR 2000:GOSUB 900 'SET PAR
AMETERS FOR HSCREENS
50 M1=PEEK(&HBA)*256: GOSUB 1000
 'SET UP ML CODE STARTS AT START
 OF PMODE SCREEN AREA
60 DEFUSR0 = M1 'ENTRY POINT
70 DIM A$(3) 'ARRAY TO RETURN ST
RINGS MAX SIZE
80 P1=M1+256: POKE M1+15,PEEK(&H
BA)+1 'SET PARAMETER AREA
90 H=4: PT=7 'H = HSCREEN & PT=7
 FOR TANDY 8=EPSON
100 FOR X=0 TO 3: POKE P1+X,V(H,
X):NEXT X 'SET PARAMS
110 POKE P1+4,PT: POKE P1+5,128:
POKE P1+6,0 'REST OF PARAMETERS
120 'PUT SOMETHING ON SCREEN
130 HSCREEN H: HCOLOR 1,0:HCLS
140 HPRINT (10,0),"TESTING grahp
ic screen DUMP"
150 A$="HSCREEN "+STR$(H) + " WI
TH PRINTER TYPE " + STR$(PT)
160 HPRINT (2,2), A$
170 HLINE (30,30)-(90,90),PSET,B
180 IF H <> 3 THEN HCOLOR 2,0
190 HLINE (110,35)-(200,60),PSET
,BF
200 IF H = 2 THEN HCOLOR 12,0
210 HCIRCLE (150,150),25
220 IF H > 2 THEN HLINE (330,10)
-(600,90),PSET,B: HPRINT (40,2),
A$
225 IF PT = 8 THEN 400
230 T=23: IF H>2 THEN T=20
240 PRINT#-2,CHR$(30);CHR$(27);C
HR$(T);CHR$(18); 'SET DENSITY AN
F GRAPHICS
250 IF PT=7 THEN NX=28 ELSE NX=2
4 'NUM ROWS TO DO
260 FOR X=1 TO NX
270 A$(0) = USR0(A$(0))
280 FOR Y=0 TO V(H,0)-1
290 PRINT#-2,A$(Y);
300 NEXT Y: PRINT#-2
310 NEXT X: PRINT#-2,CHR$(30)
320 STOP
330 '
340 'FOR EPSON PRINTER
400 T=5:IF H>2 THEN T=6 'DENSITY
410 C$=CHR$(27)+"*"+CHR$(T) 'GRA
PHICS
420 T=V(H,1)*V(H,2) 'GRAPHIC BYT
ES PER ROW
430 X=INT(T/256):Y=T-INT(T/256)*
256 'TO BYTES
440 C$=C$ + CHR$(Y)+CHR$(X) 'COM
PLETE CODE
450 PRINT#-2,CHR$(27)+"A"+CHR$(8
); 'SET LF DISTANCE
460 FOR X=1 TO 24 'NUM LOOPS
470 A$(0)=USR0(A$(0)) 'GET STRIN
GS
480 PRINT#-2,C$;
490 FOR Y=0 TO V(H,0)-1
500 PRINT#-2,A$(Y);
510 NEXT Y: PRINT#-2,CHR$(10) 'F
OR MY PRINTER SETTING
520 NEXT X: PRINT#-2,CHR$(27)+"A
"+CHR$(12) 'RESET LF
530 STOP
880 '
890 'SET UP ARRAY FOR DIFFERENT
HSCREENS
900 DATA 2,2,4,4,80,160,80,160,4
,2,8,4,2,4,1,2
910 DIM V(4,6) 'FOR PARAMETERS
920 FOR Y=0 TO 3: FOR X=1 TO 4
930 READ V(X,Y): NEXT X,Y
940 RETURN
990 'SET UP ML
1000 PRINT "SETTING UP":LN=58000
:FOR X=0 TO 168 STEP 25: IF X <
149 THEN N=25 ELSE N=18
1010 B=0:FOR Y=0 TO N-1:READ A$:
 T=VAL("&H"+A$): B=B+T
1020 POKE M1+X+Y,T: NEXT Y: READ
 A$: IF B <> VAL("&H"+A$) THEN P
RINT "ERROR IN LINE NUMBER";LN:
STOP
1030 LN=LN+10: NEXT X
1040 RETURN
58000 DATA 1A,50,CC,30,31,FD,FF,
A4,CC,32,33,FD,FF,A6,86,F,1F,8B,
C6,10,DD,7,1F,3,1E,B43
58010 DATA 13,C6,A0,96,0,E7,C4,A
F,42,33,45,3A,4A,26,F6,96,4,97,9
,DE,5,96,1,97,A,A18
58020 DATA 9E,7,E6,C0,96,2,97,B,
96,3,97,C,4F,59,49,A,C,26,FA,4D,
27,4,1A,1,20,79B
58030 DATA 2,1C,FE,66,80,A,B,26,
E6,A,A,26,DC,A,9,26,D2,DF,5,96,0
,97,9,9E,7,803
58040 DATA 96,4,81,7,26,12,86,A0
,E6,84,56,CA,80,E7,80,4A,26,F8,A
,9,26,F0,20,1A,86,A40
58050 DATA A0,97,A,86,8,97,B,A6,
84,46,59,A,B,26,FA,E7,80,A,A,26,
EE,A,9,26,E6,91D
58060 DATA CC,3C,3D,FD,FF,A4,CC,
3E,3F,FD,FF,A6,1C,AF,4F,1F,8B,39
,9CD
```

Code changes and additions to add the 80 Column Text Dump to the Small Investor

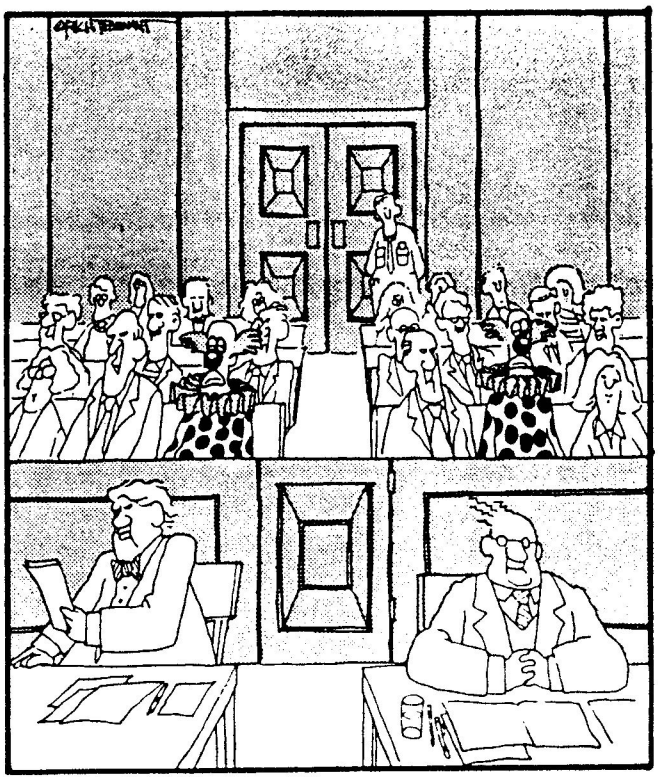
```
26 HD=0:R=0:H=0:F=1:W=0:P1=1:Y=1
:DT$="O":M1=&H400
28 DIMN$(10),D$(10,7),H$(10,5,4)
,A$(24),C(52,7),CH(52),LH(52),LS
(52),R$(1):GOTO9000

7499 '*** DUMP 80 COLUMN TEXT SC
REEN ***
7500 GOSUB11000
7510 DEFUSR1=M1:T=&H1D1:POKE T+1
,80 'FOR 80 COLUMN SCREEN
7520 FOR X = 0 TO 22 'DO ROW BY
ROW
7530 POKE T,X 'SET ROW NUMBER IN
 PARAMETER TABLE
7540 R$(0) = USR1(R$(0)) 'EXTRAC
T IT
7550 PRINT #-2,R$(0); 'AUTOMATIC
 CR WITH TANDY PRINTER AT 80 COL
S
7560 NEXT X
7570 RESTORE:RETURN


10998 '*** SET UP ML ROUTINE FOR
 80 TEXT ***
10999 '*** STARTS AT &H400 ***
11000 LN=58000:FOR X=0 TO 58 STE
P 25: IF X < 49 THEN N=25 ELSE N
=8
11010 B=0:FOR Y=0 TO N-1:READ R$
: T=VAL("&H"+R$): B=B+T
11020 POKE M1+X+Y,T: NEXT Y: REA
D R$: IF B <> VAL("&H"+R$) THEN
PRINT "ERROR IN LINE NUMBER";LN:
 STOP
11030 LN=LN+10: NEXT X
11040 RETURN


57999 '*** DATA ***
58000 DATA 1A,50,86,36,B7,FF,A4,
CE,5,0,10,8E,5,80,FC,1,D1,E7,84,
EF,2,30,5,E7,84,B40
58010 DATA 10,AF,2,8E,80,0,4D,27
,5,3A,3A,4A,26,FB,A6,80,A7,C0,A6
,80,A7,A0,5A,26,F5,A96
58020 DATA 86,3C,B7,FF,A4,1C,AF,
39,420
```

STOP PRESS

Due to an illness I have been unable to complete the text for the Small Investor Programme.

I hope to complete it in the near future when time and health allow. This means that it will be carried on to the next magazine.

My apologies for any inconvenience caused.



"The long-range effects of the 'look and feel' copyright lawsuits were lost on no-one — least of all Clarabelle and Bozo the clown."

So you want to add a Hard Drive???

Article: Don Berrie

Foreword: Robbie Dalzell

FOREWORD
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Recently we have had several enquiries regarding adding Hard drives to Coco. This rather technical subject is beyond the knowledge of Garry or I at COCO-LINK. However, in the usual spirit of this magazine, we will try to give you what information you reqire to make a decision on whether it will be worth the time and expense for you to add this truly magnificent upgrade to your Coco.

I must start by saying that most of the people who add Hard Drives to Coco are OS9 users. This is where the most benefit is obtained on Coco Hard Disk Systems.
This does not mean that you can not use a hard drive with RS-DOS. There are, however, some drawbacks. I understand that certain protected software will not run with a hard drive fitted.
Basically on a RS-DOS Hard drive the 20-30 Meg disk is split up into the equivalent of a number of Single-sided 35Track drives (you can work out how many yourselves).

Reasonably priced 20/30 Meg hard drives with MS DOS controllers are available locally but you would need the interface available through BURKE & BURKE or HOWARD MEDICAL in the USA. (Their address etc. can be found in the RAINBOW magazine). Don Berrie has informed me that the people at BURKE & BURKE are very helpful and are quite happy to answer any queries on their Hard Drive System.
On top of the above you would need to obtain a power supply for the drive. This may be a bit more difficult to find and probably would mean getting one made especially for this particular job.

To give you some idea of what you might be in for, I have reprinted the following article which was extracted and adapted from an "AUSTRALIAN OS9 NEWSLETTER" of April 1989. Tha article should give the prospective Hard Drive purchaser some idea of what is involved, although it must be taken into account that this article was written on setting up the Hard Drive for OS9.
At a later date we will try to get a bit of information on the set up of the RS-DOS version.

The following article was written by Don Berrie who has, in a recent conversation with yours truly, agreed to answer any queries from COCO-LINK readers. We really appreciate this and thank him for his kind co-operation. His address and phone number can be found at the end of this article.

HARD DISK FOR COCO
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By Don Berrie

One of the most sought after acquisitions for your system this year could be a hard drive, unless you are one of the lucky few who already have one. It is timely to write an article about the hardware requirements, and the setting up, of a hard drive system for the CoCo.
For a good general discussion about the available systems for the CoCo, I recommend that you try to get a copy of the article in the March 1989 edition of U.S. Rainbow, pages 44 - 56 entitled "Adding a hard drive to your system", by Marty Goodman.
Obviously, my experience may be limited. However, I will try to answer some of the "unanswered" questions using my experiences in setting up my hard drive system.

Firstly, what hardware is needed?
