********** BITS & P.C.S COMPUTER PRODUCTS LTD **********

GEMINI G808 iss 2

2708 2716 EPROM PROGRAMMER

ASSEMBLY INSTRUCTIONS AND CIRCUIT DIAGRAMS

KIT CONTENTS
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Check your kit against the following list and report any shortages to your dealer.

1 of G808 iss. 2 Printed circuit board
1 of assembly listing
1 of cassette tape with operating software
2 of Zero insertion sockets
2 of 4 pole change over switches
2 of 16 pin i/c sockets
1 of 8 pin i/c socket
2 solder posts
1 of i/c 555 (IC 1)
1 of i/c 4049 (IC 2 Observe CMOS precautions)
1 of i/c 4040 (IC 3 Observe CMOS precautions)
1 of 680 ohm resistor [BLUE/GREY/BROWN] (R1)
1 of 560 ohm resistor [GREEN/BLUE/BROWN](R3)
6 of 10K ohm resistor [BROWN/BLACK/ORANGE] (R2,R4,R8,R13, R19,R20,)
1 of 180 ohm resistor [BROWN/GREY/BROWN] (R5)
1 of 47 ohm resistor [YELLOW/PURPLE/BLACK] (R6)
1 of 33K ohm resistor [ORANGE/ORANGE/ORANGE] (R7)
3 of 1K ohm resistor [BROWN/BLACK/RED] (R9,R14,R15)
1 of 820K ohm resistor [GREY/RED/YELLOW] (R10)
1 of 47K ohm resistor [YELLOW/PURPLE/ORANGE] (R11)
4 of 1M ohm resistor [BROWN/BLACK/GREEN] (R12,R16,R17,R18)
8 of 4K7 ohm resistor [YELLOW/PURPLE/RED] (R21,R22,R23,R24, R25,R26,R27,R28)
2 of 22uf Tantalum capacitors (C1,C2)
2 of 2.2uf Tantalum capacitors (C3,C4)
4 of 10N ceramic capacitors (C5,C6,C7,C9)
1 of 47N ceramic capacitor (C10)
2 of 100N ceramic capacitor (C8,C11)
2 of AA119 diode (D1,D2)
2 of 4148 diode (D5,D6)
1 of BZY88C 24V zener diode (D3)
1 of BZY88C 4.7V zener diode (D4)
4 of BC548 transistor (TR3,TR4,TR5,TR6)
1 of BC558 transistor (TR2)
1 of BFY50 transistor (TR1)

Please note that resistor colour codes are shown in square [] brackets and that component numbers are shown in round () brackets.

ASSEMBLY INSTRUCTIONS

With reference to the P.C.B. overlay and the contents list ,assemble your Eprom blower in the following order.

1)The two solder posts
2)All resistors
3)All diodes
4)The i/c sockets
5)All capacitors
6)All transistors (see overlay for orientation)
7)The switches SW1 and SW2
8)Zero insertion sockets
9)I/cs 1,2,and 3 into sockets (see overlay for orientation)

With reference to the overlay and your NASCOM circuit diagrams wire PL1 to your port connections as shown.
NASCOM 2 owners or NASCOM 1 owners with a PIO board can purchase a 26 pin strip line connector and a 26 way ribbon cable with two IDC plugs terminated at either end.Thus eliminating the need for soldering. The only other connections required are the two power supplies -5v and +12v connect these from the Eprom programmer to any convenient place on your system.
Please note that the lines on your computer ports marked ASTB and BSTB will need tying to 0 volts.This can be achieved by connecting PL1 18 to PL1 9 and PL1 11.

