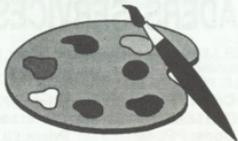


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Vol.8 N°7.

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NEWS ON 4

SAM SEES C

Just in time for last months issue of FORMAT we received a small advert from Dundee based Fred Publishing. The advert contained the news that many SAM users had been waiting for - the launch of a version of the C language for using in SAM native mode (as opposed to the CP/M environment of ProDOS).

The new C compiler, which should be launched at the Gloucester show in April, is based on ANSI C and includes a built-in editor, debugger and calculator. You can also include assembly language code in the C source file. The package will include standard libraries for input/output, graphics, strings and lots more.

One of the main selling points of C is its portability. That means code written for one machine using C should be usable with very few mods on another machine. Given the large amount of programs written in C on other machines this should give SAM owners access to possible thousands of new programs.

The launch price is likely to be less than £20 which, when you compare it to the £80+ you would have to pay for a MS-DOS version, is very cheap.

APRIL SHOW

Yep its that time again folks! The date of the next Gloucester Show has been fixed. Saturday April 29th, the weekend before the bank-holiday weekend (ignore your diary if it tells you 1st May is a bank-holiday, it lies).

Same venue as past shows, Quedgely Village Hall on the outskirts of Gloucester and within very easy reach of the M5 (we will print the usual map next

month).

This show will build on the success of the previous three and we hope to have even more stalls and more demos than before. If you have something you would like to demo to people, get in touch with Bob as soon as possible.

Visitors are expected from all over the UK and from parts of the Continent. If anyone is coming to Gloucester for the show and can offer a lift to someone else please let us know right away, we can then list your name and phone number in the next issue.

MEMS '95

MEMS, the Midi Electronic Music Show, is being held at Olympia 2 in Kensington, London from April 21st to 23rd this year.

Hailed as the show-case for Midi, electronic music and recording products, the show is expecting around 7,000 visitors over its three days. Sponsored by Future Publishing's *Future Music* magazine the show is a must for anyone who likes electronic music (or noise as some would call it).

TnT EXPLODES ON SAM

Without doubt one of the best Spectrum games of all time was Bomb Jack. Well now SAM owners have a new game, TnT, based on similar ideas but packed with fantastic colour and sound. What's more, two players can compete at once on the same screen - a real advance. See Revelation's advert for more details.

Credits:

URGENT we need your news. Anything you think other people should know about. Each item printed earns the contributor 3 months extra subscription (please claim when next renewing).

The Editor Speaks

Saturday April 29th, that's the date to remember, the date of the 4th Gloucester show. Same venue as the past shows and I'm putting in a booking for good weather.

Sorry to anyone who has been trying to get hold of me by telephone recently and found the answerphone on at unusual hours, but there has been a good reason. I have been in intense negotiation with West Coast Computers and at last I am able to tell you all about it. Since December 1993 we have been handling the order processing for West Coast and since this time last year we have been doing the dispatching as well. This came about because we convinced them it was what we were good at and it was better to use our resources to handle the work than to pay for their own.

Well now we are taking things one stage further. West Coast Computers have now appointed us as their sole mail-order distributor. This means that West Coast will no longer be directly involved in the mail-order market and everything will be handled by us here in Gloucester. What difference will it make? Well, for a start it means that cheques will now be made out to Format, we no longer have to order the product from West Coast who in turn get it made by the assembly companies - we order direct from the suppliers and just provide West Coast with a monthly analysis of what is going through the system. This should help speed some things up a bit, and it will certainly lead to some savings in costs which in turn will help keep prices down.

We are pleased that West Coast has expressed this vote of confidence in us

and we will do everything we can to ensure the continued success of the SAM range of machines.

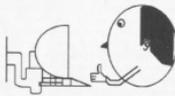
At the same time I have agreed to personally take on one other role for West Coast. It was one of Blue Alpha's jobs to help West Coast in the development of new products but, with Mark still very ill, I have agreed to take over co-ordination of new hardware projects, at least for the time being. So, I'm launching an urgent appeal: Wanted - Hardware People to help develop for SAM and Spectrum. Ideas exist for the right people to start working on right away, or we are certainly on the look-out for new ideas if you already have something in design. All I can promise is long hours, no pay, but big glory at the end of the day if your prototype goes through for production. Do you fit the bill? If so then give me a ring, I would love to hear from you.

Right, now down to something purely FORMAT related. Last year we dropped volumes 1 & 2 from our back issue list (because the cost of reprinting in small quantities had become too high and we did not have space to store large numbers). Sadly this now applies to volume 3 as well. So, if you have not already purchased volume 3 now is your last chance. Any orders received by 1st May will be guaranteed (although the quicker you order the better). After that volume 3 will be out of print. In addition, from the same date, volume 5 will only be available as a complete volume, so if you have any odd issues missing from volume 5 get your order in quick.

Until next month.

Bob Brenchley, Editor.

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*Requires MasterDos and MasterBasic to use OPUS single density discs.

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Please add £2.00 to price for each 3" disc required.

Please add £0.50 postage for each order (£1.20 outside UK).

* Using SpecMaker Spectrum emulator

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BASICally Speaking...

Part 12.

By:- David Finch.

It is symbolic of our modern times that we aim to get machines to do 'work' for us. From the dishwasher to the car, we put something in (dirty dishes or fuel) and get something preferable out (clean dishes or motion). The intention of the computer is to do work on information. We put some form of data in and get more useful information out.

The information, whether textual, graphical, musical or numeric, is always represented, stored and processed as binary numbers, so the 'work' is essentially on numbers. That is what we are going to look at this month. A process which takes in a number and gives out one number is called a function. The key point is that there can only ever be one result for a given function with a given argument (argument: variable input). Hence, by definition a function always has the same result for a given input. However, we can have as many arguments as we like, and for the purpose of Basic, we can take strings as arguments.

When you use a function in your programs you can consider the function itself as any other variable or string. You can use a function which produces a number like any other variable in a numerical expression, so it can be as complicated as you like. Similarly a function which produces a string can be used in place of any other string expression (within a PRINT statement or LET a\$=... for example).

We have already met a few functions which are built in to the Basic language. For example VAL takes a number represented by a string as the argument and gives the number as a variable and STR\$ does the opposite, that is, it takes a numerical variable and converts it to a string which would print as that number. It is important to notice the difference between this and CHR\$ (another function, see part 6 in April '94, and part 8 in July '94) which also converts numbers to strings, except the string produced is a single character corresponding to the ASCII code of the number. We saw the trigonometrical functions when we did the pie chart (SIN and COS). The third one is TAN. If you look at the diagram on page 26 of Vol.7, N° 10 (June '94) then:-

$$\begin{aligned} \text{TAN } a &= y/x \\ x \text{ TAN } a &= y \\ \text{TAN } a &= (\text{SIN } a) / (\text{COS } a) \end{aligned}$$

ACS ASN and ATN are three more trigonometric functions. They are short for ArcCoSine, ArcSiNe and ArcTaNgent, and are the opposite functions to COS SIN and TAN respectively. So if SIN a=y/r then a=ASN (y/r) for example.

The 'up arrow' (↑ or CHR\$ 94) provides a function to raise a number to the power of another number. For example 2↑3 is two raised to the power of three. That means two multiplied by itself three times, two times two times two, which is eight.

There is a number called e (which

equals 2.718281828...), which is unique in that the gradient of the graph of e to the power of any number (say x) is actually the value of e to the power of x . That is why the number e is important to natural systems such as population or radioactive decay where the rate of increase or decrease is proportional to the amount that you have. This value that we call e is so important that there is a function especially for powers of e . EXP is a function which, when followed by a single argument, say x , gives the value of e to the power of x . I suppose you only need to know it if you are a mathematical fanatic, but it is amazingly useful when you do need to use it. We will be using it in a later example because I am a mathematical fanatic I suppose.

LN is a function which gives the natural logarithm of the argument (i.e. the log to the base of e). LN is the opposite function to raising to the power of e . I suppose logs are the sort of thing that if you are a person who needs to use them then you know about them, and if you don't know about them then you are probably better off that way! If you need to perform a logarithm to any other base (say ten) then all you need to do is to divide the natural log of the number by the natural log of the base. So in base ten, LOG x is equal to (LN x)/(LN 10).

PI is a function without an argument, and simply returns the value 3.1415926535..., which is quite useful for all those calculations on circles. (Area=PI*radius*radius, Circumference=2*PI*radius).

I would just like to comment on the inaccuracies which occur when using irrational numbers (such as PI, square root of two) and fractions such as a third on a computer. Since the numbers are

represented by binary which is converted to decimal for our convenience, after a certain number of decimal places the number is rounded off and there is a slight inaccuracy. Incidentally, that inaccuracy is greater if you are dividing using an Intel Pentium processor on your IBM compatible since two million of these new top spec chips, costing billions to develop and about \$400 to buy, can't divide accurately. They should use a Z80 to check their results!

Seriously though, if you are careful in how you do your maths (by avoiding calculating from other results when you can use original numbers) you can minimise the effects. I suppose it is analogous to making a copy of a key from another copy (or a copy of a copy), in that any slight inaccuracies are compounded. However, for most general maths you needn't worry yourself. Bear it in mind for wire frame graphics, statistics etc. And that is all I have to say about that.

If you need to find the square root of a number you should use the function SQR followed by the argument.

```
10 LET a=SQR 2
```

The above makes a equal to the square root of two and it is that simple. However there is an alternative method which is of no advantage as far as I know. Taking the square root of a number is the same as raising it to the power of a half (like raising it to a power of two is squaring). Hence, the equivalent to the above line would be:-

```
10 LET a=2↑0.5
```

If you wanted to find the cube root of some number there is no function to do this directly. However, you can simply raise the number to the power of a third to gain the cube root. For example, two is the cube root of eight so the following

would make a equal to two:-

```
10 LET a=8↑(1/3)
```

ABS is a function which gives the absolute value of the argument. That means if it is negative then it makes it the same number but positive, and if it is positive then it leaves it alone.