After reading everything I could about the various systems, including ads in the U.S. Rainbow, and taking price into consideration, I decided on the Burke and Burke XTC. The primary reason for choosing this system was because I already had a 20 meg. NEC drive and MFM controller available after upgrading my XT clone to a 30 meg. RLL drive. I wrote to Frank Hogg Labs in New York, and ordered the Burke and Burke XT Controller with real-time clock option, and the Burke and Burke XT-ROM, to allow direct booting from the hard disk.

When my package from the U.S. finally arrived, the system was all there with plenty of documentation, and even an Allen-Key to open the controller case. I had almost everything I needed to run my hard drive. How- ever, I still needed.....
Yes, you need more than just a drive, XT controller and the B and B interface etc. For a start, you need a power supply. You will probably have to contact one of the CoCo hardware experts through a user group for this.
Bob Defries did a great job of mine. The power supply will probably need a fan fitted to keep the supply case cool.

Back to the hardware requirements. NOT ALL hard drives and controllers will work with the Burke and Burke system, but the main limitation seems to be the controller. Not all PC-compatible hard disk controllers are alike; some will not work with the CoCo XT at all, and some will not fit into the case. The controller case and the interface software are optimised for use with particular controllers. The manual states that the following controllers work well with the interface:

Western Digital WD1002-WX1 (MFM)
Westerb Digital WD 1002A-WX1 (MFM)
DTC 5150CRH (MFM)
Western Digital WD1002-27X (RLL)
Western Digital WD1002A-27X (RLL)
Adaptech 2072(RLL)
DTC 5160CRH (RLL)

Most popular drives will work, provided that they can be used with the above controllers. The following is a list of some drives which are mentioned in the XTC manual:
ATASI AT3046, AT3051, AT3085
CDC 9415-21&36, 94205-30&51m 94155-30,51,25,38,48,67&86
CMI CM5410, CM5616, CM6426, CM6426S, CM6640, CM6853
Evotek 5820
Microscience HH725
Miniscribe 1006, 1012, 3012, 3053, 3085, 3438, 3650, 3675, 8425, 8438
Rodime 101, 102, 103, 104, 201, 202, 203, 204
Seagate ST-506, ST-412, ST-419 ST-213, ST-225, ST-138R, ST-238R
Stugart SA604,, SA606, SA612
Tandomn TM252, TM262, TAN501, TAN 502, TAN 503, TM602S TM603S
As well as these drives, I know that an NEC D5126 will work, because that is the type of drive which I am using at present.

When you have got the hardware together the next step is to put it all together. Because hard drives are an order of magnitude larger and faster than floppy drives, so too are the timing considerations of disk access. You will need to know things like number of tracks, number of surfaces and heads, stepping rate, park track, starting track for write precompensation, storage format (RLL or MFM) and such like in order to configure your drive. This means you will almost certainly need to have a data sheet for your drive.

The Burke and Burke system comes with software that will allow you to build a device descriptor that is particular for your drive. Their programme "Ddmaker" poses a number of questions about the above drive data in order to accomplish this. You will then need to select the device driver from a number (13) which are supplied when you order the system. Why so many? Well there are different drivers for different versions and levels of CoCo OS9, as well as versions for formattability and for single and multiple physical drives.

Once you have constructed the device descriptor and selected the device driver you will need to generate a new boot (floppy) disk. You can use OS9gen to do this,

simply by adding the new modules to your existing boot.

Now supplied with the system is a utility called EZgen. This programme is a system for manipulating all types of merged files (of which OS0boot is one) with options for ensuring that tht output files are written in one block, reside in a particular place on the disk, provision for rewriting DD.BT on LSN0 of the disk for boot disks, and many other options. I feel that this programme is worth more than the hardware. Things like manipulating the order of modules within the OS9boot file become a breeze.

So after generating a new boot, by whatever method, you are ready to go. Well almost! If you are running Level 2, you will need to make a CMDS directory on the floppy, and copy to it Shell and Grfdrv. Level 1 users do not need to do this. Now we put the disk in floppy drive 0, and press the button. Hopefully the system boots up. We are now ready to format the drive. In my own system, I use the D.P. Johnston SDisk3 drivers and descriptors, and the sformat utility which is supplied with that package.

When you type format /h0, you will find that the format utility recognises(that you are attempting to format a hard drive, and asks you a number of questions which are not asked when formatting a floppy disk. You will need to answer yes to all these questions in the initial instance. Now is the time to get a cup of coffee, do the washing or take the dog for a walk ..... it takes at least 25 minutes for a 20 meg har drive.
After you have the drive formatted, there are still a few things to be done. When you boot your system, it would be nice to be able to have the initial directories set for /H0 and /H0/CMDS. There is a patch to the Init module described in the manual that will allow you to do this. Incidentally, when this patch is made, it has the added advantage of reading the Shell file from the hard drive, and you will find that this will make your boots just that much quicker.

If, like me, you have also purchased the XT-ROM for the controller, you will also need to patch the boot module of the kernel. Burke and Burke have assigned track 128 of the hard drive as the location for the kernel. The standard kernel resides on track 34 (that is where the DECB DOS command looks).
Burke and Burke have also, when using their XT-ROM system, given us the ability to use an "alternate boot", using an alternate kernel. This alternate kernel is stored on track 129, and looks for a bootfile called altboot. This is quite handy when you need to be able to have module relating to a particular piece of software, or perhaps need to use a VDG /TERM device etc. For example, the popular game Kingsquest3 needs a specialized driver/descriptor combination which uses VIRQ's, and a specialized clock module. These modules cannot be successfully loaded into memory. I would not suggest that you waste your hard drive for such things .....

So there you have it, a hard drive for your system. When you have used this type of system, you can really appreciate the comments of people who write about OS9 really coming into its own with a hard drive. It's really true. Multiview really shines, and what's more it runs at a speed that IS usable. Profile, a database programme will amaze you, and of course the hard drive does not use interrupts(, has a 2K buffer (within the controller) and, therefore, will really support multi user capacity.

If you have any further questions, or require further discussion, please don't hesitate to call or write me.

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Oxley
Qld. 4075
Ph. 07 375 1284

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COMPUTERS

Computer buffs have added new symbols to their written language:

The Smiley (:-) is one

The Wink (;-) is a second

The Shock (:o) is a third

The Sorrow (:() is a fourth

The Sarcasm (:/) is a fifth

Give this paragraph a sideways clockwise turn and look at the symbols again!!

OOPS !

This section of code was inadvertantly ommited from our last issue It is the completion of code for the LABOUR COSTING programme.

```
1220 WRITE#1,DD$:WRITE #1,IN:WRI
TE#1,CN$:WRITE#1,AD$:WRITE#1,PC$
1230 WRITE#2,CQ:WRITE#2,AP:WRITE
#2,PP:WRITE#2,CM$
1240 CLOSE#1,#2:GOTO40
1250 '*** PROGRESS PAYMENT ***
1260 GOSUB1760
1270 CLS:LOCATE10,12:PRINT"Enter
 the name of the Progress paymen
t file to load";:INPUT FF$:CZ$=F
F$:FF$=FF$+".ADP":CZ$=CZ$+".PRO"
1280 '*** LOAD PROGRESS PAYMENT
***
1290 OPEN"I",#1,FF$:OPEN"I",#2,C
Z$
1300 IF EOF(1)=-1 THEN1330
1310 INPUT#1,DD$,IN$,CN$,AD$,PC$
1320 GOTO1300
1330 IN=VAL(IN$):GOTO1350
1340 IFEOF(1)=-1 THEN1370
1350 INPUT#2,A$,B$,C$,CM$
1360 GOTO1340
1370 CQ=VAL(A$):AP =VAL(B$):PP=V
AL(C$):
1380 CLOSE#1,#2:GOTO40
1390 '*** SAVE LABOUR FILE ***
1400 GOSUB1760
1410 CLS:LOCATE10,12:PRINT"Enter
 the name of the labour/wage fil
e to save";:INPUTFF$:CZ$=FF$:FF$
=FF$+".ADL":CZ$=CZ$+".LAB"
1420 OPEN "O",#1,FF$:OPEN"O",#2,
CZ$
1430 WRITE#1,DD$:WRITE#1,IN:
1440 WRITE#1,CN$:WRITE#1,AD$:WRI
TE#1,PC$
1450 WRITE#2,W$:WRITE#2,SH:WRITE
#2,MH:WRITE#2,TH:WRITE#2,WH
1460 WRITE#2,TA:WRITE#2,FH:WRITE
#2,S
1470 WRITE#2,HR:WRITE#2,AA:WRITE
#2,ZZ
1480 WRITE#2,XX:WRITE#2,OT:WRITE
#2,RR:WRITE#2,DT:WRITE#2,DX
1490 WRITE#2,WW
1500 CLOSE#1,#2:GOTO40
1510 '*** LOAD LABOUR WAGE FILE
***
1520 GOSUB1760
1530 CLS:LOCATE10,12:PRINT"Enter
 the name of the labour /wage fi
le to load";:INPUTFF$:CZ$=FF$:FF
$=FF$+".ADL":CZ$=CZ$+".LAB"
1540 OPEN"I",#1,FF$:OPEN"I",#2,C
Z$
1550 IF EOF(1)=-1 THEN1580
1560 INPUT#1,DD$,IN$,CN$,AD$,PC$
1570 GOTO1550
1580 IN=VAL(IN$):GOTO1600
1590 IF EOF(1)=-1 THEN1650
1600 INPUT#2,W$,SH$,MH$,TH$,WH$
1610 INPUT#2,TA$,FH$,S$
1620 INPUT#2,HR$,AA$,ZZ$,XX$,OT$
,RR$,DT$,DX$
1630 INPUT#2,WW$
1640 GOTO1590
1650 SH=VAL(SH$):MH=VAL(MH$):TH=
VAL(TH$):WH=VAL(WH$):TA=VAL(TA$)
:FH=VAL(FH$):S=VAL(S$)
1660 HR=VAL(HR$):AA=VAL(AA$):ZZ=
VAL(ZZ$):XX=VAL(XX$):OT=VAL(OT$)
:RR=VAL(RR$):DT=VAL(DT$):DX=VAL(
DX$):WW=VAL(WW$)
1670 CLOSE#1,#2:GOTO40
1680 '*** LOAD AN ADDRESS ***
1690 CLS:GOSUB1760:LOCATE5,12:PR
INT"Enter the name of the addres
s file to load plus extention";:
INPUTFF$
1700 OPEN"I",#1,FF$
1710 IF EOF(1)=-1 THEN1740
1720 INPUT#1,DD$,IN$,CN$,AD$,PC$
1730 GOTO1710
1740 IN=VAL(IN$)
1750 CLOSE#1
1760 CLS:LOCATE20,12:PRINT"Inser
t your data disk now! in drive "
;DR:FORZ=1 TO 1500:NEXT:RETURN
1770 EXEC&HAD26:GOTO40
1780 EXEC&H71,0:EXEC&HA027
1790 '**** CLIENTS NAME ADDRESS
****
1800 CLS:LOCATE25,8:PRINT"ENTER
TODAYS DATE ";:LINEINPUT DD$
1810 LOCATE25,10:INPUT"INVOICE N
UMBER";IN
1820 LOCATE25,12:INPUT"Client/Cu
stomers Name";CN$:LOCATE25,14:IN
PUT"Street Address";AD$:LOCATE25
,16:INPUT"Post Code";PC$:RETURN
```

END

Exchange and Mart

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******

CGP 220 COLOR PRINTER

contact: Bob Barker
PO Box 711
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NSW 2170

****

1) Serial to Parallel interface for IKIDATA 182 Printer.
2) Manual for above printer or some information on control codes.
