SCREEN ENHANCEMENT KIT

for UK101 and OHIO Personal Computers

CAUTION

This kit is very complicated and should not be attempted unless you are an experienced constructor. The PCB is double-sided, plated through and in places high density. It could easily be damaged by poor soldering. If, after reading through these construction notes, you feel that you are not capable of successfully constructing this kit, please return it to PREMIER, enclosing the balance of the 'built' charge, plus £2.50 postage and packing.

If you build the kit and are unable to get it working, PREMIER will repair it under our normal repair service rules - a cheque for £35.00 must be enclosed. In the event of very poor construction, PREMIER reserve the right to refuse a repair.

SEK COMPONENT LIST

INTEGRATED CIRCUITS   designated 'V' on diagrams

V1	=	74LS86	V9	=	74LS04
V2	=	7400	V10	=	74LS157
V3	=	74LS08	V11	=	74LS04
V4	=	74LS00	V12	=	74LS04
V5	=	7400	V13	=	74LS74
V6	=	74LS123	V14	=	74LS174
V7	=	CHARGEN	V15	=	74LS93
V8	=	74LS133	V16	=	74LS161/3*

V17	=	74LS161/3*
V18	=	74LS161/3*
V19	=	74LS161/3
V20	=	74LS161/3
V21	=	74LS165*
V22	=	74LS138*
V23	=	74LS157*
V24	=	74LS123

V25	=	74LS157*
V26	=	74LS157*
V27	=	74LS157
V28	=	2114
V29	=	74LS157
V30	=	74LS157
V31	=	74LS157
V32	=	2114

* = removed from main board and used on SEK.
V = I.C numbers. (V is used to avoid confusion with main computer PCB)
V2 and V5 must be 7400, NOT 74LS00 for the SEK to function correctly.

RESISTORS designated 'R' on diagrams

R1=470ohm $	R4 = 470ohm	R7 = 4K7	R10 = 1K
R2 = 470ohm $	R5 = 4K7	R8 = 4K7	R11 = 3K3
R3 = 470ohm	R6 = 27K $	R9 = 180ohm	R12 = 4K7
RV1 = 5K pot	$ denotes SUPERBOARD only.		

CAPACITORS   designated 'C' on diagrams

C0 = 27pf $	C5 = .01 disc	C10 = 820pf	C15 = .01 disc
C1 = 27pf	C6 = .01 disc	C11 = .01 disc	C16 = 27pf
C2 = .01 disc	C7 = .01 disc	C12 = .01 disc	C17 = 10n
C3 = .01 disc	C8 = .22u $	C13 = .01 disc	C18 = 47u elec
C4 = .01 disc	C9 = 2.2n tant	C14 = .01 disc	$ SUPERBOARD only

XTALS   designated X on diagrams

X1 = 8mhz (SUPERBOARD only)   X2 = 12mhz

OTHER COMPONENTS

5 x 16 pin header cables (assembled)
1 x 16 pin crossover plug
1 x 24 pin crossover plug
1 x S E K Printed Circuit Board
10 x 14 pin I.C. sockets
19 x 16 pin I.C. sockets
2 x 18 pin I.C. sockets
1 x 24 pin I.C. sockets
Link Wires

C O N S T R U C T I O N

Before constructing this kit, please read the 'CAUTION' notice !
        The supplied PCB is a top quality through-hole plated device with fine trackwork.
You will need a fine-tipped soldering iron (15watt approx) and good quality solder.

1/   Insert the 32 I.C. sockets in place ensuring correct orientation. When all are fitted,
solder them in place.

2/   Refer to the three links on the board (LK1, LK2 and LK3).
        LK1 should be left alone unless you have a character generator in EPROM
(unlikely), in which case the link between points 1 and 2 should be cut and points 1 and 3
joined instead.

        LK2 - UK101 - no change.
                SUPERBOARD - cut the track which joins points 1 to 2, then connect 1
to 3.