INT is a function that we have already seen (part 7), and it simply gives an integer (whole number) by just ignoring any fractional part. You should note that this is NOT rounding off since a fraction of a half or above is not rounded up. INT always rounds down.

It is very useful to have these functions to help us when writing programs, but what do you do if you need a function which is not built in to the language? The answer is to define your own function. For example, we use INT to round down a number, but we may need a function to round off a number (that is, round down if the fractional part is less than a half, and round up if the fractional part is at least a half).

You define a function using the DEF FN command followed by the name of the function. On the Spectrum you can only have a single letter for the name whereas on the SAM you can have more meaningful names by using more characters. After the name of the function you include the arguments of the function in brackets which are separated by commas if there is more than one. Then you type the equals sign and then the actual function. You can use any sort of mathematical expression including logical conditions. Include the following line in your program and then you will be able to round off numbers.

```
10 DEF FN RoundOff(a)=(INT a)
  +((a-INT a)>=0.5)
```

This function takes the whole part of a

(INT a) and adds on one if the fractional part (a -INT a) is greater or equal to a half. The brackets to the right of the plus sign are either one or zero depending whether the fractional part is at least a half. Spectrum owners will have to replace the function name with a single letter, say r . You implement it using FN RoundOff(a) like any other function, where a is the argument. For example:-

```
20 LET b=FN RoundOff(2.7)
```

would assign the value 3 to b because you round 2.7 off to become 3. Of course, Spectrum users will have to replace the name RoundOff with their single letter equivalent. The DEF FN part can appear anywhere in your program since it operates in a similar way to a procedure. A procedure causes the program to digress but a function causes the program to digress and return with a value. In more structured languages such as Modula 2 or Pascal, a function is written more like a procedure which allows more flexibility (such as producing self contained recursive functions).

A more useful user defined function would be the hyperbolic trigonometric functions, cosh and sinh (which are similar to sin and cos). They aren't provided by the basic language and it would take a long time to write the formulas out each and every time you want to make a hyperbolic calculation. These functions make use of the predefined function EXP. If you needed to, you could use your own user defined functions within your user defined functions.

```
10 DEF FN cosh(x)=(EXP x + EX
  P (-x))/2
20 DEF FN sinh(x)=(EXP x - EX
  P (-x))/2
```

So if you include these lines in your program then you can use FN cosh(x)

and FN sinh(x) in a similar way that you use COS x and SIN x normally.

As I said earlier, you can have more than one argument. Try this example (Spectrum owners will have to change the name to a single letter name again).

```
10 DEF FN Difference(a,b)=ABS
(a-b)
```

The result of this function will give the absolute difference between the numbers irrespective of which is larger.

```
20 LET a=FN Difference(4,2)
30 LET b=FN Difference(3,5)
```

Both *a* and *b* would have the positive value of two. Notice that the use of variables *a* and *b* are not affected by the function. The variables which are declared in the left hand side of the equation are local to the function. If they are used outside the function then they operate independently from the values assigned when used in the function. Similarly, you could have a variable with the same name as a function (one character only on the Speccy), and the variable would operate totally independently from the function. However, this is not recommended since it causes confusion for the programmer.

User defined functions can produce a Boolean result. After all, we represent a Boolean result as either 0 or 1 (and other number is interpreted as 1) so true and false are simply numbers. For example, to produce a function which tells you if it is hot given a temperature: (Speccy programmers should, again replace the names with single letters)

```
10 DEF FN hot(temp)=(temp>25)
```

And then you could write:

```
20 IF FN hot(34) THEN PRINT "
Phew, it's hot!"
```

This condition will always be true in this example since the value 34 is not variable. I'm sure that you can think of a

more complicated and useful function.

You can take a string as an argument. LEN is an example of this, but there is nothing to stop you from creating your own. Try this example:-

```
10 DEF FN Capital(a$)=(CODE a
$(1)>64 AND CODE a$(1)<91)
```

This function returns a truth value depending on whether the character in the string, or the first character in the string if there is more than one, is a capital letter. However, the program doesn't cope if the string is empty, and ideally you would like to incorporate some kind of error checking in the function.

In Basic, a function can only consist of an expression. In Basic, functions are simply a means to prevent you from having to type out the expression every time you want to use them, making it easier to change the function if necessary. In other languages it is possible to incorporate conditions and other commands within the function, so it is more like a procedure. With Basic there is no way to do this other than using procedures (or a GOSUB) and returning the result in via a normal variable. This restriction makes it impossible to use functions recursively (using functions alone) since there is no way of using conditions in functions. To demonstrate this I would like to use the factorial problem as an example of a recursive function.

The factorial of a number is the product of all the natural numbers up to that number, so 4 factorial (written as 4!) is $1*2*3*4 = 24$. This may seem pointless, but it is very useful in statistics and when expanding out equations (eg Taylor's expansion). Two essential conditions for a recursive function to work are:- some kind of

diminishing of the problem as the recursive function is recalled, and some end where the result can be easily stated. To break down the problem we can say the factorial of a number is that number multiplied by the next number below. So 8! is the same as $8*(7!)$, $7! = 7*(6!)$, $x! = x*((x-1)!)$. As our first attempt we may write:-

```
10 DEF FN Factorial(n)=n*FN F
actorial(n-1)
```

I hope you can see the essential part of recursion: The function calls itself but with a simpler argument.

FN Factorial(8) calls FN Factorial(7) which calls FN Factorial(6) etc... However, we don't have the second essential part of recursion, an end. We want to say that when we call FN Factorial(1) we want to return the value one without calling FN Factorial(0). To do so would require a condition which is not possible in functions in Basic, which is why we have to resort to procedures.

```
10 DEF FN Factorial(n)=(1 AND
n=1)+(n*FN Factorial(n-1)
AND n>1)
```

(Spectrum owners should remember to replace the name factorial with a single lettered name) The above example would work if our implementation of Basic used short circuit evaluation. It would return one if *n* is one, or $n*n!$ if *n* is greater than one. Short circuit evaluation means that, in this example, it would check if *n* is greater than one, and if so then it would evaluate the function. However, our Basic evaluates the function even if the condition is false. It will still evaluate 0! (and hence -1!, -2!, -3!...) and the function will never end (probably producing an out of memory error).

I challenge all readers to produce a recursive function using only functions in SAM or Spectrum Basic. You may like

to try the palindrome problem instead of the factorial example. OTTO is a palindrome because it is the same backwards as forwards. So the first letter is the same as the last and the bit in-between (TT) is also a palindrome, hence the recursive bit. I would be delighted to be proved wrong, but I don't think it is possible.

Finally, try this function. I know it is a bit pointless, but I am demonstrating a point. The idea is that it adds a full stop to a string:-

```
10 DEF FN a$(a$)=a$+ "."
20 PRINT FN a$("Hello")
```

The *a\$* within the DEF FN has nothing to do with any *a\$* already in use within your program. To prove that, add the following lines to the two given above.

```
5 LET a$="I'm Your Computer"
30 PRINT a$
```

And on that point I will leave you, see you soon.

FORMAT

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780 SUBS

By:- Adrian Stevens.

Z80 SUBS is back this month with more fascinating and wonderful machine code routines for readers to digest. To start this month off there is a demonstration of the use of some of the subroutines presented in the first Z80 SUBS article printed last month.

The routine to follow makes use of the 'Moire patterns' pixel setting algorithm, colour = (((X*X+Y*Y)/n)BAND 15), where 'n' is some integer value. Unfortunately this routine is only suitable for SAM, but there are more subroutines to follow suitable for any Z80 machine. There is just one more subroutine which is required and that is a plot pixel routine, which is included at the end of the Moire patterns routine. The multiply and word (16 bit) division subroutines from last month are then added at the end. If you are using the COMET Assembler then you can either merge or include the relevant subroutines required.

```

;*** Moire Patterns ***
;Uses:- Multiplication, word
;(16bit) division and pixel
;setting subroutines
;
START:  DI
        IN A,(250)
        EX AF,AF' ;save LMPR
        IN A,(252) ;get video
        AND 31 ;memory page
        OR 32
; write enable RAM section A
        OUT (250),A
; page in video mem in low RAM
        LD (SP_STORE),SP
        LD SP,NEWSP
; save SP & point to new stack
        LD D,192 ;No of lines
        LP_Y: LD E,0
        LP_X: LD H,E
        LD L,E
    
```

```

CALL MULTIPLY ;x*x
SRL H
RR L
; divide by 2 to scale for add
LD B,H
LD C,L
LD H,D
DEC H
LD L,H
CALL MULTIPLY ;y*y
SRL H
RR L
; divide by 2 to scale for add
ADD HL,BC ;x*x + y*y
LD BC,10 ;divide val
CALL DIVIDE_W
LD A,C
; use LD A,L for remainder
AND 15
LD C,A
RLCA
RLCA
RLCA
OR C ;copy low nibble
LD C,A ;to high nibble
EX DE,HL
DEC H
CALL PLOT_PIXEL
INC H
EX DE,HL
DEC E
JP NZ,LP_X
DEC D
JP NZ,LP_Y
LD SP,(SP_STORE)
; restore stack pointer
EX AF,AF'
OUT (250),A
EI
RET
;
SP_STORE: DEFW 0
DEFS 16
NEWSP: DEFBS 0
;## Plot Pixel Subroutine ##
;Enter routine with the screen
;paged in low memory section AB
    
```

```

;Registers: C=colour
;H=y coordinate (0 = top of scr)
;L=x coordinate
;
PLOT_PIX: SRL H
          RR L
          LD A,(HL)
          JR C,ODD_PLOT
          XOR C
          AND 15
; retain right nibble
          KOR C ;mix left nibble
          LD (HL),A
          ADD HL,HL ;restore HL
          RET
ODD_PLOT: KOR C
          AND 240 ;(11110000)
; retain left nibble
          KOR C ;mix right nibble
          LD (HL),A
          ADD HL,HL
          INC L
          RET
; Multiply and Word (16bit)
; division subroutines either
; included or merged here.