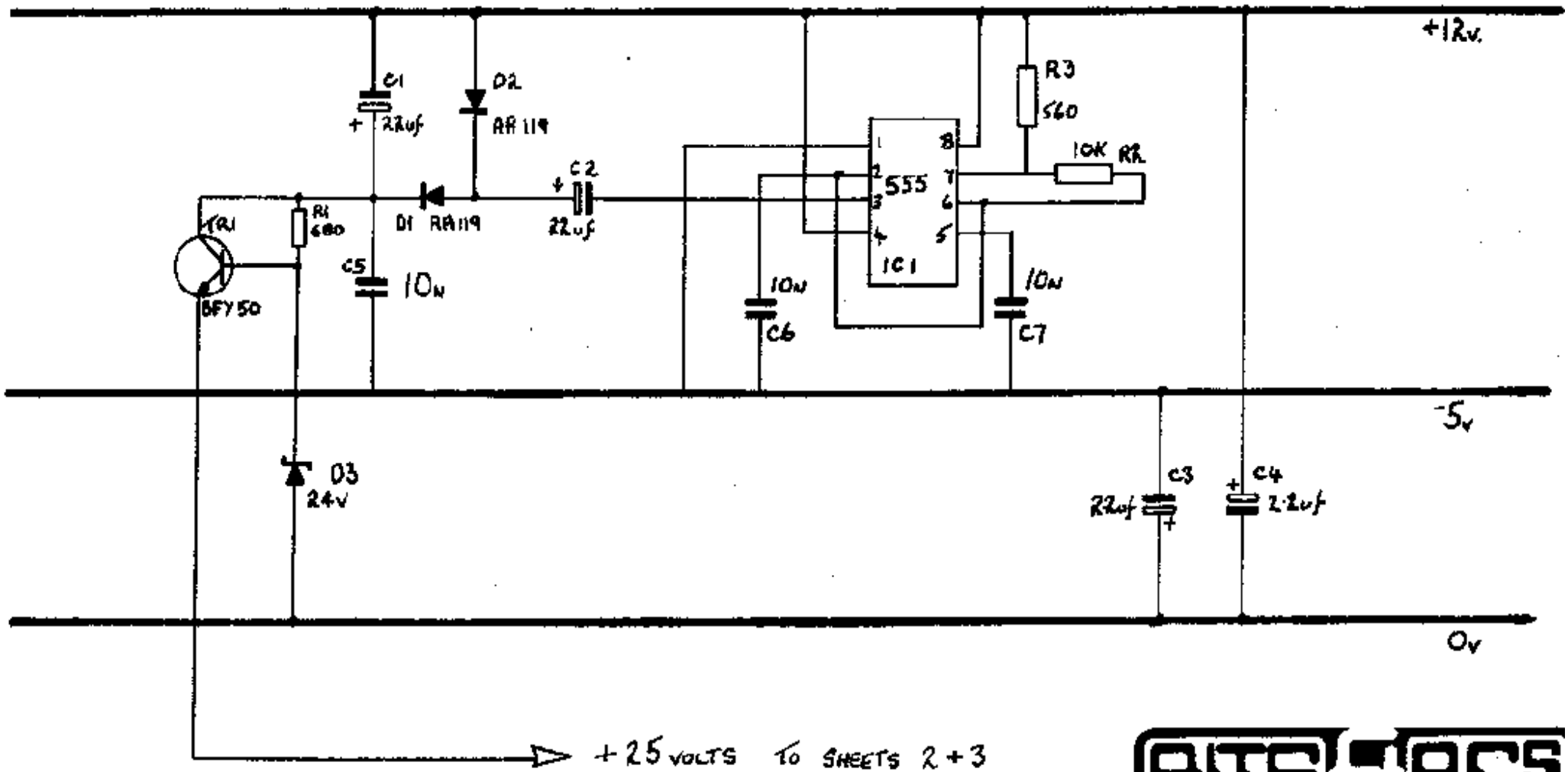
USING THE PROGRAMMER

Having connected the Eprom programmer load the operating software into your NASCOM execute the software at 1000Hex. By reading the assembly listing and the control menu you should now be ready to blow your first eprom.