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****

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****

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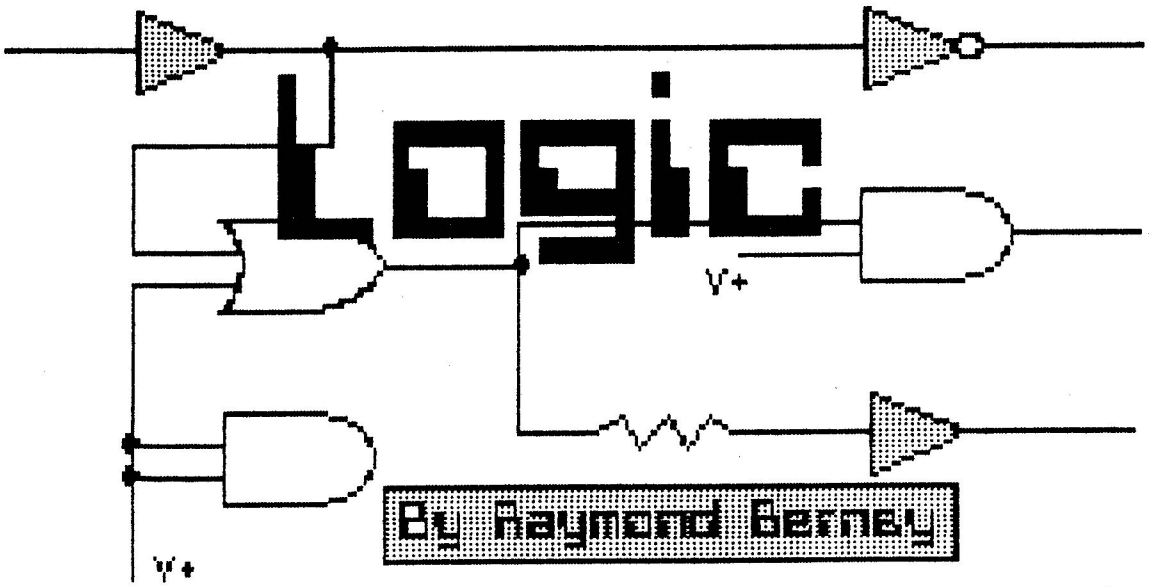
WANTED URGENTLY

Programmes, Articles, Hints and tips for COCO-LINK Magazine.



So you want to play a different type of game? Well, you have just picked a game that's as different as anything you have ever tried! How about an arcade-style game that could teach you something as well as offer a challenge? Here we have had our wonderful Color Computer 3 since 1986, but no real game that stimulates how our computer (or any other electronic gizmo) works.

Maybe this little gem of a game can fill some of that field. LOGIC (along with LOGIC2 and LOGIC3) is a test of knowledge and a trial of decisions. Actually, LOGIC should be called LOGIC1, because it's the easiest and first level of this trio of complex games.

(This first level of the LOGIC game is the only one reproduced in these pages. It is fully operational and a stimulating test. Try it, I am sure you will not be disappointed. Fur further infomation please read ROBBIE'S COLUMN...ED)

In playing LOGIC, you use your right joystick to move around a simulated clock pulse (a flashing circle) across a screen of circuitry connecting logic gates and other electronic circuitry. The objective is quite simple: just get your clock pulse from the left side to the right side. Sounds simple, doesn't it? Far from it. There is always at least one way across each schematic screen, sometimes more than one. Schematic screens with more than one way across usually have one way which scores much better than the rest. Some traceways are just a tad bit short and will trap you! This is where you test your knowledge of logic gates.

You can control the speed of your travel, but at a cost. You see, all logic inputs need voltage, but this voltage decays as time progresses. So you need to get to the next gate as quickly as possible. You have a fixed amount of voltage that available for use. This is the Voltage Output High (High) to Voltage High Threshold (Low) amount of voltage and isn't very much!

These schematics are designed to be deceptive, confusing and difficult. You gain a certain amount of points for "passing through" each gate successfully and lose a certain number of points for any anomalies. So it is not as simple or as easy as it sounds.

Playing LOGIC isn't as strange as it may seem. But that doesn't mean it is a push-over. Reading up on the set of rules of how logic gates (along with other integrated circuitry and passive components) will help a great deal, but remember, this is a game; rules are sometimes bent in games. Any good book that teaches electronics will most likely do. I seem to remember that there was such an article in the RAINBOW in the past.

Here is a description of each section of the game in a nutshell.

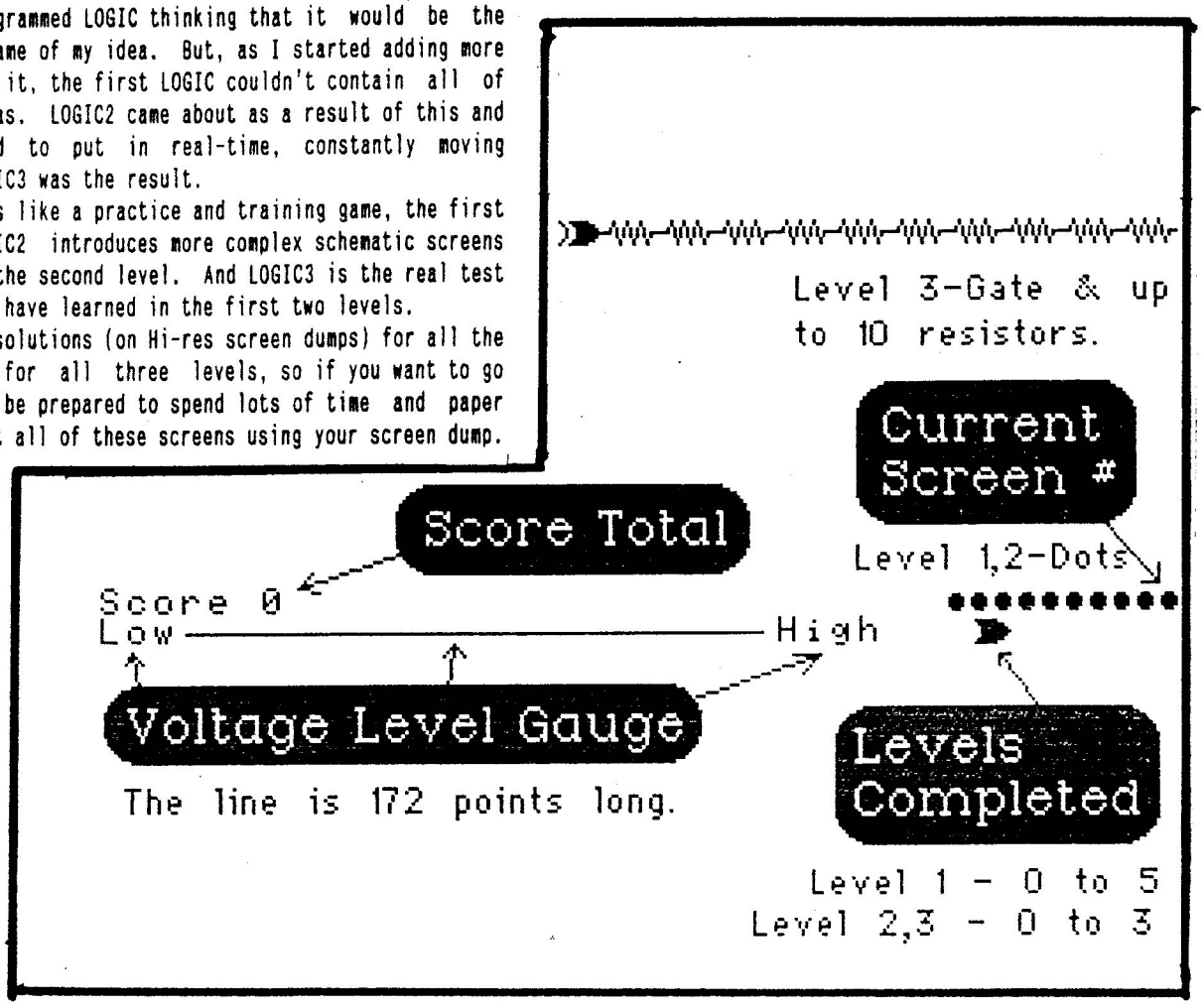
LOGIC has scoring of each logic gate, bonus scoring at the end of each screen and more bonus scoring (fixed amount) when going to the next level. It has 6 levels of 10 rather ordinary, mostly easy screens, each. It has a few tough screens.

LOGIC2 has scoring and bonus scoring of each logic gate, bonus scoring at the end of each screen and more bonus scoring (fixed amount) when going to the next level. It has 4 levels of 10 screens each. It has quite a bunch of tough screens. Several new symbols and types of logic are introduced. (FUZZY, BLACKBOX etc.)

LOGIC3 has scoring and bonus scoring of each logic gate, bonus scoring at the end of each screen and more bonus scoring (progressive amount) when going to necxt level. It has 4 levels of 10 screens each. Many new logic symbols have been made standard. Most of the screens are animated in some way.

Figures 1 and 2 are instructional references for the programme.

I first programmed LOGIC thinking that it would be the standard game of my idea. But, as I started adding more and more to it, the first LOGIC couldn't contain all of my new ideas. LOGIC2 came about as a result of this and when I tried to put in real-time, constantly moving events, LOGIC3 was the result.
Now LOGIC is like a practice and training game, the first level. LOGIC2 introduces more complex schematic screens and ideas, the second level. And LOGIC3 is the real test of what you have learned in the first two levels.
I have the solutions (on Hi-res screen dumps) for all the schematics for all three levels, so if you want to go that route, be prepared to spend lots of time and paper to print out all of these screens using your screen dump.




```
0 RGB:A$="5F5C96BC1F027E96A3":FO
RA=0TO8:POKE960+A,VAL("&H"+MID$(
A$,A*2+1,2)):NEXTA:EXEC960
1 HSCREEN2:HCLS8:HDRAW"BM87,15C4
DGLGFRFGF4D3FEUF2D5FD3LHD3FD2GDF
D2RF2GD2FD4F3RFDG2LD3G2D4FDGLGDF
D2GDFDFD3RFDGL2GDL3H2GD4G3DGL2HU
HLD2H2LD2GDLHU3EUE2RE2U2ERFD3GDF
RE2UEUHU3EFREU2EU4H3U2H2UE2UEUHU
3HU2HU"
2 HDRAW"HU2HLGD4H4LGLHUH2GLGL2H2
L2GL2HGL8HL2HLH2ULHL3HLHLHLHUHL3
HLGFDFD4G2D4FD2GDF5DF2DFDF4D12FD
2FD5FDFD11FD15FD3GD5GD2RERFR2E2R
3FRFR2ER2FD2F2R4E2RFRFR3F3DFD4FD
FDFD8FDF2RFR4F2R2FR2ER2ER2E2RE3R
2ER5E"
3 HDRAW"R4FR7FD2FR3ER4ER5E3R5FR7
ERERERERER2ER6ER2UER5ER10E4R68H3
U2EU3H2UH2U2HUE2HU4HU110L178BM17
7,36RDLC5":HPRINT(16,3),"C!W Sof
tware":PLAY"P1":HCOLOR1:HPRINT(1
4,9),"Load which program?"
4 HPRINT(18,11),"1. LOGIC":HPRIN
T(18,12),"2. LOGIC2":HPRINT(18,1
3),"3. LOGIC3"
5 I$=INKEY$:HCOLOR3
6 IFI$="1" THENHPRINT(18,11),"1.
 LOGIC":LOAD"LOGIC",R
7 IFI$="2" THENHPRINT(18,12),"2.
 LOGIC2":LOAD"LOGIC2",R
8 IFI$="3" THENHPRINT(18,13),"3.
 LOGIC3":LOAD"LOGIC3",R
9 GOTO5
```

End

Continued Overleaf

Look for....

Points per Level.....

SCHMITT TRIGGER

THIS IS AT THE END OF EVERY LEVEL CHANGE & A FEW OTHER SCREENS.

25

OR

NOTHING SPECIAL.

30

AND

NOTHING SPECIAL.

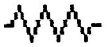
30

BUFFER

NOTHING SPECIAL.

20

RESISTOR



RESISTOR DROPS THE VOLTAGE LEVEL GAUGE 50 POINTS. IF GAUGE IS LESS THAN 50 BEFORE YOU PASS THRU THE RESISTOR, THEN FOR YOU IT'S

GAME OVER

Avoid....