```

Now all that is required is to run the routine (using screen mode 4) and in about 40 seconds the screen will be filled with 'Moire Patterns'. You will notice that there is a line labelled VALUE, and by putting in different values various patterns can be created. Also there is line labelled MODIFY and by changing the instruction so that either the quotient or remainder is used other various and quite interesting patterns can be created. Below are just a few values for you to try, and I expect there are many other values which will give interesting patterns.

Value	Modify	Value	Modify
20	LD A,C	79	LD A,L
28	LD A,C	63	LD A,L
7	LD A,C	47	LD A,L
26	LD A,C		

Next is a subroutine for converting an 8-bit binary number to packed BCD, this routine will work on any Z80 machine. Each digit of decimal numbers is represented in BCD by a 4 bit binary

number eg. 279 = 0010 0111 1001. The number to convert is passed in the A register, and the BCD digits are returned in DE with the MS digit in D. This routine can be used when you either want to display the number on the VDU (BCD to ASCII is all that is required) or if a number is to be displayed on some sort of 7-segment display.

```

;## 8bit Bin To BCD Converter #
;Enter with reg A=binary number
;On exit BCD digits in DE.
;

```

```

BIN_BCD: LD E,A
          LD D,1
          XOR A
BCD_SHIFT:RL E
          ADC A,A
          ; shift A and add carry
          DAA
          ; convert to BCD
          RL D ;store MS digit
          JR NC,BCD_SHIFT
          LD E,A ;E=low digits
          RET

```

```

EXAMPLE: LD A,137
          CALL BIN_BCD
;reg D=0000 0001, E=0101 0111
;      0      1      3      7

```

As I mentioned above to display the numbers on the VDU a BCD to ASCII conversion is required. So the next subroutine will allow a number in register A to be printed to the current I/O channel (eg upper screen). Note this subroutine requires the last subroutine (Binary to BCD conversion), and on exit all registers are unaltered.

```

;## Print DEC Num Subroutine ##
;Enter with reg A=binary number
;Output to channel ASCII encoded
;decimal number (eg. screen)
;Uses:- Bin to BCD subroutine
;
PRNUM_D: PUSH AF
          PUSH DE
          CALL BIN_BCD
          LD A,D ;MS digit
          OR A
          ; skip digit if number<100
          JR Z,PRNUM_DL1
          ADD A,48
          ; convert to ASCII character

```

```

RST 16
; print first digit
PRNUM_DL1:LD A,E
          AND 240
          CP D
          ; skip digit if number<10
          JR Z,PRNUM_DL2
          ; mask off upper digit
          RRCA
          RRCA
          RRCA
          RRCA
          ; shift into lower 4 bits
          ADD A,48
          RST 16
          ; print second digit
PRNUM_DL2:LD A,E
          AND 240
          ; mask off lower digit
          ADD A,48
          RST 16
          ; print third digit
          POP DE
          POP AF
          RET

```

That has dealt with the printing of numbers in decimal, but there may be times when you need to print a number in hexadecimal. This is a little simpler to achieve as Hex numbers are of base 16 which is a power of base 2 (binary numbers). So all that is required is to split the binary number up into a series of 4 bit sequences which then represents the hexadecimal digits. The routine below masks off the upper and lower 4 bits of register A separately and adds appropriate values to the 4 bit number to encode as ASCII characters. The routine leaves all registers unaltered, and outputs the ASCII characters to the current channel.

```

;## Print HEX Num Subroutine ##
;Enter with reg A=binary number
;Output to channel ASCII encoded
;HEX number (eg. screen)
;
PRNUM_H: PUSH AF
          PUSH DE
          LD D,A
          AND 240 ;(11110000)
          ; mask off upper Hex number
          RRCA
          RRCA
          RRCA

```

```

RRCA
; shift into lower 4 bits
CP 10
; check for numeral or letter
JR C,PRNUM_HN1
ADD A,7 ;letter
PRNUM_HN1:ADD A,48
          RST 16
          ; print MS HEX digit
          LD A,D
          AND 15 ;(00001111)
          ; mask off lower Hex number
          CP 10
          JR C,PRNUM_HN2
          ADD A,7 ;letter
PRNUM_HN2:ADD A,48
          RST 16
          ; print LS HEX digit
          POP DE
          POP AF
          RET

```

Finally this month is a demonstration of the use of the above print number routines. The routine to follow will print all the numbers from 0 to 255 in hexadecimal and its corresponding decimal value. The routine also makes use of the 'Print String' subroutine from last month's Z80 SUBS article.

```

;Number sequence example
;
START:   LD A,2 ;upper scr I/O
          CALL 274
; set channel (SAM)
; Spectrum use CALL 5633
          LD B,0
NEXT_NUM: CALL PRSTRING
          DEFM "HEX NUMBER="
          DB 255
          LD A,B
          CALL PRNUM_H
          ; print number in hexadecimal
          CALL PRSTRING
          DEFM ", IN DECIMAL="
          DB 255
          LD A,B
          CALL PRNUM_D
          ; print number in decimal
          LD A,13 ;carriage ret
          RST 16
          DJNZ NEXT_NUM
          RET

```

Remember if you have got any subroutines or complete m/c routines how ever small or large (within reason of course!) then send them in. Bye for now.

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SC_WORD pro

A 2nd Review By:- Carol Brooksbank.

Since my original review of SC_Word pro, the program has undergone some major improvements.

It now drives 9-pin, as well as the 24-pin dot matrix and bubble jet printers the original program supported. The master disc lets you prepare a customized version for your type of printer, so if you own more than one you don't have to buy several versions.

You would not expect 9-pin quality to be as good as that produced by the higher resolution printers, but the output of the 9-pin version is, in fact, remarkably good. In the larger type sizes the quality is much the same as the 24/48 pin output. In medium size type - the sort of sizes you would use for general printing - it is at least as good as that of PCG's DTP Pack hi-res printing. Only in the very tiny type faces does the quality drop off noticeably. Shaded screen dumps are inevitably coarser than those produced by the higher resolution printers.

Page design still has to be worked out on paper, but a new feature in the program gives the precise measurement down the paper of the bottom line of the current text before you print. Previously, you set the dimensions of the text box, but you had no means of knowing whether the text would fill the box without printing it out, and so could not predict how far down the page the measurement worked out for you by the

program makes page planning much easier. If your text runs to more than one page, the display shows the number of lines and the text on the last line of the early pages, and the distance down the page in mm. of the text on the last page.

You still need to plan each text box and illustration position separately, check it by printing the page (putting the paper through once per box/illustration), and print each one to a separate disc when you are satisfied with it. But now there is a supplementary program for 1-meg expansion owners which links all the boxes and illustrations for one page together, and prints the whole page, single or multiple copies, in one pass over the paper, quickly and with no inserting of font discs. So once your linked page is made, the individual discs holding the page elements are no longer needed and can be recycled, and printing multiple copies is quick and easy. The Basic for this image linking program is easy to break into, if you want to insert special printer codes such as form length or colour selection.

Five new discs of fonts have been issued (£3 each + £1.50 p+p, but post free if you order all five) in addition to the two which come free with the program. Each disc holds four compressed fonts, which have to be expanded onto two working discs. Some of the pairs of fonts are related - the same typeface in normal/bold, or normal/italic. Others are pairs of quite different fonts, the second

one being implemented by selecting the 'bold' option. One of the discs has four clip art files, with a wide range of useful (and some obscure) 'dingbats', and there is pair of symbol fonts (Greek letters, mathematical symbols, etc.) on another. So now there are 28 different typefaces (22 lettering, 4 clip art and 2 symbols) for the program, and each one is available in a range of sizes - 10 sizes plus a large headline size for most of the fonts, though some of the more elaborate decorative ones do not have the full range of 10 sizes. The illustration shows some of the clip art, and one or two of the new fonts.

There is another new facility - for adding horizontal or vertical lines. It has always been possible to surround text by a box. The lines can also be saved to disc and linked into your page.

The program still needs a lot of patience if you are designing a complicated page, flowing text round illustrations and so on. But once your page is complete and processed onto one disc by the Imagelink program, printing is quick and easy, and multiple copies can be left to get on with it.

Inevitably, SC_Word *pro* has to be compared with PCG's DTP Pack. SC_Word's quality is as good with a 9-pin printer, and far better with a 24-pin or bubble jet. (PCG's is only compatible

with a 24-pin/bubble jet which has 9-pin emulation.) SC_Word has no screen fonts, such as PCG's has, but has more hi-res text fonts, and each is available in multiple sizes. Both programs can print shaded dumps to show colours, PCG DTP uses mode 1 screens, SC_Word mode 4.

Page design is much easier with PCG's suite of programs, which have an on-screen preview of the finished page. However, PCG's DTP cannot print multiple copies in hi-res without modification, and is limited to 24 text boxes per page, whereas SC_Word has no such limitations. SC_Word can print a multi-page hi-res document, with one text box filling the page, in continuous printing with no page designing, in single or multiple copies. PCG's DTP requires each page to be designed and printed separately.