        LK3 - UK101 - no change.
                SUPERBOARD - cut link 1 to 2 then link points 1 to 3.

3/   Insert the resistors and solder into place.

4/   Insert the crystal(s) and solder into place. Do not overheat - use pliers as a heat sink.

5/   Insert and solder the capacitors. Ensure correct orientation of C9 and C18.

6/   Insert and solder the variable resistor. Screw it to mid-position.

7/   Check for solder bridges and correct component placing.

8/   Insert the supplied I.C.'s into their sockets. Remove IC's 20, 30(not S/B), 41, 42, 53,
54, 55, 60 and 61 from the main board and place them in their relevant sockets on the
SEK P.C.B.
SUPERBOARD owners only - some of these I.C's are NOT socketed - if you destroy them
on removal, PREMIER can provide a supplementary kit - ring for details. Sockets MUST be
put into the board where the I.C.'s are removed as some of these sockets are used by the
header jumper plugs.

9/   Carefully strip about 5mm of insulation off the end of each wire on each of the five
headers. Locate pin one of each header and follow the wire from the plug to the open end.
Solder each header plug into the correct location as shown on the main diagram.   Take
care to identify pin one on the header - do NOT rely on the numbering on the plug or
striping on the cable - these vary according to supplier! TAKE GREAT CARE when
soldering as the pads are very close in these areas.

10/   Build the two Crossover Plugs as shown below.

On the 24 pin crossover plug (goes into U41), connect pins

UK 101	SUPERBOARD
5 to 9	5 to 17
4 to 10	4 to 16
3 to 11	3 to 15
2 to 13	2 to 14
1 to 14	1 to 13
23 to 15	23 to 11
22 to 16	22 to 10
19 to 17	19 to 9

8 to 16
12 to 12

Insert the 16 pin crossover into main-board IC30 (UK 101 only) and the 24pin crossover into IC41.

11/ Insert the Header Jumper (HJ) plugs as follows:-

Header Jumper	1	plugs into IC20
Header Jumper	2	plugs into IC42
Header Jumper	3	plugs into IC53
Header Jumper	4	plugs into IC54
Header Jumper	5	plugs into IC55

12/ Lift out IC56 (SN7420), bend out pin 2 and re-insert into same socket.
SUPERBOARD Only - if the I.C is not socketed, carefully cut the leg on pin 2.
        If at any time you remove the SEK and revert to normal display, your computer
will work quite normally without pin 2 connected.

13/ OPTIONAL additional modification. On initial power-up, the computer will always display 64 x 32. It will then stay as poked, even when RESET/BREAK is pressed. If you would like your display to revert to 64 x 32 every time you press RESET/BREAK, carry out the following:-

        Locate IC8 pin 40 (the 6502). Connect it to IC55 pin 13 (empty) on the main board (IC55 was removed to SEK).

14/ SUPERBOARD ONLY - Now refer to the enclosed ADDITIONAL MODIFICATIONS sheet and make all the relevant changes.

15/ Having plugged in all header cables, crossovers, and double-checked for correct orientation, turn on the computer and enter BASIC via the normal cold start. Your screen should be displaying 64 x 32. The cursor could be anywhere, depending upon which CEGMON is resident! POKE 56960,128 and the screen should instantly alter to 64 x 32 inverse. Now adjust RV1 to centralise the white square on your TV/VDU. Note that the 64 x 32 format leaves a small margin down each side of the screen. This should enable any TV/VDU to display it successfully.

S E K   S C R E E N   F O R M A T S

The software switch is at DE80hex, 56960decimal. It is a write only location.

NORMAL	INVERTED	FORMAT
0 or 1	128 or 129	32 x 64
2 or 3	130 or 131	32 x 48
4	132	32 x 32 top
5	133	32 x 32 bottom
6	134	32 x 24 top
7	135	32 x 24 bottom
8	136	16 x 64 top
9	137	16 x 64 bottom
10	138	16 x 48 top
11	139	16 x 48 bottom
12-15	140-143	Illegal !

