C16/C116+4

COMPUTING-MONTHLY

ODDS
SODS

LETTERS

NO REVIEWS!

MORE STUFF NEXT ISH!

JAM PACKED OF PROGRAMS

|||||||||PLUS/4

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GO BED
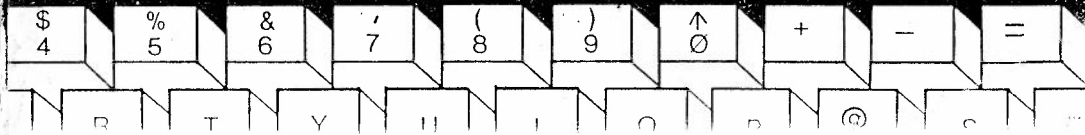
NOTHING REALLY TO
SAY EXCEPT
SORRY FOR THE
DELAY

ALL THE
BEST

Roy ROBINSON
(COBOL PROGRAMMER (SYSTEMS ANALYST)

I'M GETTING LONELY
SOMEBODY RING MEE
TALK CLEARLY LANGUAGE
ON 0164 - 534011, IF
OUT LEAVE NAME & NO.

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* This month I am sending a lot of data. this is always the problem with
* sprite programmes. a fairly short programme backed by lots and lots of
* data to type in. SORRY. First enter monitor and type in return then alter
* memory location $07F8 to $$80. next type in F1000 DFFF 00 this will alter
* all the memory we are going to use. now load last months programme
* listings. and add this months. When it is all in save it in two parts the
* first from $4000 to $6FFF and the second from $9000 to $DFFF. For further
* information on sprite operation see the issues with BLOOPING BUG listings.
* This is the explanations of this months listings.

4300-4325 Save sprite pointers routine (see BLOOPING BUG for details). This
*   is done for each sprite at the end of its move $4317 to $4324 does
*   nothing and is just a carry over from BLOOPING BUG.

432B-4336 Set pixel curser colour and luminance routine. switch out ram
*   above $8000 gosub basic routine and switch ram back in.

4337-4341 Move sprite up one pixel point 'X' register holds number of times
*   loop is repeated hence the need to save it to the stack.

4042-4353 Transfer FLAME sprite data to working area routine. $4346 contains
*   the page number where original sprite data is to be found $8300 is
*   the FLAME sprite working area and $9E00 is the reload area. $09 is
*   the lenth of the sprite string.

4354   Gosub clear screen.

4357   Gosub clear under sprite data area.

435A-4361 Set volume.

4364-4370 Get final screen number (there are nine). here we are deciding the
*   the group (there are three). and set 'X' accordingly.

4371-437B Add screen address offsets and transfer it to 'X' register.

437C-438E Load page number of screen data (this is for one of the nine final
*   landing sites). and store it in the print base line routine. Load
*   start point of base line (this is the vertical start point. the
*   horizontal start point is always at the left hand edge of the
*   screen and is always set to $$00). store 'X' register in $67D2
*   (screen page number). lastly gosub print base line.

438F-43A7 Load sprite angle number. mix in high nybble of biggest sprite
*   data address (this sprite data is stored from $D000 to $DFFF each
*   page contains the same sprite at a different angle). and save it
*   on the stack. now transfer sprite pointers from reload pages $4000
*   to $49FF to working pages $4600 to $47FF. in each case 'X' reg.
*   holds the start point and 'Y' register the number of bytes to be
*   transfered. store sprite data address in $468D and gosub move this
*   sprites second group of pointers (page numbers and move limits).

43A8-43BD This routine gets the FLAME sprite pointers and loads $$9F (this
*   page is always empty). in $4346 by using the routine at $4342 we
*   we can clear both $8300 to $83FF and $9E00 to $9EFF. next we gosub
*   move rocket FLAME sprite to correct position ($40FF).

43C0-43D8 Because we are using HI-RES there are 320 pixels accross the
*   screen so two bytes have to be used to hold the position of the
*   sprite. $DD holds the high byte and $DE the low byte of the
*   centre of the sprite. $E2 holds the value of the furthest position
*   to the right that the sprite can go (this will be in the range
* $$00 to $$38 the second will have to be altered to take into
*   account the size of the sprite so as to prevent wrap around that
*   is to say splitting the sprite so that half is on the right of the
*   screen and the rest is on the left. so. first check $DD if it is
*   zero then the sprite is not near the right hand edge of the screen
*   if it is one then we must compare $DE with $E2 and if it is the
*   same then further movement to the right is not possible so set
*   the carry flag and return (a return with the carry flag clear
*   means movement to the right is possible).

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43E3-43F8 Same as $43D3 to $43D8 but checks for movement to the left. $E6
*   contains the leftmost point on the screen that the centre of the
*   sprite can be printed.
* The next five routines deal with sprite movement and printing and were
* fully explained in the BLOOPING BUG listings.
4400-444C Move right routine.
4450-4498 Move left routine.
44A0-44D4 Move up routine. $E7 holds the limit up. $DF holds the centre of
*   the sprite.
44D8-44DB Move down routine. $E3 holds the limit down.
4500-45FF Erase old and print new sprite routine. this routine waits until
*   the raster beam is just below the sprite then erases the old
*   sprite by printing what was there before the old sprite was last
*   printed ($4500 to $4532). next at $4534 it take a screen byte.
*   stores it in this sprites under sprite data area. ands it with a
*   corresponding byte of this sprites data working page if the result
*   is zero then the sprite has not moved over anything on the screen.
*   else store the result in $E4 (collision flag). next mix the screen
*   byte and the sprite byte and print it on the screen. this is
*   repeated for all the sprites bytes in turn.
4560-4594 Evaluate collision $D8 contains the result.
45A6-45B6 Update pointers.
45C0-45E0 Move $D0 and $D1 down to point to the next row of bytes.
45E1-45F5 Updates various pointers.
4800-48AF Groups of sixteen sprite pointers (see BLOOPING BUG).
4900-4957 Groups of eight sprite pointers   (see BLOOPING BUG).
49E0-49ED Twelve offsets for FLAME sprite. this is the number of pixel
*   points away from the centre of the (smallest) rocket that the
*   centre of the FLAME sprite has to be (HRIZONTAL).
49F0-49FD Same as above but VERTICALLY.
9C00-9DA0 Last two smallest rocket and flame sprite definitions.
A000-A0A0 The next four groups of data are the large crash definitions.
A100-A1A0
A200-A2A0
A300-A3A0
A400-A430 Large debris sprite data.
A500-A510 The next three are the small debris sprite data areas.
A600-A610
A700-A710
B000-B0C0 From here to $BDC0 are the middle size rocket and flame sprite
*   data areas one page per group. twelve in all. The rocket sprite
*   data is from $$00 to $$61. the first flame is from $$60 to $$91.
*   and the second flame data is from $$90 to $$C1 for each page.
* Well thats it for this month. now to save it all. first check location
* $07F8 and ensure it is still set to $$80.
* next type in S'prog name 1'.8.4000.6FFF and press return.
* now type in S'prog name 2'.8.9000.DFFF and press return. change 8 to 1 in
* each case if you are using a tape recorder.
* If you have any problems. suggestions. or queries writ in to the magazine
* and I will be happy to answer them.
****
************************************* until next issue ************
************************************* PETER CRACK *****************
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. 4300  A5 E5     LDA $E5          . 437B  AA        TAX
. 4302  ØA        ASL              . 437C  BD BØ 67  LDA $67BØ.X
. 4303  ØA        ASL              . 437F  8D 19 4D  STA $4D19
. 4304  ØA        ASL              . 4382  8D 25 4D  STA $4D25
. 4305  ØA        ASL              . 4385  BD CØ 67  LDA $67CØ.X
. 4306  A8        TAY              . 4388  8E D2 67  STX $67D2
. 4307  18        CLC              . 438B  20 05 4D  JSR $4DØ5
. 4308  69 ØE     ADC #$ØE         . 438E  60        RTS
. 430A  85 E4     STA $E4          . 438F  AD E7 53  LDA $53E7
. 430C  A2 ØØ     LDX #$ØØ         . 4392  Ø9 DØ     ORA #$DØ
. 430E  B5 D4     LDA $D4.X        . 4394  48        PHA
. 4310  99 00 46  STA $4600.Y      . 4395  A2 AF     LDX #$AF
. 4313  E8        INX              . 4397  AØ 1F     LDY #$1F
. 4314  C8        INY              . 4399  20 00 4A  JSR $4AØØ
. 4315  C4 E4     CPY $E4          . 439C  AØ ØF     LDY #$ØF
. 4317  DØ F5     BNE $430E        . 439E  A2 57     LDX #$57
. 4319  B9 00 46  LDA $4600.Y      . 43AØ  68        PLA
. 431C  99 00 46  STA $4600.Y      . 43A1  8D ØD 46  STA $460D
. 431F  B9 01 46  LDA $4601.Y      . 43A4  20 ØB 4A  JSR $4AØB
. 4322  99 01 46  STA $4601.Y      . 43A7  60        RTS
. 4325  60        RTS              . 43A8  A9 01     LDA #$01
. 4326  EA        NOP              . 43AA  85 E5     STA $E5
. 4327  EA        NOP              . 43AC  20 FØ 41  JSR $41FØ
. 4328  EA        NOP              . 43AF  A9 9F     LDA #$9F
. 4329  EA        NOP,             . 43B1  8D 46 43  STA $4346
. 432A  EA        NOP              . 43B4  AØ 00     LDY #$ØØ
. 432B  8D 3E FF  STA $FF3E        . 43B6  20 42 43  JSR $4342
. 432E  58        CLI              . 43B9  20 FF 40  JSR $40FF
. 432F  20 88 C5  JSR $C588        . 43BC  60        RTS
. 4332  78        SEI              . 43BD  EA        NOP
. 4333  8D 3F FF  STA $FF3F        . 43BE  EA        NOP
. 4336  60        RTS              . 43BF  EA        NOP
. 4337  8A        TXA              . 43CØ  A5 DD     LDA $DD
. 4338  48        PHA              . 43C2  FØ 06     BEQ $43CA
. 4339  20 50 44  JSR $4450        . 43C4  A5 DE     LDA $DE
. 433C  68        PLA              . 43C6  C5 E2     CMP $E2
. 433D  AA        TAX              . 43C8  FØ ØD     BEQ $43D7
. 433E  E8        INX              . 43CA  A5 DE     LDA $DE
. 433F  DØ F6     BNE $4337        . 43CC  18        CLC
. 4341  60        RTS              . 43CD  69 01     ADC #$01
. 4342  A2 ØØ     LDX #$ØØ         . 43CF  90 02     BCC $43D3
. 4344  B9 01 9F  LDA $9F01.Y      . 43D1  E6 DD     INC $DD
. 4347  9D 00 83  STA $8300.X      . 43D3  85 DE     STA $DE
. 434A  9D 01 9E  STA $9E01.X      . 43D5  18        CLC
. 434D  C8        INY              . 43D6  60        RTS
. 434E  E8        INX              . 43D7  38        SEC
. 434F  E4 D9     CPX $D9          . 43D8  60        RTS
. 4351  DØ F1     BNE $4344        . 43D9  EA        NOP
. 4353  60        RTS              . 43DA  EA        NOP
. 4354  20 67 C5  JSR $C567        . 43DB  EA        NOP
. 4357  20 AØ 4D  JSR $4DAØ        . 43DC  EA        NOP
. 435A  AD 11 FF  LDA $FF11        . 43DD  EA        NOP
. 435D  29 FØ     AND #$FØ         . 43DE  EA        NOP
. 435F  Ø9 06     ORA #$06         . 43DF  EA        NOP
. 4361  8D 11 FF  STA $FF11        . 43EØ  A5 DD     LDA $DD
. 4364  A2 02     LDX #$02         . 43E2  DØ 06     BNE $43EA
. 4366  AD B7 4E  LDA $4EB7        . 43E4  A5 DE     LDA $DE
. 4369  C9 01     CMP #$01         . 43E6  C5 E6     CMP $E6
. 436B  FØ 03     BEQ $4370        . 43E8  FØ ØD     BEQ $43F7
. 436D  30 02     BMI $4371        . 43EA  A5 DE     LDA $DE
. 436F  CA        DEX              . 43EC  38        SEC
. 4370  CA        DEX              . 43ED  E9 01     SBC #$01
. 4371  18        CLC              . 43EF  BØ 02     BCS $43F3
. 4372  7D F8 69  ADC $69F8.X      . 43F1  C6 DD     DEC $DD
. 4375  6D D1 67  ADC $67D1        . 43F3  85 DE     STA $DE
. 4378  8D DØ 67  STA $67DØ        . 43F5  18        CLC
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. 43F6  60         RTS
. 43F7  38         SEC
. 43F8  60         RTS
. 43F9  EA         NOP
. 43FA  EA         NOP
. 43FB  EA         NOP
. 43FC  EA         NOP
. 43FD  EA         NOP
. 43FE  EA         NOP
. 43FF  EA         NOP
. 4400  20 C0 43   JSR $43C0
. 4403  B0 2A      BCS $442F
. 4405  EA         NOP
. 4406  EA         NOP
. 4407  EA         NOP
. 4408  EA         NOP
. 4409  EA         NOP
. 440A  A4 D7      LDY $D7
. 440C  C8         INY
. 440D  C0 08      CPY #$08
. 440F  F0 1F      BEQ $4430
. 4411  84 D7      STY $D7
. 4413  A0 00      LDY #$00
. 4415  18         CLC
. 4416  08         PHP
. 4417  A2 01      LDX #$01
. 4419  28         PLP
. 441A  BD FF 82   LDA $82FF.X
. 441D  6A         ROR
. 441E  08         PHP
. 441F  9D FF 82   STA $82FF.X
. 4422  E8         INX
. 4423  E4 D9      CPX $D9
. 4425  D0 F2      BNE $4419
. 4427  28         PLP
. 4428  88         DEY
. 4429  10 EA      BPL $4415
. 442B  A9 40      LDA #$40
. 442D  85 E0      STA $E0
. 442F  60         RTS
. 4430  18         CLC
. 4431  A5 D2      LDA $D2
. 4433  69 08      ADC #$08
. 4435  90 02      BCC $4439
. 4437  E6 D3      INC $D3
. 4439  85 D2      STA $D2
. 443B  A9 00      LDA #$00
. 443D  85 D7      STA $D7
. 443F  A0 00      LDY #$00
. 4441  B9 01 9E   LDA $9E01.Y
. 4444  99 00 83   STA $8300.Y
. 4447  C8         INY
. 4448  C4 D9      CPY $D9
. 444A  D0 F5      BNE $4441
. 444C  60         RTS
. 444D  EA         NOP
. 444E  EA         NOP
. 444F  EA         NOP
. 4450  20 E0 43   JSR $43E0
. 4453  B0 26      BCS $447B
. 4455  EA         NOP
. 4456  EA         NOP
. 4457  EA         NOP
. 4458  EA         NOP
. 4459  EA         NOP
. 445A  A4 D7      LDY $D7