Minor alterations can be made to a PCG document at any time. Once the SC_Word page has been image-linked, no changes are possible. You would have to keep all the separate image discs if you anticipate altering a page, change and re-save the one you want to update, and re-link the whole page.

To sum up, I would say that PCG's DTP is easier and quicker to use, but SC_Word produces a higher quality result if you have the time and patience. I am glad that I have both programs.



Animals and Birds

JUST BASIC

By:- Eric M. Day.

I've put together this small collection of programs which I originally wrote for my grandson. They are all simple Basic and should work on either SAM or Spectrum.

All of the programs are educational but some of them are really useful as well. They all have instructions built in so I will not waste space here.

Listing 1.

```

10 PRINT "*** CONTRACT TIME
E ****"
20 BORDER 3: PAPER 1: INK 7:
CLS
30 PRINT "Program calculate
s the", "probability of com
pleting", "a contract on ti
me."
40 PRINT "The Optimistic, P
essimistic, & Hopeful (or
most likely) times are e
ntered."
50 PRINT " If there is
more than one process in t
he contract then", "they ca
n be aggregated together a
nd the final total/s enter
ed."
60 PRINT " If the proce
sses are of a different na
ture then you could enter
each activity and then add
the totals to give the exp
ected time."
70 PRINT "The times (totals)
of the 3 entries must, na
turally, all be in the sam
e, i.e. Weeks, Days, Hours,
etc.,"
80 PRINT "EXAMPLE Enter 47 ho
urs for hope-ful time, 35 h
ours for optimistic time &
58 for pessimistic time."
90 PRINT # 1, "Press any key."

```

```

: PAUSE 0: CLS
100 INPUT "Enter hopeful time=
";H
110 PRINT "Hopeful time is "
;H
120 INPUT "Enter Optimistic ti
me=";K
130 PRINT "Optomistic time is
";K
140 INPUT "Enter pessimistic t
ime=";P
150 PRINT "Pessimistic time i
s ";P
160 LET T=(K+4*H+P)/6
170 PRINT "INVERSE 1;'"The E
xpected time is=";INT (T*1
0+.5)/10;" Units"
180 STOP

```

Listing 2.

```

1000 REM SAVE "triangle-a"
1010 BORDER 5: PAPER 6: INK 0:
CLS
1020 PRINT " Given Two angles
and one side, FIND leng
th of side AC."
1030 INPUT "Angle B degrees=";B
D
1035 INPUT "Angle B Minutes(if
none enter 0)=";BM
1040 LET BX=(BD+(BM/60))
1050 PRINT "Angle B=";INT (BX
*1e2+.5)/1e2;" Degrees"
1060 LET BB=BX*PI/180
1070 INPUT "Angle C Degrees=";C
D
1080 INPUT "Angle C Minutes(if
none enter 0)=";CM
1090 LET CX=(CD+(CM/60))
1100 PRINT "Angle C=";INT (CX
*1e2+.5)/1e2;" Degrees"
1110 LET CC=CX*PI/180
1120 INPUT "length of side AB(c
)=";SC
1130 PRINT "Side AB is ";SC
1140 LET x=SIN BB*SC/SIN CC
1150 LET Y=INT (x*1e2+.5)/1e2

```

Please turn to page 22


```
1160 PRINT ' INVERSE 1; "Side A
C=";Y;" Units."
1170 STOP
```

Listing 3.

```
2000 REM SAVE "triangle-b"
2010 BORDER 4: PAPER 1: INK 7:
CLS
2020 PRINT ' "Given the lengths
of the 3 sides FIND Angl
e C."
2030 INPUT "Enter Side a=";a
2040 INPUT "Enter side b=";b
2050 INPUT "Enter side c=";c
2070 PRINT ' "Side a=";a; TAB
15;"b=";b; TAB 24;"c=";c
2080 LET x=((a*a)+(b*b)-(c*c))/
(2*a*b)
2100 LET x=ACS x
2200 LET x=x*180/PI
2210 PRINT ' INVERSE 1;"Angle C
=";INT (x*1e2+.5)/1e2;" De
grees"
2220 STOP
```

Listing 4.

```
3000 REM SAVE "triangle-c"
3010 BORDER 3: PAPER 4: INK 0:
CLS
3020 PRINT ' "Given the length
of the 3 sides, FIND area
of the triangle."
3030 INPUT "Enter side a=";a
3040 INPUT "Enter side b " ;b
3050 INPUT "Enter side c " ;c
3060 PRINT ' "Side a=";a; TAB 1
2;"b=";b; TAB 20;"c=";c
3070 LET s=(a+b+c)/2
3080 LET x=s*(s-a)*(s-b)*(s-c)
3090 IF x<0 THEN GO TO 2900
3100 LET y=SQR x
3110 PRINT ' PAPER 1; INK 7;"Ar
ea of triangle=";INT (1e2*
y)/1e2
3120 PRINT PAPER 1; INK 7; "'
Square units"
3130 STOP
```

```
4000 REM SAVE "triangle-d"
4010 PAPER 7: BORDER 3: INK 0:
CLS
4015 CLS
4020 PRINT ' " Given 2 sides and
an angle OPPOSITE to
one of these sides. FIND
ANGLE <BCA. NOTE if side
```

```
AC is less than side AB,t
here will be 2 possible
answers."
4030 INPUT "Enter length of sid
e AB=";ab: PRINT ' "SIDE A
B=";AB;" UNITS."
4040 INPUT "Enter length of sid
e AC=";ac: PRINT "SIDE AC
=";AC;" Units"
4050 INPUT "Enter degrees of an
gle <ABC=";BD
4060 INPUT "Enter minutes of an
gle <ABC, If none ente
r 0=";BM
4070 LET BX=(BD+(BM/60))
4080 PRINT ' "Angle ABC=";INT (
BX*1E2+.5)/1E2
4090 LET x=BX*PI/180
4100 LET y=(SIN x*AB)/AC
4120 LET z=ASN y*180/PI
4130 LET z=INT (z*1e2+.5)/1e2
4140 PRINT ' PAPER 1; INK 7; "A
ngle BCA=";z;" Degrees."
```

Listing 6.

```
10 REM SAVE "depreciate"
15 BORDER 5: PAPER 6: INK 0:
CLS
20 PRINT "Program calculates
the reducing value from it
's new value to it's sc
rap value at the end of x
years.":
30 PRINT ' "By way of example
take the case of a new ca
r costing £10,750 with
a scrap value of £1,200 in
10 years time."
40 PRINT #1;"Press any key":
PAUSE 0: CLS
50 INPUT "Enter new value=";
N
60 PRINT ' "New value is ";N
70 INPUT "Enter Scrap Value "
;S
80 PRINT "Scrap value is ";S
90 INPUT "Enter number of yea
rs to Scrap Value=";Y
100 PRINT "Number of years is
";Y
110 LET Z=(S/N)^(1/Y)
120 LET Z=INT (z*1e6+.5)/1e6
130 PRINT ' "The Depreciation
Factor is ";Z
140 PRINT #1;"Press any key":
PAUSE 0: CLS
150 PRINT "*****DEPRECIATED
VALUES*****"
```

```
160 PRINT '"YEAR","REVISED VAL
UE"
170 FOR F=1 TO Y
180 PRINT F,INT (N*Z^F*1e2+.5
)/1e2
190 NEXT F
200 REM **Program End**
```

Listing 7.

```
10 REM SAVE "reordering"
20 BORDER 4: PAPER 1: INK 7:
CLS
30 PRINT "Before an Order is
despatched the cost of p
lacing the order & the cos
t of tyingup unnecessary s
tock must be given due cons
ideration."
40 PRINT "The Program calcu
lates the ECONOMIC qu
antity to order."
50 PRINT "EXAMPLE A shopkee
per sells about 12,000 pack
ets of CLEANO a year. It c
osts him, in bank loan
charges, rent & rates on
the storage space about
14% of the cost of each
article. The Clerical
costs would be say £5. C
LEANO costs 95p & sells at
160p An ECONOMIC numb
er to order would be 1148"
60 PRINT #1;"Press any key":
PAUSE 0: CLS
70 INPUT "Enter Clerical etc.
, costs £";C
80 PRINT "The cost of placin
g the order is £";C
90 INPUT "Enter the average n
umber of this article sold
per annum. ";N
100 PRINT "The number of thi
s article sold (or used)
each year is ";N
110 INPUT "Enter the cost of t
ying-up capital in re
serve stock as a percent
age of the article price "
;P
120 LET F=P/100
130 PRINT "The percentage co
st of holding stock is ";
F
140 INPUT "Enter the cost of e
ach article. Don't forget
the decimal point for ink
ce ";U
```

```
150 PRINT ' "The cost of each
article is ";U
160 LET X=SQR ((2*C*N)/(U*P))
170 LET X=INT (X+.5)
180 PRINT ' "An ECONOMIC numbe
r of this article to
order would be ";X
190 REM ** Program End **";X
```

Listing 8.

```
10 REM SAVE "breakeven"
20 BORDER 4: PAPER 1: INK 7:
CLS
30 PRINT "Often an analysis o
f production (or sales) co
sts is required or perhaps
a change in production i
s contemplated. The program
will compare the old to th
e new."
40 PRINT "The Break-Even VOLU
ME calculated will give the
cross over point at whic
h process B will give a g
reater profit."
50 PRINT "By way of example
take a change in productio
n the fixed cost of making
brass taps is £9,500 and
the variable cost of each
is £5 "
60 PRINT "The fixed cost of
making alloy taps is £13,
500 and the variable cost
is only £3.50."
70 PRINT #1;"Press any key.":
PAUSE 0: CLS
80 INPUT "Enter Fixed cost of
process A. £";A
90 PRINT "The fixed cost of
process A is £";A
100 INPUT "Enter the variable
cost of process A
£";X
110 PRINT "The variable cost
of process A is £";X
120 INPUT "Enter the Fixed cos
t of process B £";B
130 PRINT "The Fixed cost of
process B is £";B
140 INPUT "Enter the variable
cost of process B £"
;Y
150 PRINT "The variable cost
of process B is £";Y
160 LET z=(B-A)/(X-Y)
170 PRINT ' INVERSE 1;"THE BRE
AK-EVEN VOLUME. IS ";INT Z
```