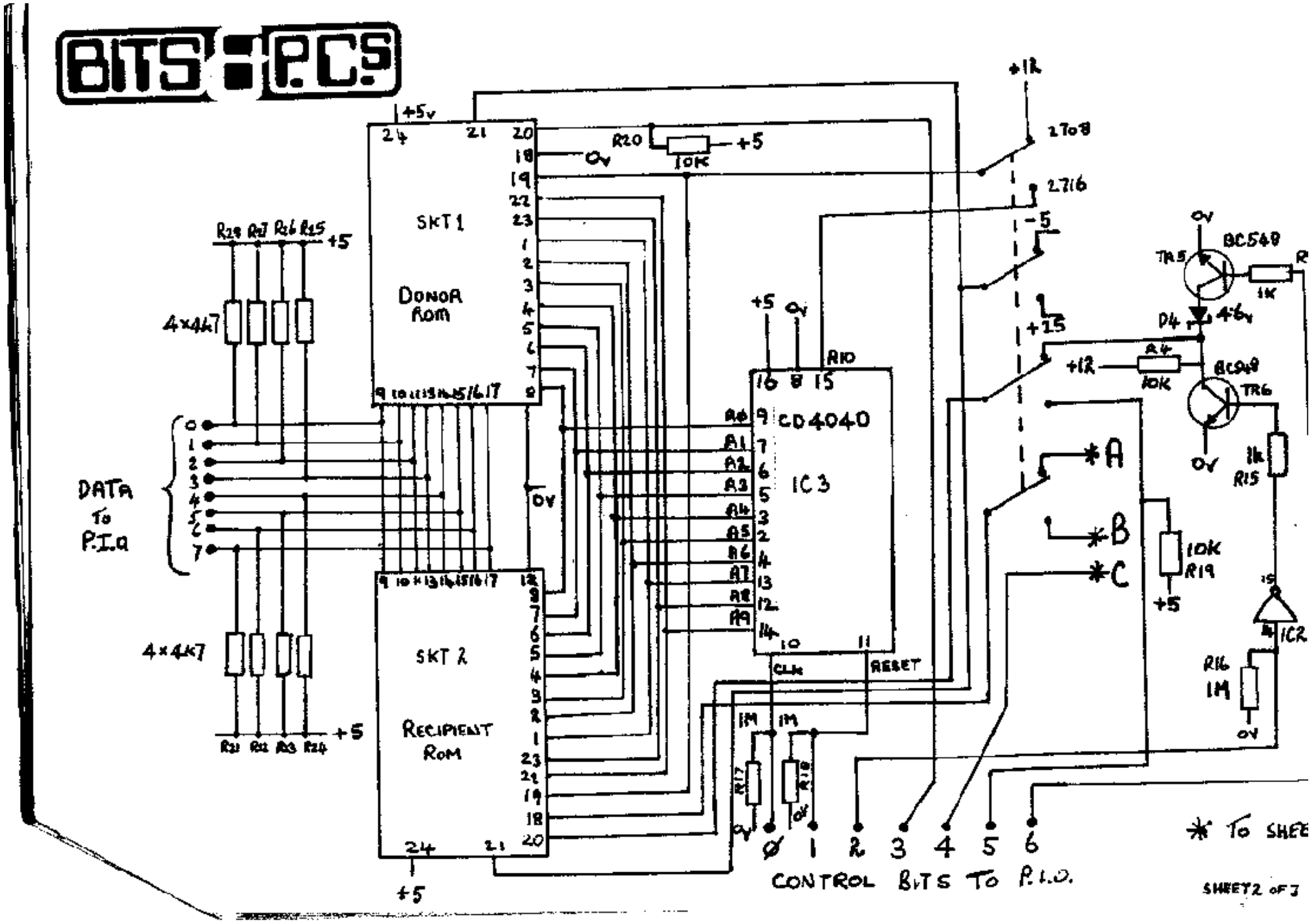
******* HAPPY EPROM BLOWING *******

2708 2716 EPROM PROGRAMMER BSW 160

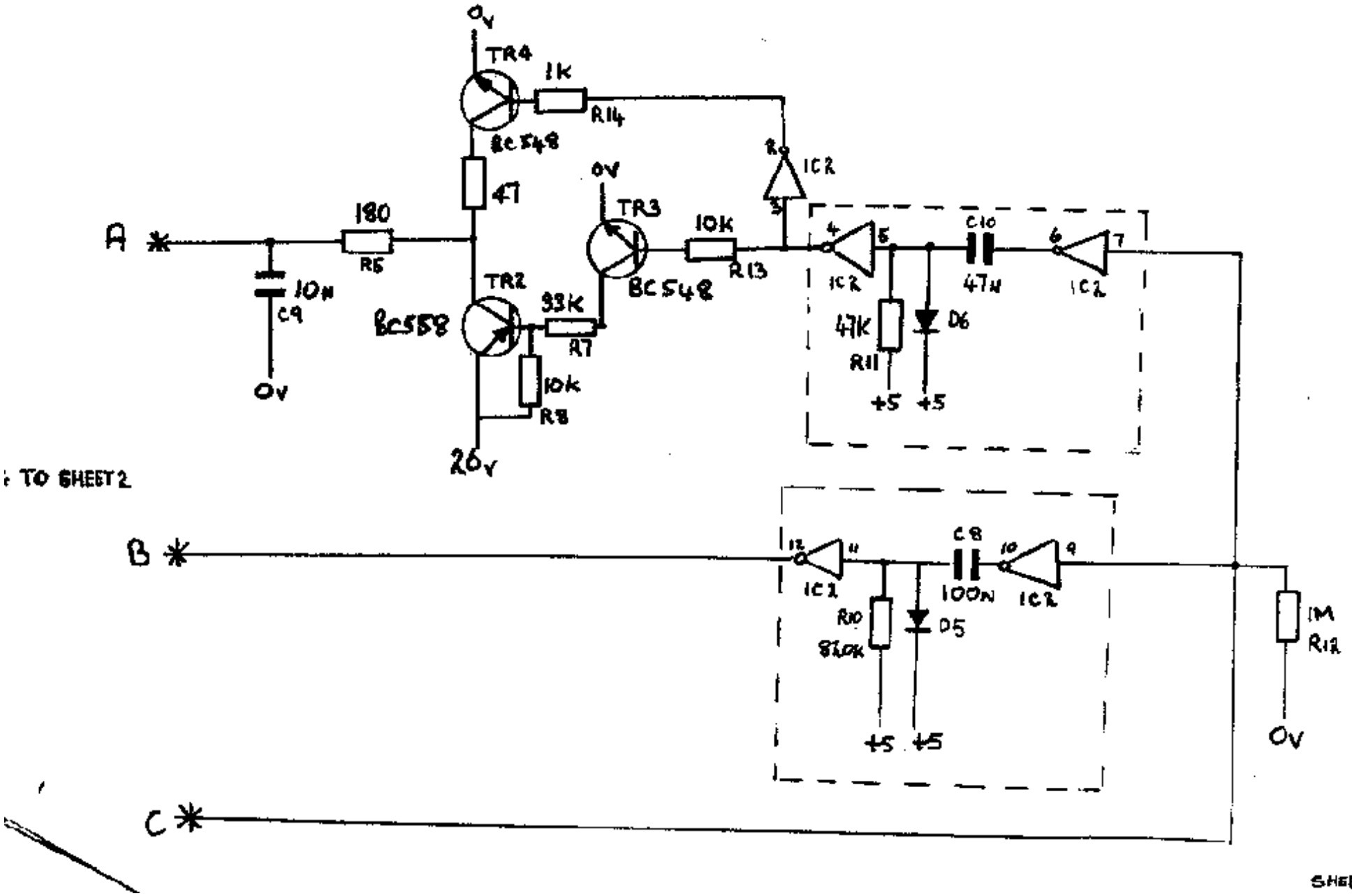
25 VOLT GENERATOR



BITS P.C.s
COMPUTER PRODUCTS LTD


BITS PCs
SKT 1
DONOR ROM
SKT 2
RECIPIENT ROM
CD4040
IC 3
DATA TO P.I.O
4×4K7
4×4K7
R20
10K
+5
0V
+12
2708
2716
-5
+25
BC548
TR5
TR6
1K
10K
1k
R15
10K
R19
1M
R16
IC2
*A
*B
*C
CLK
RESET
CONTROL BITS TO P.I.O.
* TO SHEE
SHEET 2 OF 3