THESE ARE LETHAL....

NAND

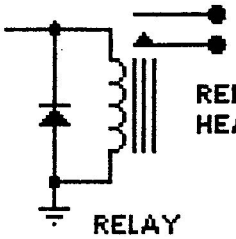
NOR

INVERTER

XOR

DUAL PURPOSE GATE-
WHEN LOWER INPUT IS GROUNDED, IT'S LIKE A BUFFER.
WHEN LOWER INPUT IS TIED HIGH, IT'S LIKE AN INVERTER.

45



RELAY

RELAY CONTACTS MUST CLOSE [YOU WILL HEAR A "CLICK"] BEFORE YOU CAN PASS.

LEVEL CHANGE

EVERY 10TH SCREEN, YOU WILL CHANGE LEVELS. YOU MUST USE THE SCHMITT GATE.

VOLTAGE SOURCE CONNECTIONS

D FLIP-FLOP

CONNECT POINT

COUPLING CAPACITOR

SIGNAL SOURCE

Continued Overleaf

```
10 REM  LOGIC 03.25.90
20 CLEAR800:WIDTH40:GOSUB1820:DI
M G$(9),C(9):HBUFF1,15:HBUFF2,15
:LV=10:SC=1:S$="V20L255O1CC#DC#D
D#DD#ED#EFEFED#ED#DD#DC#DC#C":T$
="V31T255O4BA#AG#GF#FED#DC#C"
30 ON BRK GOTO1860
40 HSCREEN2:HDRAW"BM95,0C1D29R19
U6L13U23L6BR30GLG3DGD17FDF3RFR8B
H6R4E2U13H2L4G2D13F2BF6ERE3UEU17
HUH3LHL7BR25R8FRF3DFD3L6UH2L4G2D
13F2R4E2UL3U5R9D8GDG3LGL8HLH3UHU
17EUE3RE"
50 HDRAW"BR20D6R2D17L2D6R10U6L2U
17R2U6L10BR22R8FRF3DFD3L6UH2L4G2
D13F2R4E2UR6D3GDG3LGL8HLH3UHU17E
UE3RE":FORI=113TO193STEP20:HPAIN
T(I,28),1,1:NEXTI
60 GOSUB1810:PLAY T$:HCOLOR1:HPR
INT(12,11),"by Ray Berney":PLAY
S$:HPRINT(0,23),"Press right joy
stick FIREBUTTON to start"
70 IFBUTTON(0)=0 THENHCOLOR RND(
9)+1:U$="V3L11T110"+CHR$(RND(3)+
49)+CHR$(RND(7)+64):PLAY U$:HPRI
NT(21,23),"FIREBUTTON":GOTO70 EL
SESOUND60,3:HCLS
80 G$(1)="R16FR2FRFRF3DF2G2DG3LG
LGL2GL16EUEU2EU6HU2HU":G$(2)="R1
8FRF3DFD6GDG3LGL18U17":G$(3)="BD
18EUEU2EU6HU2HUHBR5"+G$(1):G$(4)
="FRFRFRFRFRFRFRFRFRLGLGLGLGLG
LGLGLGU17":G$(5)=G$(1)+"BR27BD7E
R2FD2GL2H"
90 G$(6)=G$(2)+"BR25BD7ER2FD2GL2
H":G$(7)=G$(4)+"BR18BD7ER2FD2GL2
H":G$(8)="R2UEUEUDFDFDFDFDUEUEUE
UEUDFDFDFDFDUEUEUEUEUDFDFDFDFDUE
UER2":G$(9)="U2LGD2FR2EU2HD3L2U2
F":G$(0)=G$(4)+"BM+2,+5R4D6R2L4U
6L2"
91 E$="C1UH2L4G2D8F2R4E2U2L3BF4B
R3U3EU2EU2EUEFDFD2FDNL5DFD3BR4U1
2F4E4D12BR4NR8U12NR8D6R5BF6BR15H
2U8E2R4F2D8G2NL4BR6BU12D3FD2FD2F
DFEUEU2EU2EU3BR4NR8D6NR5D6R8BR4U
12R6F2D2G2L5RF6"
100 L$="LR5FRL6FR6FL7DR6GL6GR5":
C(0)=2:C(1)=10:C(2)=8:C(3)=6:C(4
)=7:C(5)=3:C(6)=5:C(7)=9:C(8)=4:
C(9)=1
110 HCOLOR1:HSCREEN2:HDRAW"BM1,0
R2FD2GL2HU2":HGET(0,0)-(4,4),2
120 HCLS:GOSUB1820:GOSUB390:GOSU
B1770:GOSUB1810
130 IFJ>=316 THENSOUND200,2:GOTO
350
140 HGET(J-2,K-2)-(J+2,K+2),1:HP
UT(J-2,K-2)-(J+2,K+2),2,PSET:HPU
T(J-2,K-2)-(J+2,K+2),1,PSET
150 X=JOYSTK(0):Y=JOYSTK(1)
160 IFBUTTON(0)=0 THENHRESET(TI,
188):TI=TI-1:IFTI<=25 THEN1850
170 IFBUTTON(0)=1 THENHLINE(TI,1
88)-(TI-1,188),PRESET:TI=TI-2:IF
TI<=25 THEN1850
180 IFX<20 ANDBUTTON(0)=0 ANDHPO
INT(J-1,K)=1 THENJ=J-1
190 IFX<20 ANDBUTTON(0)=1 ANDHPO
INT(J-3,K)=1 THENJ=J-3
200 IFX>44 ANDBUTTON(0)=0 ANDHPO
INT(J+1,K)=1 THENJ=J+1
210 IFX>44 ANDBUTTON(0)=1 ANDHPO
INT(J+3,K)=1 THENJ=J+3
220 IFY<20 ANDBUTTON(0)=0 ANDHPO
INT(J,K-1)=1 THENK=K-1
230 IFY<20 ANDBUTTON(0)=1 ANDHPO
INT(J,K-3)=1 THENK=K-3
240 IFY>44 ANDBUTTON(0)=0 ANDHPO
INT(J,K+1)=1 THENK=K+1
250 IFY>44 ANDBUTTON(0)=1 ANDHPO
INT(J,K+3)=1 THENK=K+3
260 P=HPOINT(J+1,K):IFP=1 THEN13
0
270 IFP=2 THENFORI=1TO30:SOUND R
ND(99),1:NEXTI:J=J+19:S=S+((LV-9
)*25):GOSUB1790:GOSUB1840:GOTO13
0
280 IFP=4 THENPLAY"V31L8T201C":J
=J+29:TI=TI-50:IFTI<=25 THENHLIN
E(TI+50,188)-(26,188),PRESET:GOT
O1860 ELSEHLINE(TI+50,188)-(TI,1
88),PRESET:GOTO130
290 IFP=6 THENSOUND9,1:IFHPOINT(
J,K+10)=14 THENJ=J+32:K=K+5:S=S+
((LV-9)*45):GOSUB1780:GOSUB1840:
GOTO130 ELSEIFHPOINT(J,K+10)=13
THENP=3:GOTO330
300 IFP=7 THENSOUND9,1:J=J+19:S=
S+((LV-9)*20):GOSUB1790:GOSUB184
0:GOTO130
310 IFP=8 THENSOUND9,1:J=J+25:K=
K+5:S=S+((LV-9)*30):GOSUB1790:GO
SUB1840:GOTO130
320 IFP=10 THENSOUND9,1:J=J+27:K
=K+5:S=S+((LV-9)*30):GOSUB1790:G
OSUB1840:GOTO130
330 IFP=3 ORP=5 ORP=9 THENPLAY"V
31L101C":HCOLOR1:HLINE(0,176)-(1
43,183),PRESET,BF:HPRINT(0,22),"
Wrong again, human!!":SOUND1,1:G
OSUB1841:GOTO1860
340 GOTO130
350 FORI=TI TO26STEP-1:S=S+(LV-9
):HRESET(I,188):NEXTI:GOSUB1840
360 SC=SC+1:IFSC>10 THENHPRINT(1
0,7),"BONUS POINTS -"+STR$((LV-9
)*1000):S=S+((LV-9)*1000):GOSUB1
840:SC=1:LV=LV+1:PLAY T$+S$+T$+S
$+"P1"
370 IFLV=16 THEN1890
380 GOTO120
390 READ Q$
400 IFLEFT$(Q$,1)>"9" THENHDRAW
Q$:GOTO390
410 Q=VAL(Q$):IFQ=400 THENREAD Q
1:HCOLOR C(Q1):HDRAW G$(Q1):HCOL
OR1:GOTO390
420 IFQ=401 THENREAD Q1,Q2,Q$:HP
RINT(Q1,Q2),Q$:GOTO390
430 IFQ=402 THENHCOLOR13:HDRAW"B
M-5,+13L0":HCOLOR1:GOTO390
440 IFQ=403 THENHCOLOR14:HDRAW"B
M-5,+13L0":HCOLOR1:GOTO390
450 IFQ=999 THENREAD J,K:RETURN
460 DATA"BM3,19R46BR20R210BR24R1
4BL210XG$(9);D30L70D25R14BD10L14
D50NR12XG$(9);D10NR12XG$(9):D10B
M79,79R50U5R150BD10L10BM305,79R1
2BL188XG$(9);D60R20BR30R100BR20R
18"
470 DATA"BM50,10",400,4,"BM280,1
0",400,7,"BM50,70",400,1,"BM280,
70",400,2,"BM50,130",400,2,"BM28
0,130",400,4,"BM150,139",400,8,4
01,4,20,V+,401,31,10,V+,999,3,19

480 DATA"BM3,76R98BU50L70D50XG$(
9);D50R70BM100,36L11BD50R11BD50L
11BM134,31R85BD50L85BD50R85BM243
,31R74BD50L78BD50R78BM100,22",40
0,3,403,"BM100,72",400,3,402,"BM
100,122",400,3,403,"BM60,36",400
,8,"BM60,86",400,8,"BM60,136",40
0,8
490 DATA"BM220,22",400,7,"BM220,
72",400,4,"BM220,122",400,4,"BM3
1,76",400,9,401,5,4,0V,401,5,11,
V+,401,5,17,0V,999,3,76
500 DATA"BM3,152R46BR30R10BR20R6
U125R26BD10L9D130R10U6BM169,32R2
0XG$(9):BM239,7L50D50R50BU40L6BD
50R6BM265,12R52BM265,62R2BR30R2D
15L34D15R2BR30R20BM50,152",400,8
,"BM90,143",400,4,"BM140,23",400
,1,"BM240,3",400,2,"BM240,53",40
0,2
510 DATA"BM268,62",400,8,"BM268,
92",400,8,401,17,19,0V,401,27,2,
V+,401,27,8,V+,999,3,152
520 DATA"BM3,92R16BR30R3BR30R11B
R20R47XG$(9);BU26XG$(9);BU50NR51
D50NR53D50R53BM213,126L12BU50R12
BU50BL2L10BR41BU5R75BD50L22BL24L
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25BD50BL5R76BM20,92",400,8,"BM53
,92",400,8
530 DATA"BM94,83",400,4,"BM212,6
2",400,3,403,"BM212,112",400,1,"
BM212,12",400,6,"BM272,62",400,7
,401,23,3,0V,401,23,9,0V,401,23,
15,0V,999,3,92
540 DATA"BM3,26R38BD10L10D50R90D
25L6BL24L19BM74,31R12U24NR15D19X
G$(9);R62BD10L27D50XG$(9);BM131,
7RBR30RBR30R124BM181,31R40U5R42B
D10L20D75L12BL20L10BM296,31R21BM
40,22",400,3,403,"BM147,22",400,
3,403,"BM262,22",400,3,403
550 DATA"BM92,102",400,7,"BM212,
102",400,4,"BM102,7",400,8,"BM13
3,7",400,8,"BM164,7",400,8,401,7
,13,V+,401,23,13,0V,999,3,26
560 DATA"BM3,82R47BR20R30BR20R30
BR20R40BR20R40BR20R26BL230XG$(9)
;U69R8BR30R20BR30R142BD20L82BL30
L30BL30L9D49XG$(9);BR50XG$(9);U2
9R19BR30R82BD29BL80XG$(9);D20L16
0D43R13BD5BR28R15U5R45BD5BR26R11
3BD5BL139L10D10L90U10NR12XG$(9);
L12BM95,13"
570 DATA 400,8,"BM145,13",400,8,
"BM145,33",400,8,"BM205,33",400,
8,"BM205,53",400,8,"BM51,73",400
,4,"BM101,73",400,4,"BM151,73",4
00,4,"BM211,73",400,4,"BM271,73"
,400,4,"BM88,141",400,1,"BM178,1
41",400,2,401,6,19,V+,999,3,82
580 DATA"BM3,98R18BD10L10D10R120
U10NR10D10XG$(9);D35L28BL24L30BR
130R20BR20R20U55NR22D10XG$(9);NR
22BU5BR55R23L13XG$(9);U30L110U25
R7BU10L15D65L12BU5BL33L20D5L67BU
5BL40XG$(9);U60R67BD10L14R7XG$(9
);D10R60U40R7BU10L20D35L7BR120R8
3BU30L143BM20,94"
590 DATA 400,3,403,"BM140,94",40
0,3,403,"BM260,94",400,3,403,"BM
200,34",400,3,403,"BM80,34",400,
3,402,"BM140,4",400,3,402,"BM80,
144",400,7,"BM200,144",400,4,401
,6,6,V+,401,4,19,V+,401,20,19,V+
,999,3,98
600 DATA"BM3,143R16BD5BR28R10U5R
18BD5BR26R10U5R26BD5BR33R15BR20R
8U5NR10XG$(9);BD5BR41R8U5NR13XG$
(9);BD5BR45R10BL42BD5L6D10L50U10