. 445C  88         DEY
. 445D  30 1D      BMI $447C
. 445F  84 D7      STY $D7
. 4461  A0 00      LDY #$00
. 4463  18         CLC
. 4464  08         PHP
. 4465  A6 D9      LDX $D9
. 4467  28         PLP
. 4468  BD FF 82   LDA $82FF.X
. 446B  2A         ROL
. 446C  08         PHP
. 446D  9D FF 82   STA $82FF.X
. 4470  CA         DEX
. 4471  D0 F4      BNE $4467
. 4473  28         PLP
. 4474  88         DEY
. 4475  10 EC      BPL $4463
. 4477  A9 80      LDA #$80
. 4479  85 E0      STA $E0
. 447B  60         RTS
. 447C  A9 07      LDA #$07
. 447E  85 D7      STA $D7
. 4480  A5 D2      LDA $D2
. 4482  38         SEC
. 4483  E9 08      SBC #$08
. 4485  B0 02      BCS $4489
. 4487  C6 D3      DEC $D3
. 4489  85 D2      STA $D2
. 448B  A0 00      LDY #$00
. 448D  B9 00 9E   LDA $9E00.Y
. 4490  99 00 83   STA $8300.Y
. 4493  C8         INY
. 4494  C4 D9      CPY $D9
. 4496  D0 F5      BNE $448D
. 4498  60         RTS
. 4499  EA         NOP
. 449A  EA         NOP
. 449B  EA         NOP
. 449C  EA         NOP
. 449D  EA         NOP
. 449E  EA         NOP
. 449F  EA         NOP
. 44A0  A5 DF      LDA $DF
. 44A2  EA         NOP
. 44A3  C5 E7      CMP $E7
. 44A5  F0 2D      BEQ $44D4
. 44A7  C6 DF      DEC $DF
. 44A9  EA         NOP
. 44AA  20 E1 45   JSR $45E1
. 44AD  A5 D0      LDA $D0
. 44AF  38         SEC
. 44B0  E9 01      SBC #$01
. 44B2  48         PHA
. 44B3  29 0F      AND #$0F
. 44B5  C9 0F      CMP #$0F
. 44B7  F0 0A      BEQ $44C3
. 44B9  C9 07      CMP #$07
. 44BB  F0 06      BEQ $44C3
. 44BD  68         PLA
. 44BE  85 D0      STA $D0
. 44C0  38         SEC
. 44C1  B0 0E      BCS $44D1
. 44C3  68         PLA
. 44C4  A5 D0      LDA $D0
. 44C6  38         SEC
. 44C7  E9 39      SBC #$39
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. 44C9  85 D0        STA $D0
. 44CB  A5 D1        LDA $D1
. 44CD  E9 01        SBC #$01
. 44CF  85 D1        STA $D1
. 44D1  20 EC 45     JSR $45EC
. 44D4  60           RTS
. 44D5  EA           NOP
. 44D6  EA           NOP
. 44D7  EA           NOP
. 44D8  A5 DF        LDA $DF
. 44DA  EA           NOP
. 44DB  C5 E3        CMP $E3
. 44DD  F0 F5        BEQ $44D4
. 44DF  E6 DF        INC $DF
. 44E1  EA           NOP
. 44E2  20 E1 45     JSR $45E1
. 44E5  20 C0 45     JSR $45C0
. 44E8  20 EC 45     JSR $45EC
. 44EB  60           RTS
. 44EC  EA           NOP
. 44ED  EA           NOP
. 44EE  EA           NOP
. 44EF  EA           NOP
. 44F0  EA           NOP
. 44F1  EA           NOP
. 44F2  EA           NOP
. 44F3  EA           NOP
. 44F4  EA           NOP
. 44F5  EA           NOP
. 44F6  EA           NOP
. 44F7  EA           NOP
. 44F8  EA           NOP
. 44F9  EA           NOP
. 44FA  EA           NOP
. 44FB  EA           NOP
. 44FC  EA           NOP
. 44FD  EA           NOP
. 44FE  EA           NOP
. 44FF  EA           NOP
. 4500  A5 DF        LDA $DF
. 4502  18           CLC
. 4503  69 00        ADC #$00
. 4505  CD 1D FF     CMP $FF1D
. 4508  D0 FB        BNE $4505
. 450A  A2 02        LDX #$02
. 450C  20 E3 45     JSR $45E3
. 450F  A2 00        LDX #$00
. 4511  A4 DA        LDY $DA
. 4513  98           TYA
. 4514  48           PHA
. 4515  A0 00        LDY #$00
. 4517  BD 00 82     LDA $8200.X
. 451A  EA           NOP
. 451B  EA           NOP
. 451C  EA           NOP
. 451D  EA           NOP
. 451E  91 D0        STA ($D0).Y
. 4520  E8           INX
. 4521  98           TYA
. 4522  18           CLC
. 4523  69 08        ADC #$08
. 4525  A8           TAY
. 4526  C4 DB        CPY $DB
. 4528  D0 ED        BNE $4517
. 452A  20 C0 45     JSR $45C0
. 452D  68           PLA
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. 452E  A8           TAY
. 452F  88           DEY
. 4530  10 E1        BPL $4513
. 4532  A9 00        LDA #$00
. 4534  85 D8        STA $D8
. 4536  85 E4        STA $E4
. 4538  20 E1 45     JSR $45E1
. 453B  A2 00        LDX #$00
. 453D  A4 DA        LDY $DA
. 453F  98           TYA
. 4540  48           PHA
. 4541  A0 00        LDY #$00
. 4543  B1 D0        LDA ($D0).Y
. 4545  48           PHA
. 4546  9D 00 82     STA $8200.X
. 4549  3D 00 83     AND $8300.X
. 454C  F0 02        BEQ $4550
. 454E  85 E4        STA $E4
. 4550  68           PLA
. 4551  1D 00 83     ORA $8300.X
. 4554  91 D0        STA ($D0).Y
. 4556  E8           INX
. 4557  98           TYA
. 4558  18           CLC
. 4559  69 08        ADC #$08
. 455B  A8           TAY
. 455C  C4 DB        CPY $DB
. 455E  D0 E3        BNE $4543
. 4560  A4 E4        LDY $E4
. 4562  F0 2A        BEQ $458E
. 4564  68           PLA
. 4565  48           PHA
. 4566  F0 1C        BEQ $4584
. 4568  C5 DA        CMP $DA
. 456A  F0 13        BEQ $457F
. 456C  24 E0        BIT $E0
. 456E  30 07        BMI $4577
. 4570  70 03        BVS $4575
. 4572  4C 8A 45     JMP $458A
. 4575  A9 08        LDA #$08
. 4577  4C 86 45     JMP $4586
. 457A  A9 04        LDA #$04
. 457C  4C 86 45     JMP $4586
. 457F  A9 01        LDA #$01
. 4581  4C 86 45     JMP $4586
. 4584  A9 02        LDA #$02
. 4586  05 D8        ORA $D8
. 4588  85 D8        STA $D8
. 458A  A9 00        LDA #$00
. 458C  85 E4        STA $E4
. 458E  20 C0 45     JSR $45C0
. 4591  68           PLA
. 4592  A8           TAY
. 4593  88           DEY
. 4594  10 A9        BPL $453F
. 4596  EA           NOP
. 4597  EA           NOP
. 4598  EA           NOP
. 4599  EA           NOP
. 459A  EA           NOP
. 459B  EA           NOP
. 459C  EA           NOP
. 459D  EA           NOP
. 459E  EA           NOP
. 459F  EA           NOP
. 45A0  EA           NOP
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. 45A1  EA        NOP                    . 45FD  EA        NOP
. 45A2  EA        NOP                    . 45FE  EA        NOP
. 45A3  EA        NOP                    . 45FF  EA        NOP
. 45A4  EA        NOP
. 45A5  EA        NOP                   >4800  10 20 00 00 00 31 0F 18  :. ...1..
. 45A6  EA        NOP                   >4808  00 00 18 07 40 9B 00 00  :....@...
. 45A7  EA        NOP                   >4810  00 20 00 00 00 11 07 10  :. ......
. 45A8  EA        NOP                   >4818  00 00 04 03 00 9E 00 00  :........
. 45A9  EA        NOP                   >4820  00 20 00 00 00 A1 1F 28  :. ...!.(
. 45AA  EA        NOP                   >4828  00 00 0F 0F 40 A0 00 00  :....@ ..
. 45AB  EA        NOP                   >4830  00 20 00 00 00 31 0F 18  :. ...1..
. 45AC  EA        NOP                   >4838  00 00 07 07 40 A4 00 00  :....@$..
. 45AD  EA        NOP                   >4840  00 20 00 00 00 11 07 10  :. ......
. 45AE  A5 D2     LDA $D2               >4848  00 00 04 03 80 A5 50 D8  :.....%PX
. 45B0  85 D4     STA $D4               >4850  00 20 00 00 00 11 07 10  :. ......
. 45B2  A5 D3     LDA $D3               >4858  00 00 04 03 80 A6 50 D8  :.....&PX
. 45B4  85 D5     STA $D5               >4860  00 20 00 00 00 11 07 10  :. ......
. 45B6  60        RTS                   >4868  00 00 04 03 40 A7 00 00  :....@'..
. 45B7  EA        NOP                   >4870  90 22 00 00 00 61 17 20  :.".. .a.
. 45B8  EA        NOP                   >4878  00 00 1C 1C 00 B0 00 00  :.......0.
. 45B9  EA        NOP                   >4880  00 20 00 00 00 31 0F 18  :. ...1..
. 45BA  EA        NOP                   >4888  00 00 08 07 00 9E 00 00  :........
. 45BB  EA        NOP                   >4890  00 20 00 00 00 F1 27 30  :. ...a'0
. 45BC  EA        NOP                   >4898  00 00 14 14 40 D0 00 00  :....@P..
. 45BD  EA        NOP                   >48A0  00 20 00 00 00 61 17 20  :. ...a.
. 45BE  EA        NOP                   >48A8  00 00 0C 0C 00 9E 00 00  :........
. 45BF  EA        NOP
. 45C0  A5 D0     LDA $D0               >4900  80 81 81 28 B6 14 07 00  :...(6...
. 45C2  18        CLC                   >4908  82 83 83 38 C4 04 03 00  :...8D...
. 45C3  69 01     ADC #$01              >4910  80 81 81 30 B0 0F 0F 00  :...00...
. 45C5  48        PHA                   >4918  82 83 83 30 B0 07 07 00  :...00...
. 45C6  29 0F     AND #$0F              >4920  94 85 85 38 C4 04 03 00  :...8D...
. 45C8  F0 08     BEQ $45D2             >4928  86 87 87 38 C4 04 03 00  :...8D...
. 45CA  C9 08     CMP #$08              >4930  88 89 89 38 C4 04 03 00  :...8D...
. 45CC  F0 04     BEQ $45D2             >4938  80 81 81 1C B8 1B 1D 00  :....8...
. 45CE  68        PLA                   >4940  82 83 83 30 C0 07 07 00  :...0@...
. 45CF  85 D0     STA $D0               >4948  80 81 81 08 A8 30 2C 00  :....(0..
. 45D1  60        RTS                   >4950  82 83 83 30 BC 0A 0C 00  :...0<...
. 45D2  68        PLA
. 45D3  A5 D0     LDA $D0               >49E0  10 0D 0D 09 00 F6 F2 F0  :......vrp
. 45D5  18        CLC                   >49E8  F3 F8 00 0A 0D 0D FF FF  :sx....
. 45D6  69 39     ADC #$39              >49F0  00 0A 10 15 15 15 10 00  :........
. 45D8  85 D0     STA $D0               >49F8  8D 93 95 94 8D 87 FF FF  :......
. 45DA  A5 D1     LDA $D1
. 45DC  69 01     ADC #$01              >9C00  00 00 00 00 00 00 3C 00 00  :......<..
. 45DE  85 D1     STA $D1               >9C08  FE 00 01 FA 00 03 82 00  :~..z....
. 45E0  60        RTS                   >9C10  07 02 00 06 04 00 0C 04  :........
. 45E1  A2 00     LDX #$00              >9C18  00 3C 08 00 70 10 00 30  :.<..p..0
. 45E3  B5 D2     LDA $D2.X             >9C20  E0 00 19 80 00 1D 00 00  :'.......
. 45E5  85 D0     STA $D0               >9C28  0F 00 00 02 00 00 02 00  :........
. 45E7  B5 D3     LDA $D3.X             >9C30  00 02 A0 00 00 00 60 00  :.. ...'.
. 45E9  85 D1     STA $D1               >9C38  00 00 C0 00 00 00 00 00  :..@.....
. 45EB  60        RTS                   >9C40  00 00 00 00 00 00 00 00  :........
. 45EC  A5 D0     LDA $D0               >9C48  00 00 00 00 00 00 00 00  :........
. 45EE  85 D2     STA $D2               >9C50  00 00 00 00 00 00 00 00  :........
. 45F0  A5 D1     LDA $D1               >9C58  00 00 00 00 00 00 00 00  :........
. 45F2  85 D3     STA $D3               >9C60  00 03 00 05 00 10 00 00  :........
. 45F4  60        RTS                   >9C68  00 04 00 10 00 00 00 80  :........
. 45F5  EA        NOP                   >9C70  00 00 00 00 00 00 00 00  :........
. 45F6  EA        NOP                   >9C78  00 00 00 00 00 00 00 00  :........
. 45F7  EA        NOP                   >9C80  00 00 00 00 00 00 00 00  :........
. 45F8  EA        NOP                   >9C88  00 00 00 00 00 00 00 00  :........
. 45F9  EA        NOP                   >9C90  00 00 00 02 00 00 00 10  :........
. 45FA  EA        NOP                   >9C98  00 08 00 40 00 80 00 00  :...@....
. 45FB  EA        NOP                   >9CA0  00 00 00 00 00 00 00 00  :........
. 45FC  EA        NOP                   >9CA8  00 00 00 00 00 00 00 00  :........
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8

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>9CB0 00 00 00 00 00 00 00 00 :........
>9CB8 00 00 00 00 00 00 00 00 :........
>9CC0 00 00 00 00 00 00 00 00 :........

>9D00 00 00 00 00 00 F0 00 03 :.....D..
>9D08 F8 00 07 E8 00 06 08 00 :x..h....
>9D10 0C 98 00 08 08 00 08 10 :........
>9D18 00 08 10 00 10 20 00 30 :..... .0
>9D20 40 00 70 40 00 78 80 00 :@.p@.x..
>9D28 0E 80 00 0D 80 00 01 80 :........
>9D30 00 01 D0 00 00 01 A8 00 :..P...(.
>9D38 00 00 30 00 00 00 20 00 :..0... .
>9D40 00 00 00 00 00 00 00 00 :........
>9D48 00 00 00 00 00 00 00 00 :........
>9D50 00 00 00 00 00 00 00 00 :........
>9D58 00 00 00 00 00 00 00 00 :........
>9D60 00 06 00 08 00 22 00 40 :.....".@
>9D68 00 02 00 44 00 10 00 40 :...D...@
>9D70 00 00 00 00 00 00 00 00 :........
>9D78 00 00 00 00 00 00 00 00 :........
>9D80 00 00 00 00 00 00 00 00 :........
>9D88 00 00 00 00 00 00 00 00 :........
>9D90 00 00 00 04 00 0C 00 20 :........
>9D98 00 08 00 10 00 00 00 20 :........
>9DA0 00 00 00 00 00 00 00 00 :........
>9DA8 00 00 00 00 00 00 00 00 :........
>9DB0 00 00 00 00 00 00 00 00 :........
>9DB8 00 00 00 00 00 00 00 00 :........
>9DC0 00 00 00 00 00 00 00 00 :........

>A000 00 00 00 00 00 00 00 0A :........
>A008 A0 00 00 00 5B 90 00 00 : ...[...
>A010 00 8F 20 00 00 00 27 D1 :.. ...'Q
>A018 80 00 04 2F 02 E0 00 02 :.../.'..
>A020 8B C4 60 00 01 2F 06 80 :.D'../..
>A028 00 02 73 89 60 00 0A 17 :..s.'...
>A030 C0 00 00 03 2F 9D 40 00 :@.../.@.
>A038 10 D9 CC 10 00 2A BF FF :.YL..*?
>A040 40 00 00 26 B2 00 00 40 :@..&2..@
>A048 CF F3 28 00 1F 4B F9 80 :Os(..Kv.
>A050 00 67 CF E9 02 00 01 4B :.gOi...K
>A058 FB 20 00 28 0F B2 80 00 :{ .(.2..
>A060 05 2F 72 08 00 26 7B E3 :./r..&{c
>A068 00 00 00 38 C4 20 00 19 :...8D(..
>A070 EE 79 00 00 02 E3 E0 34 :nv...c'4
>A078 00 0B E6 C5 80 00 03 D8 :..fE...X
>A080 C3 B4 00 03 DE C8 00 00 :C4..↑H..
>A088 07 08 E6 C0 00 00 51 C0 :..f@..Q@
>A090 00 00 00 01 F0 00 00 00 :......D..
>A098 03 E0 00 00 00 03 C0 00 :.'....@.
>A0A0 00 00 00 00 00 00 00 00 :........

>A100 00 00 00 00 00 00 00 0F :........
>A108 E0 00 00 00 6A 9C 00 00 :'....i..
>A110 00 09 27 00 00 00 22 D1 :..'...."Q
>A118 80 00 00 09 02 E0 00 0E :.....'..
>A120 8A 44 60 00 0A D0 06 80 :.D'..P..
>A128 00 1E F3 09 68 00 10 7F :..s.h...
>A130 E0 04 00 36 6F FD 40 00 :'..6o}@.
>A138 23 DF FC 14 00 26 BE 3F :#_!..&>?
>A140 44 00 63 3C 1E 00 00 42 :D.c<...B
>A148 F8 97 22 00 43 70 1F 80 :x.".Cp..
>A150 00 63 FB 0F 04 00 49 70 :.cx...Ip
>A158 0F 20 00 5F F8 1E 88 00 :. ._.x..
>A160 6A BC 1E 04 00 24 7F 3F :.j<...$?
>A168 00 00 2A BF FC 14 00 35 :..*?!..5
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>A170 EF F9 00 00 16 43 E0 08 :ov...C'.
>A178 00 1A 66 C4 80 00 0E 18 :..fD....
>A180 00 18 00 07 9E 48 10 00 :.....H..
>A188 07 08 A0 00 00 01 D0 00 :.....P..
>A190 A0 00 00 E1 51 00 00 00 : ..aQ...
>A198 32 02 00 00 00 02 C0 00 :2.....@.
>A1A0 00 00 00 00 00 00 00 00 :........

>A200 00 00 00 00 00 00 00 02 :........
>A208 00 00 00 00 58 94 00 00 :....X...
>A210 00 80 21 40 00 00 1F FC :..!@...¦
>A218 60 00 06 FF FE 08 00 06 :'..~....
>A220 EF AE 00 00 0D C9 2F C8 :o.....I/H
>A228 00 19 E8 4B C4 00 17 8C :..hKD...
>A230 59 E2 00 37 E8 88 F0 00 :Yb.7h.D.
>A238 27 A0 04 70 00 2F A0 20 :' .D./
>A240 3C 00 56 40 0C 38 00 4E :<.V@.8.N
>A248 01 C1 BD 00 6F 00 84 19 :.A=.o...
>A250 00 57 E1 C9 3C 00 6E A0 :.WaI<.n
>A258 00 BB 00 47 50 06 B8 00 :..:.GP.8.
>A260 77 88 00 70 00 03 D2 04 :w..D..R.
>A268 7A 00 2B E8 9E F0 00 21 :z.+h.D.!
>A270 F3 E3 E0 00 03 9A B7 EC :sc'...71
>A278 00 00 D5 E2 10 00 03 FF :..Ub...
>A280 BF D0 00 02 78 2B 50 00 :?P..x+P.
>A288 02 1F FC 40 00 00 80 21 :..¦@...!
>A290 00 00 00 00 08 8C 00 00 :........
>A298 03 00 00 00 00 00 00 00 :........
>A2A0 00 00 00 00 00 00 00 00 :........