BITS & P.C.S
COMPUTER PRODUCTS LTD



EPROM PROGRAMMER BSW 160

OVERLAY

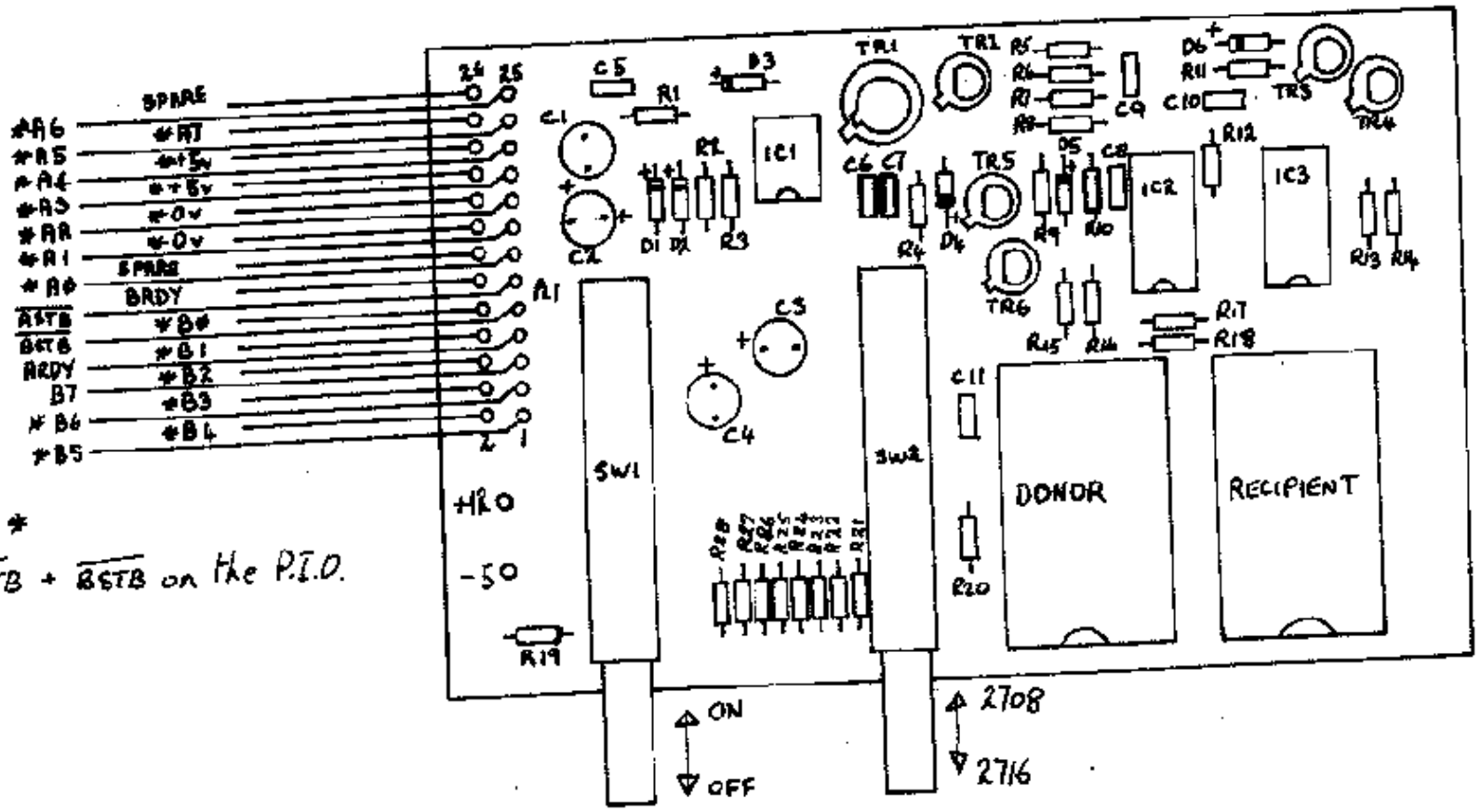
BITS P.C.s
COMPUTER PRODUCTS LTD

THE PORT CONNECTIONS

NASCOM 2 (PL 4) A Ribbon cable could be used directly

NASCOM 1
Make only the connections shown :- *

CONNECT $\overline{ASTB}$ + $\overline{BSTB}$ on the P.I.O. To 0 volts.