Listing 9.

```

10 REM SAVE "standby"
20 BORDER 4: PAPER 1: PEN 7:
CLS
30 PRINT "A program to compar
e the cost of holding spare
units against the cost of
a breakdown of a unit."
40 PRINT " In a factory the
heavyload on the lathe mo
tors could cause a break
down with loss of output."
50 PRINT "EXAMPLE. The co
st of holding additional m
otors is about £575 and in
production loss is about
£1200."
60 PRINT "From past records
the probable demand for r
eplacements is as per th
e following table."
65 PRINT #1;"Press any key":
PAUSE 0: CLS
70 PRINT " PROBABLE DEMAND F
OR A MOTOR."
```

```

80 PRINT "-----"
90 PRINT "DEMAND", "PROBABILIT
Y."
100 PRINT 0,1.0
110 PRINT 1,.80
120 PRINT 2,.75
130 PRINT 3,.50
140 PRINT 4,.35
150 PRINT 5,.20
160 PRINT 6,.10
170 INPUT "Enter cost of a new
unit ";C
180 PRINT "The cost of a new
unit is ";C
190 INPUT "Enter cost of not h
aving a replacement unit "
;D
200 PRINT "The cost of NOT ha
ving a replacement
unit is ";D
210 LET X=C/(C+D)
215 LET X=INT (X*1e2+.5)/1e2
220 PRINT "The probability of
NOT having a replacement
unit is ";X;" Compa
re this figure with the
Probability Table"
```

Z80 REFLECTIONS

Z80 REFLECTIONS

By:- Andrew Gale.

When I got my September copy of **FORMAT** I was very pleased to read that it intended to cover Z80 computers other than the SAM and Spectrum. I'm a bit of a computer freak and have managed to accumulate quite a collection of machines - 9 in fact. I started with a C16 and now I've got two C64s, a QL, two ZX81s, a Hewlett Packard pocket computer, a Jupiter Ace (remember that?) and of course my SAM.

My interest in computers suddenly deepened when I got my Jupiter Ace. Apart from the ROMs it was built entirely from individual logic chips, with a Z80 at the core - just like the SAM. Hence my interest in hardware was born. Since then I haven't stopped - I am often thinking of a new project to add on to my SAM or perhaps the C64. Usually it's the SAM though - why? Because of the fact that it is Z80 based. Let's take a journey through the history of the marvellous Z80 and the machines built around it....

It all started when Intel brought out the world's first micro-processor: the 4-bit 4004. Before long we had the 8-bit 8008 and then the advanced 8080. The 8080 was the microprocessor to be used in the first home computer and it was for the 8080 that the operating system CP/M was written.

A few engineers who had designed the 8080 broke away from Intel to form Zilog where they started on the design of a new microprocessor.

CP/M was starting to become an important operating system and programmers were familiar with the 8080's machine code, so it made sense for the Zilog crew to make their new microprocessor software compatible with the 8080. One disadvantage of the 8080 was that it was not complete in itself - it needed several other support chips to get it to work. What Zilog produced was the Z80 - the Z80 didn't need the support chips that the 8080 needed, and not only was it 8080-code compatible but it had many extra commands which made life easier for the programmer. Another advantage was that the Z80 could automatically refresh dynamic RAM - a type of memory which was much cheaper than the alternative static RAM.

Its low cost, and CP/M compatibility, meant that the Z80 found its way into many machines. The CP/M compatibility wasn't too important in Britain but Amstrad's PCW range made use of the capability.

Britain's first sub-£100 computer used a Z80 - being, of course, the Sinclair ZX80. Sinclair used the Z80 in many machines including the ZX81 and the whole family of Spectrums. One of the Spectrum's designers (Richard Altwasser) and the author of the Spectrum's ROM (Steven Vickers) formed a company called Jupiter Cantab and marketed the Jupiter Ace. This machine fell somewhere between the ZX81 and ZX Spectrum in capability and



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Zooms

was unique in that it had not Basic on-board but FORTH - a peculiar backwards language where to add two and two you do '2 2 +'. Sadly the Ace was not very popular and Jupiter Cantab, the company formed to produce the machine, soon closed. Richard Altwasser joined Amstrad where he later had a hand in turning the Spectrum 128 into the +2.

Eager to get into the computer market, Amstrad worked hard on producing a home computer that looked like a 'proper' computer. With a 'non-rubber-mat' keyboard and bundled with a monitor there is no doubt that the Amstrad CPC range looked much more impressive than the Spectrum when parents were being taken round the like of Dixon's just before Christmas. The CPC range started with the tape based CPC 464 and was followed by disc based CPC 664 (a 464 with a disc drive in place of the cassette player) and then the CPC 6128 which had a redesigned PCB with 128K of memory instead of the 64K on the earlier two machines. - The CPC 664 didn't attract many sales and was quickly phased out. All Amstrad Z80 machines, including the Spectrum +3, were tarred by the choice of 3" rather than 3.5" or 5.25" drives - Alan Sugar chose these because he could get them cheap, despite the fact that they were starting to become defunct even then.

There were several other machines using the Z80 including the MSX machines - MSX being a standard devised by Microsoft and Japanese hardware manufacturers, and not specific to one manufacturer. There was also the TRS80 range marketed by Tandy in the early 80s which has a very loyal following at the time.

More recently we've seen the SAM

Coupé, Cambridge Computer's Z88 and Amstrads NC100 and NC200 notebooks. The Hobbit is a Russian Spectrum clone using 5.25" drives and having networking capabilities. Even Commodore recognised the Z80's worth and produced a plug-in Z80 cartridge for the C64; the Commodore 128 has two microprocessors, one being a Z80. Acorn did a similar trick by producing a Z80 second processor for the BBC range, but I don't know of anybody producing an add-on 6502 microprocessor card for any Z80 machines, which goes to show that the Z80 is good enough on its own!

The Z80 is a truly remarkable microprocessor which is still used today in many new microprocessor based designs. Through **FORMAT** we can pool our knowledge and support the many thousands of users of Z80 based computers out there - your machine code and hardware knowledge is applicable to all of us!

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TABCALC

By:- Ted Cartwright.

This article, the second part of which should appear next month, produces a very simple spreadsheet, nowhere near the power of **CAMPION** or **TASCALC**, but useful nevertheless.

It started life as a program published in ZX Computing many years ago, but over the years it has been added to and converted from one storage media to the next. As it is written entirely in Basic it should work on any Spectrum and would only need slight amendments to work on SAM.

Right. Here is the program. Get typing and you may just be ready for next month instalment.

```

500 REM TABCALC - A SIMPLE
    SPREADSHEET
510 BRIGHT 1: INK 0: BORDER 7:
    PAPER 7: CLS
1000 BEEP .5,2: POKE 23658,8: CL
    S : PRINT AT 0,10; INVERSE
    1;"OPTIONS"'''
1010 PRINT "(1) RE-FORMAT/INITIA
    LISE";''
1020 PRINT "(2) ENTER AND/OR AME
    ND DATA";''
1030 PRINT "(3) PRINTER ROUTINE"
    ;''
1040 PRINT "(4) CALCULATION ROUT
    INE";''
1050 PRINT "(5) SAVE/LOAD ROUTIN
    E";''
1060 PRINT "(6) ATTRIBUTES";''
1070 PRINT "(7) CLEAR NUMERIC DA
    TA";''
1080 PRINT "(8) CANCEL/REINSTATE
    TOTALS";''
1090 PRINT #0; AT 0,0; INVERSE 1
    ;"SELECT ROUTINE NUMBER REQ
    UIRED": PAUSE 0
1100 IF INKEY$="1" THEN GOSUB 90
    00
1110 IF INKEY$="2" THEN GOSUB 20
    00
1120 IF INKEY$="3" THEN GOSUB 30
    00
1130 IF INKEY$="4" THEN GOSUB 40
    00
1140 IF INKEY$="5" THEN GOSUB 50
    00
1150 IF INKEY$="6" THEN GOSUB 80
    00
1160 IF INKEY$="7" THEN GOSUB 61
    40
1170 IF INKEY$="8" THEN GOSUB 60
    00
1190 GOTO 1000
2000 REM MAIN LOOP
2010 LET P=1: LET X=1: LET Y=8:
    LET L=1: LET C=9
2020 CLS
2030 IF WIDTH>32 THEN PRINT INVE
    RSE 1;A$(VAST,1, TO 32): FO
    R N=1 TO LINES: PRINT ; INV
    ERSE 1;A$(P,N,1 TO 8); INVE
    RSE 0;A$(P,N,9 TO 32): IF N
    =W THEN GOTO 2060
2040 IF WIDTH<=32 THEN PRINT INV
    ERSE 1;A$(VAST,1, TO WIDTH)
    : FOR N=1 TO LINES: PRINT ;
    INVERSE 1;A$(P,N,1 TO 8);
    INVERSE 0;A$(P,N,9 TO WIDTH
    ): IF N=W THEN GOTO 2060
2050 NEXT N
2060 PRINT ; INVERSE 1; AT 21,0;
    "
2070 PRINT ; OVER 1; PAPER 16; A
    T X,Y;"*": PAUSE 2
2080 PRINT ; OVER 1; PAPER 16; A
    T X,Y;"*"
2090 LET B$=INKEY$
2100 IF L>=1 AND CODE B$>=32 AND
    CODE B$<=127 THEN PRINT ;
    AT X,Y;B$: LET A$(P,L,C)=B$
    : LET Y=Y+1: LET C=C+1: GOS
    UB 4360: IF Y>31 OR C>WIDTH
    THEN GOSUB 2230
2110 IF L<1 AND CODE B$>=32 AND
    CODE B$<=127 THEN PRINT ; A
    T X,Y;B$: LET A$(VAST,1,C)=