>A300 00 00 03 44 00 00 00 6F :...D...o
>A308 F6 00 00 03 FF DF 00 00 :v..._...
>A310 07 D5 4B 80 00 0E 02 DC :.UK....\
>A318 E0 00 08 14 20 E0 00 18 :'... '..
>A320 10 00 F0 00 18 82 62 F0 :..D...bD
>A328 00 18 42 80 38 00 18 80 :..B.8...
>A330 20 B8 00 38 15 28 1C 00 : 8.8.(..
>A338 1E C4 00 3C 00 38 41 00 :.D.<.8A.
>A340 58 00 13 05 40 38 00 50 :X...@8.P
>A348 C3 82 1C 00 22 2F E5 0C :C..."/e.
>A350 00 61 03 80 5E 00 70 05 :.a..↑.D.
>A358 49 06 00 70 01 00 DE 00 :I..D..↑.
>A360 74 20 15 1C 00 78 00 28 :t ...x.(
>A368 18 00 30 38 C0 58 00 31 :..08@X.1
>A370 24 20 B8 00 3A 00 C0 38 :$ 8.:.@8
>A378 00 0F 80 00 70 00 07 80 :....D...
>A380 09 F0 00 07 60 00 00 00 :.D..'.@.
>A388 01 FB 47 80 00 00 FC 9F :.{G...¦.
>A390 1B 00 00 3F FE 00 00 00 :...?~...
>A398 07 F0 00 00 00 00 00 00 :.D......
>A3A0 00 00 00 00 00 00 00 00 :........

>A400 00 00 00 00 00 00 00 03 :........
>A408 E0 00 06 10 00 0C 18 00 :'......
>A410 09 88 00 09 D8 00 0B F0 :....X..D
>A418 00 0F E0 00 0D F0 00 10 :..'..D..
>A420 08 00 77 9C 00 73 00 00 :..w..s..
>A428 30 00 00 00 00 00 00 00 :0.......
>A430 00 00 00 00 00 00 00 00 :........

>A500 00 20 00 30 00 30 00 38 :. .0.0.8
>A508 00 20 00 00 00 00 00 00 :. ......
>A510 00 00 00 00 00 00 00 00 :........

>A600 00 00 00 00 00 00 00 00 :........
>A608 00 04 00 1E 00 0F 00 00 :........
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9

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>A610 00 00 00 00 00 00 00 00 00 :........

>A700 00 00 00 00 18 00 18 00 3C :.......<
>A708 00 08 00 00 00 00 00 00 00 :........
>A710 00 00 00 00 00 00 00 00 00 :........

>B000 00 00 3C 00 00 00 00 76 00 :..<...v.
>B008 00 00 63 00 00 00 00 D1 80 :..c....Q.
>B010 00 01 E0 80 00 00 01 C0 80 :..'....@.
>B018 00 01 A0 80 00 00 03 D0 C0 :.. ...P@
>B020 00 03 80 40 00 00 03 00 40 :...@...@
>B028 00 03 00 40 00 00 03 00 40 :...@...@
>B030 00 02 00 40 00 00 02 00 40 :...@...@
>B038 00 03 00 C0 00 00 01 00 80 :...@....
>B040 00 01 00 80 00 00 03 00 C0 :.......@
>B048 00 07 00 E0 00 00 07 81 80 :...'...
>B050 00 04 81 20 00 00 05 E7 A0 :.... ...o
>B058 00 05 3C A0 00 00 07 3C E0 :..<. ..<'
>B060 00 00 00 00 00 00 01 00 00 :........
>B068 40 00 00 00 00 00 03 40 00 :@.....@.
>B070 00 80 00 00 08 10 00 00 00 :........
>B078 00 03 40 00 00 04 A0 00 00 :..@.. ..
>B080 00 00 00 00 00 00 02 C0 00 :.......@.
>B088 01 00 00 00 00 00 00 00 00 :........
>B090 00 00 00 00 00 00 00 00 01 :........
>B098 00 00 01 C0 00 00 02 40 00 :...@..@.
>B0A0 00 00 00 00 02 C0 00 05 20 :.....@..
>B0A8 00 00 00 00 00 00 00 00 03 :........
>B0B0 40 00 04 A0 00 00 00 00 00 :@.. ....
>B0B8 00 00 00 00 03 40 00 00 00 :.....@...
>B0C0 00 00 00 00 00 00 00 00 00 :........

>B100 00 07 C0 00 00 00 0F F0 00 :..@....D.
>B108 00 0F D8 00 00 00 1F 0C 00 :..X....
>B110 00 1F 06 00 00 00 1E 03 00 :........
>B118 00 1E 01 00 00 00 1C 01 80 :........
>B120 00 0C 00 80 00 00 0C 00 C0 :...........@
>B128 00 06 00 40 00 00 02 00 40 :...@...@
>B130 00 03 00 60 00 00 01 00 30 :...'...Ø
>B138 00 01 80 18 00 00 C0 2E :......@.
>B140 00 00 60 43 00 00 38 7F :..'C..8
>B148 00 00 27 A6 00 00 20 A0 :...'&.
>B150 00 00 27 F0 00 00 24 C0 :..'D..$@
>B158 00 00 3C 00 00 00 18 00 :..<....
>B160 00 00 00 00 02 00 00 0C :........
>B168 80 00 00 00 00 04 80 00 :........
>B170 02 90 00 04 00 00 00 00 :........
>B178 00 04 B0 00 01 40 00 01 :..Ø..@..
>B180 00 00 00 10 00 00 20 00 :........ 
>B188 00 A0 00 00 00 00 00 00 :.. .....
>B190 00 00 00 00 00 00 00 00 :........
>B198 00 00 00 00 80 00 03 40 00 :.......@.
>B1A0 04 00 00 02 C0 00 02 20 :.....@..
>B1A8 00 00 80 00 02 10 00 00 :........
>B1B0 48 00 00 A0 00 01 00 00 :H.. ....
>B1B8 00 00 00 00 10 00 00 00 :........
>B1C0 00 00 00 00 00 00 00 00 :........

>B200 00 3F 80 00 00 7F C0 00 :.?...@.
>B208 00 FF F0 00 00 E3 F8 00 :..D..cX.
>B210 00 C0 FC 00 00 80 1E 00 :.@!.....
>B218 00 80 03 00 00 80 01 00 :........
>B220 00 C0 01 80 00 60 00 F0 :.@...'.D
>B228 00 20 00 18 00 30 00 0C :. ...Ø..
>B230 00 18 00 06 00 0C 00 7E :.......~
>B238 30 06 00 4C 00 03 80 40 :...L...@

>B240 00 00 80 E0 00 00 8F C0 :...'...@
>B248 00 00 88 80 00 00 C8 00 :......H.
>B250 00 00 6C 00 00 00 00 3C 00 :..l...<.
>B258 00 00 18 00 00 00 00 00 00 :........
>B260 00 00 00 00 00 00 00 00 08 :........
>B268 00 00 14 00 00 32 40 00 :.....2@.
>B270 10 00 00 06 00 00 08 60 :.......'
>B278 00 01 00 00 02 40 00 08 :.....@..
>B280 08 00 01 10 00 00 50 00 :......P.
>B288 00 00 00 00 00 00 00 00 :........
>B290 00 00 00 00 00 00 00 00 :........
>B298 00 00 00 00 00 00 00 00 :........
>B2A0 01 80 00 02 00 00 04 60 :.......'
>B2A8 00 04 80 00 00 00 00 02 :........
>B2B0 94 00 01 30 00 00 40 00 :...Ø..@.
>B2B8 00 02 00 00 00 46 00 00 08 :....F...
>B2C0 00 00 00 00 00 00 00 00 00 :........

>B300 00 00 00 00 00 00 00 00 00 :........
>B308 00 00 00 00 00 00 00 00 00 :........
>B310 00 1F 00 00 00 00 7F E0 00 :.......'.
>B318 00 FF F8 00 00 FF FE 00 :.x..~.
>B320 00 81 FF 00 00 80 3F FF :......?
>B328 00 C0 03 FF 00 40 00 7E :.@..@.~
>B330 00 60 00 18 00 30 00 10 :.'...Ø..
>B338 00 18 00 08 00 0E 00 04 :........
>B340 00 03 80 0C 00 00 F0 78 :......DX
>B348 00 00 1E 40 00 00 02 40 :...@...@.
>B350 00 00 03 40 00 00 01 40 :...@...@
>B358 00 00 01 C0 00 00 00 C0 :...@...@
>B360 00 00 00 00 00 00 00 00 :........
>B368 00 00 00 00 00 21 00 00 :.....!..
>B370 50 00 00 44 20 00 60 40 :P..D .'@
>B378 00 2A 48 00 08 88 00 01 :.*H.....
>B380 04 00 04 90 00 00 00 00 :........
>B388 00 00 00 00 00 00 00 00 :........
>B390 00 00 00 00 00 00 00 00 :........
>B398 00 00 00 00 00 00 00 00 :........
>B3A0 00 00 00 04 00 00 0B 40 :.......@
>B3A8 00 19 28 00 00 00 00 0A :..(.....
>B3B0 92 00 00 20 00 01 44 00 :.... ..D.
>B3B8 00 24 00 00 00 00 00 00 :..$.....
>B3C0 00 00 00 00 00 00 00 00 :........

>B400 00 00 00 00 00 00 00 00 00 :........
>B408 00 00 00 00 00 00 00 00 00 :........
>B410 00 00 00 00 00 00 00 00 3F :.......?
>B418 00 01 FE 7F 00 1F FF FF :..~.~
>B420 00 3F F0 1C 00 7E 00 04 :.?D..~..
>B428 00 F0 00 07 00 C0 00 03 :.D...@.
>B430 00 80 00 03 00 C0 00 07 :.....@.
>B438 00 70 00 04 00 18 00 1C :.D....
>B440 00 0F 03 F7 00 01 FE 71 :...w..~o
>B448 00 00 00 3F 00 00 00 00 :...?....
>B450 00 00 00 00 00 00 00 00 :........
>B458 00 00 00 00 00 00 00 00 :........
>B460 00 00 00 00 00 00 00 00 :........
>B468 00 00 00 00 00 02 00 00 :........
>B470 00 40 00 A8 88 00 84 48 :.@.(...H
>B478 00 48 84 00 A8 88 00 00 :.H..(...
>B480 40 00 02 00 00 00 00 00 :@.......
>B488 00 00 00 00 00 00 00 00 :........
>B490 00 00 00 00 00 00 00 00 :........
>B498 00 00 00 00 00 00 00 00 :........
>B4A0 01 10 00 1A 22 00 12 11 :....."...
>B4A8 00 31 22 00 0A 22 00 01 :.1".."..
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>B4B0 10 00 00 00 00 00 00 00 00 :........       >B750 00 01 83 00 00 00 C2 00 :......B.
>B4B8 00 00 00 00 00 00 00 00 00 :........       >B758 00 00 66 00 00 00 3C 00 :..f...<.
>B4C0 00 00 00 00 00 00 00 00 00 :........       >B760 80 00 03 40 00 00 00 00 :...@....

                                                 >B768 80 00 03 40 00 00 00 00 :...@....
>B500 00 00 00 C0 00 00 01 E0 :...@...'          >B770 00 00 00 05 20 00 02 C0 :.... ..@
>B508 00 00 01 E0 00 00 03 C0 :...'...@          >B778 00 00 00 00 08 10 00 01 :........
>B510 00 00 07 C8 00 00 0F F8 :...H...x          >B780 00 00 02 C0 00 00 00 00 :...@....
>B518 00 00 7C CC 00 01 F8 1C :..!L..x.          >B788 02 40 00 00 80 00 00 00 :.@......
>B520 00 07 F0 08 00 0F E0 08 :..o...'.          >B790 00 00 00 00 02 C0 00 00 :.....@..
>B528 00 1F E0 0F 00 3F C0 03 :..'..?@.          >B798 00 00 00 00 00 05 20 00 :...... .
>B530 00 7F 80 03 00 7F 00 FE :.....~          >B7A0 02 C0 00 00 00 00 00 00 :.@......
>B538 00 FE 01 80 00 FC 03 00 :.~..!..          >B7A8 00 04 A0 00 03 40 00 00 :.. ..@..
>B540 00 F8 0E 00 00 F0 38 00 :.x...o8.          >B7B0 00 00 02 40 00 03 80 00 :...@....
>B548 00 E0 60 00 00 71 C0 00 :.''..o@.          >B7B8 00 80 00 00 00 00 00 00 :........
>B550 00 1F 00 00 00 00 00 00 :........          >B7C0 00 00 00 00 00 00 00 00 :........
>B558 00 00 00 00 00 00 00 00 :........
>B560 00 00 00 00 00 00 00 00 :........          >B800 00 00 00 00 00 00 18 00 :........
>B568 00 00 00 00 00 00 04 90 00 :........       >B808 00 00 3C 00 00 00 3E 00 :..<...>.
>B570 00 8C 00 00 40 00 2C 84 :....@...          >B810 00 00 1F 00 00 01 3F 00 :......?.
>B578 00 00 60 00 44 00 00 2A :..'.D..*          >B818 00 03 FF 00 00 07 FF 00 :......
>B580 80 00 20 00 00 00 00 00 :.. .....          >B820 00 02 7F 00 00 32 0F 80 :....2..
>B588 00 00 00 00 00 00 00 00 :........          >B828 00 7E 03 E0 00 7F 00 30 :.~.'.. 0
>B590 00 00 00 00 00 00 00 00 :........          >B830 00 3F 00 18 00 1F 80 0C :.?......
>B598 00 00 00 25 00 00 42 00 :...%..B.          >B838 00 0F 00 06 00 01 80 02 :........
>B5A0 01 11 00 0A 20 00 12 90 :.... ...          >B840 00 00 80 03 00 00 C0 01 :......@.
>B5A8 00 08 08 00 0B 40 00 04 :.....@..          >B848 00 00 60 01 00 00 30 01 :..'...0.
>B5B0 00 00 00 00 00 00 00 00 :........          >B850 00 00 18 01 00 00 0E 03 :........
>B5B8 00 00 00 00 00 00 00 00 :........          >B858 00 00 03 06 00 00 01 FC :........!
>B5C0 00 00 00 00 00 00 00 00 :........          >B860 00 00 00 00 00 00 00 00 :........
                                                 >B868 00 00 0A 00 00 08 80 00 :........
>B600 00 00 04 00 00 00 0C 00 :........          >B870 10 10 00 02 40 00 00 80 :....@...
>B608 00 00 1E 00 00 00 3E 00 :......>.          >B878 00 06 10 00 00 60 00 00 :.....'..
>B610 00 00 7C 00 00 00 7C 80 :..!...!.          >B880 08 00 02 4C 00 00 28 00 :...L..(.
>B618 00 00 7F C0 00 00 FF 20 :..@..          >B888 00 10 00 00 00 00 00 00 :........
>B620 00 03 FE 40 00 07 F0 40 :..~@..o@          >B890 00 00 00 00 62 00 00 40 :....b..@
>B628 00 0F F0 2C 00 1F C0 16 :..o...@.          >B898 00 00 02 00 00 0C 80 00 :........
>B630 00 3F 00 0F 00 3F 00 0C :.?...?..          >B8A0 29 40 00 00 00 00 01 20 :)@.....
>B638 00 7E 00 18 00 FE 03 F0 :.~...~.o          >B8A8 00 06 20 00 00 40 00 01 :.. ..@..
>B640 00 F8 06 00 00 F0 04 00 :.x...o..          >B8B0 80 00 00 00 00 00 00 00 :........
>B648 00 F0 0C 00 00 E0 18 00 :.o...'..          >B8B8 00 00 00 00 00 00 00 00 :........
>B650 00 C0 30 00 C0 60 00 :.@0..@@'.           >B8C0 00 00 00 00 00 00 00 00 :........
>B658 00 61 C0 00 00 3F 00 00 :.a@..?..
>B660 00 00 00 00 00 00 00 00 :........          >B900 00 07 00 00 00 07 80 00 :........
>B668 00 00 00 20 00 00 18 00 :... ....          >B908 00 07 80 00 00 03 C0 00 :......@.
>B670 01 00 00 09 48 00 00 00 :....H...          >B910 00 03 C0 00 00 03 F8 00 :..@...x.
>B678 00 00 00 90 00 0A 00 12 :......@.          >B918 00 1F FF 00 00 3F FF C0 :.....?@
>B680 00 00 21 20 00 1C 00 00 :..! ....          >B920 00 3F E0 F0 00 1F 00 18 :.?'o....
>B688 08 00 00 00 00 00 00 00 :........          >B928 00 0E 00 0C 00 1C 00 06 :........
>B690 00 00 00 00 00 00 06 00 00 :........       >B930 00 78 00 02 00 C0 00 03 :.x...@..
>B698 22 00 00 00 00 00 30 00 :".....0.          >B938 00 FF 80 01 00 00 C0 01 :.....@.
>B6A0 01 10 00 01 0A 00 04 A0 :........          >B940 00 00 70 01 00 00 1C 03 :..o.....
>B6A8 00 04 10 00 02 20 00 01 :..... ..          >B948 00 00 07 8E 00 00 00 F8 :.......x
>B6B0 80 00 00 00 00 00 00 00 :........          >B950 00 00 00 00 00 00 00 00 :........
>B6B8 00 00 00 00 00 00 00 00 :........          >B958 00 00 00 00 00 00 00 00 :........
>B6C0 00 00 00 00 00 00 00 00 :........          >B960 00 00 00 00 00 00 00 00 :........
                                                 >B968 00 00 00 00 00 00 09 20 :...... .
>B700 00 07 3C E0 00 07 3C E0 :..<'..<'          >B970 20 80 00 81 10 00 82 54 : ......T
>B708 00 07 F7 A0 00 07 E1 20 :..w.. a           >B978 00 02 06 00 04 22 00 00 :....."..
>B710 00 07 E1 E0 00 07 C0 E0 :..a'..@'          >B980 0A 00 00 84 00 00 00 00 :........
>B718 00 03 C0 C0 00 01 C0 80 :..@@..@.          >B988 00 00 00 00 00 00 00 00 :........
>B720 00 01 80 80 00 03 80 00 :.......@          >B990 00 00 00 00 00 00 00 24 :.......$
>B728 00 03 80 40 00 03 80 40 :...@...@          >B998 00 00 22 80 00 04 00 00 :.."....
>B730 00 03 80 40 00 03 00 40 :...@...@          >B9A0 49 50 00 00 01 00 14 98 :IP......
>B738 00 03 00 40 00 03 00 40 :...@...@          >B9A8 00 02 D0 00 00 20 00 00 :..P.. ..
>B740 00 03 00 C0 00 01 00 80 :...@....          >B9B0 00 00 00 00 00 00 00 00 :........
>B748 00 01 00 80 00 01 01 80 :........          >B9B8 00 00 00 00 00 00 00 00 :........
```

```
>B9C0 00 00 00 00 00 00 00 00 00 00 :........