ZEAP Z80 Assembler - Source Listing

```
1000                    0010         ORG  £1000
                        0020 ;BITS & P.C.s COMPUTER PRODUCTS LTD
                        0030 ;***** 2708/2716 PROM BLOWER ******
                        0040 ;************ 03:3:81 ***************
                        0050 ;
                        0060 ;****** TEST AND AND DEMO SOFTWARE *******
                        0070 ;ITS A PROM BLOWER SO MAKE THIS ROMABLE
                        0080 ;         ALLOW 1K SO LOTS OF ROOM
                        0090 ;========== DO,s AND DONT,s ==========
                        0100 ;
                        0110 ;ALWAYS CHECK THAT THE ROM TYPE SELECTION
                        0120 ;SWITCH IS SET CORRECTLY
                        0130 ;     I.E. IN FOR 2708 EPROMS
                        0140 ;          OUT FOR 2716 EPROMS
                        0150 ;
                        0160 ;ALWAYS SWITCH OFF THE BLOWER BEFORE
                        0170 ;REMOVING OR INSERTING A ROM
                        0180 ;     I.E. IN FOR ON
                        0190 ;          OUT FOR OFF
                        0200 ;
                        0210 ;OBSERVE MOS HANDLING PRECAUTIONS WITH
                        0220 ;ALL ROMS AND WITH THE BLOWER ITS SELF
                        0230 ;
                        0240 ;EXECUTE THE PROGRAM TAPE FROM 1000H
                        0250 ;THE MENU WILL HELP YOU
                        0260 ;IT CAN ALWAYS BE RETURNED TO BY E1000H
                        0270 ;
                        0280 ;THIS LISTING WAS USED FOR ASSEMBLING YOUR
                        0290 ;TAPE SO IT HAS WORKED
                        0300 ;
                        0310 ;THE PROTOTYPE BLOWER HAS BEEN BLOWING
                        0320 ;OUR ROMS FOR SEVERAL MONTHS
                        0321 ;
1000 0004               0330 ADATA  EQU  £4 ;DATA TO AND FROM COMPUTER
1000 0006               0340 ACTRL  EQU  £6 ;control for data port
1000 0005               0350 BDATA  EQU  £5 ;CONTROL FOR BLOWER
1000 0007               0360 BCTRL  EQU  £7 ;control for control port
                        0370 ;
1000 0C0E               0380 ARG2   EQU  £0C0E
1000 0C10               0390 ARG3   EQU  £0C10
                        0400 ;
                        0410 ;The blower control port is as follows
                        0420 ;BIT 0 ADDRESS COUNTER CLOCK low to clock
1000 0000               0430 ACLOCK EQU  £0
                        0440 ;BIT 1 RESET ADDRESS COUNTER high to reset
                        0450 ;LOW TO ENABLE
1000 0001               0460 RESET  EQU  £1
                        0470 ;BIT 2 READ/PROG. 2708 low to read
1000 0002               0480 RP2708 EQU  £2
                        0490 ;BIT 3 MASTER ROM SELECT low to select
1000 0003               0500 MROM   EQU  £3
                        0510 ;BIT 4 TRIG PROGRAM PULSE high to trigger
1000 0004               0520 TRIG   EQU  £4
                        0530 ;BIT 5 2716 READ/WRITE low to read
1000 0005               0540 RW2716 EQU  £5
                        0550 ;BIT 6 ACTIVATE 2708 DESELECT
                        0560 ;used in conjunction with bit 2
1000 0006               0570 STATE3 EQU  £6
```

```
                0580 ;
                0590 ;BIT 7 spare on this version
                0600 ;
                0610 ;THE DATA PORT IS CONNECTED IN SEQUENCE
                0620 ;E.G. BIT 0 to BIT 0
                0630 ;
                0640 ;INITIALY A CONTROL WORD (CTRLWD)IS SET UP
                0650 ;
1000 0007       0660 TBIT   EQU  7 ;USED IN CTRLWD TO INDICATE
                0670 ;2708 OR 2716 ROM 1=2716 0=2708
                0680 ;
                0690 ;BIT3 IN THE PORT CTRLWD CAN BE USED
                0700 ;TO INDICATE SOURCE FROM RAM OR DONOR
                0710 ;
                0720 ;DISPLAY SCREEN PROMPTS
1000 EF0C00     0730 START1 DEFB £EF £0C £00
1003 EF0D0D0D   0740 START2 DEFB £EF £0D £0D £0D
1007 456E7465   0750        DEFM /Enter options as follows/
     72206F70
     74696F6E
     73206173
     20666F6C
     6C6F7773
101F 0D         0760        DEFB £0D
1020 45786563   0770        DEFM /Execution address prefixed by E
     7574696F
     6E206164
     64726573
     73207072
     65666978
     65642062
     792045
103F 0D         0780        DEFB £0D
1040 526F6D20   0790        DEFM /Rom type 2708 or 2716 /
     74797065
     20323730
     38206F72
     20323731
     3620
1056 0D         0800        DEFB £0D
1057 536F7572   0810        DEFM /Source address or D for Donor /
     63652061
     64647265
     7373206F
     72204420
     666F7220
     446F6E6F
     7220
1075 0D         0820        DEFB £0D
                0830 ;
                0840 ;THREE ARGUMENTS ARE ALWAYS REQUIRED
                0850 ;AFTER EACH OPTION THE BLOWER RETURNS TO
                0860 ;THE NAS-SYS COMMAND MODE.THIS ALOWS THE
                0870 ;REPETION OF THE PREVIOUS BLOWER OPTIONS
                0880 ;BY SIMPLY ENTERING "E".
                0890 ;OR OF COURSE E1000 FOR THE OPTION MENU
                0900 ;ALTERNATIVELY ANY NAS-SYS COMMAND CAN
                0910 ;BE USED. e.g. "M","T","W",ETC.
```

```
                0920 ;
1076 45786563   0930        DEFM /Execution options:/
     7574696F
     6E206F70
     74696F6E
     733A
1088 0D         0940        DEFB £0D
1089 31314535   0950        DEFM /11E5 BLOW A ROM (Fully erased)/
     20424C4F
     57204120
     524F4D20
     2846756C
     6C792065
     72617365
     6429
                0960 ;
                0970 ;THIS ROUTINE  CHECKS THE ROM FOR ERASURE
                0980 ;BLOWS IT AND THEN VERIFIES IT
                0990 ;DATA IS FROM DONOR OR RAM ADDRESS USED
                1000 ;IN THE OPTIONS
                1010 ;
10A7 0D         1020        DEFB £0D
10A8 31333431   1030        DEFM /1341 BLOW A ROM (Not erased)/
     20424C4F
     57204120
     524F4D20
     284E6F74
     20657261
     73656429
                1040 ;
                1050 ;THIS ROUTINE BLOWS A ROM WITHOUT CHECKING
                1060 ;FOR ERASURE AND VERIFIES IT
                1070 ;DATA IS FROM DONOR OR RAM ADDRESS USED
                1080 ;IN THE OPTIONS
                1090 ;
10C4 0D         1100        DEFB £0D
10C5 31324238   1110        DEFM /12B8 VERIFY A ROM/
     20564552
     49465920
     41205246
     4D
                1120 ;
                1130 ;THIS ROUTINE VERIFIES A ROM WITH EITHER
                1140 ;THE DONOR OR RAM DEPENDING UPON THE
                1150 ;OPTIONS USED
                1160 ;IT WILL PRINT OUT ANY LOCATIONS INCLUDING
                1170 ;CONTENTS WHICH HAVE NOT COMPARED
                1180 ;
10D6 0D         1190        DEFB £0D
10D7 31324130   1200        DEFM /12A0 LOAD DATA FROM DONOR TO RAM/
     204C4F41
     44204441
     54412046
     524F4D20
     444F4E4F
     5220544F
     2052414D
                1210 ;
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                1220 ;SIMPLY DUMPS THE DONOR ROM CONTENTS
                1230 ;INTO THE ADDRESS SPECIFIED IN THE OPTIONS
                1240 ;
10F7 0D         1250        DEFB £0D
10F8 31323941   1260        DEFM /129A CHECK FOR FULLY ERASED ROM/
     20434845
     434B2046
     4F522046
     554C4C59
     20455241
     53454420
     524F4D
                1270 ;
                1280 ;CHECKS THAT ALL BITS IN THE ROM ARE SET
1117 0D00DF5B   1290        DEFB £0D £00 £DF £5B
                1300 ;
                1310 ;THIS ROUTINE INPUTS FROM THE DATA PORT
                1320 ;DOES NOT SAVE CTRLWD
                1330 ;CTRLWD PRESET TO SELECT DONOR OR MASTER
                1340 ;
111B 3E7F       1350 INBYTE LD   A £7F
111D D306       1360        OUT  (ACTRL) A      ;SET FOR INPUT
111F 79         1370        LD   A C             ;GET CTRLWD
1120 D305       1380        OUT  (BDATA) A      ;SELECT ROM
1122 DB04       1390        IN   A (ADATA)       ;GET A BYTE
1124 C9         1400        RET
                1410 ;
                1420 ;
                1430 ;ROMCHK THIS ROUTINE CHECKS FOR A VALID
                1440 ;ROM TYPE AND PREPARES THE REGISTERS FOR
                1450 ;THE NUMBER OF CYCLES AND SIZE OF ROM
                1460 ;IT ALSO SETS THE TEST BIT
                1470 ;
1125 ED5B0E0C   1480 ROMCHK LD   DE (ARG2)
1129 3E27       1490        LD   A £27
112B BA         1500        CP   D          ;VERIFY ENTRY
112C 2038       1510        JR   NZ ERROR
112E 3E08       1520        LD   A £08
1130 BB         1530        CP   E          ;CHECK ROM TYPE
1131 2008       1540        JR   NZ ROMT2 ;NOT 2708 BUT IS IT 2716 ?
1133 110004     1550        LD   DE 1024  ;NO OF LOCATIONS IN ROM
1136 79         1560        LD   A C       ;GET CTRLWD
1137 CBBF       1570        RES  TBIT A   ;NOT 2716
1139 4F         1580        LD   C A       ;SAVE CTRLWD
113A C9         1590        RET
113B 3E16       1600 ROMT2  LD   A £16
113D BB         1610        CP   E          ;IS IT 2716 ?
113E 2026       1620        JR   NZ ERROR
1140 110008     1630        LD   DE 2048  ;NO OF LOCATIONS
1143 79         1640        LD   A C       ;GET CTRLWD
1144 CBFF       1650        SET  TBIT A  ;IS 2716
1146 4F         1660        LD   C A       ;SAVE CTRLWD
1147 C9         1670        RET
                1680 ;
                1690 ;PREPARE CONTROL PORT AND CTRLWD
                1700 ;ASSUMES A ROM TO BLOW FROM RAM
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                1710 ;
1148 3E0F       1720 INIT   LD   A £0F
114A D307       1730        OUT  (BCTRL) A ;SET PORT TO OUTPUT
114C 3E6F       1740        LD   A £6F ;X1101111  CTRLWD
114E D305       1750        OUT  (BDATA) A ; INIT PROM BLOWER
1150 CB8F       1760        RES  RESET A
1152 D305       1770        OUT  (BDATA) A ;RESET ADDRESS COUNTER
1154 4F         1780        LD   C A     ;SAVE CTRLWD
1155 C9         1790        RET
                1800 ;
                1810 ;DONROM THIS ROUTINE DETERMINES THE
                1820 ;SOURCE OF DATA TO BE USED i.e. DONOR
                1830 ;OR RAM AND SETS THE CTRLWD
                1840 ;
1156 2A100C     1850 DONRAM LD   HL (ARG3)
1159 3E0D       1860        LD   A £D
115B BD         1870        CP   L
115C 2007       1880        JR   NZ MBRAM   ;MUST BE RAM
115E 79         1890        LD   A C        ;GET CTRLWD
115F CB9F       1900        RES  MROM A    ;TURN DONOR ON
1161 4F         1910        LD   C A        ;SAVE CTRLWD
1162 210000     1920        LD   HL 0000
1165 C9         1930 MBRAM  RET
1166 EF0C       1940 ERROR  DEFB £EF £0C
1168 2A2A2A20   1950        DEFM /*** OPTIONS INCORRECT ***/
     4F505449
     4F4E5320
     494E434F
     52524543
     54202A2A
     2A
1181 00         1960        DEFB £00
1182 C30310     1970        JP   START2
                1980 ;
                1990 ;THIS ROUTINE INCREMENTS THE ADDRESS
                2000 ;COUNTER AND DEC DE READY FOR TESTING
                2010 ;ALSO INC HL FOR NEXT BYTE
                2020 ;
1185 79         2030 INCADD LD   A C ;GET CTRLWD
1186 CB87       2040        RES  ACLOCK A
1188 D305       2050        OUT  (BDATA) A ;INCREMENT COUNTER
118A 00         2060        NOP
118B CBC7       2070        SET  ACLOCK A
118D D305       2080        OUT  (BDATA) A ;COMPLETE CLOCK PULSE
118F 4F         2090        LD   C A        ;SAVE CTRLWD
1190 23         2100        INC  HL       ;NEXT BYTE
1191 1B         2110 DECDE  DEC  DE ;USED FOR DELAYS AND LOOPS
1192 7A         2120        LD   A D
1193 B3         2130        OR   E        ;SET FLAG IF ZERO
1194 C9         2140        RET  ;TEST FLAG IN MAIN ROUTINE
                2150 ;
                2160 ;
1195 EF0D0D     2170 FINISH DEFB £EF £0D £0D
1198 454E5445   2180        DEFM /ENTER "E" FOR SAME OPTIONS/
     52202245
     2220464F
     52205341
     4D45204F
     5054494F
     4E53
```