NR4D10XG$(9);L10BM137,153L7BM219
,163D7L150U17NR6D17XG$(9);L60U17
R10BM262,143U20R55BM213,143U20L7
1"
610 DATA"U15R19BR20R136BM11,143X
G$(9);U35R5BR24R10U30R267BM18,13
9",400,1,"BM76,139",400,2,"BM136
,139",400,3,403,"BM186,139",400,
4,"BM224,139",400,6,"BM274,139",
400,5,"BM17,99",400,7,"BM162,99"
,400,4
620 DATA 401,24,20,V+,401,14,19,
0V,999,3,143
630 DATA"BM3,25R55BD10L10D20NR10
U10XG$(9);L25BD20BR35L10D10R40D1
5L12BL20L18BM91,30R165BR24R37BL1
10XG$(9);D60R19BR20R20BR30R20BM8
6,60R50D60R181BM57,21",400,3,403
,"BM257,21",400,7,"BM57,51",400,
1,"BM57,81",400,4,"BM227,81",400
,4
640 DATA"BM267,90",400,8,401,1,5
,0V,401,3,11,V+,999,3,25
650 DATA"BM3,145R16BR20R2BR30R3B
R20R3BR30R2BR20R2BR30R2BR20R2BR3
0R2BR20R4XG$(9);U10NR55D20R54BM2
0,136",400,4,"BM42,145",400,8,"B
M75,136",400,4,"BM98,145",400,8,
"BM130,136",400,4,"BM152,145",40
0,8,"BM184,136",400,4,"BM206,145
",400,8
660 DATA"BM238,136",400,0,999,3,
145
670 DATA"BM3,7R8BD10L9D30NR79XG$
(9);D120R29U10NL6XG$(9);R20BU10L
20XG$(9);NL6U50R18BD10L10D15R120
U20R10BR30R4U70R50D2DL10BL24L10D
30R20D70L30BL30L90BU50BL4R10U20L
10U25R6BU5BR28R30U35R20BU10L30D5
L30BL20L40BR146R84BR20R28BM10,3"

680 DATA 400,1,"BM80,3",400,4,"B
M160,3",400,2,"BM270,3",400,4,"B
M80,43",400,1,"BM220,43",400,7,"
BM50,93",400,2,"BM50,143",400,1,
"BM170,152",400,8,"BM170,102",40
0,8,401,1,18,0V,401,1,19,V+,999,
3,7
690 DATA"BM3,155R156BR30NR126BL4
0XG$(9);U26R12BD10L4D7R40BM189,1
34R10XG$(9);NR116U14L70U21R30BD1
0L7BU5BR33R10XG$(9);NR120U14L66U
21R32BD10L4D4L4BM194,74R10XG$(9)
;NR111U14L75U21R32BD10L8BU5BR41R
10XG$(9);NR111U14L75U16R30BR20R1
37BM160,35"
700 DATA 400,3,403,"BM160,65",40
0,3,403,"BM160,95",400,2,"BM160,
125",400,1,"BM160,5",400,4,"BM16
0,155",400,8,401,25,18,0V,401,17
,13,V+,401,17,10,0V,401,17,6,0V,
999,3,155
710 DATA"BM3,92R147BR20R148BM151
,83",400,4,999,3,92
720 DATA"BM3,22R104L50XG$(9);D40
NR48XG$(9);D40NR50XG$(9);D45R48B
U35BR2L18BU40R16BU40BR2L18R8XG$(
9);D10R140U10R20BL160BD40XG$(9);
D10R140U10R18BL158BD40XG$(9);D10
R140D25R18BR30R32BU40NL38BU40NL3
1BU40L28BU5BL32L30D5L92BD40BL4R9
5U5R29BD45L115"
730 DATA"BD40BL15R70D20R122BM106
,18",400,1,"BM106,58",400,2,"BM1
06,98",400,3,403,"BM106,138",400
,4,"BM256,18",400,5,"BM256,58",4
00,6,"BM256,98",400,7,"BM256,147
",400,8,401,9,4,0V,401,9,9,V+,40
1,9,14,0V,999,3,22
740 DATA"BM3,92RBR30R0BR30R0BR30
RBR20R0BR30R0BR30R0BR30R0BR20R0B
R30R0BR20R42BL312",400,8,"BM35,9
2",400,8,"BM65,92",400,8,"BM96,8
3",400,4,"BM116,92",400,8,"BM146
,92",400,8,"BM176,92",400,8,"BM2
06,83",400,4,"BM226,92",400,8
750 DATA"BM256,83",400,4,999,3,9
2
760 DATA"BM3,96R8BD10L4D43BM44,1
01R10U90NR15D45NR17XG$(9);D45XG$
(9);D5XG$(9);NR17D50R65BD10L7BM8
9,11R10BR20R10BR20R10BR20R10BR20
R10BR20R10BR20R10BR20R16BM65,77U
11R6BM81,83R30U17NR10D17XG$(9);R
50U17NR10D17XG$(9);R50U17NR10D17
XG$(9);"
770 DATA"R50U17NR10D17XG$(9);R54
BU22L11BU5BL33L10D5L7BU5BL33L10D
5L7BU5BL33L10D5L7BU5BL33L10D5L7B
M66,125U9R5BM81,131R30U15NR10D15
XG$(9);R50U15NR10D15XG$(9);R50U1
5NR10D15XG$(9);R50U15R10BU5BR44L
16BU5BL28L10D5L12BU5BL28L10D5L12
BU5BL28"
780 DATA"L10D5L12BU5BL28L10D5L12
BM145,161R171BM10,92",400,3,403,
"BM70,2",400,4,"BM100,2",400,4,"
BM130,2",400,4,"BM160,2",400,4,"
BM190,2",400,4,"BM220,2",400,4,"
BM250,2",400,4,"BM280,2",400,4,"
BM70,52",400,3,403,"BM120,52",40
0,3,403
790 DATA"BM170,52",400,3,403,"BM
220,52",400,3,403,"BM270,52",400
,3,403,"BM70,102",400,1,"BM120,1
02",400,1,"BM170,102",400,1,"BM2
20,102",400,1,"BM270,102",400,1,
"BM120,152",400,2,401,0,19,0V,40
1,8,16,V+,401,8,10,0V,401,12,20,
V+,999,3,96
800 DATA"BM3,12R74BR59R8BR20R30B
R20R32BD10L7BU5BR40R38BD30L48BL2
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0L237U35XG$(9);BM78,12",400,8,"B
M107,12",400,8,"BM145,3",400,4,"
BM195,3",400,4,"BM245,8",400,3,4
03,"BM250,38",400,4,401,28,2,0V,
999,3,12
810 DATA"BM3,96R28BR10SR5BD10L5B
U5BR33R20U35XG$(9);NR22U10R22BD5
BR32R10D35XG$(9);NR26D10R26BU5BR
26R10U60L240D15XG$(9);NR14D10R14
BU5BR31R5D20L20D40L80U15R6BU5BR3
3R5U20L5U60R79BR20R154BM144,12",
400,4,"BM30,92",400,3,403,"BM90,
52",400,6
820 DATA"BM140,92",400,1,"BM210,
52",400,5,"BM280,92",400,2,401,1
5,12,0V,401,15,13,V+,999,3,96
830 DATA"BM3,169R10XG$(9);U160R9
0BR20R194BM13,49XG$(9);R130BR20R
154BM13,89XG$(9);R170BR20R114BM1
3,129XG$(9);R149BR30R10BR20R95BM
13,169R50BR30R5BR30R30BR20R139BM
104,0",400,4
840 DATA"BM144,40",400,4,"BM184,
80",400,4,"BM163,129",400,8,"BM2
03,120",400,4,"BM84,169",400,8,"
BM99,169",400,8,"BM159,160",400,
4,999,3,169
850 DATA"BM3,140R19BD10L8BU5BR34
R6BR30R5U5R25BD10L10BM317,145L5B
L20L20BL30L95BM23,136",400,2,"BM
55,145",400,8,"BM113,136",400,3,
403,"BM243,145",400,8
860 DATA"BM293,136",400,0,401,0,
19,V+,401,11,19,0V,999,3,140
870 DATA"BM3,82R10XG$(9);D20NR16
U40NR16D20R16BU20BR30R10BR20R228
BD20L258BD20R10BR20R190BR30R8BM3
0,62",400,8,"BM30,82",400,8,"BM3
0,102",400,8,"BM70,53",400,4,"BM
70,93",400,4,"BM280,102",400,8,9
99,3,82
880 DATA"BM3,53R12BD10L5D20R3BR2
0R20U15NR12D15XG$(9);R50U10NR12D
10XG$(9);D10R50U15NR12D15XG$(9);
R50U10NR12D10XG$(9);R50U5R12BU5B
R50L17BU5BL33L17BU5BL33L17BU5BL3
3L17BU5BL33L17BU5BL33L17R9XG$(9)
;U20L50U20R6BR20R2BR20R2BR20R2BR
20"
890 DATA"R2BR20R2BR20R2BR20R2BR2
0R2BR20R2BR20R2BR20R2BR20R2BR20R
18BM305,83XG$(9);D20L180D14R5BR2
0R166BM14,9",400,4,"BM36,9",400,
4,"BM58,9",400,4,"BM80,9",400,4,
"BM102,9",400,4,"BM124,9",400,4,
"BM146,9",400,4,"BM168,9",400,4,
"BM190,9",400,4
900 DATA"BM212,9",400,4,"BM234,9
",400,4,"BM256,9",400,4,"BM278,9
",400,4,"BM14,49",400,3,403,"BM6
4,54",400,3,403,"BM114,59",400,3
,403,"BM164,64",400,3,403,"BM214
,69",400,3,403,"BM264,74",400,3,
403
910 DATA"BM131,108",400,4,401,2,
10,0V,999,3,53
920 DATA"BM3,71R6BR20R265BR20R3B
D30L143BL20L10BL20L121U30BM10,62
",400,4,"BM295,62",400,4,"BM125,
92",400,4,"BM155,92",400,4,999,3
,71
930 DATA"BM3,154R33BR20R30U5R10X
G$(9);NR52U90R52BD10L10BD90R10BU
5BR33R30U5XG$(9);NR45U10R105BD15
BLL33BD5BL26L10BM176,64R139BL313
R34BR20R20U30R240BM37,145",400,4
,"BM147,145",400,3,403
940 DATA"BM257,145",400,2,"BM147
,55",400,1,"BM37,55",400,0,401,1
5,9,0V,401,15,20,0V,401,29,20,V+
,999,3,154
950 DATA"BM3,162R66BR20R20BR88R2
BR20R12BR30R0BR30R26BM70,153",40
0,4,"BM110,162",400,8,"BM139,162
",400,8,"BM168,162",400,8,"BM200
,153",400,4,"BM232,162",400,8,"B
M262,162",400,8,999,3,162
960 DATA"BM3,98R15BD10L4D7R40BM7
,98XG$(9);D33R11BD10L10D8BM46,13
6R269BM51,103R57BR20R64U49NR16D1
9XG$(9);NR16D20XG$(9);R16BM238,5
4R77BD19L77BD20R78BM17,94",400,3
,403,"BM17,127",400,1,"BM109,94"
,400,4,"BM209,54",400,8,"BM209,7
3",400,8
970 DATA"BM209,93",400,8,401,7,1
4,0V,401,0,19,0V,999,3,98
980 DATA"BM3,134R30XG$(9);D10R26
0BR20R4BL284U20R71XG$(9);R10BR30
R129BR20R24BL213U20R10BR30R10BR2
0R143BM115,124",400,8,"BM115,104
",400,8,"BM155,95",400,4,"BM294,
135",400,4,"BM274,115",400,4,999
,3,134
990 DATA"BM3,101R24L20XG$(9);D22
NR20U45R6BM51,123R5D30R260BM51,1
01R10D44R254BM33,78R5XG$(9);R35L
7XG$(9);D60R250BM38,78U20R5BR20R
5U50R248BM93,78R5XG$(9);U20NR5D2
0R35BR20R5U20R5BR20R40BR20R5D20R
5BR20R42L37XG$(9);U20"
1000 DATA"R5BR20R12BL192R10U40R1
82BM98,78D54R217BM158,78XG$(9);N
R35D47R157BM203,58XG$(9);U30R112
BM213,78R20D40R82BM248,58XG$(9);
U20R67BM278,78D20R38BM28,92",400
,7,"BM28,114",400,7,"BM14,69",40