>BA00 00 00 00 00 00 00 00 00 00 00 :........
>BA08 00 00 00 00 00 00 00 00 00 00 :........
>BA10 00 00 00 00 00 FC 00 00 :.....¦..
>BA18 00 FE 7F 80 00 FF FE F0 :.~..~ᴅ
>BA20 00 3F F0 18 00 3F 00 0E :.?ᴅ..?..
>BA28 00 F8 F0 03 00 E0 00 01 :.x...`..
>BA30 00 C0 00 01 00 E0 00 03 :.@...`..
>BA38 00 20 00 06 00 38 00 0C :. ...8..
>BA40 00 EF C0 F8 00 C6 7F 80 :.o@x.F.
>BA48 00 FC 00 00 00 00 00 00 :.¦......
>BA50 00 00 00 00 00 00 00 00 :........
>BA58 00 00 00 00 00 00 00 00 :........
>BA60 00 00 00 00 00 00 00 00 :........
>BA68 00 00 00 00 00 00 40 00 :......@.
>BA70 02 00 00 11 14 00 21 12 :......!.
>BA78 00 12 20 00 11 14 00 02 :.. ....
>BA80 00 00 00 40 00 00 00 00 :...@....
>BA88 00 00 00 00 00 00 00 00 :........
>BA90 00 00 00 00 00 00 00 00 :........
>BA98 00 00 00 00 00 00 00 00 :........
>BAA0 08 80 00 44 50 00 44 8C :...DP.D.
>BAA8 00 08 48 00 44 58 00 08 :..H.DX..
>BAB0 80 00 00 00 00 00 00 00 :........
>BAB8 00 00 00 00 00 00 00 00 :........
>BAC0 00 00 00 00 00 00 00 00 :........

>BB00 00 00 00 00 00 00 00 00 :........
>BB08 00 00 00 00 00 00 00 F8 :.......x
>BB10 00 00 03 FE 00 00 07 FB :...~...{
>BB18 00 00 1F E1 00 00 7F 81 :...a...
>BB20 00 00 FC 01 00 01 F0 03 :...¦...ᴅ.
>BB28 00 7F C0 02 00 FF 80 06 :.@....
>BB30 00 FF 80 0C 00 7F 00 18 :......
>BB38 00 1E 00 30 00 1C 00 E0 :...ø...`
>BB40 00 38 03 80 00 38 3E 00 :.8...8>.
>BB48 00 1E 30 00 00 12 60 00 :...ø...`.
>BB50 00 02 C0 00 00 04 80 00 :..@.....
>BB58 00 04 80 00 00 03 00 00 :........
>BB60 00 00 00 00 00 00 00 00 :........
>BB68 00 00 00 00 00 00 04 00 :........
>BB70 01 54 00 00 22 00 06 00 :.T.."...
>BB78 00 21 34 00 02 00 00 31 :.!4....1
>BB80 00 00 09 20 00 00 00 00 :... ....
>BB88 00 00 00 00 00 00 00 00 :........
>BB90 00 00 00 00 00 00 00 00 :........
>BB98 00 00 00 00 00 00 00 00 :........
>BBA0 00 20 00 02 D0 00 10 10 :. ..P...
>BBA8 00 09 48 00 04 50 00 08 :..H..P..
>BBB0 80 00 42 00 00 24 00 00 :..B..$..
>BBB8 00 00 00 00 00 00 00 00 :........

>BBC0 00 00 00 00 00 00 00 00 00 00 :........

>BC00 00 00 00 FC 00 00 03 FE :...¦...~
>BC08 00 00 07 FB 00 00 0F F1 :...{....ɑ
>BC10 00 00 1F 81 00 00 3F 01 :......?.
>BC18 00 00 3E 01 00 00 7C 01 :..>...¦.
>BC20 00 0F F8 03 00 1F F0 06 :..x...ᴅ.
>BC28 00 3F E0 04 00 7F E0 0C :.?`..`.
>BC30 00 7F C0 18 00 37 C0 30 :.@..7@0
>BC38 00 03 80 60 00 03 01 C0 :...`...@
>BC40 00 07 03 00 00 03 E2 00 :......b.
>BC48 00 01 22 00 00 00 26 00 :..".&.
>BC50 00 00 6C 00 00 00 78 00 :..l...x.
>BC58 00 00 30 00 00 00 00 00 :..0....
>BC60 00 00 00 00 00 00 00 00 :........
>BC68 10 00 00 38 00 04 84 00 :...8....
>BC70 00 48 00 02 50 00 09 00 :.H..P...
>BC78 00 00 00 00 12 90 00 00 :........
>BC80 00 00 18 00 00 04 00 00 :........
>BC88 00 00 00 00 00 00 00 00 :........
>BC90 00 00 00 00 00 00 00 00 :........
>BC98 00 00 00 00 00 00 00 00 :........
>BCA0 01 80 00 04 40 00 08 20 :....@..
>BCA8 00 05 20 00 50 80 00 08 :... .P...
>BCB0 80 00 0C 00 00 00 00 00 :........
>BCB8 44 00 00 60 00 00 00 00 :D..`....
>BCC0 00 00 00 00 00 00 00 00 :........

>BD00 00 00 07 C0 00 00 1E E0 :...@...`
>BD08 00 00 3D 20 00 00 7C 30 :..= ..¦0
>BD10 00 00 F8 10 00 01 F0 10 :..x...ᴅ.
>BD18 00 01 F0 10 00 03 E0 30 :..ᴅ...`0
>BD20 00 03 E0 20 00 07 C0 20 :..` ..@
>BD28 00 07 80 60 00 07 80 40 :...`...@
>BD30 00 0F 00 C0 00 0F 00 80 :...@....
>BD38 00 1E 01 80 00 79 03 00 :.ᴅ...v..
>BD40 00 F1 02 00 00 EB 02 00 :.ɑ...k..
>BD48 00 22 02 00 00 02 22 00 :.."...".
>BD50 00 03 5A 00 00 01 8A 00 :...Z....
>BD58 00 00 0E 00 00 00 06 00 :........
>BD60 00 00 00 00 00 E0 00 01 :.....`..
>BD68 90 00 00 20 00 03 00 00 :... ....
>BD70 08 40 00 01 00 00 04 10 :.@......
>BD78 00 0A 00 00 01 80 00 00 :........
>BD80 40 00 08 00 00 03 00 00 :@.......
>BD88 04 00 00 00 00 00 00 00 :........
>BD90 00 00 00 00 00 00 00 00 :........
>BD98 00 00 01 00 00 05 80 00 :........
>BDA0 00 40 00 04 80 00 11 80 :.@......
>BDA8 00 04 00 00 10 80 00 29 :.......)
>BDB0 00 00 04 00 00 01 00 00 :........
>BDB8 30 00 00 04 00 00 00 00 :0.......
>BDC0 00 00 00 00 00 00 00 00 :........
```

12

```
10  rem ******************************
20  rem *         bart simpson       *
30  rem *                            *
40  rem *   by rob marshall  25.2.91 *
50  rem ******************************
60  key1,"color0,2:(blk)graphic0"+chr$(13)
70  color0,8:color1,3,2:graphic1,1
80  circle1,150,80,15:poke740,212
90  char1,7,21,"Hey man, what's happenin?"
100 circle1,155,80,2:paint1,155,79
110 circle1,130,78,13,13,230,410
120 circle1,130,79,2:paint1,130,79
130 draw1,136,87to120,87
140 circle1,119,92,5,5,180,360
150 draw1,128,97to120,97
160 draw1,122,97to122,100to118,110
170 draw1to124,112to140,111to150,110
180 circle1,154,120,15,10,350,550
190 draw1to140,127to140,125
200 circle1,135,115,10,10,90,150
210 circle1,135,108,6,6,130,210
220 circle1,144,109,6,6,110,230
230 circle1,156,109,6,6,115,245
240 circle1,164,126,6,5,275,395
250 circle1,155,127,6,5,260,395
260 paint1,155,120
270 draw1,141,115to140,118to135,123
280 draw1to135,129to141,131to142,135
290 circle1,155,126,25,12,100,212
300 circle1,229,118,50,50,260,280
310 circle1,180,100,8,8,300,560
320 circle1,180,100,5,5,300,420
330 circle1,179,100,3,4,0,160
340 draw1,182,92to202,41to206,36to195,41to195,32
350 draw1to190,40to187,30to183,38to179,28
360 draw1to173,37to168,27to164,36to161,26to156,35
370 draw1to151,25to145,34to140,24to135,33
380 draw1to130,23to127,60to125,61to124,65
390 box1,85,22,230,152:paint1,86,25
400 color0,3,2:color1,2
410 char1,14,18,"Bart Simpson"
420 color1,8
430 char1,7,21,"                    ",1
440 color0,7:color1,7,0
450 forj=0to1200:next
460 fori=0to7
470 char1,13,21,"Do the Bartman"
480 forj=0to750:next
490 color1,8
500 char1,13,21,"                ",1
510 color1,7,0:forj=0to1400:next
520 nexti
```

13

```
10 REM *******************************
20 REM *          MOVE GRAPHIC        *
30 REM *    LEFT / RIGHT / UP / DOWN  *
40 REM * USING 4 MACHINE CODE ROUTINES*
50 REM *      BY R.MARSHALL   6.3.91  *
60 REM *******************************
70 IFPEEK(20480)=169ANDPEEK(20977)=96THEN140
80 FORI=0TO50:X=0
90 FORJ=0TO7
100 READA:POKE20480+(I*8)+J,A:X=X+A
110 NEXTJ:L$=RIGHT$(HEX$(PEEK(64)),2)+RIGHT$(HEX$(PEEK(63)),2)
120 READS:IFX<>STHENPRINT"ERROR IN DATA IN LINE"DEC(L$):END
130 NEXTI
140 GRAPHIC1:KEY1,"GRAPHIC0"+CHR$(13)
150 GETKEYA$
160 IFA$="(UP)"THENSYSDEC("50AE")
170 IFA$="(DOWN)"THENSYSDEC("5000")
180 IFA$="(LEFT)"THENSYSDEC("5158")
190 IFA$="(RGHT)"THENSYSDEC("51A5")
200 POKE239,0:GOTO150
210 DATA169,56,133,224,169,63,133,225,1172
220 DATA162,0,160,0,177,224,200,200,1123
230 DATA200,200,145,224,136,136,136,192,1369
240 DATA4,208,241,165,224,56,233,8,1139
250 DATA176,2,198,225,133,224,232,224,1414
260 DATA40,208,223,169,56,133,224,169,1222
270 DATA63,133,225,169,248,133,226,169,1366
280 DATA61,133,227,169,24,72,32,108,826
290 DATA80,104,233,1,208,247,169,0,1042
300 DATA133,226,169,32,133,227,162,0,1082
310 DATA169,0,160,0,145,226,200,192,1092
320 DATA4,208,249,165,226,24,105,8,989
330 DATA144,2,230,227,133,226,232,224,1418
340 DATA40,208,229,96,162,0,160,4,899
350 DATA177,226,136,136,136,136,145,224,1316
360 DATA200,200,200,200,200,192,8,208,1408
370 DATA239,160,0,177,226,200,200,200,1402
380 DATA200,145,226,136,136,136,192,4,1175
390 DATA208,241,165,226,56,233,8,176,1313
400 DATA2,198,227,133,226,165,224,56,1231
410 DATA233,8,176,2,198,225,133,224,1199
420 DATA232,224,40,208,193,96,169,0,1162
430 DATA133,224,169,32,133,225,162,0,1078
440 DATA160,4,177,224,136,136,136,136,1109
450 DATA145,224,200,200,200,200,200,192,1561
460 DATA8,208,239,165,224,24,105,8,981
470 DATA144,2,230,225,133,224,232,224,1414
480 DATA40,208,221,169,0,133,224,169,1164
490 DATA32,133,225,169,64,133,226,169,1151
500 DATA33,133,227,169,24,72,162,0,820
510 DATA160,0,177,226,200,200,200,200,1363
520 DATA145,224,136,136,136,192,4,208,1181
530 DATA241,177,226,136,136,136,136,145,1333
540 DATA226,200,200,200,200,192,8,1426
550 DATA208,239,165,226,24,105,8,144,1119
560 DATA2,230,227,133,226,165,224,24,1231
570 DATA105,8,144,2,230,225,133,224,1071
```

NB:- LINE 80 SHOULD BE:-
80 FOR I=0 TO 62: X=0 etc.

14