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11B2 0D          2190          DEFB £0D
11B3 4F522045    2200          DEFM /OR E1000 TO RETURN TO START/
     31303030
     20544F20
     52455455
     524E2054
     4F205354
     415254
11CE 0D0D00DF    2210          DEFB £0D £0D 00 £DF £5B
     5B
                 2220 ;
                 2230 ;ROUTINE TO OUTPUT REGISTER CONTENTS IN
                 2240 ;HEX AND TO INDICATE THAT THE PROG. IS
                 2250 ;RUNNING
                 2260 ;
11D3 78          2270 PNTHEX LD   A B
11D4 3D          2280        DEC  A
11D5 DF68        2290        DEFB £DF £68
11D7 3E07        2300        LD   A 7
11D9 85          2310        ADD  A L
11DA 6F          2320        LD   L A
11DB 22290C      2330        LD   (£0C29) HL
11DE 7A          2340        LD   A D
11DF DF68        2350        DEFB £DF £68
11E1 7B          2360        LD   A E
11E2 DF68        2370        DEFB £DF £68
11E4 C9          2380        RET
11E5 CD7B12      2390 ROMBLO CALL ALSET1 ;VERIFY ROM ERASED
11E8 214713      2400 BLO    LD   HL MES1
11EB CD8313      2410        CALL TLINE
11EE 79          2420        LD   A C          ;GET CTRLWD
11EF CB7F        2430        BIT  TBIT A ;TEST FOR ROM TYPE
11F1 C2F811      2440        JP   NZ CYCL16
11F4 0664        2450        LD   B 100   ;2708 CYCLES
11F6 1802        2460        JR   ROMBL4
11F8 0602        2470 CYCL16 LD   B 2    ;2716 CYCLES
11FA CD4811      2480 ROMBL4 CALL INIT
11FD CD2511      2490        CALL ROMCHK
1200 CD5611      2500        CALL DONRAM
1203 79          2510        LD   A C       ;GET CTRLWD
1204 CBB7        2520        RES  STATE3 A  ;2708 INTO PROG MODE
1206 4F          2530        LD   C A         ;SAVE CTRLWD
1207 CB5F        2540        BIT  MROM A  ;RAM OR DONOR
1209 C41012      2550        CALL NZ ROMBL1
120C 3E7F        2560        LD   A £7F    ;TO SET PORT FOR INPUT
                 2570 ;IN THIS MODE IT WILL NOT EFFECT THE
                 2580 ;DATA BUS ON THE PROM BLOWER
                 2590 ;SLAVE IN PROGRAM MODE FROM INIT
                 2600 ;
120E 1802        2610        JR   ROMBL2
1210 3E0F        2620 ROMBL1 LD   A £0F  ;TO SET PORT TO OUTPUT
1212 D306        2630 ROMBL2 OUT  (ACTRL) A ;SET TO CHOSEN MODE
1214 79          2640        LD   A C          ;GET CTRL
1215 D305        2650        OUT  (BDATA) A   ;OUT CTRLWD
1217 7E          2660 ROMBL3 LD   A (HL) ;DATA TO A FROM RAM
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1218 D304      2670          OUT   (ADATA) A    ;SEND DATA TO PORT
121A 79        2680          LD    A C           ;RESTORE CTRLWD
121B CBE7      2690          SET   TRIG A
121D D305      2700          OUT   (BDATA) A    ;TRIG PULSE
121F D5        2710          PUSH  DE
1220 54        2720          LD    D H
1221 5D        2730          LD    E L
1222 E5        2740          PUSH  HL
1223 211B08    2750          LD    HL £081B
1226 22290C    2760          LD    (£0C29) HL
1229 CDD311    2770          CALL  PNTHEX
122C E1        2780          POP   HL
122D D1        2790          POP   DE
122E 79        2800          LD    A C           ;GET CTRLWD
122F D5        2810          PUSH  DE          ;SAVE LOCATION COUNT
1230 CB7F      2820          BIT   TBIT A          ;2708 OR 2716
1232 CA3E12    2830          JP    Z NODEL
1235 115505    2840          LD    DE £0555   ;DELAY FOR 2716 PROG.PULSE
               2850 ;
               2860 ;THE BITS AND P.C.s PROM BLOWER NORMALLY
               2870 ;WORKS @ 4MHZ FOR 2MHZ WORKING LD DE £0333
               2880 ;
1238 CD9111    2890 GODEL    CALL  DECDE ;WAIT FOR DELAY TIME
123B C23812    2900          JP    NZ GODEL
123E D1        2910 NODEL    POP   DE
123F 79        2920          LD    A C     ;TRIG OFF FROM INIT
1240 D305      2930          OUT   (BDATA) A    ;TRIG OFF
1242 CD8511    2940          CALL  INCADD      ;INC ADDRESS COUNT AND HL
1245 20D0      2950          JR    NZ ROMEL3      ;GO AGAIN IF NOT END
1247 05        2960          DEC   B             ;CHECK FOR LAST CYCLE
1248 C2FA11    2970          JP    NZ ROMEL4     ;RESET AND GO AGAIN
124B 000000EF  2980          DEFB  00 00 00   £EF £0C
     0C
1250 57414954  2990          DEFM  /WAITING 4 Secs                    /
     494E4720
     34205365
     63732020
     20202020
     20202020
     20202020
     202020
126F 00        3000          DEFB  £00
               3010 ;
1270 DF5DDF5D  3020          DEFB  £DF £5D £DF £5D   ;WAIT 2 SECS
1274 DF5DDF5D  3030          DEFB  £DF £5D £DF £5D   ;WAIT 2 SECS
               3040 ;ERRORS WILL OCCUR WHEN VERIFYING EPROMS
               3050 ;WHICH HAVE NOT BEEN ALLOWED TO COOL
               3060 ;THIS DELAY SHOULD BE HALVED FOR 2MHZ
               3070 ;i.e. REPLACE 2 DELAYS WITH NOPS
               3080 ;******BITS AND P.C.S*********
               3090 ;
1278 CDB812    3100          CALL  VERIF1
127B EF0C00    3110 ALSET1   DEFB  £EF £0C £00
127E CD4811    3120          CALL  INIT
1281 CD2511    3130          CALL  ROMCHK    ;GET ROM SIZE
1284 79        3140          LD    A C      ;GET CTRLWD
1285 CB97      3150          RES   RP2708 A      ;*
1287 CBF7      3160          SET   STATE3 A      ;* SET RECIPIENT TO READ
1289 CBAF      3170          RES   RW2716 A      ;*
128B 4F        3180          LD    C A           ;SAVE CTRLWD
128C CD1B11    3190 ALSET2   CALL  INBYTE    ;GET A BYTE
```