```

```

B$: GOSUB 4360: LET Y=Y+1:
LET C=C+1: IF Y>31 OR C>WID
TH THEN GOSUB 2230
2120 IF B$=CHR$ 9 THEN LET Y=Y+1
: LET C=C+1: GOSUB 4360: IF
Y>31 OR C>WIDTH THEN GOSUB
2230
2130 IF B$=CHR$ 8 THEN LET Y=Y-1
: LET C=C-1: GOSUB 4360: GO
SUB 7000
2140 IF B$=CHR$ 10 THEN LET X=X+
1: LET L=L+1: GOSUB 4360: I
F X>20 OR L>LINES OR (20*(P
-1)+(L-1)=W THEN LET P=P+1
: GOSUB 2430
2150 IF B$=CHR$ 11 THEN GOSUB 70
40: GOSUB 4360: LET X=X-1:
LET L=L-1: IF L<0 THEN LET
L=0: LET X=0: BEEP .1,.1
2160 IF CODE B$=195 THEN LET B$=
CHR$ 124: PRINT : AT X,Y;B$
: LET A$(P,L,C)=B$: LET Y=Y
+1: LET C=C+1: GOSUB 4360:
IF Y>31 OR C>WIDTH THEN GOS
UB 2230
2170 IF CODE B$=12 AND X=0 THEN
GOSUB 7000: PRINT : AT X,Y,
" : LET A$(VAST,1,C)=" : L
ET Y=Y-1: LET C=C-1: GOSUB
4360
2180 IF CODE B$=12 AND X>0 THEN
GOSUB 7000: GOSUB 4360: PRI
NT : INVERSE 1; AT X,Y;" :
LET A$(P,L,C)=" : LET Y=Y-
1: LET C=C-1
2190 IF CODE B$=13 THEN LET C=C-
Y: LET Y=INT (Y/8): LET Y=Y
*8+8: LET C=C+Y: GOSUB 4360
: GOSUB 2480
2200 IF B$=CHR$ 226 THEN BEEP .5
,.5: RETURN
2210 PRINT AT 21,0: INVERSE 1;"P
AGE " ;P;" " : AT 21,11;"LINE
" ;L;" " : AT 21,21;"COLUMN
" ;C;" "
2220 GOTO 2070
2230 IF C>WIDTH THEN LET C=C-1:
LET Y=Y-1: BEEP .5,.5: RETU
RN
2240 IF L>LINES THEN LET L=L-1:
LET X=X-1: BEEP .2,.2: RETU
RN
2250 LET Y=8
2260 IF C+23<WIDTH THEN PRINT AT
0,8;U$(9 TO 32): PRINT AT
0,8: INVERSE 1;A$(VAST,1,C
TO WIDTH): GOTO 2280
2270 IF C-23<WIDTH THEN PRINT A
T 0,8: INVERSE 1;A$(VAST,1,
C TO C+23)
2280 IF C+23<WIDTH THEN FOR N=1
TO 20: IF N+20*(P-1)<=W THE
N PRINT : INVERSE 1; AT N,0
;A$(P,L-X+N,1 TO 8): INVERS
E 0: AT N,8;A$(P,L-X+N,C TO
C+23): NEXT N
2290 IF C+23>WIDTH THEN FOR N=1
TO LINES: IF N+20*(P-1)<=W
THEN PRINT : INVERSE 1; AT
N,0;A$(P,L-X+N,1 TO 8): IN
VERSE 0: AT N,8;U$(9 TO )
: AT N,8;A$(P,L-X+N,C TO WID
TH): NEXT N
2300 IF N<21 THEN FOR M=N TO 20:
PRINT AT N,0;U$(1 TO 32):
NEXT N
2310 RETURN
2320 REM LEFT
2330 IF C<9 THEN LET C=C+1: LET
Y=Y+1: BEEP .5,.5: RETURN
2340 LET Y=31
2350 PRINT AT 0,8: INVERSE 1;A$(
VAST,1,C-23 TO C)
2360 FOR N=1 TO LINES: IF N+20*(
P-1)<=W THEN PRINT AT N,8;A
$(P,L-X+N,C-23 TO C): NEXT
N
2370 RETURN
2380 REM UP
2390 IF P<1 THEN LET P=P+1: LET
L=L+1: LET X=X+1: BEEP .1,.
1: RETURN
2400 LET YY=Y: LET CC=C: LET C=C
-Y+8: LET L=20: LET X=20: L
ET Y=8: GOSUB 2280
2410 LET Y=YY: LET C=CC
2420 RETURN
2430 REM DOWN
2440 IF P>PAGES OR W<100 AND ((2
0*P)+L-1)=W THEN LET P=P-1:
LET X=X-1: LET L=L-1: BEEP
.2,.2: RETURN
2450 LET YY=Y: LET CC=C: LET C=C
-Y+8: LET Y=8: LET L=1: LET
X=1: GOSUB 2280
2460 LET Y=YY: LET C=CC
2470 RETURN
2480 REM ENTER
2490 IF C>WIDTH THEN LET X=X+1:
LET L=L+1: LET Y=8: LET C=
9: GOSUB 2260: IF X>20 OR (
20*(P-1)+L-1)=W THEN LET P
=P+1: GOSUB 2430: RETURN
2500 IF Y>31 THEN GOSUB 2230
2510 RETURN
3000 REM PRINTER CODES
3005 POKE @11,0
3010 CLS :

```

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```

3030 POKE @5,WIDTH
3040 PRINT : INVERSE 1; AT 0,19;
"PRINTER CODES"
3050 PRINT : AT 0,0;"(1) COMPRE
SSED";"(2) ENLARGED";"
";"(3) SUBSCRIPT";"(4)
N.L.Q.";"(5) ITALICS";"
";"(6) BOXED";"(7) SET
LEFT MARGIN ";"(8) UTI
LITY";"(9) LINE SPACING
";"(P) LLPRINT DATA";"
";"(M) MAIN MENU"
3060 PRINT : AT 2,19: INVERSE 1;
"ENTER NUMBER"; AT 3,19;"
REQUIRED. " : PAUSE 0: IF I
NKEY$="P" THEN GOTO 3180
3070 IF INKEY$="1" THEN LPRINT C
HR$ 27;CHR$ 15
3080 IF INKEY$="2" THEN LPRINT C
HR$ 27;CHR$ 14
3090 IF INKEY$="3" THEN LPRINT C
HR$ 27;CHR$ 27;CHR$ 27;CHR$
83;CHR$ 27;CHR$ 1
3100 IF INKEY$="4" THEN LPRINT C
HR$ 27;CHR$ 27;CHR$ 27;CHR$
73;CHR$ 27;CHR$ 51
3110 IF INKEY$="5" THEN LPRINT C
HR$ 27;CHR$ 27;CHR$ 27;CHR$
37;CHR$ 27;CHR$ 71
3120 IF INKEY$="6" THEN LET R=1:
CLS
3130 IF INKEY$="7" THEN GOSUB 33
20
3140 IF INKEY$="8" THEN LPRINT C
HR$ 27;CHR$ 27;CHR$ 27;CHR$
73;CHR$ 27;CHR$ 49
3150 IF INKEY$="9" THEN GOSUB 33
80
3160 IF INKEY$="M" THEN RETURN
3170 GOTO 3030
3180 CLS : PRINT #0; AT 0,0: INV
ERSE 1;"SET PAPER POSITION
& PRESS ENTER": PAUSE 0
3185 LPRINT CHR$ 27;CHR$ 27;CHR$
27;CHR$ 79
3190 INPUT : INVERSE 1;"INPUT " "
TITLE"V(c)" "ENTER"";Z$
3200 LPRINT : AT 0,8;Z$
3210 LPRINT ;A$(VAST,1,1 TO WIDT
H)
3220 FOR M=1 TO PAGES: FOR N=1 T
O LINES

```

OK, that is all the room I have for this month. Next month I will give you the rest of the program and tell you how to use it.

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COMING SOON

A new Clock/Calendar system for SAM, fully compatible with MasterDOS.
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More news as soon as we have it.

EASTER SUNDAY

A Date Of Confusion

By:- Ken Elston.

One of the very strange features of our calendar system is the fixing of the Easter holiday. Easter Sunday appears to be set at random, on the whim of some religious leader like the Pope. Well that is not quite true.

The truth is, that like so many religious matters, the date was decided by a committee, and you know what a mess you get into when you let a committee get to work on things - at best you get the most complicated compromise they can find, and that is certainly true of Easter.

Easter Sunday is defined as the first Sunday after the first full moon on or after the 21st March.

Now most of you will recognise the 21st March as being the Spring Vernal Equinox - the date when the length of the day and night are as equal as they can be. Well, way back in 325AD the Council of Nicea developed the idea to bring together several different methods used to work out when this most important Christian festival should be observed. This method was finally accepted by the *all* the Christian Churches of England following the Synod of Whiteby in 664 (a bit before my time).

Anyway. The date can vary between the 22nd March and the 27th April and what is even more surprising is that the date is calculated using an imaginary moon. By that I mean that a full moon is defined as occurring 14 days after the first sighting of a new, crescent moon -

that is when the moon is already about two or three days old. Confused? So was I. But as luck would have it I found a program the other day that does the calculation for us. It was originally published way back, written I think for a TRS80 (one of the earliest of the affordable Z80 based computers). Here is the program, which by the way replaces 9 pages of calculations and tables printed in The Book of Common Prayer.