```
580 DATA232,224,40,208,195,104,233,1,1237
590 DATA208,187,169,62,133,227,169,0,1155
600 DATA133,226,162,0,169,0,160,4,854
610 DATA145,226,200,192,8,208,249,165,1393
620 DATA226,24,105,8,144,2,230,227,966
630 DATA133,226,232,224,40,208,229,96,1388
640 DATA169,32,133,227,169,0,133,226,1089
650 DATA133,229,169,0,133,228,160,0,1052
660 DATA177,226,72,74,74,74,74,166,937
670 DATA228,240,4,17,224,145,224,104,1186
680 DATA10,10,10,10,145,226,200,192,803
690 DATA8,208,229,165,227,133,225,165,1360
700 DATA226,133,224,24,105,8,144,2,866
710 DATA230,227,133,226,230,228,165,228,1667
720 DATA201,40,208,202,230,229,165,229,1504
730 DATA201,25,208,190,96,169,63,133,1085
740 DATA227,169,56,133,226,169,25,133,1138
750 DATA229,169,40,133,228,160,0,177,1136
760 DATA226,72,10,10,10,10,166,228,732
770 DATA224,40,240,4,17,224,145,224,1118
780 DATA104,74,74,74,74,145,226,200,971
790 DATA192,8,208,227,165,227,133,225,1385
800 DATA165,226,133,224,56,233,8,176,1221
810 DATA2,198,227,133,226,198,228,165,1377
820 DATA228,208,202,198,229,165,229,208,1667
830 DATA192,96,0,0,0,0,0,0,288
```

This program permits the graphic on the graphic screen to be moved
up, down, left or right. If the graphic goes off the edge of the
screen it has gone for ever. A point of interest to those who want
to write data for others to copy from a page is where in lines 110
and 120 locations 64 and 63 are used. These store the BASIC line
number what ever it was that data was being read from when the
addition of the eight parts of data proper did not agree with the
checksum. The values stored in 63 and 64 make one number taken as a
pair but only in hexadecimal not in decimal. The right two digits of
the hexadecimal numbers in these locations are joined together to
make a four digit answer before being converted to decimal to go on
the screen. It does not matter, therefore, how you renumber the
BASIC program, the error advice on the screen will tell you what
line the error is in.
The graphic is moved by 4 dots at a time. Two character sized areas
are worked on at any one time, shuffling data around to create the
desired effect. E0/E1 and E2/E3 hold the two start locations for
this operation.

1K CHARACTER SET STORAGE ON THE C-16/PLUS 4/CBM 64

----

000 @	032 SPACE	064 ⎻ SHIFT *	096 SHIFT SPACE
001 A	033 !	065 ♠ SHIFT A	097 ▮ CBM K
002 B	034 ''	066 ⎮ SHIFT B	098 ▬ CBM I
003 C	035 #	067 ⎺ SHIFT C	099 ⎺ CBM T
004 D	036 $	068 ⎺ SHIFT D	100 ▁ CBM @
005 E	037 %	069 ⎺ SHIFT E	101 ⎮ CBM G
006 F	038 &	070 ⎯ SHIFT F	102 ▨ CBM +
007 G	039 '	071 ⎮ SHIFT G	103 ⎮ CBM M
008 H	040 (	072 ⎮ SHIFT H	104 ▨ CBM £
009 I	041)	073 ╲ SHIFT I	105 ◤ SHIFT £
010 J	042 *	074 ╲ SHIFT J	106 ⎮ CBM N
011 K	043 +	075 ╱ SHIFT K	107 ├ CBM Q
012 L	044 ,	076 └ SHIFT L	108 ▪ CBM D
013 M	045 ─	077 ╲ SHIFT M	109 └ CBM Z
014 N	046 .	078 ╱ SHIFT N	110 ┐ CBM S
015 O	047 /	079 ┌ SHIFT O	111 ▁ CBM P
016 P	048 0	080 ┐ SHIFT P	112 ┌ CBM A
017 Q	049 1	081 ● SHIFT Q	113 ┴ CBM E
018 R	050 2	082 ─ SHIFT R	114 ┬ CBM R
019 S	051 3	083 ♥ SHIFT S	115 ┤ CBM W
020 T	052 4	084 ⎮ SHIFT T	116 ⎮ CBM H
021 U	053 5	085 ╭ SHIFT U	117 ▮ CBM J
022 V	054 6	086 ╳ SHIFT V	118 ▮ CBM L
023 W	055 7	087 ○ SHIFT W	119 ⎺ CBM Y
024 X	056 8	088 ♣ SHIFT X	120 ⎺ CBM U
025 Y	057 9	089 ⎮ SHIFT Y	121 ▬ CBM O
026 Z	058 :	090 ♦ SHIFT Z	122 ┘ SHIFT @
027 [	059 ;	091 + SHIFT +	123 ▪ CBM F
028 £	060 <	092 ▨ CBM ─	124 ▪ CBM C
029]	061 =	093 ⎮ SHIFT ─	125 ┘ CBM X
030 ↑	062 >	094 π CBM =	126 ▪ CBM V
031 ←	063 ?	095 ◥ CBM *	127 ▙ CBM B

EXCHANGE (CBM =) FOR CBM ↑ ON THE COMMODORE 64

16

BIT IN BYTE CHART

○○○○○○○○=000	○○●●●○●●=059	○●●●○●●○=118	●○●●○○○●=177	●●●○●●○○=236
○○○○○○○●=001	○○●●●●○○=060	○●●●○●●●=119	●○●●○○●○=178	●●●○●●○●=237
○○○○○○●○=002	○○●●●●○●=061	○●●●●○○○=120	●○●●○○●●=179	●●●○●●●○=238
○○○○○○●●=003	○○●●●●●○=062	○●●●●○○●=121	●○●●○●○○=180	●●●○●●●●=239
○○○○○●○○=004	○○●●●●●●=063	○●●●●○●○=122	●○●●○●○●=181	●●●●○○○○=240
○○○○○●○●=005	○●○○○○○○=064	○●●●●○●●=123	●○●●○●●○=182	●●●●○○○●=241
○○○○○●●○=006	○●○○○○○●=065	○●●●●●○○=124	●○●●○●●●=183	●●●●○○●○=242
○○○○○●●●=007	○●○○○○●○=066	○●●●●●○●=125	●○●●●○○○=184	●●●●○○●●=243
○○○○●○○○=008	○●○○○○●●=067	○●●●●●●○=126	●○●●●○○●=185	●●●●○●○○=244
○○○○●○○●=009	○●○○○●○○=068	○●●●●●●●=127	●○●●●○●○=186	●●●●○●○●=245
○○○○●○●○=010	○●○○○●○●=069	●○○○○○○○=128	●○●●●○●●=187	●●●●○●●○=246
○○○○●○●●=011	○●○○○●●○=070	●○○○○○○●=129	●○●●●●○○=188	●●●●○●●●=247
○○○○●●○○=012	○●○○○●●●=071	●○○○○○●○=130	●○●●●●○●=189	●●●●●○○○=248
○○○○●●○●=013	○●○○●○○○=072	●○○○○○●●=131	●○●●●●●○=190	●●●●●○○●=249
○○○○●●●○=014	○●○○●○○●=073	●○○○○●○○=132	●○●●●●●●=191	●●●●●○●○=250
○○○○●●●●=015	○●○○●○●○=074	●○○○○●○●=133	●●○○○○○○=192	●●●●●○●●=251
○○○●○○○○=016	○●○○●○●●=075	●○○○○●●○=134	●●○○○○○●=193	●●●●●●○○=252
○○○●○○○●=017	○●○○●●○○=076	●○○○○●●●=135	●●○○○○●○=194	●●●●●●○●=253
○○○●○○●○=018	○●○○●●○●=077	●○○○●○○○=136	●●○○○○●●=195	●●●●●●●○=254
○○○●○○●●=019	○●○○●●●○=078	●○○○●○○●=137	●●○○○●○○=196	●●●●●●●●=255
○○○●○●○○=020	○●○○●●●●=079	●○○○●○●○=138	●●○○○●○●=197	
○○○●○●○●=021	○●○●○○○○=080	●○○○●○●●=139	●●○○○●●○=198	
○○○●○●●○=022	○●○●○○○●=081	●○○○●●○○=140	●●○○○●●●=199	
○○○●○●●●=023	○●○●○○●○=082	●○○○●●○●=141	●●○○●○○○=200	
○○○●●○○○=024	○●○●○○●●=083	●○○○●●●○=142	●●○○●○○●=201	
○○○●●○○●=025	○●○●○●○○=084	●○○○●●●●=143	●●○○●○●○=202	
○○○●●○●○=026	○●○●○●○●=085	●○○●○○○○=144	●●○○●○●●=203	
○○○●●○●●=027	○●○●○●●○=086	●○○●○○○●=145	●●○○●●○○=204	
○○○●●●○○=028	○●○●○●●●=087	●○○●○○●○=146	●●○○●●○●=205	
○○○●●●○●=029	○●○●●○○○=088	●○○●○○●●=147	●●○○●●●○=206	
○○○●●●●○=030	○●○●●○○●=089	●○○●○●○○=148	●●○○●●●●=207	
○○○●●●●●=031	○●○●●○●○=090	●○○●○●○●=149	●●○●○○○○=208	
○○●○○○○○=032	○●○●●○●●=091	●○○●○●●○=150	●●○●○○○●=209	
○○●○○○○●=033	○●○●●●○○=092	●○○●○●●●=151	●●○●○○●○=210	
○○●○○○●○=034	○●○●●●○●=093	●○○●●○○○=152	●●○●○○●●=211	
○○●○○○●●=035	○●○●●●●○=094	●○○●●○○●=153	●●○●○●○○=212	
○○●○○●○○=036	○●○●●●●●=095	●○○●●○●○=154	●●○●○●○●=213	
○○●○○●○●=037	○●●○○○○○=096	●○○●●○●●=155	●●○●○●●○=214	
○○●○○●●○=038	○●●○○○○●=097	●○○●●●○○=156	●●○●○●●●=215	
○○●○○●●●=039	○●●○○○●○=098	●○○●●●○●=157	●●○●●○○○=216	
○○●○●○○○=040	○●●○○○●●=099	●○○●●●●○=158	●●○●●○○●=217	
○○●○●○○●=041	○●●○○●○○=100	●○○●●●●●=159	●●○●●○●○=218	
○○●○●○●○=042	○●●○○●○●=101	●○●○○○○○=160	●●○●●○●●=219	
○○●○●○●●=043	○●●○○●●○=102	●○●○○○○●=161	●●○●●●○○=220	
○○●○●●○○=044	○●●○○●●●=103	●○●○○○●○=162	●●○●●●○●=221	
○○●○●●○●=045	○●●○●○○○=104	●○●○○○●●=163	●●○●●●●○=222	
○○●○●●●○=046	○●●○●○○●=105	●○●○○●○○=164	●●○●●●●●=223	
○○●○●●●●=047	○●●○●○●○=106	●○●○○●○●=165	●●●○○○○○=224	
○○●●○○○○=048	○●●○●○●●=107	●○●○○●●○=166	●●●○○○○●=225	
○○●●○○○●=049	○●●○●●○○=108	●○●○○●●●=167	●●●○○○●○=226	
○○●●○○●○=050	○●●○●●○●=109	●○●○●○○○=168	●●●○○○●●=227	
○○●●○○●●=051	○●●○●●●○=110	●○●○●○○●=169	●●●○○●○○=228	
○○●●○●○○=052	○●●○●●●●=111	●○●○●○●○=170	●●●○○●○●=229	
○○●●○●○●=053	○●●●○○○○=112	●○●○●○●●=171	●●●○○●●○=230	
○○●●○●●○=054	○●●●○○○●=113	●○●○●●○○=172	●●●○○●●●=231	
○○●●○●●●=055	○●●●○○●○=114	●○●○●●○●=173	●●●○●○○○=232	
○○●●●○○○=056	○●●●○○●●=115	●○●○●●●○=174	●●●○●○○●=233	
○○●●●○○●=057	○●●●○●○○=116	●○●○●●●●=175	●●●○●○●○=234	
○○●●●○●○=058	○●●●○●○●=117	●○●●○○○○=176	●●●○●○●●=235	

17

```
10 REM **************
20 REM * KEY BLEEPER *
30 REM **************
100 FORL=0TO5:CX=0:FORD=0TO7:READC:CX=CX+C:POKE1632+L*8+D,C:NEXTD
110 READC:IFC<>CXTHENPRINT"ERROR IN LINE";1000+(L*10):STOP
120 NEXTL
130 POKE786,96:POKE787,6:NEW
1000 DATA 032,159,255,165,239,240,031,169, 1290
1010 DATA 080,141,014,255,173,018,255,009, 0945
1020 DATA 003,141,018,255,169,253,141,252, 1232
1030 DATA 004,169,255,141,254,004,173,017, 1017
1040 DATA 255,009,024,141,017,255,076,066, 0843
1050 DATA 206,000,000,000,000,000,000,000, 0206
1100 REM ************************
1110 REM * THIS IS A BASIC LOADER *
1120 REM * VERSION OF HARRY       *
1130 REM * HOOYEN'S M/C WEDGE FOR *
1140 REM * THE KEY BEEPER PROGRAM *
1150 REM ************************
```

As you can see the above program is a BASIC loader for Harry's key beeper program, nice one Harry.

I thought i would send it in for those readers that don't like dabbling in machine code very much, and i hope it meets Harry's aproval.

Once you have typed it in and saved it, just run it and there you go.

Kevin Wheals.

18

```
1 REM ************************
2 REM * PRESENTING IN HI-RES *
3 REM * GAVIN FRIDAY CARTOON *
4 REM * IN MULTICOLOR MODE   *
5 REM ************************
6 REM *   BY KEVIN WHEALS    *
7 REM ************************
8 REM *        (C) 1990      *
9 REM ************************
10 POKE55,0:POKE56,60:CLR
20 POKE1177,62
30 FORI=0TO1023:POKE15360+I,PEEK(53248+I):NEXTI
40 POKE1177,63:POKE65299,60:POKE65298,192
50 POKE65287,24:SCNCLR
60 FORC=0TO127:FORBT=0TO7:READA:POKE15360+(C*8)+BT,A
70 NEXTBT,C
100 PRINT"(DOWN)(DOWN)"
110 COLOR0,6,5:COLOR4,6,5
120 COLOR3,1
130 PRINTTAB(21);:COLOR1,10,7:PRINT"@A"
140 PRINTTAB(20);:PRINT"BCD"
150 PRINTTAB(20);:PRINT"EFGA"
160 PRINTTAB(20);:PRINT"HIJK"
170 PRINTTAB(20);:PRINT"LMNO"
180 PRINTTAB(19);:PRINT"PQRSTU"
190 PRINTTAB(18);:PRINT"VWTXYTTZ["
200 PRINTTAB(18);:PRINT"£TTTT]T↑←"
210 PRINTTAB(17);:PRINT"!TTT";:PRINTCHR$(34);:PRINT"TTT#$"
220 PRINTTAB(17);:PRINT"%TT&'(TT)$"
230 PRINTTAB(17);:PRINT"*T+,-./012"
240 PRINTTAB(16);:PRINT"V3456789:;<="
250 PRINTTAB(16);:PRINT">?-↟|T-9-‾;-"
260 PRINTTAB(16);:PRINT"| ⌐ 'TT-9-'L.;⟍"
270 PRINTTAB(14);:PRINT"⟋T‾V⬢TTT-9⬥| ; ⟋"
280 PRINTTAB(14);:PRINT"⋙⊙⬥ |TTTT⬥+⁂ |;π"
290 PRINTTAB(14);:PRINT"◥ ▮◾TTT⌐┘ ⊞ |;⋙'"
300 PRINTTAB(14);:PRINT"◤ |⊦◾TTT └┐ ┌┬"
310 PRINTTAB(14);:PRINT"⌐| |┌ ‾◾┘|"
320 PRINTTAB(22);:PRINT"◾ ◥┘"
500 PRINT"(HOME)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOW
N)(DOWN)(DOWN)(DOWN)(DOWN)":PRINTTAB(15);:COLOR1,8:PRINT"■ "
510 FORI=1TO1000:NEXTI
520 PRINT"(HOME)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOW
N)(DOWN)(DOWN)(DOWN)":PRINTTAB(15);:PRINT"■"
530 FORI=1TO1000:NEXTI:GOTO500
999 REM *** MULTICOLOR UDG DATA FOLLOWS ***
1000 DATA 001,001,001,001,001,001,005,005
1010 DATA 000,000,064,064,064,064,064,064
1020 DATA 000,000,000,000,001,001,001,001
1030 DATA 005,005,085,085,085,085,085,085
1040 DATA 080,080,084,084,085,085,085,085
1050 DATA 001,001,005,005,007,007,007,007
1060 DATA 085,085,253,253,255,255,255,255
1070 DATA 085,085,245,245,119,119,119,119
1080 DATA 007,007,015,015,015,015,015,015
1090 DATA 255,255,253,253,087,087,255,255
1100 DATA 119,119,223,223,087,087,255,255
```

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```
1110 DATA 064,064,192,192,192,192,192,192
1120 DATA 007,007,023,023,023,023,021,021
1130 DATA 255,255,255,255,253,253,245,245
1140 DATA 255,255,255,255,255,255,125,125
1150 DATA 064,064,080,080,084,084,080,084
1160 DATA 000,000,000,001,005,005,021,021
1170 DATA 021,021,085,085,085,085,085,085
1180 DATA 255,255,127,127,085,085,127,127
1190 DATA 253,253,245,245,093,093,253,253
1200 DATA 085,085,085,085,085,085,085,085
1210 DATA 000,000,064,084,085,085,085,085
1220 DATA 000,000,000,000,000,000,001,001
1230 DATA 021,085,085,085,085,085,085,085
1240 DATA 127,127,127,127,093,093,085,085
1250 DATA 085,085,085,085,085,085,117,117
1260 DATA 064,064,080,080,112,245,127,127
1270 DATA 000,000,000,000,000,064,080,080
1280 DATA 001,005,021,021,021,021,085,085
1290 DATA 093,093,085,085,085,085,085,085
1300 DATA 087,087,085,085,087,087,087,087
1310 DATA 208,208,244,244,117,117,221,221
1315 DATA 000,000,000,000,000,000,000,000
1320 DATA 001,001,005,005,021,021,021,021
1330 DATA 085,085,085,085,085,085,087,087
1340 DATA 095,095,095,095,127,127,127,127
1350 DATA 253,253,253,253,253,253,253,253
1360 DATA 021,021,021,021,021,021,021,021
1370 DATA 085,085,069,069,065,065,081,081
1380 DATA 095,095,087,087,085,085,085,085
1390 DATA 213,213,085,085,085,085,085,085
1400 DATA 095,095,095,095,095,095,087,087
1410 DATA 005,005,001,001,021,021,021,021
1420 DATA 085,085,087,087,093,093,095,095
1430 DATA 081,081,255,255,080,080,255,255
1440 DATA 085,085,213,213,255,255,255,255
1450 DATA 085,085,085,085,255,255,253,245
1460 DATA 085,085,085,085,085,085,213,213
1470 DATA 085,085,085,085,085,095,127,127
1480 DATA 087,087,087,087,085,213,245,253
1490 DATA 253,253,252,252,252,252,124,092
1500 DATA 021,021,021,021,085,085,085,085
1510 DATA 085,085,085,085,085,085,084,084
1520 DATA 083,083,064,064,000,000,000,000
1530 DATA 255,255,253,253,021,021,031,031
1540 DATA 213,213,085,085,085,085,085,085
1550 DATA 085,085,095,095,093,125,119,119
1560 DATA 221,221,119,119,221,221,119,119
1570 DATA 095,095,095,095,215,215,119,119
1580 DATA 255,255,255,255,255,255,255,255
1590 DATA 212,212,255,255,255,255,255,255
1600 DATA 000,000,000,000,192,192,240,240
1610 DATA 001,001,000,000,003,003,003,003
1620 DATA 085,085,255,255,255,255,255,255
1630 DATA 080,080,192,192,192,192,000,000
1640 DATA 000,000,001,001,007,007,029,029
1650 DATA 125,117,213,213,085,085,085,085
1660 DATA 117,117,119,119,117,117,119,119
1670 DATA 215,215,119,119;221,221,117,117
1680 DATA 255,255,253,253,245,245,245,245
```
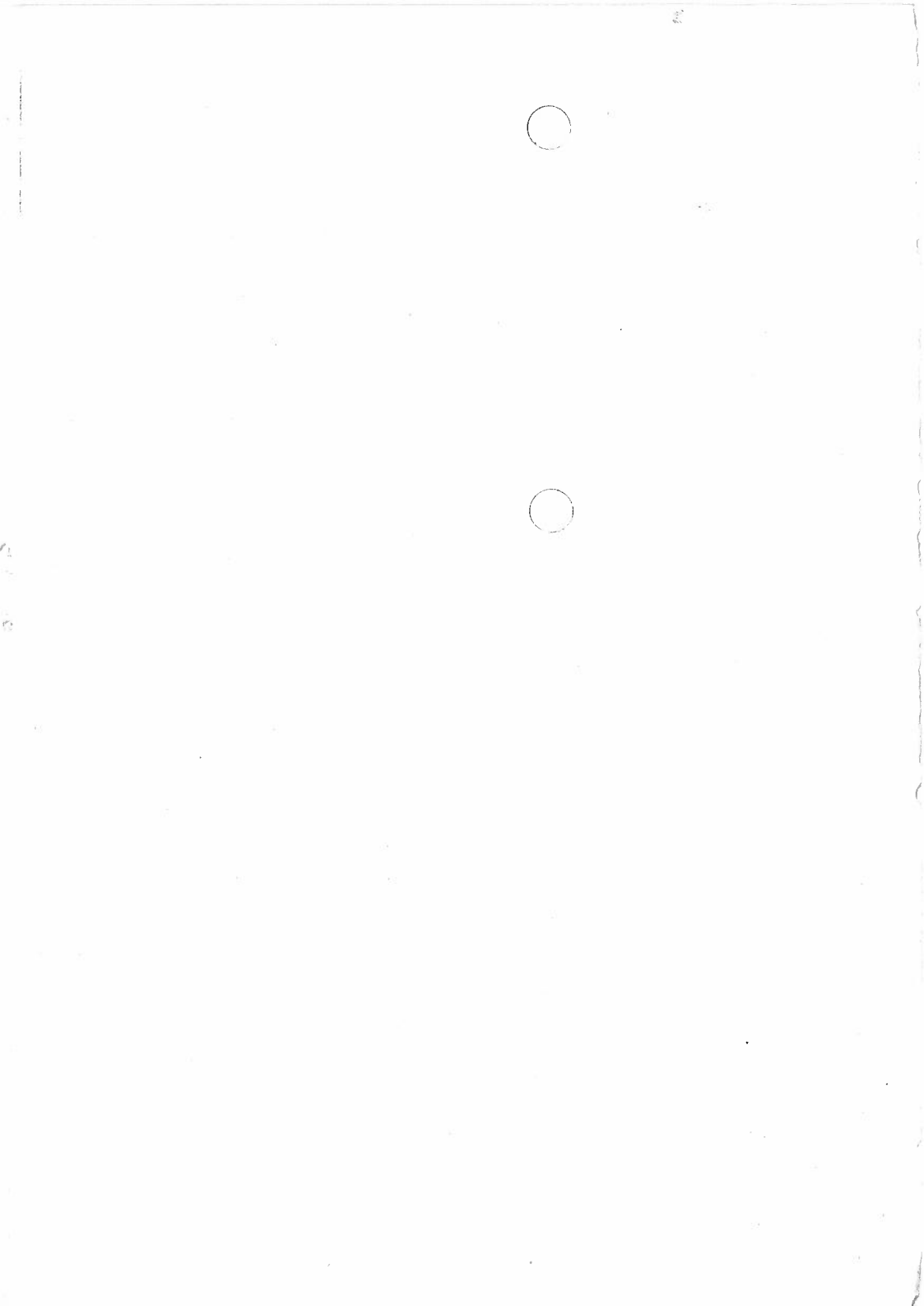
```
1690 DATA 208,208,244,244,244,244,240,240
1700 DATA 015,015,015,015,063,063,063,063
1710 DATA 255,255,252,252,240,240,192,192
1720 DATA 000,000,001,001,001,003,003,003
1730 DATA 093,125,117,117,213,213,085,085
1740 DATA 221,221,117,117,215,215,119,119
1750 DATA 213,213,213,213,213,213,213,213
1760 DATA 240,240,240,240,240,240,240,240
1770 DATA 000,000,000,000,001,001,053,053
1780 DATA 192,192,195,195,223,223,215,215
1790 DATA 255,255,252,252,240,240,240,240
1800 DATA 007,007,029,029,117,117,213,213
1810 DATA 117,117,215,215,213,213,213,213
1820 DATA 215,215,119,119,223,223,095,095
1830 DATA 213,213,085,085,087,087,087,087
1840 DATA 240,240,252,252,244,244,244,244
1850 DATA 213,213,005,005,000,000,000,000
1860 DATA 085,085,087,087,067,067,067,067
1870 DATA 192,192,192,192,000,000,000,000
1880 DATA 005,005,001,001,003,003,029,061
1890 DATA 213,213,245,245,117,117,117,117
1900 DATA 221,221,119,119,093,093,119,119
1910 DATA 223,223,095,095,221,221,093,093
1920 DATA 087,087,087,087,087,087,087,087
1930 DATA 244,244,244,244,212,212,244,244
1940 DATA 001,001,000,000,000,000,000,000
1950 DATA 083,083,064,064,064,064,064,064
1960 DATA 000,000,000,000,001,001,005,005
1970 DATA 053,053,245,253,125,093,085,085
1980 DATA 085,085,085,087,095,095,127,127
1990 DATA 061,125,253,253,253,253,245,245
2000 DATA 221,221,119,119,093,093,085,085
2010 DATA 221,221,093,093,093,093,093,093
2020 DATA 087,087,087,087,087,087,095,095
2030 DATA 252,252,240,112,080,080,080,080
2040 DATA 000,001,005,005,021,021,085,085
2050 DATA 064,080,212,212,213,213,085,085
2060 DATA 000,000,000,000,000,000,064,064
2070 DATA 053,061,013,013,013,013,021,021
2080 DATA 127,127,095,095,061,125,117,117
2090 DATA 245,213,213,085,085,085,085,085
2100 DATA 117,125,127,127,119,119,119,119
2110 DATA 085,085,085,213,213,213,244,244
2120 DATA 095,095,095,095,125,253,000,000
2130 DATA 245,244,212,084,080,064,000,000
2140 DATA 021,005,001,000,000,000,000,000
2150 DATA 085,084,080,000,000,000,000,000
2160 DATA 085,085,085,085,021,005,000,000
2170 DATA 085,085,085,084,080,064,000,000
2180 DATA 080,064,000,000,000,000,000,000
2190 DATA 085,085,085,085,085,085,021,021
2200 DATA 247,247,221,221,221,221,127,127
2210 DATA 192,192,192,192,192,192,112,112
2220 DATA 021,005,005,005,001,001,000,000
2230 DATA 255,255,255,255,085,085,085,085
2240 DATA 240,240,208,208,080,064,000,000
2250 DATA 012,012,048,048,048,048,192,192
2260 DATA 192,192,192,192,192,192,192,192
2270 REM *** END OF DATA ***
```