0,4,"BM74,69"
1010 DATA 400,4,"BM134,69",400,4
,"BM194,69",400,4,"BM254,69",400
,4,"BM284,49",400,4,"BM224,49",4
00,4,"BM164,49",400,4,"BM104,49"
,400,4,"BM44,49",400,4,999,3,101

1020 DATA"BM3,14R14BR20R280BM3,1
11R14L7XG$(9);D16NR7U33R7BR20R40
U10R169BR20R51BD30L36BU5BL33L190
D2L11BM234,137R7L3XG$(9);U18R10B
M37,127R10D30R270BM18,5",400,0,"
BM18,118",400,4,"BM18,111",400,8

1030 DATA"BM18,85",400,4,"BM89,1
37",400,8,"BM118,137",400,8,"BM1
47,137",400,8,"BM176,137",400,8,
"BM205,137",400,8,"BM242,137",40
0,8,"BM247,105",400,3,402,"BM247
,75",400,4,401,9,17,0V,401,34,17
,V+,999,3,111
1040 DATA"BM3,11R32BR20R40BR30R7
0BR30R30BR30R32BL252XG$(9);D15L4
0D124R10BR20R160BR20R40NR10XG$(9
);U30XG$(9);NR10U30R10BR32L8BD30
R8BD30L12BM36,2",400,4,"BM96,11"
,400,8,"BM196,11",400,8,"BM256,1
1",400,8
1050 DATA"BM36,141",400,4,"BM216
,141",400,4,"BM286,81",400,7,"BM
286,111",400,0,"BM286,111",400,7
,"BM286,141",400,0,999,3,11
1060 DATA"BM3,117R40XG$(9);U5NR3
3D20R13BR24R20U10R8BU10L12BD5BR4
5R115L10XG$(9);U40R10BR20R39BD40
BL39R30D20L25U7R20U6L28D20R43BM1
07,108",400,3,403,"BM77,103",400
,4,"BM57,123",400,7,"BM257,108",
400,4
1070 DATA"BM257,68",400,4,999,3,
117
1080 DATA"BM3,11XG$(9);R3BR20R0B
R20R0BR20R0BR20R0BR20R0BR20R0BR2
0R0BR20R0BR20R0BR20R0BR20R0BR20R
0BR20R0BR20R0BR20R9BD30BRRBL31L0
BL30L0BL30L0BL20L0BL20L0BL20L0BL
20L0BL20L0BL20L0BL20L0BL20L0BL20
L0BL20L0BL20L3U30"
1090 DATA"BM7,2",400,4,"BM27,2",
400,4,"BM47,2",400,4,"BM67,2",40
0,4,"BM87,2",400,4,"BM107,2",400
,4,"BM127,2",400,4,"BM147,2",400
,4,"BM167,2",400,4,"BM187,2",400
,4,"BM207,2",400,4,"BM227,2",400
,4,"BM247,2",400,4
1100 DATA"BM267,2",400,4,"BM287,
2",400,4,"BM7,32",400,4,"BM27,32
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",400,4,"BM47,32",400,4,"BM67,32
",400,4,"BM87,32",400,4,"BM107,3
2",400,4,"BM127,32",400,4,"BM147
,32",400,4,"BM167,32",400,4
1110 DATA"BM187,32",400,4,"BM207
,32",400,4,"BM227,41",400,8,"BM2
57,41",400,8,"BM287,41",400,8,99
9,3,11
1120 DATA"BM3,78R25L10XG$(9);D30
NR11XG$(9);D27NR11U87NR10XG$(9);
U30R10BR20R140BR20R80BR20R7BD30L
2BL20L70BL20L80BL20L55BD30R150BR
20R76BR20RBD30BRL7BL20L240BD27R2
10BR20R37BM30,126",400,4,"BM260,
126",400,4,"BM30,99",400,4
1130 DATA"BM290,99",400,4,"BM29,
69",400,4,"BM199,69",400,4,"BM29
5,69",400,4,"BM294,39",400,4,"BM
204,39",400,4,"BM104,39",400,4,"
BM29,39",400,4,"BM29,9",400,4,"B
M189,9",400,4,"BM289,9",400,4,99
9,3,78
1140 DATA"BM3,100R253BR20R41BM25
7,91",400,4,999,3,100
1150 DATA"BM141,4R108D30L108U30B
U2BL2R112D34L112U34BM3,82R12BR20
R10ND91XG$(9);U5R12BD5BR33R10D40
NR215U40XG$(9);U5R17BD5BR33R20D3
0NR146U30XG$(9);U5R17BD5BR33R10D
20NR87U20XG$(9);U5R35BD5BR26R26B
M16,73"
1160 DATA 400,4,"BM56,73",400,3,
403,"BM116,73",400,3,403,"BM186,
73",400,3,402,"BM266,73",400,2,4
01,18,1,"WARNING! SOME",401,18,2
,"INPUTS ARE",401,18,3,"UNDEFINE
D!!",999,3,82
1170 DATA"BM3,117R10U10R5D20R5U2
0R5D20R5U10R5BR20R30BR30R10BR20R
80U5L50U5R138BM157,117XG$(9);U30
R158U80BM157,117D20R118BR30R12BM
39,108",400,4,"BM89,117",400,8,"
BM129,108",400,4,"BM276,137",400
,8,999,3,117
1180 DATA"BM3,110R15BD10L2BU5BR3
5R15BR30R20BR20R30L15XG$(9);U40R
55BR24R10U30R16BR30R31BD70LBL20L
22BL30L10D40L10U40L28BM10,110XG$
(9);U70R78BD10L9D59NH4NE4BM116,4
5R50U20R150BM17,106",400,3,403
1190 DATA"BM117,106",400,4,"BM29
7,106",400,4,"BM207,66",400,7,"B
M87,36",400,1,"BM257,45",400,8,"
BM167,115",400,8,"BM245,115",400
,8,"BM67,115",400,8,401,0,15,0V,
999,3,110
1200 DATA"BM3,92R52L10XG$(9);U10
NR272BD20NR10D30R14D26XG$(9);NL5
NR5BR40XG$(9);NL5NR5U51R6BU10L17
R8XG$(9);U10R221BD10L132D10NL7NR
7XG$(9);BM138,102R7BD10L6D46NL5N
R5XG$(9);BR40NL5NR5XG$(9);U41R13
BU5BR33R23L13XG$(9);U10R82BD15"
1210 DATA"L36BD5BL33L20D10L9D26N
L5NR5XG$(9);BR35R10BL240L8BM25,1
58",400,8,"BM65,158",400,8,"BM10
5,158",400,8,"BM145,158",400,8,"
BM185,158",400,8,"BM225,158",400
,8,"BM265,158",400,8,"BM247,108"
,400,3,402
1220 DATA"BM191,103",400,3,402,"
BM144,98",400,3,403,"BM104,93",4
00,3,403,"BM54,88",400,3,403,401
,0,19,0V,401,37,19,V+,999,3,92
1230 DATA"BM3,81R8L6XG$(9);U20NR
6XG$(9);U20NR6XG$(9);U20NR6D80NR
6XG$(9);D20NR6XG$(9);D20R6BR20R5
0L20XG$(9);D20NR255U20BR40R10U20
L10XG$(9);ND10L30XG$(9);NU10ND10
L20BL20NR10BU20R50D10R40D40L20BM
31,81"
1240 DATA"R10D10R10U10R10D10R10U
10R10D10R10U10R10D10R10U10R10D10
R10U10R10BR20R10D20L40NL40XG$(9)
;D40R120BR20R40D10L30BM31,61R150
D20R10U20R40BR20R10D20L60R50XG$(
9);D10L70R60XG$(9);D10L60D10L10D
10R60"
1250 DATA"BR20R64L44XG$(9);U60R1
0D40R10BR20R5BM31,41R240BR20R10D
10L10D30R20U50R4BU10L154BL20L20D
10L10U20L10D20L10U20L10D10L50BM1
2,12",400,4,"BM12,32",400,4,"BM1
2,52",400,4,"BM12,72",400,4,"BM1
2,92",400,4
1260 DATA"BM12,112",400,4,"BM12,
132",400,4,"BM142,12",400,4,"BM1
42,72",400,4,"BM232,52",400,4,"B
M232,112",400,4,"BM252,132",400,
4,"BM272,32",400,4,"BM292,92",40
0,4,"BM82,132",400,4,999,3,81
1270 DATA"BM3,142R3BR59R11BD10L1
9BU5BR52R10BR30R15BR20R2BR30R2BR
30R4BR30R3BR20R12BM7,142",400,8,
"BM36,142",400,8,"BM75,138",400,
3,403,"BM165,138",400,4,"BM120,1
47",400,8,"BM187,147",400,8,"BM2
19,147",400,8,"BM253,147",400,8
1280 DATA"BM286,138",400,0,401,5
,19,0V,999,3,142
1290 DATA"BM3,92R253L241XG$(9);U
80R10D60R71BD40L71D40R10D10L20U7
0BM96,82L14BD40R148BM256,102L15BM
289,97R26BU20L186BD40R187BM95,68
",400,3,403,"BM95,108",400,3,403
,"BM255,88",400,3,403,401,8,10,0
V,401,8,15,0V,401,28,12,0V,999,3
,92
1300 DATA"BM135,6R105D26L106U26B
U2BL2R110D30L110U30BU2BL2R114D34
L114U34BM3,86R26BD5BR33R10U5XG$(
9);NR17U20NR243D5XG$(9);R80D15R7
BD5BL37R10D20R90XG$(9);NR93U25R7
BD5BL37R20U20R103BD20NRL54BM28,8
2",400,3,403
1310 DATA"BM88,82",400,3,403,"BM
158,82",400,3,403,"BM228,82",400
,3,403,401,17,1,"Warning! Some",
401,17,2,"inputs are",401,17,3,"
undefined!!",999,3,86
1320 DATA"BM3,116R36BD10L20BU5BR
46R34L14XG$(9);U20R14BR20R10U15L
40U14R159BD29L10D20NR10XG$(9);NL
119D15R12BD10L58BL24L140U20XG$(9
);BM268,72R48BLBD29L47BD20BR4R43
BD20L32BM40,112",400,2
1330 DATA"BM100,112",400,4,"BM10
0,92",400,4,"BM249,63",400,4,"BM
249,92",400,4,"BM249,112",400,7,
"BM249,132",400,3,403,"BM169,137
",400,7,401,0,16,V+,999,3,116
1340 DATA"BM3,122R20U3R3U3R3U3R3
U3R3U3R3U3R3U38BR20R217BM80,92
",400,4,999,3,122
1350 DATA"BM3,50R7D10R10XG$(9);D
10NL10U30L10U10XG$(9);NU20R10U10
R10D10XG$(9);D10R10D10L10D30L10D
20R9BR20R11D10L10D10L30U10L10U30
BM30,30R10U10R10U10XG$(9);NL30R1
0D10R9BR20R11XG$(9);U10NL10D20L1
0D10L40D20NR9XG$(9);"
1360 DATA"D20R9BR20R11D10L10D30L
10XG$(9);NU20D10L10XG$(9);NU10L5
0D10R12BD10L12D7BM55,145R5U5R10D
10R10U20R10XG$(9);ND30U30R9BR20R
11D10L10D10L20D40R217BM130,110XG
$(9);D20L20D20R10U10R19BR20R11D1
0R145BM50,60"
1370 DATA"L10D30R10BM130,110R10U
20L20U10L20U10L20BM100,20R10D10R
10U20R10D30L30D10L20BD10LR31XG$(
9);NR20SU10R30U30R9BR20R11D10R10
D10L20XG$(9);NU10L20D10R50U40R10
D4R11BD10L11D26R107U20L4BL24L11B
M254,19R6U9R56"
1380 DATA"BM100,70XG$(9);R30D10R
19BR20R11XG$(9);U10NL10D30L30D20
XG$(9);NL10R10XG$(9);NU10D10R10U
20R19BR20R11XG$(9);D30L40U10XG$(
9);NU10R30U10BR10BU10U40L30D20R1
0U10R10D20BD10BR10R10U10XG$(9);U
30R70D10L40D10"
1390 DATA"L10U10L10D10BD10BL10NR
85R10XG$(9);D20L10D10R19BR20R11U
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10XG$(9);R10D20L20BR10BU20L10U10