```
128F FEFF     3200         CP   £FF          ;TEST FOR ALL BITS SET
1291 C2FF12   3210         JP   NZ ERROR1
1294 CD8511   3220         CALL INCADD
1297 20F3     3230         JR   NZ ALSET2  ;GET NEXT BYTE
1299 C9       3240         RET
129A CD7B12   3250 ERASE   CALL ALSET1
129D C39511   3260         JP   FINISH
12A0 CD4811   3270 INPUT   CALL INIT
12A3 CD2511   3280         CALL ROMCHK
12A6 2A100C   3290         LD   HL (ARG3)
12A9 CB9F     3300         RES  MROM A
12AB 4F       3310         LD   C A
12AC CD1B11   3320 INPUT2  CALL INBYTE
12AF 77       3330         LD   (HL) A
12B0 CD8511   3340         CALL INCADD
12B3 20F7     3350         JR   NZ INPUT2
12B5 C39511   3360         JP   FINISH
12B8 216513   3370 VERIF1  LD   HL MES2
12BB CD8313   3380         CALL TLINE
12BE CD4811   3390 VERIFY  CALL INIT
12C1 CD2511   3400         CALL ROMCHK
12C4 CD5611   3410         CALL DONRAM
12C7 D5       3420 V1      PUSH DE
12C8 79       3430         LD   A C
12C9 5F       3440         LD   E A
12CA CB97     3450         RES  RP2708 A ;*
12CC CBF7     3460         SET  STATE3 A ;* SET RECIPIENT TO READ
12CE CBAF     3470         RES  RW2716 A ;*
12D0 CBDF     3480         SET  MROM A   ;DONOR DESELECTED
12D2 4F       3490         LD   C A       ;SAVE CTRLWD
12D3 CD1B11   3500         CALL INBYTE  ;GET BYTE FROM RECIPIENT
12D6 57       3510         LD   D A       ;SAVE BYTE FROM RECIPIENT
12D7 7B       3520         LD   A E
12D8 CB5F     3530         BIT  MROM A   ;DATA FROM ROM OR RAM
12DA 200E     3540         JR   NZ VRAM
12DC CBEF     3550         SET  RW2716 A ;*
12DE CBD7     3560         SET  RP2708 A ;* DESELECT RECIPIENT ROM
12E0 CBF7     3570         SET  STATE3 A ;*
12E2 CB9F     3580         RES  MROM A   ;SELECT DONOR
12E4 4F       3590         LD   C A       ;SAVE CTRLWD
12E5 CD1B11   3600         CALL INBYTE  ;GET A BYTE FROM DONOR
12E8 1801     3610         JR   V2
12EA 7E       3620 VRAM    LD   A (HL);GET A BYTE FROM RAM
12EB BA       3630 V2      CP   D       ;ARE BOTH BYTES THE SAME
12EC C41A13   3640         CALL NZ ERROR2
12EF D1       3650         POP  DE
12F0 CD8511   3660         CALL INCADD
12F3 20D2     3670         JR   NZ V1     ;GET NEXT BYTE
12F5 C39511   3680         JP   FINISH
12F8 21CA0B   3690 CURPOS  LD   HL £0BCA
12FB 22290C   3700         LD   (£0C29) HL
12FE C9       3710         RET
12FF EF0C     3720 ERROR1  DEFB £EF £0C
```