Incase you may have difficulty in entering the lines containing
the graphic symbols in the Gavin Multicolor Cartoon program follow
this little explanation:-

LINES 130 - 240 Are pretty well straight forward enough.

LINE 250	LINE 260	LINE 270	LINE 280	LINE 290	LINE 300
>	shift g	shift n	shift v	cbm *	shift £
?	shift h	shift o	shift w	shift space	cbm n
shift *	shift i	shift p	shift x	cbm k	cbm q
shift a	shift j	V	shift y	cbm i	cbm d
shift b	T	shift q	T	T	T
T	T	T	T	T	T
shift c	shift c	T	T	T	T
9	9	T	T	cbm t	cbm z
shift d	shift k	shift r	shift z	cbm @	cbm s
shift e	shift l	9	shift +	cbm +	cbm p
;	;	shift s	cbm -	cbm m	cbm a
shift f	shift m	shift t	shift -	;	cbm e
		;	;	cbm £	cbm r
		shift u	cbm =		

LINE 310	LINE 320	LINE 500	LINE 520
cbm w	cbm f	cbm v	cbm b
cbm h	cbm c		
SPACE	cbm x		
SPACE			
cbm j			
cbm l			
cbm y			
SPACE			
SPACE			
cbm u			
cbm o			
shift @			

```
1 REM ***********************
2 REM * PRESENTING IN HI-RES *
3 REM * SEE THOSE EYES       *
4 REM * IN MULTICOLOR MODE   *
5 REM ***********************
6 REM *   BY KEVIN WHEALS    *
7 REM ***********************
8 REM *     (C) MARCH 1991   *
9 REM ***********************
10 PRINT"(CLR)":TT$="EYES DOWN"
20 LN=LEN(TT$):TB=20-LN/2:PRINTTAB(TB)TT$
30 POKE55,0:POKE56,60:CLR
40 POKE1177,62
50 FORI=0TO1023:POKE15360+I,PEEK(53248+I):NEXTI
60 POKE1177,63:POKE65299,60:POKE65298,192
70 POKE65287,24:SCNCLR
80 FORC=0TO51:FORBT=0TO7:READA:POKE15360+(C*8)+BT,A
90 NEXTBT,C
110 CD$="(HOME)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN)(DOWN
)":X=16
120 COLOR4,1:COLOR0,1:COLOR1,10,7:COLOR2,7,0:COLOR3,3,0
130 PRINTCD$
140 PRINTTAB(X);:PRINT"@AB    @AB"
150 PRINTTAB(X);:PRINT"CDE    CDE"
160 PRINTTAB(X);:PRINT"FGH    FGH"
170 FORY=0TO50:NEXTY
180 PRINTCD$
190 PRINTTAB(X);:PRINT"@AB    @AB"
200 PRINTTAB(X);:PRINT"IJK    IJK"
210 PRINTTAB(X);:PRINT"FGL    FGL"
220 FORY=0TO50:NEXTY
230 PRINTCD$
240 PRINTTAB(X);:PRINT"@AB    @AB"
250 PRINTTAB(X);:PRINT"MNK    MNK"
260 PRINTTAB(X);:PRINT"FOP    FOP"
270 FORY=0TO50:NEXTY
280 PRINTCD$
290 PRINTTAB(X);:PRINT"@AB    @AB"
300 PRINTTAB(X);:PRINT"QRK    QRK"
310 PRINTTAB(X);:PRINT"FST    FST"
320 FORY=0TO50:NEXTY
330 PRINTCD$
340 PRINTTAB(X);:PRINT"@AB    @AB"
350 PRINTTAB(X);:PRINT"UVW    UVW"
360 PRINTTAB(X);:PRINT"FXT    FXT"
370 FORY=0TO100:NEXTY
380 PRINTCD$
390 PRINTTAB(X);:PRINT"@AB    @AB"
400 PRINTTAB(X);:PRINT"YZ[    YZ["
410 PRINTTAB(X);:PRINT"F£T    F£T"
420 FORY=0TO50:NEXTY
430 PRINTCD$
440 PRINTTAB(X);:PRINT"@AB    @AB"
450 PRINTTAB(X);:PRINT"Y]↑    Y]↑"
460 PRINTTAB(X);:PRINT"←!T    ←!T"
470 FORY=0TO50:NEXTY
480 PRINTCD$
```

```
490 PRINTTAB(X);:PRINT"@AB    @AB"
500 PRINTTAB(X);:PRINT"Y#$    Y#$"
510 PRINTTAB(X);:PRINT"%GT    %GT"
520 FORY=0TO50:NEXTY
530 PRINTCD$
540 PRINTTAB(X);:PRINT"@AB    @AB"
550 PRINTTAB(X);:PRINT"&'(    &'("
560 PRINTTAB(X);:PRINT")GT    )GT"
570 FORY=0TO50:NEXTY
580 PRINTCD$
590 PRINTTAB(X);:PRINT"@AB    @AB"
600 PRINTTAB(X);:PRINT"*+,    *+,"
610 PRINTTAB(X);:PRINT"-.T    -.T"
620 FORY=0TO50:NEXTY
630 PRINTCD$
640 PRINTTAB(X);:PRINT"@AB    @AB"
650 PRINTTAB(X);:PRINT"/01    /01"
660 PRINTTAB(X);:PRINT"F23    F23"
670 FORY=0TO50:NEXTY
680 GOTO130
999 REM *** MULTICOLOR UDG DATA FOLLOWS ***
1000 DATA 000,000,000,000,000,003,015,063 :REM UDG  1 = @
1010 DATA 000,000,000,000,255,255,255,255 :REM UDG  2 = A
1020 DATA 000,000,000,000,000,192,240,252 :REM UDG  3 = B
1030 DATA 048,015,058,056,058,015,048,063 :REM UDG  4 = C
1040 DATA 063,207,179,188,179,207,063,255 :REM UDG  5 = D
1050 DATA 252,252,252,252,252,252,252,252 :REM UDG  6 = E
1060 DATA 015,003,000,000,000,000,000,000 :REM UDG  7 = F
1070 DATA 255,255,255,000,000,000,000,000 :REM UDG  8 = G
1080 DATA 240,192,016,004,004,004,001,001 :REM UDG  9 = H
1090 DATA 060,051,014,062,014,051,060,063 :REM UDG 10 = I
1100 DATA 015,243,172,047,172,243,015,255 :REM UDG 11 = J
1110 DATA 252,252,252,060,252,252,252,252 :REM UDG 12 = K
1120 DATA 240,192,000,064,016,016,016,004 :REM UDG 13 = L
1130 DATA 063,048,014,062,014,048,063,063 :REM UDG 14 = M
1140 DATA 255,003,172,047,172,003,255,255 :REM UDG 15 = N
1150 DATA 255,255,255,004,004,001,000,000 :REM UDG 16 = O
1160 DATA 240,192,000,000,000,000,064,064 :REM UDG 17 = P
1170 DATA 063,063,000,062,000,063,063,063 :REM UDG 18 = Q
1180 DATA 255,255,000,047,000,255,255,255 :REM UDG 19 = R
1190 DATA 255,255,255,004,004,004,004,001 :REM UDG 20 = S
1200 DATA 240,192,000,000,000,000,000,000 :REM UDG 21 = T
1210 DATA 063,063,063,048,063,063,063,063 :REM UDG 22 = U
1220 DATA 255,255,255,000,255,255,255,255 :REM UDG 23 = V
1230 DATA 252,252,252,012,252,252,252,252 :REM UDG 24 = W
1240 DATA 255,255,255,016,016,016,016,016 :REM UDG 25 = X
1250 DATA 063,063,063,060,063,063,063,063 :REM UDG 26 = Y
1260 DATA 255,255,000,248,000,255,255,255 :REM UDG 27 = Z
1270 DATA 252,252,000,188,000,252,252,252 :REM UDG 28 = [
1280 DATA 255,255,255,016,016,016,016,064 :REM UDG 29 = £
1290 DATA 255,192,058,248,058,192,255,255 :REM UDG 30 = ]
1300 DATA 252,012,176,188,176,012,252,252 :REM UDG 31 = ↑
1310 DATA 015,003,000,000,000,000,001,001 :REM UDG 32 = ←
1320 DATA 000,000,000,000,000,000,000,000 :REM SPACE
1330 DATA 255,255,255,016,016,064,000,000 :REM UDG 33 = !
1340 DATA 000,000,000,000,000,000,000,000 :REM " (NOT USED)
1350 DATA 240,207,058,248,058,207,240,255 :REM UDG 34 = #
1360 DATA 060,204,176,188,176,204,060,252 :REM UDG 35 = $
1370 DATA 015,003,000,001,004,004,004,016 :REM UDG 36 = %
```

```
1380 DATA 063,063,063,063,063,063,063,063 :REM UDG 37 = &
1390 DATA 252,243,206,062,206,243,252,255 :REM UDG 38 = '
1400 DATA 012,240,172,044,172,240,012,252 :REM UDG 39 = (
1410 DATA 015,003,004,016,016,016,064,064 :REM UDG 40 = )
1420 DATA 063,063,060,051,060,063,063,063 :REM UDG 41 = *
1430 DATA 192,063,234,226,234,063,192,255 :REM UDG 42 = +
1440 DATA 252,060,204,240,204,060,252,252 :REM UDG 43 = ,
1450 DATA 015,003,000,000,001,001,001,004 :REM UDG 44 = -
1460 DATA 255,255,255,064,064,000,000,000 :REM UDG 45 = .
1470 DATA 063,060,051,015,051,060,063,063 :REM UDG 46 = /
1480 DATA 003,252,255,171,139,168,003,255 :REM UDG 47 = 0
1490 DATA 252,252,060,204,060,252,252,252 :REM UDG 48 = 1
1500 DATA 255,255,255,004,005,001,001,000 :REM UDG 49 = 2
1510 DATA 240,192,000,000,000,000,000,064 :REM UDG 50 = 3
1520 REM *** END OF DATA ***
1530 REM
1540 REM ***********************
1550 REM *  NO CHECKSUM ON DATA *
1560 REM *  SO BE VERY CAREFUL   *
1570 REM *  WHEN TYPING IN       *
1580 REM ***********************
```

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AMMENDMENT FOR DALEK HI-RES PICTURE
****

Although there is actually nothing wrong with the way the program
puts up the picture on the sceen, i noticed a few weeks back when
i was converting the program over to CBM 64 format, for use on that
machine, that some lines of the data had been worked out completely
wrong.
     So if you re-type the following lines your hi-res picture
will be as it should of been in the first place (slapped wrists
for you i here the Ed saying).
     Here are the corrections:-

1030 DATA 000,000,001,000,000,160,081,175, 0417

1060 DATA 000,000,206,050,038,076,088,052, 0510

1130 DATA 130,098,034,033,045,169,073,001, 0583

1700 DATA 057,057,240,240,240,241,226,226, 1527

1730 DATA 071,071,135,007,007,007,135,135, 0568

     Once you have changed these lines above things should look better.