```

10 PRINT "Easter Sunday
Calculator"
20 INPUT "Year ";Y: PRINT Y;"
=";
30 LET I= INT (Y/100) - INT
(Y/400)
40 LET A=Y MOD 4
50 LET B=Y MOD 7
60 LET C=Y MOD 19
70 LET D=(19*C+15+I - INT
(Y/300)) MOD 30
80 LET E=(2*A+4*B+6*D+4+I)
MOD 7
90 IF D=29 AND E=6 THEN LET
E=-1
100 IF D=28 AND E=6 AND C>10
THEN LET E=-1
110 LET R=D+E+1
120 IF R<11 THEN PRINT "March
";R+21 ELSE PRINT April
";R-10
130 GOTO 20

```

I have used MOD here because it makes life so much easier. Those of you with Spectrums will need to alter the lines to produce a MOD effect. ie line 60 would become:-

```
60 LET C=Y - INT(Y/19)*19.
```

As I understand it, the program is based on a very simple rule that essentially depends on the fact that the

sun and the moon are in almost exactly the same place in the sky every 19 years. Added to which the moon takes almost exactly 30 days to completely wax and wane.

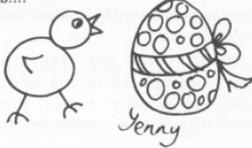
Since there was a new moon on the 1st February 1900 (I'm taking someone else's word for that, I was not around at the time) then there would have been new moons on February 1st 1919, 1938, 1957 and 1976 and also this year, 1995. This cycle, plus the 30 day Lunar cycle, allows the calculation of the age (in days) of the moon at any other date.

The program is made more accurate by allowing for leap years. I'm not guaranteeing that the program is always right, having studied the tables in the Book of Common Prayer I gave up doing the long-winded calculations to confirm the programs accuracy - but I think it should work for the 20th and 21st centuries (unless one of you nice readers finds a bug or a flaw in my formula - in which case please, feel free to write to **FORMAT** with details - clever \$%^&ers).

Anyway, there it is, for those of you who can't wait for next year diaries to come out so you can book your Easter holiday in the sun.

Why, after all these years, we still continue to put up with a movable feast like this is beyond me - but then all I'm interested in at Easter is avoiding the gardening and bank-holiday traffic while sitting down with lots of lovely chocolate.

And may I be the first to wish everyone a really Happy Easter - whatever the date is....



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GOLD ASIC (As seen in January **FORMAT**) for sale due to student poverty! Phone Allan on 0860 140281. Cost £80, will accept £40 o.n.o.

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YOUR LETTERS

Dear Editor,

My Coupé has recently stopped displaying colour, so at the moment I am stuck with a black and white screen. Since I use the computer constantly, I don't think that I would be able to lose it whilst it is sent off for repair. However, I would imagine that the problem lies with the power supply unit, and would like to enquire how much a new PSU costs as complete unit.

Yours Sincerely, Antony Drage.

It could be the PSU but there are also faults on the main SAM board that could also cause total loss of colour. A new PSU is available from us on an exchange basis at £24.95, if you send your old one back, and refer to this reply, then I will test it before sending out a new PSU. If the old one works for me then I will give you a ring so you can send back your SAM to be looked at. **Ed.**

Dear Editor,

Is it possible to obtain spare parts for the Sam Coupé?

I bought my 256K single disc drive in July 1991 and I have been having a little trouble with the keyboard membrane. Before it packs up altogether I would like to have a spare in hand.

Yours Sincerely, G.L.Lewis.

Keyboard membranes are not available separate but you can order a complete keyboard assembly from us at £12.95 including postage and packing. They are fairly easy to fit but you do need to be careful as the tails (the parts that go into the connectors on the SAM mother

board) are easily damaged. **Ed.**

Dear Editor,

Reference your article on page 32 of February's **FORMAT**, where you ask for readers to send in articles. As a would be contributor I have a grumble. I sent in an article about a MIDI program that I have developed. (The program has since been accepted into the SAM PD library).

Since sending you the material way back last year, I have not heard a thing. I do not know whether the article ended up in your rubbish bin or is being published later this year. It seems to me that common courtesy would be to first of all acknowledge the receipt of an article and then to say whether the item will be published, with or without rewriting and possibly a forecast date of publication.

I realise that sending out acknowledgement letters would be time consuming and expensive, so may I suggest that you have an acknowledgements page in **FORMAT**, wherein receipt of readers' articles could be acknowledged along with comments on suitability etc., This would keep your contributors happy and maybe encourage more readers to have a go. At the moment sending in articles (John Wase's Short Spot excepted) is like sending them into a black hole!

Yours Sincerely P.J.Williamson.

Your article arrived here, in printed form, in July 1994 and Jenny sent you a note saying I was interested in it and asking for the article to be put on disc, which you did and then sent it back to us. The article was then edited and put into file as usual. You did ring us some

time last year to check on the article and were told then that the article was in the system and would appear in time.

The problem is that I have to try and balance what appears in *FORMAT*, keep the right mix of Spectrum and SAM for instance. Your article, being SAM specific, and editing out at 5 pages, is more difficult to fit in than some. However, it will appear sometime, I just can't guarantee when.

As to listing contributions as you suggest, first it would take up space that would be better used for articles. But, more importantly, it could dissuade some people from submitting articles. What I mean by that is if someone sees that an article on, let us say, FOR-NEXT loops has been sent in then they may not send in (or even write) their article on the same subject. If, as has happened several times in the past, we end up with more than one article on the same subject then I decide which order to run them in and how far apart.

All articles are acknowledged by a standard letter, and if we later decide not to use them then they are returned to the author with a note giving reasons. Some articles can appear within weeks of being submitted, others take far longer. In the end it is true that a small article will appear quicker than a long one and that an article that applies to both Spectrum and SAM will appear quicker than a machine specific one. *Ed.*

Dear Editor,

In answer to one of your questions on the renewal form what would you most like to see covered.

When a program is being explained for Spectrum and SAM, could the complete program be given either at the end or beginning of the article with the Spectrum or SAM lines to be changed listed separately, and a sample program that will run with the new listing given.

I find that I do not know if I have

made a mistake in typing in the listing or whether I have put in the wrong information for the program to work. My last disaster was the pie-chart program.

Yours Sincerely, R.W.Whittle.

Different authors present things in different ways and there is really no right or wrong way of doing it. Some readers prefer short burst of lines interspersed with explanations. Others prefer the listings as one lump. I would value other readers comments. *Ed.*

Dear Editor,

Thank you for the prompt attention you gave to the repair of my SAM Computer, in this day and age when people have cause to complain about all sorts of things, it is nice to be able to congratulate a firm for their good service.

Yours sincerely, J.T.McNally.

Dear Editor,

Please send a quote for a lead of following details: length approx 300mm one end 26 pin to fit the back of a ZX Spectrum 48K (upgraded from rubber key 48K). Other end to fit front of an Opus Discovery System II. This lead is basically an extension lead to create a space between the two pieces of equipment which would not fit together without a lead.

Yours Sincerely, Glyn Kennington.

As far as I know a flexible extension cable will not work with the Discovery. The problem is that fast switching devices like a disc system just don't like being on the end of ribbon cables unless the signal lines are buffered, which they are not on the Spectrum.

Sorry, but we can't help in this case.

Ed.

Dear Editor,

We have a SAM 512K, which we are working off the TV, We would like to

know if there is a monitor on the market and connection to give us a better screen. We have spoken to the shop where we got SAM a few years ago and they have no information, please could you help us. We are very happy with SAM and the various discs we have had from you.

So we would be grateful for any help you can give us. Or can you tell us where to get the help?

Yours Sincerely, C.Rodger.

My recommendation is to go for a TV with a scart connector, that way you have the best of both worlds. OK the quality is not *quite* as good, but you would be hard pushed to see the difference. In addition you have the benefits of the TV when you need it and these days a scart TV will probably be cheaper than a dedicated monitor. *Ed.*

Dear Editor,

I hope through your letters page to find if any body has converted colossus 4 chess to work from disc or if anyone still has the microdrive version on tape.

I enjoy playing chess on my old Speccy and hope to beat it one day but it does annoy me having to save my efforts to tape and then having to load back from tape to see where I went wrong in the game.

Yours Sincerely, D.Smith.

Anyone help? *Ed.*

Dear Editor,

Thank you for a full year of *FORMAT*! Your magazine has brightened up many a dull morning. I have not found any fault, so far, in this wondrous mag. Congratulations!

For years I was content with old mags like Your Sinclair, Crash, Sinclair User, etc. then I got in touch with *FORMAT* and joined INDUG, and what a change!! Instead of reading about Spectrum Games, with a small helping of SAM I began to read great articles like

Basically Speaking.

I had a 48K Spectrum for 2 years before it gave me up as a bad job and blew up. I then got a SAM 512K, with single disc drive, in 1990 and have had that ever since. For 3 years I had my SAM, with a few SAM compatible Speccy games and the software supplied with it! Since then I have received more and more SAM software.

This Christmas I received the PRO-DOS from B.G.Services along with the PAW. I was surprised to find that the PAW was not a piece of SAM software at all, but an Old P.C. adventure writer! Huh! there was I thinking that with this I could write adventure games for the SAM! Are there any adventure games writing packages like this on the SAM?

I also received the fitting instructions for a new SAM Disc Drive but no disc drive! My parents cannot remember sending off for it or receiving it! Did they send off for one? Is it a sales idea from West Coast Computers? Or is it just a mistake?

Yours Sincerely Mark Thomson.

Jenny accidentally sent you the drive fitting instructions because she forgot to send the instructions to a couple of other people who ordered a drive kit. When she sent them out separately you just got one by mistake.