```
1301 202A2A20 3730         DEFM / ** ROM NOT ERASED **/
     524F4D20
     4E4F5420
     45524153
     4544202A
     2A
1316 00       3740         DEFB 00
1317 C39511   3750         JP   FINISH
131A 47       3760 ERROR2  LD   B A     ;SAVE A
131B 04       3770         INC  B
131C E5       3780         PUSH HL
131D D5       3790         PUSH DE
131E 54       3800         LD   D H
131F 5D       3810         LD   E L
1320 EF0D     3820         DEFB £EF £0D
1322 4552524F 3830         DEFM /ERROR   @    /
     52202040
     202020
132D 00       3840         DEFB 00
132E 2A290C   3850         LD   HL (£0C29)
1331 CDD311   3860         CALL PNTHEX
1334 3E08     3870         LD   A 8
1336 85       3880         ADD  A L
1337 6F       3890         LD   L A
1338 22290C   3900         LD   (£0C29) HL
133B D1       3910         POP  DE
133C 7A       3920         LD   A D
133D DF68     3930         DEFB £DF £68
133F E1       3940         POP  HL
1340 C9       3950         RET
1341 CD2511   3960 FBLOW   CALL ROMCHK
1344 C3E811   3970         JP   BLO
1347 2A2A2A20 3980 MES1    DEFM /*** BLOWING *** LOOP  LOCATION/
     424C4F57
     494E4720
     2A2A2A20
     4C4F4F50
     20204C4F
     43415449
     4F4E
1365 2A2A2A20 3990 MES2    DEFM /*** VERIFYING ***             /
     56455249
     4659494E
     47202A2A
     2A202020
     20202020
     20202020
     2020
               4000 ;
               4010 ;TLINE WRITES TO THE TOP LINE OF THE
               4020 ;SCREEN
1383 C5       4030 TLINE   PUSH BC
1384 EF0C00   4040         DEFB £EF £0C £00
1387 11CA0B   4050         LD   DE £0BCA
138A 011E00   4060         LD   BC 30
138D EDB0     4070         LDIR
138F C1       4080         POP  BC
1390 C9       4090         RET
```