                    Kevin Wheals.

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QUIKADON for the COMMODORE C-16/+4

QUIKADON will add on ('append')'a further BASIC program to the end of one already in the machine, using a single 'SYS' call. It works in conjunction with QUIXAVER, doesn't take up any BASIC memory space, and doesn't interfere with either BASIC or QUIXAVER.

Either QUIXAVEd or FLIXAVEd programs may be QUIKADONed to the existing program, but QUIKADON won't work with any other tape system.

QUIKADON also serves as an example of how to QUIXAVE multipart programs so that they can be loaded with a single direct BASIC 'LOAD'.

QUIKADON loads in three parts. The first part is from $D8 to $E0 inclusive (an area 'used by application software'), and is QUIXAVEd with an auto-run device number.   When loaded with a direct BASIC 'LOAD' it FLIKLOADs the other two parts of QUIKADON and returns to direct BASIC mode; it's not required after that and needn't be kept intact.

The second part is from $BE8 to $BFF, between the colour-memory and character-memory of the text screen (where it won't be affected by a reset), and is FLIXAVEd.   When called by a direct BASIC 'SYS3048' it saves the current start-of-BASIC address, alters the pointers to point to the end of the existing program, calls up a FLIKLOAD of whatever comes next on the tape, and jumps to the beginning of the third part.

The third part is from $FE8 to $FFF, between the character-memory and the normal start of BASIC (where again it won't be affected by a reset), and it too is FLIXAVEd.   It restores the start-of-BASIC pointers to their original values, prints a warning that a 'RENUMBER' may be necessary, performs a 'CLR' to reset the other BASIC pointers, and returns to direct BASIC mode.

If there is no BASIC program in the machine, QUIKADON's 'SYS3048' will just load the new program in the same way as a normal FLIKLOAD's 'SYS843' except that it will perform a 'CLR' after loading (which QUIXAVER doesn't).

GETTING IT IN

Enter the three parts in MONITOR in the usual way.

SAVING IT

With QUIXAVER present, save the three parts one after the other in MONITOR with

        S"QUIKADON",FF,D8,E1 ‹RETURN›

        S"",80,BE8,C00 ‹RETURN›

        S"",80,FE8,1000 ‹RETURN›

LOADING IT

Use a normal direct BASIC 'LOAD', which will load all three parts automatically and return to direct BASIC mode.

RUNNING IT

Set up the tape and enter 'SYS3048 ‹RETURN›'.   Before running the combined program, check the line-numbers of the original and QUIKADONed parts, and RENUMBER if necessary so that the lowest line-number of the QUIKADONed part is greater than the highest line-number of the original.

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```
.  00D8   20 4B 03   JSR  $034B
.  00DB   20 4B 03   JSR  $034B
.  00DE   4C DC 8B   JMP  $8BDC

.  0BE8   A5 2B      LDA  $2B
.  0BEA   48         PHA
.  0BEB   A5 2C      LDA  $2C
.  0BED   48         PHA
.  0BEE   A5 2D      LDA  $2D
.  0BF0   E9 01      SBC  #$01
.  0BF2   85 2B      STA  $2B
.  0BF4   A5 2E      LDA  $2E
.  0BF6   E9 00      SBC  #$00
.  0BF8   85 2C      STA  $2C
.  0BFA   20 4B 03   JSR  $034B
.  0BFD   4C E8 0F   JMP  $0FE8

.  0FE8   68         PLA
.  0FE9   85 2C      STA  $2C
.  0FEB   68         PLA
.  0FEC   85 2B      STA  $2B
.  0FEE   20 D8 FB   JSR  $FBD8

>0FF1  0D 12 52 45 4E 55 4D 3F  :

.  0FF9   00         BRK
.  0FFA   20 9A 8A   JSR  $8A9A
.  0FFD   4C DC 8B   JMP  $8BDC

>00D8  20 4B 03 20 4B 03 4C DC  :
>00E0  8B 00 00 00 00 00 00 00  :

>0BE8  A5 2B 48 A5 2C 48 A5 2D  :
>0BF0  E9 01 85 2B A5 2E E9 00  :
>0BF8  85 2C 20 4B 03 4C E8 0F  :

>0FE8  68 85 2C 68 85 2B 20 D8  :
>0FF0  FB 0D 12 52 45 4E 55 4D  :
>0FF8  3F 00 20 9A 8A 4C DC 8B  :
```

28

Eric Jones   The Fold   Bucknell   Shropshire   SY7 OAA
05474 348   91-05-01

Dear Editor Roy

TWO-BITS: more BASIC memory for the C-16

I very nearly called this little demo 'HEINEKEN', because it reaches parts (of memory) that some others don't!   It came about because I needed more than 2K of memory for a program that used GRAPHIC2 split-screen mode.   There was a system described years ago in 'Your Commodore' that would provide an extra 2K in GRAPHIC1 or GRAPHIC3 by adding the whole of the text-screen area to the normal BASIC storage area, but it was useless if you wanted a split screen of graphics and text.

The idea of 'Two-bits' is that the top part of the text screen is 'windowed off' so that 'PRINT' and so on can't get at it, and then part of the program is stored there, the main part being stored in the usual place.   All variables are common to both parts of the program, and each part can use 'GOSUBs' and 'GOTOs' either within itself or in the other part.

'Two-bits' uses tape with QUIXAVER, and if you want to adapt it for stone-age tape or middle-age disc you may have problems; but that's *your* worry!

The program loads (and auto-runs, if you want it to) with a single normal direct BASIC 'LOAD', but is actually saved and loaded in three parts.   The first part is QUIXAVEd and is in machine-code; when it's loaded it auto-runs, setting up the window on the screen, calling up FLIKLOADs of the two parts of the BASIC program, and then either returning to direct BASIC mode or causing the new program to auto-run.

Leaving 5 lines free at the bottom of the screen for use in GRAPHIC2 or GRAPHIC4, you can use .up to 20 lines of 40 bytes on the 'character' part of the screen from $0C00 (3072) to $0F1F (3871) and the same again on the 'colour' part from $0800 (2048)to $0B1F (2847) — 1600 extra bytes in all, though you have to use just a few of them for the 'jumps' from one part of the program to another.   (When you use both parts of the screen, of course 'Two-bits' becomes 'Three-bits'; but we'll forget that for now and stick to 'Two-bits'.)

A jump from either part (the 'from' part) to the other (the 'to' part) is made by poking the 'start-of-BASIC' values for the 'to' part into locations 43 and 44 ($2B and $2C) — usually only 44 has to be poked — and then using either 'GOTO' or 'GOSUB' or 'RETURN'.   A 'GOTO' or 'GOSUB' jump must always be to a line number in the 'to' part equal to or less than the line number that it's made from in the 'from' part, but there's no such restriction on 'RETURN'.

The demo program is very simple and doesn't actually use any graphic mode.   It's intended to run on the ordinary unexpanded C-16; it will run on an expanded C-16 provided the start of BASIC hasn't been shifted by putting the machine into a graphic mode.   But you can easily modify it to jump correctly, wherever the start of BASIC happens to be.

What follows may look a bit complicated, but try it out and you'll find it's quite straightforward and follows a logical routine.

2·9(

To get used to the way 'Two-bits' works, start by entering the demo program from the listings, following the instructions below; then I suggest that for your first try with a program of your own you should use only up to 10 lines for the on-screen part of the program, leaving yourself 15 for normal use, and use only the 'character' part of the screen, as in the demo.

Before typing anything in, first make sure that QUIXAVER is present. Then enter the on-screen part in the normal way *at the normal start of BASIC* — trying to enter it directly on to the screen is fraught with problems. Don't try to run it; just QUIXAVE it on a spare tape with 'SAVE"TITLE ON-SCREEN" «return»'. (Keep this tape.) Reset the C-16, press '«CLEAR»' followed by 10 cursor-downs and '«ESC»T' to set up the window, enter 'POKE3072,0:POKE44,12 «return»', and then load the on-screen part you've just saved. That gets it into the right place, properly chained. It will appear as rubbish on the screen, but 'LIST' will let you check it.

Now enter 'POKE44,16 «return»' to restore the normal start of BASIC, and then enter the 'normal' part of the program. QUIXAVE this also on the spare tape with 'SAVE"TITLE OFF-SCREEN" «return»'.

You can now run the program if you wish, but it's better to save it first; and before you can do that you have to enter the machine-code part.

First count the number of screen-lines taken up by the on-screen part of the program, including any part-line at the end, and note its value in hex. Also multiply the number of lines by 40 to get the number of bytes they contain, add 3072 to this to get the address of the first byte of the text window, and note the value of the result in hex. Keep a note of these values, so that you can save the program again whenever you want to, without doing any more sums.

Now go into MONITOR (I always use 'SYS62613 «return»' for this) and enter the machine-code from $0718 to $072A inclusive; but in the first line replace the 'LDA #$05' with 'LDA #$«hex value of the number of lines»'. QUIXAVE this on the spare tape with 'S"TITLE M/C",99,718,72B'.

The program is now complete.

Put a fresh tape in place and save the three parts like this:

Still in MONITOR, enter 'S"TITLE",FF,718,72B «return»' to auto-run-QUIXAVE the machine-code. Don't press 'STOP' on the tape at the end.

Next enter 'S"",88,C00,«hex value of address of window» «return»' to FLIXAVE the on-screen part. Don't press 'STOP'.

Last of all, enter 'X «return»' to return to direct BASIC mode and FLIXAVE the remaining part with 'SAVE"",O «return»'. Now you can press 'STOP'!

Rewind the tape, reset the C-16, and enter 'LOAD «return»'. The program should load and auto-run. You can re-run it with a normal 'RUN «return»'.

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If you don't want the program to auto-run, before you save the machine-code replace 'JSR $8BBE' in its last line but one by 'JSR $8A9A' to perform just a 'CLR' instead of a 'RUN'.

If you ever get round to doing a "Three-bits", the 'on-screen-colours' part is entered and saved in exactly the same way as the 'on-screen-characters' part, with the appropriate changes of values. You will of course need an extra 'JSR $034B' in the machine-code, making it three bytes longer.

If later on you need to edit the on-screen part of the program, it's not practicable to do it on-screen; instead, reset the C-16, load the on-screen part from the spare tape — it will go to the normal start of BASIC — edit it, and then QUIXAVE it again on the spare tape. From there you can load it back on to the screen as before; then load the other parts from the spare tape instead of typing them in all over again, and save the edited program just as before. (The off-screen part can be edited in the usual way.)

Cheers!

Eric

TWO—BITS DEMO

```
. 0718  A9 05     LDA #$05
. 071A  85 CD     STA $CD
. 071C  8D E6 07  STA $07E6
. 071F  20 4B 03  JSR $034B
. 0722  20 4B 03  JSR $034B
. 0725  20 BE 8B  JSR $8BBE
. 0728  4C DC 8B  JMP $8BDC
```

ON-SCREEN PART

```
10 PRINT"✿THIS IS THE ON-SCREEN PART OF THE TWO-
20 PRINT"BITS PROGRAM, AND IT'S SETTING SOME
30 PRINT"VARIABLES FOR THE NORMAL PART.":A=1.23:B%=456:C$="C STRING
40 POKE44,16:RETURN
```

OFF-SCREEN PART

```
10 PRINT"✿✿THIS IS THE NORMAL PART OF THE TWO-BITS
20 PRINT"PROGRAM, AND IT'S GOSUBBING . . .":POKE44,12:GOSUB10
30 PRINT"✿HERE WE ARE, BACK AGAIN:  PRESS <SHIFT>":WAIT1347,1
40 PRINT,"✿A ="A," B% ="B%,,"   C$ = "C$
```

3 1

Eric Jones   The Fold   Bucknell   Shropshire   SY7 0AA
05474 348   91-01-10

Dear Editor Roy

DISABLING «STOP»

Rob Marshall's letter (September issue) with its warning about funny things happening when you try to disable «STOP» came at exactly the right time, because I was just wanting to do that very thing in my 'ASEMBLIT' (yes, it's still coming along!). So I tried his suggestion, and it certainly worked when I entered the POKEs in direct mode before running the program and restored «STOP» in direct mode afterwards. But then I tried putting the appropriate lines into the program itself, and some very odd things happened — usually resulting in a delayed crash, either in the middle of the program or right at the end when «STOP» was supposedly being restored. ('ASEMBLIT' is a long program with hundreds of data lines, and its length may account for me hitting trouble when Rob Marshall didn't.)

I tried a lot of variations in an attempt to find out just what was happening, with no success, and then it dawned on me: new values had to be POKEd into two addresses by two BASIC statements separated by a colon, and the system was trying to check «STOP» after the first POKE and before the second — and of course it saw half the old vector and half the new, and went off and did some very silly things. So I made up two small machine-code routines, one to disable «STOP» and one to enable it, and put the appropriate SYS calls in the program, and it worked first time!

Now I didn't really want to replace 'check «STOP»' with 'turn screen on', because that could cause problems during tape operations. So I investigated, and found that what was needed to replace the check-«STOP» routine was a routine that would load the accumulator with anything other than zero and then return; and by using MONITOR's 'H' command I found a convenient ready-made one at $B9CD. So I modified my machine-code to send the system there, and it worked. Then I combined the two routines into one to save bytes, and here it is. Try it and see if there are any snags I've missed!

The code is relocatable, so you can put it anywhere convenient; the version I've listed lives near the bottom of the BASIC pseudo-stack, out of reach of the program I'm using it with. With the code in that position, 'SYS1840' disables «STOP» and 'SYS1846' enables it again. Of course if you put it somehwere else you'll have different SYSs.

A word of warning: you'll find that «STOP» is always enabled after you've used QUIXAVER, because QUIXAVER always ends by resetting all vectors to their normal values; but of course you can disable it again immediately afterwards.

I enclose a copy for Rob Marshall.

Cheers!

<STOP> CONTROL