You will also have seen the PAW conversion mentioned in the News On 4 section last month. *Ed.*

Dear Editor,

Have I done something to upset you? Maybe it was because I was a bit churlish about West Coast in my previous letter that you saw fit to cobble together the comments from my questionnaire, present them as a letter, then spend almost a page slagging me off for it...? (Jenny's comment about my handwriting is fair enough, though, the only excuse I can offer is that I'm left-handed! How about making the

boxes on the questionnaire a bit bigger?)

Seriously though, I'm not entirely sure about a few of your arguments. If you turn to our old friend the OED, I think you'll find that it is emphatically stated that 'disk', 'on to' and 'thank you' are invariably the correct forms. Perhaps this is being a bit pedantic and wanting to let people have their say in their own words is highly commendable - but isn't typing out letters letter for letter (if you see what I mean) going a bit far? Surely you could operate your editing skills a little and make sure that all sentences start with a capital letter and finish with a full stop?

Returning to West Coast Computers, I probably was a bit cruel about them - they are operating on a limited budget, and they do their job to the best of their abilities (and let's not forget they've lasted longer than SAMCo did). However, I do think I was echoing the frustrations of a number of people regarding their unwillingness to speak to anyone other than yourselves - perhaps you don't realise how hard it is for non-**FORMAT** readers to obtain information about the SAM. This is what Martin Scholes, Assistant Editor of ZAT, had to say in his Soap Box article in the Apr/May issue of said fanzine:-

"I recently had enough money to buy a computer. I had always promised myself a SAM Coupé, but after a lot of thought I decided against it. Why? Well, I am in the same position as any other reader of ZAT. West Coast Computers STILL do not bother sending us press releases or adverts (which we now include FREE, space permitting) despite requests for such information.... so WE do not know the price of a typical 512K, single drive Coupé; whether any special deals are included; what special packs of software there may be. We get more information from our combined readership and contributors alike, and from good Samaritans like the services mentioned

as well as a cast of several, than WC has ever provided since they first come into existence.

"I don't know about you but I am not keen on buying a 'pig in a poke'. Please don't misunderstand me; I believe that the Coupé is probably one of the best machines available for the money (even though WC haven't sent ZAT a current price list), but why should we buy a machine that we are not told about.... that the producers of which seem to treat as the product of a secret derive rather than a computer company? Probably the closest thing to a British computer company (certainly in the 8-Bit market) that we have left, but the owners seem to willfully ignore not only ZAT, but many other organizations on the 8-bit scene."

He went on to say "Let us suppose that only ten of us ZAT folk had £300 to spend on a computer; not an overly large sum of money, but close to what I had. Based on that, WC have thrown away at least £3,000 worth of potential business. Hey, they don't want our money, they don't have to have it, do they? In the end I plumped for a PC compatible which is what I used to type this article for ZAT, and I had enough left over to buy a leather jacket with the change! (That WAS the external hard drive fund but what the hell; we deserve treats once in a while. huh?)"

Do you see what I mean? Don't get me wrong, **FORMAT** is a very good, informative, definitive magazine. It just seems that one of these days West Coast will have to get over their qualms about dealing with 'amateurs'.

P.S. You said in your reply to my last letter that I should do my bit in 'helping to expand the **FORMAT** readership'. As it happens, in my own fanzine, *Crashed* (available from the above address for the piddling sum of £1, he said in a feeble attempt to boost his circulation) I print your address several times each month,

variously as the SAM order agents, a fanzine and a user group. So, as Jenny so charmingly said, "stick that in your pipe and smoke it".

PPS If you do print this, don't feel you have to print all of it, will you?

Yours Sincerely Mark Sturdy.

Well Mark. First, it is true that the latest Oxford English Dictionary does give disk as a valid spelling. But the OED only lists words and explains the way they are being used, that is not the same as defining the language and how it **should** be used. Historically disc is the correct English spelling and that is what we will stick to. 'On to' and 'Onto' mean different things. Get a copy of "The Oxford Guide To English Usage" from the library and read up on the subject - it is to involved to go into here. As to full-stops and capital letters, a few may slip through - but not many.

While I am on the subject of spelling I have had several letters about the word 'organize'. Again, spelling this with a 'z' is correct and it is only in larger dictionaries that the alternative spelling with an 's' is given (and yes it should be 'an' not 'a' in that sentence).

Returning to your letter Mark, I have passed a copy to West Coast and they have promised to reply to it soon. However, I would comment that someone failing to buy what is "probably one of the best machines available for the money", just because he is not on West Coast's mailing list seems a bit daft to me. **Ed.**

Dear Editor,

With regards to the letter by G.R.Smith in the January **FORMAT**, although I do not have a SAM Coupé only the ancient Spectrum the problems arising from the cleaning of the keyboard so far (touch wood) have not occurred.

I usually strip the keyboard from the main circuit board, prize out all of the keys with a small screw driver, springs in one pot and keys in another, then

using cotton buds steeped with the Tandy cleaner, wipe over the circuit board (I never spray the cleaner direct on the board) this uses a lot of cotton buds. The keys are cleaned by spraying the cleaner on to a cloth and giving them a good wipe over. The larger keys ie caps shift, and space, etc., are best left in and wiped carefully in situ.

These operations need to be carried out with care, so if your not sure do not attempt it, the job will take the best part of a morning to complete but, needs doing at least once a year. The only job that was not successful with the Tandy cleaner were the sticking pins on a 9 pin printer. They are most likely past their use by date by now, the Brother HR5 has long been discontinued.

Your Sincerely, J.A.Sharvell.

Dear Editor,

I have just recently joined a camcorder club and I understand from them that it is possible to use a computer to put titles etc. on to the film.

Can you give me any ideas on how this is done. Is it in some way connected up to the Camcorder, or put through the monitor? I have a Cannon E30 Camcorder now about 7 or 8 years old and a SAM Coupé Computer.

Also can you put me in touch with the firm who supplies discs for this purpose, and are there any special leads required and where do they plug in?

Enjoying the **FORMAT** mag although a lot of it is 'double dutch'.

Yours Sincerely, Eddie Byde.

Presumably by now you will have read the article on Video Titling in last months issue, that should have answered all your questions. As to discs, well you can't go far wrong if you get in touch with Woodpecker Discs on 01293-871357 or come along to one of the Gloucester shows as Woodpecker are usually there. **Ed.**

Dear Editor,

Thank you for answering my previous questions in the December issue of **FORMAT** I have yet another two!

1) I use a Spectrum +2 (Grey Case) with PLUS D, Tasword+2 and a Panasonic KX-P1180 Printer, I can enter 2nd Characters on the screen of my Monitor/TV no problems, but how can I do this text to print on the printer, all I get is a normal 1st Character printed?

2) Can you or any of our members inform me as to where or from whom I can obtain a supply of about 1000 sheets of A5 size fan-fold computer listing paper for use in my printer?

As I use my set-up to title my home videos, I wonder if reader David Studholme would be interested in how I do this? If so here goes:- I use a Program, called 'Protitler', it has been advertised quite often in 'Video Camera', is given a *Best Buy* rating of the maximum of 10-stars, this is available on tape or +3 disc, if he has any problems you might like to pass my details to him.

Yours Sincerely, Deryck R.J.Morris.

There used to be several places that did A5 paper but I can't find one for you at the moment. Can any reader help Deryck with this and with his Tasword problem? *Ed.*

Dear Editor,

Before I get into the real substance of this letter may I take this opportunity to congratulate everyone on a high quality publication, especially Vol 8 N° 5 which was one of the best **FORMAT** magazines in recent times.

Now, into the 'heavy stuff' Recently my Dad got a Sanyo TV (CB5149, Model CZ1EF25NB for reference if anyone's interested) with Nicam Stereo. With great anticipation I set SAM up and loaded E-Tracker so I could hear what the stereo is like. Then I noticed... NO STEREO!! Whilst there was slightly

improved sound quality compared to our old TV (single speaker) all notes/sounds 'appeared' in the centre of the stereo field.

This is why I'm writing to you - can you please tell me how I can get stereo output through the TV? Currently I'm using the standard PSU (with my own PSU to TV cable 'cos I had to replace the old one which wore out). Will I need a new cable or something?

I noticed that the TV has a 21 pin terminal (diagram enclosed). Would it be possible to recommend to me a cable probably to connect SAM scart to TV (21 pin socket about 2m in length) and where I could get it from? Also in using the SAM scart socket to connect to this 21 pin terminal (if possible) would the graphics quality (on screen) be improved as well as having proper stereo (eg when using E-Tracker)?

If you can't help can you please print this or pass it to someone who can.

Yours Sincerely, Robert Pain.

The TV output from SAM is only mono, this is due to the modulator used. As you deduced, the 21 pin socket on the rear of your machine is a scart socket and this is the way to get both stereo sound and an improved picture.

The standard SAM scart lead is available from us, priced at £7.95 incl p&p. Quote order code SSL-01. The only TVs I know there seems to be a problem with are those made by Sony.

By the way. If any reader knows what mods SAMCo used to make to scart cables to get them working with Sony TVs, I would be grateful if you could send me details. *Ed.*

Letters may be shortened or edited to fit on these pages although we try to edit as little as possible.

This is YOUR letters page so it is up to you to fill it with interesting things. Come on, keep things as short as you can so we can fit in as many as possible each month. Please write clearly or type your letters. Send them to the address on page 3 or fax them to us on 0452 380890.

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