R30XG$(9);NR15D30R16BM270,80XG$(
9);D10R40U20R5BM30,91",400,4,"BM
70,11",400,4,"BM60,51",400,4,"BM
60,71",400,4
1400 DATA"BM21,136",400,3,403,"B
M100,91",400,4,"BM140,131",400,4
,"BM150,11",400,4,"BM220,10",400
,3,403,"BM290,21",400,7,"BM150,7
1",400,4,"BM190,101",400,4,"BM25
0,121",400,4,401,1,20,0V,401,33,
4,V+,999,3,50
1410 DATA"BM3,50R16L8XG$(9);D29N
R8U58R8BR290R7BD29BLL36BD29BR24R
14BM20,12",400,4,"BM39,21",400,8
,"BM68,21",400,8,"BM97,12",400,4
,"BM116,21",400,8,"BM145,21",400
,8,"BM174,21",400,8,"BM203,12",4
00,4,"BM222,21",400,8,"BM251,21"
,400,8
1420 DATA"BM280,21",400,8,"BM20,
41",400,4,"BM39,50",400,8,"BM68,
41",400,4,"BM87,50",400,8,"BM116
,41",400,4,"BM135,50",400,8,"BM1
64,41",400,4,"BM183,50",400,8,"B
M212,41",400,4,"BM231,50",400,8,
"BM260,41",400,4,"BM20,70",400,4

1430 DATA"BM39,79",400,8,"BM68,7
9",400,8,"BM97,79",400,8,"BM126,
70",400,4,"BM145,79",400,8,"BM17
4,79",400,8,"BM203,79",400,8,"BM
232,70",400,4,"BM251,79",400,8,"
BM280,70",400,7,999,3,50
1440 DATA"BM3,13R3XG$(9);R7BR242
R62BL311D40XG$(9);R7BR97R207BL31
1D40XG$(9);R9BR30R100BR30R115BR2
0R7BL311D30R140BR20R151BM14,13",
400,8,"BM43,13",400,8,"BM72,13",
400,8,"BM101,4",400,4,"BM120,13"
,400,8,"BM149,13",400,8
1450 DATA"BM178,13",400,8,"BM207
,13",400,8,"BM236,4",400,4,"BM14
,44",400,4,"BM33,53",400,8,"BM62
,44",400,4,"BM81,53",400,8,"BM16
,93",400,8,"BM146,93",400,8,"BM2
91,84",400,4,"BM147,114",400,4,9
99,3,13
1460 DATA"BM3,16R19BR20R10D15L40
D15R10BR20R10D15L40D15R10BR20R10
D15L40D15R10BR20R10D15L40D15R10B
R20R50BR20R10U15L40U15R10BR20R10
U15L40U15R10BR20R10U15L40U15R10B
R20R10U15L40U15R10BR20R50BR20R10
D15L40D15R10BR20"
1470 DATA"R10D15L40D15R10BR20R10
D15L40D15R10BR20R10D15L40D15R10B
R20R50L20XG$(9);D20NR103U50R20BR
20R63BD30L63R10BU30XG$(9);U15L40
U15R10BR20R63L53XG$(9);U15L40U15
R10BR20R64L54XG$(9);U15L40U15R10
BR20R10U13L259"
1480 DATA"BM23,7",400,4,"BM23,37
",400,4,"BM23,67",400,4,"BM23,97
",400,4,"BM23,127",400,4,"BM93,1
27",400,4,"BM93,97",400,4,"BM93,
67",400,4,"BM93,37",400,4,"BM93,
7",400,4,"BM163,7",400,4,"BM163,
37",400,4
1490 DATA"BM163,67",400,4,"BM163
,97",400,4,"BM163,127",400,4,"BM
233,127",400,4,"BM233,97",400,4,
"BM233,67",400,4,"BM233,37",400,
4,"BM233,7",400,4,999,3,16
1500 DATA"BM3,31R19L9XG$(9);U20R
9BR20R5D5R17BD10L10D5L8BM97,21R3
0U10NR35D10XG$(9);D10R35BR24R6BR
24R9U5R9BU10L10U5L42BM267,21R50B
L190D10XG$(9);D20L120D30XG$(9);N
R15D20R15BR24R8U5R10BU10L10U5L12
BD10BR55R30XG$(9);"
1510 DATA"U25NR57D20XG$(9);NR57D
20XG$(9);NR57D20R57BD10L15BU20R1
5BU20L15BU20R15BM217,71R15BD20L1
5BD20R15BD20L15BR35R10BR24R2U6L1
0U9R4BU10L15D5L15BR63R2BU30L3BU5
BL33L10U5L15BD20R15U5R10BM23,2",
400,4,"BM23,22",400,7
1520 DATA"BM63,12",400,3,403,"BM
163,2",400,4,"BM163,22",400,7,"B
M193,22",400,7,"BM233,12",400,3,
402,"BM23,72",400,4,"BM23,92",40
0,7,"BM63,82",400,3,403,"BM183,6
2",400,3,403,"BM183,82",400,3,40
3,"BM183,102",400,3,403
1530 DATA"BM183,122",400,3,403,"
BM233,62",400,7,"BM233,82",400,7
,"BM233,102",400,4,"BM233,122",4
00,4,"BM263,122",400,7,"BM280,72
",400,3,402,"BM281,102",400,3,40
3,401,19,9,0V,401,19,12,0V,401,1
9,14,0V
1540 DATA 401,19,17,0V,999,3,31
1550 DATA"BM7,157U62R7BR40BD5L10
D5L37XG$(9);D5XG$(9);R77U5R10BR4
0BD5L10D5L117XG$(9);D5XG$(9);R15
7U5R10BR40BD5L10D5L197XG$(9);D5X
G$(9);R237U5R10BU5BR33R5BR20R3BU
60L13BL20R0BL20L10D10L190U10XG$(
9);L10BL20L29"
1560 DATA"BR59U20R220BR20R14BM25
4,115L7BU5BL33L7BU5BL33L7BU5BL33
L7BU5BL33L7BU5BL33L7BU5BL33L7U10
R10U15XG$(9);BM33,51",400,4,"BM2
63,51",400,4,"BM283,51",400,4,"B
M13,81",400,3,403,"BM53,86",400,
3,403,"BM93,91",400,3,403
1570 DATA"BM133,96",400,3,403,"B
M173,101",400,3,403,"BM213,106",
400,3,403,"BM253,111",400,3,403,
"BM293,111",400,4,"BM283,31",400
,0,401,0,20,0V,999,3,60
1580 DATA"BM18,156R13BU10L6D10XG
$(9);BU5BR39R10D5R7BU10L7D5XG$(9
);BR40R10D5R7BU10L7D5XG$(9);BR40
R10D5R7BU10L7D5XG$(9);BR40R10D5R
7BU10L7D5XG$(9);BR40R5BR20R14U20
L290U15NR16XG$(9);U10R16BD5BR26R
10D5R16BU10L16"
1590 DATA"D5XG$(9);U5XG$(9);U10R
6U20R10BM114,111R8XG$(9);NR7U35R
9BM153,111R17XG$(9);NR9U35R11BM2
03,111R17XG$(9);NR9U35R11BM249,1
11R10XG$(9);NR10U20R10U15R12BD35
BR12R24BM13,106XG$(9);U30R18BU10
L28R20XG$(9);U35"
1600 DATA"R294BM64,71R7U5XG$(9);
NR10U30R246BM114,71R7U5XG$(9);NR
10U25R196BM164,71R7U5XG$(9);NR10
U20R146BM214,71R7U5XG$(9);NR10U1
5R96BM264,71R7U5XG$(9);NR10U10R4
6BD15L3BM30,142",400,3,402,"BM80
,142",400,3,402
1610 DATA"BM130,142",400,3,402,"
BM180,142",400,3,402,"BM230,142"
,400,3,402,"BM270,142",400,4,"BM
30,102",400,2,"BM80,102",400,3,4
02,"BM130,102",400,7,"BM180,102"
,400,7,"BM230,102",400,4,"BM270,
102",400,7
1620 DATA"BM30,62",400,3,403,"BM
80,62",400,3,403,"BM130,62",400,
3,402,"BM180,62",400,3,402,"BM23
0,62",400,3,402,"BM280,62",400,3
,402,401,0,19,0V,999,3,66
1630 DATA"BM3,151R39BR20R254BM43
,142",400,4,999,3,151
1640 DATA"BM3,100R7XG$(9);BR34XG
$(9);BR34XG$(9);BR55R184BL239D30
R31BR20R30BR30R50BR30R20BR20R7LB
U60L6BL20L160BL20L65D30BL34D50R3
07BM13,100",400,8,"BM47,100",400
,8,"BM81,100",400,8,"BM110,91",4
00,7
1650 DATA"BM110,61",400,4,"BM110
,121",400,4,"BM290,121",400,4,"B
M290,61",400,4,"BM240,130",400,8
,"BM160,130",400,8,999,3,100
1660 DATA"BM3,16R5L3XG$(9);U13R4
0D3R166BD10L179BM244,11R72BM9,7"
,400,7,"BM210,2",400,3,403,999,3
,16
1670 DATA"BM3,29R6L4XG$(9);U23R1
54BD10L80D13L16BL24L6BM185,11R13
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1BM160,2",400,2,"BM10,20",400,7,
"BM40,20",400,7,999,3,29
1680 DATA"BM193,144R8BD10L8BU5BR
41R5BR24R6BR20RBR20R4D20L250U15R
17BM172,144L10U20L90U10R9BM114,1
49R30XG$(9);BM3,104R78L28XG$(9);
B40R28BM114,109R125L20XG$(9);D20
R20BR20R60BU20L30BL20L6BM80,100"
,400,3,403
1690 DATA"BM80,140",400,3,403,"B
M270,100",400,0,"BM240,100",400,
7,"BM240,120",400,4,"BM240,140",
400,7,"BM270,140",400,4,"BM291,1
40",400,0,"BM200,140",400,3,402,
401,22,18,0V,401,22,19,V+,999,3,
104
1700 DATA"BM3,152R3BR88R3BR20R40
L10XG$(9);U20NR10XG$(9);U20NR10X
G$(9);U20NR10XG$(9);U20NR10XG$(9
);U20NR10XG$(9);U20NR10XG$(9);U2
0R10BR20R137BD20RL138BD20R138BD2
0L138BD20R137BD20R2L139BD20R138B
D20L138BM7,152",400,8
1710 DATA"BM36,152",400,8,"BM65,
152",400,8,"BM98,143",400,4,"BM1
58,3",400,4,"BM158,23",400,4,"BM
158,43",400,4,"BM158,63",400,4,"
BM158,83",400,4,"BM158,103",400,
4,"BM158,123",400,4,"BM158,143",
400,4,999,3,152
1720 DATA"BM3,88R123L10XG$(9);U2
0R40D5R22BD10L22D5L6BU10BR56R110
BM127,79",400,7,"BM177,69",400,1
,999,3,88
1730 DATA"BM3,46R8BD10L8R3XG$(9)
;D10R37U5NR8D5XG$(9);D5R40U5NR8D
5XG$(9);D5R40U5NR8D5XG$(9);D5R40
U5NR8D5XG$(9);D5R40U5NR8D5XG$(9)
;D5R40U5R8BM39,51R12BD5BR28R12BD
5BR28R12BD5BR28R12BD5BR28R12BD5B
R28R12BD5BR28"
1740 DATA"R10XG$(9);U20L20U20R10
BR20R10U15L40U15R10BR20R16BD160R
L27U90BM10,42",400,1,"BM50,47",4
00,1,"BM90,52",400,1,"BM130,57",
400,1,"BM170,62",400,1,"BM210,67
",400,1,"BM250,72",400,1,"BM280,
2",400,4
1750 DATA"BM280,32",400,4,999,3,
46
1760 DATA"BM3,100R250BR20R10U50L
30U20R10BR20R33BM254,91",400,4,"
BM264,21",400,0,999,3,100
1770 HCOLOR1:HPRINT(0,22),"Score
":HCOLOR15:HPRINT(5,22),STR$(S):
HCOLOR1:HPRINT(0,23),"Low":HPRIN
T(25,23),"High"
1780 FORI=1TO SC:HCOLOR I:HDRAW"
BM"+STR$(246+I*7)+",180XG$(9);":
NEXTI:IFLV>10 THENFORI=11TO LV:H