```
. 0730  A9 CD        LDA #$CD
. 0732  A2 B9        LDX #$B9
. 0734  D0 04        BNE $073A
. 0736  A9 65        LDA #$65
. 0738  A2 F2        LDX #$F2
. 073A  78           SEI
. 073B  8D 26 03     STA $0326
. 073E  8E 27 03     STX $0327
. 0741  58           CLI
. 0742  60           RTS
```

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Eric Jones   The Fold   Bucknell   Shropshire   SY7 OAA
05474 348   91-01-29

Dear Editor Roy

ILLEGAL OPCODES

Believe it or not, ASEMBLIT is finished and only needs writing up (that may take some time!), so you should be getting it one day this century.   But I've been adding John Hadlow's list of illegal opcodes into it (October 1989 issue, page 6), and I've come across some oddities when I've tried them out.   So I'd like to hear from anyone else who's had a go, and in particular I'd be glad if you'd pass the enclosed copy of this letter on to John Hadlow for his comments.

What I've done so far is this: I've tried every one of the instructions with every addressing mode listed for it, except that I haven't tried all the alternative opcodes for NOP, SKB, and SKW.   For each instruction I tried several different sets of values of inputs for one addressing mode (usually 'absolute'), and at least one set of values for each of the other modes to make sure they were accepted.

Every instruction seemed to do what the list said, except for OAL.   This is supposed to ORA the accumulator with the constant value #$EE, AND the result with data from the address, and then TAX the final result into the X register. Well, it did the last bit all right;   X and A always ended up holding the same value, but that value wasn't always what the description would lead you to expect and it wasn't always the same result for the same inputs.   It seemed to depend on what had happened before, but so far I haven't been able to find any rhyme or reason in it.   (Incidentally, what use would this instruction be if it did work as advertised?)

ASO and RLA didn't work with the 'immediate' opcodes given;   not surprising, really, because you can't expect a shift or rotate to work on a fixed value — only on the value at some given address.

LSX didn't work with the 'zero-page, X' opcode;   not really surprising, as it's going to load X!   But it *is* surprising to find that it *does* work with the '(indexed, X)' instruction, and the same applies to AXS.

It seems a pity that LAX doesn't work in 'immediate' mode — following the pattern, it looks as though the opcode for this ought to be 'AB', which is given for OAL;   but it isn't.

Well, that's the score to date.   Now: where are the discrepancies?   Do they arise in all C-16's?   in my particular C-16?   in my testing?   in the table as published in the magazine?   in the information as supplied to John Hadlow by persons unknown?   or where?   Any information will be welcome and will of course be acknowledged.   Come on, all you lot Out There!

                              Cheers!

                              Eric

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Eric Jones   The Fold   Bucknell   Shropshire   SY7 0AA
05474 348   91-05-01

Dear Editor Roy

        Thankyou for the magazine, which arrived this morning marked '23p
to pay' because it wasn't sufficiently stamped.   However, in this
civilised part of the world the postmen ignore such little details, and
I didn't have to pay, but it seems possible that some other members may
have been caught.   I expect you forgot that a triple issue was a bit
heavier than a single one!

        Unfortunately, there's an error on the first page: you've given
my phone number the wrong code.   It should be 05474 348,
not 05475 348.   So please publish a correction, otherwise somebody
living somewhere else in our telephone area may shortly be getting some
unwanted calls.

        In January I sent you 'Two-bits', and I've now spotted an error in
the instructions for saving the machine-code section ('88' should have
been '99'), so as it hasn't yet appeared in the mag I enclose a
corrected version in which I've also deleted my dig at you for not
having got QUIXAVER published.

        It's nice to see my efforts in print — now I wait for the sacks
of mail!

                                Cheers Eric

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NJR

Membership No. 16116445

N.J. Ritchie
176 Albert Ave,
Prestwich,
Manchester.
M25 8HF
6/1/91

Dear Roy

When I filled in the application form for the C16/+4 club I answered 'no' to the question about submissions to the magazine as my knowledge of programming is limited to say the least. When I received the December triple issue I decided to write a letter asking for some help with some type-ins that I was using but when I sat down at the wordprocessor the letter began to get longer and longer and I decided that the full story of my experiences might be useful to some of the readers and, at worst, should give everyone a bit of a laugh. Apart from anything else it may make some of the other strugglers feel that they aren't as daft as they thought they were.

In the editorial in the last issue you said that you could use some help with the magazine. The one thing that I can offer is some help with the photocopying as I have access to two machines at work which produce very good quality copies (I say two because it means there is usually one working properly at any one time - you'll realise what I mean if you use a copier regularly). The reduction and magnification on both the machines is infinitely variable so that you don't get the print disappearing off the edge of the page if you're careful. I can usually get away with doing small numbers of copies (say 20 - 30) for nothing and larger numbers would be 3.5p a copy (if someone sees me doing them) and I could normally return them to you in a day or so.

I am enclosing copies of the programmes mentioned in the letter in case you wanted to publish any of them, they were done in blue because we ran out of black toner over Christmas. If you dont want to copy the instuctions with them I can always type some out.

I hope the submission is suitable for publication and if there are any changes you'd like me to make please let me know.

Yours

Nick

LETTERS IN NEXT MONTHS ONE

35

PRINTER PROBLEMS

Thinking of buying a printer but unsure of which one to go for ? - Have you already got a printer but would be willing to help out a member in distress ? - if so, then read on:

Just over a year ago I decided to splash out on a printer and on looking through the magazines I found two at around £130, which was about as much as I could afford. They were the Brother 120D and the Seikosha GP500VC. As the advertisements didn't give much information and I didn't know too much about printers anyway, I decided to buy the GP500 from E.E.C. ltd. as there was a nice picture of it connected up to a PLUS/4 and the advert said it could be connected directly - no extra interface required. Well, that seemed fair enough, 'Can't go wrong' I thought!

Well, the great day dawned and a large parcel arrived by carrier. At last I thought, I can use my PLUS/4 as a wordprocessor, impress my friends and convince my wife that a computer does something useful and isn't just for playing games to avoid doing the wallpapering. Having fitted the plug I put in some paper, fitted the ribbon that was supplied & tried the 'printer test' to see what would happen. There in front of me was a printout of what it could do - complete alphabets in upper and lower case and all the CBM graphics characters. The graphics were fine but the lower case letters were, frankly, awful - at least the g's, p's, q's, j's and y's were. Now I new what all those references to the lack of descenders on the cheaper Commodore printers meant.

Undaunted I connected it up to the PLUS/4 and tried printing out a document from the word processor. The beast worked O.K. for a while and then the ribbon jammed and there were the most awful noises while the printhead tried desperately to move along whilst being slowly strangled. I leaped to turn it off before there was major damage thinking that I must have put the ribbon in wrong. I removed the cartridge and opened it up only to find yards of ribbon, with a mind of it's own leaping out all over the floor. Anyway, to cut a long story short, after taking the thing apart and putting it back together dozens of times I decided that it was never going to work and needed a new one.

The next day I phoned E.E.C. and they said that the ribbon must have dried out and that they would send a replacement as soon as possible. In the meantime I decided to see where I could get a supply of ribbons as E.E.C. said they didn't keep many in stock and so I started ploughing through the office supplies catalogues at work. And guess what? - they all stocked every ribbon known to man except the one I wanted. Eventually a friend who deal with some of the suppliers phoned a company he knew and after the inevitable cracks about his mate with a crappy printer, got them to order some for me. Bang goes my street cred. once again!

Having sorted out the ribbon problems I could now turn my attention to the print quality. I remembered seeing a programme In 'Your Commodore' which was supposed to correct this problem so out came the old mags. (I new they'

come in useful someday) and there it was,'Wordpro add - on.' 'Well' I thought
'that doesn't look too bad, not much more than a page long and it's got
those funny checksum thingies so you can't go wrong can you?'

After about four hours I had typed it all in, being very careful to get all
those numbers in the data statements right as they obviously meant something
to the computer even if they didn't mean much to me. Then came the great
moment, type 'run' hit 'return' and let her rip! - So, what do I get? -
'error in line 190' Well that didn't get very far did it? Check the line and
there it is, one of the numbers is wrong. Never mind, everyone is allowed one
mistake, so correct the line, resave and try again.

Twenty two resaves later I've finally got it right and deleted all the
unwanted versions from the disk. At least my typing's getting better, I can
type 'scratch' in one second flat and hit the 'Y' without looking. Isn't it
amazing how you know your brain has given your fingers the right instructions
but the little sods go off and do their own thing? Anyway eventually it all
looks o.k. and I try again - type 'run' hit 'return' and what happens? -
'please wait.....'

After what seems like hours when I've just decided that the thing has
obviously 'hung' the screen turns black and I'm in the wordprocessor. That
was clever, I've never touched the 'F1' key and it's done it all by itself!
Actually I worked out afterwards that the computer spends about 12 seconds
poking itself - well I hope it enjoys it - it sounds like self abuse to me!

Since then I have managed to implement all the functions on the programme
(once I'd worked out that C= referred to the CBM key) and it works very well.
By making a second pass of the printhead under each line it prints proper
descenders and the justification is much better as all the gaps between the
words are equal. The only problem is that it takes twice as long to print a
document, which in turn produces three times as many groans from the wife and
kids if the're watching T.V. Also, because of the difference in the spacing,
the print carries on over the perforations in the paper and then leaves a
gap in the middle of the next sheet (it took me hours to sort out why it was
doing that the first time it happened) but you can deal with this by changing
the pagelength and papersize with the appropriate embedded commands.

Flushed with success I got the old mags. out again and looked to see what
else there was. The 'Spellcheck' programme seemed about the same length and
I eventually managed to get it working although it took me quite some time to
sort out the instructions. I don't know if computer programmers are
particularly bad at explaining how their programmes work or if it's just me
that's thick. 'Spellcheck' is very useful and works on the clever premise
that you start out with no dictionary and check through your own documents
adding words which you know to be correct until you eventually build up a
personal dictionary of around 7,000 words maximum. This is o.k. if, like me
you can spell but you make a lot of mistakes when you type.

The next programme I looked at was 'Nufont'. Now if the aim of the game is
to make the instructions as difficult as possible then this one must be the
pinnacle of a programmer's ambitions!

I have typed in all the machine code as instructed and although it al
appears to be correct and the programme accesses the 3 PLUS 1 W.P. as i
should, the printer throws a wobbler and produces all sorts of garbage wher
there should be a capital and the spacings are all wrong. Since reading th
letter from Eric Jones in last month's magazine on how to print out a memor
dump from the monitor I've been able check the programme line by line and
know I've typed it in correctly but as the command function doesn't seem t
work properly I suspect there's a mistake in the published listing, so i
anyone knows what it is please let me know.

The instructions for 'Nufont' refer back to another programme (Ne
character sets for the MPS 801/3) written for the C64 and published in th
'Y.C. serious Users Guide 1987'. According to the writer, Frank Carson, yo
can combine the alternative character sets with 'Nufont'. Well that's fin
but he doesnt tell you how to do it. Are they all loaded seperately befor
loading 'nufont' or can they be combined into one long programme? I've
idea so if anyone can enlighten me I would be most grateful.

Since then I have bought a SCRIPT/PLUS cartridge. It took me ages to trac
one down but eventually I found out that they were produced by Precisio
Software. I new I should have bought one from Postronix when they wer
selling them for £9.99 but I didn't and of course they went bust (my £9.
may have saved the company!) Anyway I missed the boat as usual and had to b
one from Precision. I enquired about the price and they told me it would,
£37 + v.a.t. I thought this was a bit excessive as they had sold them abou
three years before for £19.99 but the man I spoke to said that it was becau
it was a 'one-off'. Now, I'm a generous man and like to think the best
people but if they expect me to believe that they made a chip just for m
had a box and instruction manual printed and delivered it to me in two day
they must think I fell out of the nearest tree! Still, when you're over
barrel you pay your money and smile. Since then I discovered a little gem
a magazine called 'Micro computer Mart' where you can place a free advert
buy or sell hardware and software and through one of the ads. I 'met' a g
in Portsmouth (Hi Tony!) who got hold of a copy for £3.00. Ah well! C'est
vie. Still he did introduce me to C16/+4 monthly and I've had some ni
software from him. Of course 'Wordpro' and 'Nufont' don't work wi
SCRIPT/PLUS and so, although it is a brilliant w.p I'm back to square o
with the printout so I still have to use the 3 PLUS 1 for anything that
want to send out.

So, where does all this leave us? Well first of all, if Roy sees fit
print this tale of woe, anyone who is thinking of buying a printer will kn
that they need to find out it's capabilities first. I would suggest that
the sort of questions you need to ask are; Does it have a built in
interface or do I need to spend £30 or more to get one? Are the ribbons e
to obtain? Can it cope with single sheets and continuous feed paper and w
it take different widths of paper? Will it be compatible with the softw

I've got or hope to get? Can it print the CBM graphic characters? If it's a dot matrix is it a 24 pin (very good but expensive) 9 pin (quite good esp. if it is capable of near letter quality - NLQ) or 7 pin (cheap but can't print descenders)? How fast does it print? -usually given in characters per second (CPS), does it have any extra fonts (typefaces) built in. If you're on a tight budget you might consider a daisywheel which is slow & noisy and can't print graphics but gives good quality print and may have interchangible print wheels for different type faces. I'll give a rundown on the Seikosha later and perhaps if other members could send in a similar list for their printers it may help prospective buyers make a more informed choice.

     And now for the most important part; can anyone help me with the following problems?;

1/ Has anyone else out there got a GP500 printer and if so do you know if it's most like the MPS 801 or 803. Also is it compatible with any of the replacement descender ROM chips such as printkit 1V or printer 1V? (if they're still available.

2/ Has anyone managed to get 'Nufont' working and if so can they tell me how to use the alternative fonts?

3/ Is it possible to convert any of the descender programmes mentioned above to work with SCRIPT/PLUS?

4/ Does anyone know if the 'Print Enhancer' desk top publishing disk from Y.E.R. works with the GP500 or, if not, could anyone lend me a copy to try out. I really don't want to spend another £20 on software I can't use.

And now, here is the rundown on the printer used for this article. I should point out that dot matrix printouts don't photocopy too well so the original copy will have been better than the one you're reading now.

Printer	Seikosha GP500VC
Print method	Dot matrix
Interface	Connects to serial printer port
Character Matrix	5 dots wide x 7 dots high + 1 (space)
Character Pitch	10 Characters/inch
Character Columns	80/line
Print speed	50 CPS
Graphics capability	Prints CBM and user defined graphics.
Near Letter Quality	No
Extra Fonts	Expanded
Paper	4.5 to 10 inches wide continuous feed only. .
Ribbon Availability	A bit hard to find
Compatibility	Seems to work with most software

If anyone would like a working copy of 'Wordpro' and/or 'Spellcheck' please send a disk and S.A.E to the following address;
Nick Ritchie, 176 Albert Avenue, Prestwich, Manchester, M25 8HF

```
10 REM ****>>> +4/C016/PATTERNS <<<****
20 COLOR4,6,4:COLOR0,6,7:COLOR1,15,5:GRAPHIC1,1
30 FOR S=6TO310 STEP +3
40 DRAW1,5,0 TO 160,100
50 NEXT S
60 FOR T=3 TO 193 STEP +3
70 DRAW1,160,100 TO 320,T
80 NEXT T
90 COLOR1,15,5
100 FOR E=314 TO 3 STEP -3
110 DRAW1,160,100 TO E,200
120 NEXT E
130 FOR V=192 TO 6 STEP -3
140 DRAW1,160,100 TO 0,V
150 NEXT V
160 COLOR1,15,2
170 FORC=0TO10
180 CIRCLE1,160,100,C:PAINT1,160,100
190 NEXT C
200 CHAR,19,12,"  "
210 :
220 FOR WT=1TO5000:NEXT WT
230 COLOR1,7,0
240 GRAPHIC1,1:P=1
250 FORR=5TO120
260 CIRCLE1,160,100,R:P=-P
270 IF P=1 THEN PAINT 1,160,101-R
280 NEXT R
290 COLOR0,5,2
300 GRAPHIC1:GRAPHIC3
310 GOTO300
```

Dear Roy (ED)
         Here is a program based on a combination of two short programs.
The first one was in C.C.I 1990 by Steven Bell called 'Patterns' and the
second one was by Mark Everingham in his articles called 'Foureground'
published also in C.C.I but in 1989.
  I've combined these two short programs with some modifications and I think
you'll find the result makes some interesting patterns,and at the end as Mark
Everingham says the screen begins to flash wildly and if you depress the
[SHIFT-LOCK] key you should see chaos resolve into a pattern of colours
gliding effortlessly up the background of the screen.You have to be patient
at the end part while the pattern unfolds as this takes a little time to
finish.

    There is a pause of about 10 to 15 seconds between the patterns in the
middle of the program.

    Please delete line 5 before running this program as it alters the
direction of the final result.If you leave line 5 in you'll see what I mean.

    J.Nichol.

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Dear Roy,

Enclosed are directory listings from disks I have been sent from Ronnald & Gerrard De Bruin which I can copy if you send some blank disks.

I have also sent a cheque of £12 for my subscription.

On the reverse of this page you will find a short listing of the little raster programe demo I have done so far, it needs a little more work yet & I will probably put in a logo or picture and if I have time and get realy clever I might get some sound on there somewhere. though I suspect that this may affect the nice scroll I have managed to achieve in basic, which as I said over the phone is an idea from a little demo by Mark Everingham, please feel free to play about with it and see what you come up with.

Right, now for the information where and what spares can be had for the C16 & plus/4 :

Catalogue No	Part description	£Cost	>	
25126301	DC POWER JACK SOCKET	00.58	>	
25161601	SOCKET 7-PIN MINI DIN	0088	>	
74 LS 257	IC 3 STATE 4X2 INP. MULTIPXR 16DIL	0097	>	C
25153502	IC 8360	16.57	>	
25184201	FILTER EMI	00.13	>	.
31800601	IC 23128 ROM TED BASIC	13.29	>	
MSM 4416 P-15	IC D RAM MEMORY 18-DIL	02.95	>	
25158701	ON/OFF SWITCH ROCKER	01.68	>	1
32557001	CIOL INDUCTOR 1 .2UH	00.19	>	
25125901	JOYSTICK SOCKET 8 PIN MINI DIN	00.92	>	6
FB3	FERRITE BEAD 4X3MM	00.03	>	
90610601	CRYSTAL 17.734MHZ	04.03	>	

****

25153502	IC 8360	16.57	>	
31800601	IC 23128 ROM TED BASIC	13.29	>	P
25164003	IC 6529B SPI	02.28	>	L
25125901	JOYSTICK SOCKET 8 PIN MINI DIN	00.92	>	U
32498050	INTRODUCTION TO BASIC, MANUAL PART 1	02.62	>	S
MANC +4	USERS MANUAL FOR COMMODORE PLUS/4	01.30	>	
31705401	IC FUNCTION ROM HIGH	13.68	>	/
31705301	IC 8005-021 FUNCTION ROM LOW	13.68	>	4
SWMANC +4	INTEGRATED SOFTWARE MANUAL	01.30	>	

****

THESE ARE AVAILABLE FROM :
HRS ELECTRONICS PLC, GARRETS GREEN LANE, BIRMINGHAM B33 0UE
TEL 021-789 7575   FAX   021-789 8040   TELEX   339992

ALL PRICES DO NOT INCLUDE VAT.   P&P FREE ON ALL ORDERS OVER £20

P.T.O.

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Hope that the information & programe are of use to the members.

W. D. Brighton.

ADAPTED & ALTERED RASTER DEMO BY DAVID BRIGHTON

```
10 COLOR0,8:COLOR4,1,1:COLOR1,10,1
20 GRAPHIC 1,1:P=1
30 FOR R=0TO90STEP10
40 CIRCLE1,180,100,R:P=-P
50 IF P=1 THEN PAINT 1,180,101-R
60 NEXT R
70 COLOR0,7,2
80 GRAPHIC3:GRAPHIC1
100 COLOR4,3,3:COLOR4,6,4:COLOR4,9,5
120 GOTO80
```

READY.

RASTER DEMO BY MARK EVERINSHAM

```
10 COLOR0,2:COLOR4,1,0:COLOR1,1,0
20 GRAPHIC 1,1:P=1
30 FOR R=0TO90STEP10
40 CIRCLE1,160,100,R:P=-P
50 IF P=1 THEN PAINT 1,160,101-R
60 NEXT R
70 COLOR0,1,0
80 GRAPHIC1:GRAPHIC3
90 GOTO80
```

READY.

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