COLOR I:HDRAW"BM"+STR$(251+((I-1
0)*11))+",185XL$;":NEXTI
1790 HCOLOR10:HLINE(26,188)-(197
,188),PSET,BF:TI=197:HCOLOR1:RET
URN
1800 A$="00000000000000001620093
63F192D26":GOSUB1830:RETURN
1810 A$="003F1E10111213141516170
8262D2019":GOSUB1830:RETURN
1820 A$="00000000000Q000000000000
000000000":GOSUB1830:RETURN
1830 FORI=0TO15:PALETTE I,VAL("&
H"+MID$(A$,I*2+1,2)):NEXTI:RETUR
N
1840 HLINE(48,176)-(95,183),PRES
ET,BF:HCOLOR15:HPRINT(5,22),STR$
(S):HCOLOR1:RETURN
1841 HCOLOR14:HLINE(100,82)-(218
,110),PSET,BF:HDRAW"BM115,93XE$;
":PLAY"O1T2L1C":RETURN
1850 GOSUB1841:HCOLOR13:HPRINT(5
,23),"Loss of Voltage!":PLAY S$
1860 PLAY S$:HSCREEN0:GOSUB1800:
CLS1:ATTR1,0,B:LOCATE12,1:PRINT"
You have failed!":ATTR4,0:LOCATE
13,3:PRINT"Last attempt -"
1870 ATTR2,0:LOCATE11,5:PRINT"Le
vels completed:";:ATTR0,0:PRINT
LV-10:ATTR6,0:LOCATE12,7:PRINT"S
chematic page:";:ATTR5,0:PRINT S
C
1880 ATTR3,0:LOCATE15,9:PRINT"Sc
ore:";:ATTR7,0:PRINT S:LOCATE0,2
2:ATTR0,0:END
1890 HSCREEN0:CLS1:LOCATE0,1:ATT
R7,0:PRINT"YOU'VE FINISHED ALL O
F THE SCHEMATICS!!":LOCATE0,3:AT
TR5,0:PRINT"FINAL SCORE:";:ATTR4
,0:PRINT S
1900 PLAY S$:GOTO1900
```

PD DISK 034 G-NUMBERS

A Cross-Lotto number Picking Programme

This month's Public Domain disk is an exclusive to COCO-LINK. It is one for all you XLOTTO fanatics. The programme is called G-NUMBERS and covers all facets of trying to pick the right numbers to put on your entry.

The master disk received is used initially to make your working programme disk and data disk. It can then be put away safely in case of future problems. It is also recommended that a backup copy of your DATA disk be made at regular intervals.

Once you have built up a backlog of weekly numbers the programme will tell you which come out the most often or those which don't come out so often. In fact this programme does so many things that I could not number them here. This is why the G-NUMBERS comes with a 36 page printed manual. In this case we have had to change from our usual distribution method to the following as we do not have a copy of the manual on disk.

Programme Disk only	$5.00
Manual only	$6.00
Prog. Disk + Manual	$10.00

You could use the programme without the manual but it is not recommended. You would miss out on knowing the intricacies of each section of this many facetted programme. Here at COCO-LINK we will NOT answer queries on the programme.

This is another top offering from COCO-LINK. Should there be some delay in receiving your copy of G-NUMBERS please be patient. The neccessity to copy the manual for each order will put a considerable strain on what little spare time I have.

Thank you.

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HOW TO SUBMIT MATERIAL TO COCO-LINK

PROGRAMMES: On tape or disk.
At least two copies should be on the tape/disk one of which should be saved in ASCII format.
Where possible include a description of your prodgramme saved as below for articles.

ML PROGRAMMES:
These require Source code saved on a suitable word processor. Two copies should be made.
A working copy of the programme should be included for checking by COCO-LINK.

ARTICLES:
At least one copy saved in ASCII format plus one copy on a commercial word processor where possible. (VIP Writer etc.)

HINTS AND TIPS:
Hand written or typed is acceptable.

LETTERS TO THE EDITOR:
Hand written letters will be accepted subject to the length. Long letters should be submitted on disk in the manner above for articles.

SOS ORDERING FORM

PROGRAMME NAME QTY PRICE

TOTAL TOTAL

CHEQUE/MONEY ORDER No. .....

NAME AND ADDRESS.....

SIGNED: .....

By Sam Thompson

There will be many readers who like to keep their paperwork tidy, especially the COCO-LINK. When the time comes to cut out a form to send away for something advertised, they may feel reluctant to mutilate regardless of what is on the back of it.

Here's a small utility that will let you roll your own in a jiffy and keep the magazine intact. It is for a SOS Order form but is flexible. Add it to the menu of your existing labels or small utilities programme and it's at your fingertips.

The absense of LOCATE and PRINT@ commands and the use of short TAB numbers is intentional to make it compatible with all screen widths. Those with 80 column screens will get a full visual display by not typing in line 5 till ready to printout.

```
1 CLS
5 M=-2
8 N=6
10 PRINT#M:PRINT#M,TAB(4)STRING$
(64,"="):PRINT#M
15 PRINT#M,TAB(26)"SOS ORDERING
FORM":PRINT#-Z
20 PRINT#M,TAB(6)"PROGRAMME NAME
"STRING$(17," ")"QTY";
25 PRINT#M,STRING$(19," ")"PRICE
30 PRINT#M,TAB(6)STRING$(9,"-")"
 "STRING$(4,"-");
35 PRINT#M,STRING$(17," ")"---"S
TRING$(19," ")"-----
40 FOR X=1TON
45 PRINT#M,TAB(5)STRING$(25,".")
STRING$(6," ")STRING$(5,".");
50 PRINT#M,STRING$(16," ")STRING
$(9,".")
55 NEXT
60 PRINT#M,STRING$(35," ")STRING
$(7,"-");
65 PRINT#M,STRING$(15," ")STRING
$(9,"-")
70 PRINT#M,STRING$(29," ")"TOTAL
"STRING$(17," ")"TOTAL
75 PRINT#M,STRING$(35," ")STRING
$(7,"=");
80 PRINT#M,STRING$(15," ")STRING
$(9,"=")
85 PRINT#M:PRINT#M,TAB(8)"CHEQUE
/MONEY ORDER No. "STRING$(22,".."
)
90 PRINT#M:PRINT#M,TAB(8)"NAME A
ND ADDRESS"STRING$(41,".")
95 PRINT#M:PRINT#M,STRING$(28,"
")"SIGNED: "STRING$(31,".")
100 PRINT#M:PRINT#M,TAB(4)STRING
$(64,"=")
```

COCO-LINK PD SOFTWARE

DISK 001 EDUCATION

Australian Geography
Australian Explorers
Fractutor
Decimal
Spellit
Times Table

DISK 002 EDUCATION #2

Binary	Mathsmt
Cocohome	Memory
Coindemo	Numfun
Formula	Puzzle
Matchem	Trigshow
Math	Word

DISK 011 GAME

CoCo Trivia
Trivial Pursuit game.
(Takes up 2 sides of disk)

DISK 012 GAME

Computer Tote
Complete with races and tote betting.
Marvelous for club fund raising!

DISK 013 13 GAMES

21 Card Trick	25 Square
Bobo	Build
Centrit	Cypher
Germ	Life
Max	Maze
Reversi	Tanks
Yancc	

DISK 015 BASIC GAMES

BEAST	BOBO
GUNNER	HOW
LANDER	LIFE
MAX	POKER
BIORITHM	BLACKBOX
BLOCKADE	BUSJUMP
CHUTE	GO
HANGMAN	OTHELLO
TARTUS	SEQUENCE
ALPHABET	GEOGRAPH
FLASH	BAGEL
OREGON	MULTIPLY
RUBIC	FRACTAL
KALSCOPE	TARTUS
WORLD3D	LOVETREK
NUDE	LIFE
STARTREK	ADVENT
HURKLE	REVERSE
GUESSFR	SCRAMBLE
PIZZA	CINQUAIN
AANDAN	

DISK 021 UTILITIES

3CLMLIST	3HBUFF
3PRNTDOC	3QKMEN40
3QKMEN80	3VIPCOCO
CATLOGUE	DIRSORT
DSKDET	GOSUBBER
HASH	MENU
MULTUTIL	PRNTDOC
QKMEN32	

DISK 022 McLINTOCK UTILITIES

XCOM	ERASE
COMSBUF	DIVERT
MKI	TRANSFER
MGEFILES	PRINTDOC

DISK 023 UTILITIES NO 3

Util	Progutil/Doc
Copycat	Copycat/Doc
Dir-back	Dirprot
Diskcert	Ramlist
Varmap	Varslist

DISK 031 HOME APPLICATIONS

Homehelp	Shoplist
Budget	Loan
Will	

DISK 032 HANDICAP SYSTEM

WINNERS
Plus full documentation & trial data

DISK 033 SPELL 'N FIX

Spell Checker with 20000+ words

DISK 041 COCO 3 GRAPHICS

DIR	ROCKFEST
AIRPORT	WATERFALL
BOUNCING BALL	WORLDMAP
NUDE	

DISK 042 COCOMAX GRAPHICS

2 sides full of Cocomax pictures.

DISK 043 RASCAN DEMO

Showing what the Rascan Digitiser can do. With it's own picture scanner.

DISK 051 FORTH83 DEMO

Demonstration of the FORTH83 language.

NEW THIS ISSUE
****

DISK 034 G-NUMBERS

Comprehensive Xlotto number picking system.
Add $5.00 for the 36 page printed instruction manual.

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