If, while using the SEK, you are left with a blank screen with no cursor, try resetting. If this does not give the CEGMON call up message, you are probably in a 'bottom screen' format or you are too far over to the right to see either the cursor or the call up message. The easiest way out of this is to enter the monitor (blind !) and type DE 80, then press key 0 until something appears on screen.
        CEGMON X is strongly recommended for use with the SEK - either as an upgrade or direct purchase. As well as powering up to 32x64, it also allows 16 hex locations per line to be displayed when using 'T' in the monitor.

FAULT FINDING

By far the most common mistake found with SEKs repaired up to now has been the header plugs orientation. If your SEK fails to work, we would strongly suggest that you check that all the header plugs have been soldered in the right way round and that pin one is where it should be! Do NOT believe coloured stripes on the ribbon or numbers on the plug - CHECK meticulously!

Other faults found have mainly consisted of solder-bridges and incorrect main-board mods (OHIO only).

SUPERBOARD 24 x 24 Additional Modifications

The following additional modifications should now be carried out. For SUPERBOARD I.C. numbers (designated 'U'), refer to the manuals supplied with your computer.

1/ On the S.E.K PCB link pin 14 of V20 to pin 12 of HJ5 (pads have been provided)
2/ On the main computer board wire pin 12 of U55 to pin 13 of U56. Now remove U65, bend out pin 9 and replace. Solder a jumper wire to this pin , and link it to pin 11 of U60.
3/ Find U59 on the main board, component side up. From pin 11, a track travels towards the back of the board. Cut it before it reaches the plated through hole.
4/ Find U56 on the main board, component side up. Travelling south, towards the keyboard, from under this I.C. are several tracks, cut the left hand track before it reaches the plated through hole.
5/ Change the CHAR-GEN links as per the diagram.

SUPERBOARD THREE Additional Modifications.

1/ As per No 1 above.
2/ Main board component side up and the keyboard towards you, find U59 pin 11. Cut the track leaving to the left before it reaches the plated through hole.
3/ Several tracks emerge from under new U54 socket, and travel towads the keyboard. Cut the leftmost track before it reaches the plated through hole.
4/ Find U56 pin 2. A track leaves to the right. Cut this track between the first two plated through holes. Also cut the leftmost track emerging from this I.C. and travelling towards the keyboard.
5/ Turn over the main board. Find U55 pin 12 and link it to pins 13 and 10 of U56.
6/ Find U56 pin 10. Cut the short track leading to the plated through hole before it gets there.
7/ Remove U65, bend out pin 9, reinsert the I.C. and link pin 9 to U54 pin 6 under the main board.
8/ Change the CHAR-GEN links as per the diaram.

CHAR-GEN LINKS FOR SUPERBOARD 24 x 24 and SUPERBOARD THREE.

Cut links A-1,B-2,C-3,D-4,E-5,F-6,G-7,H-8. (on the SEK)
LINK A-4,B-3,C-2,d-1,E-8,F-7,G-6,H-5. (on the SEK)

Screen Enhancement Kit Software

The following programs enables you to access all twenty screen formats by two keystrokes

```
10 REM * Screen Enhancement Kit Software Aid
20 REM * <C>1982 Premier Publications
30 GOSUB350
40 PRINTCHR$(26):PRINT"SCREEN ENHANCEMENT AID
50 PRINT"Formats available are:-":PRINT
60 PRINT"A....32 X 64
70 PRINT"B....32 X 48
80 PRINT"C....32 X 32   (TOP)
90 PRINT"D....32 X 32   (BOTTOM)
100 PRINT"E....32 X 24   (TOP)
110 PRINT"F....32 X 24   (BOTTOM)
120 PRINT"G....16 X 64   (TOP)
130 PRINT"H....16 X 64   (BOTTOM)
140 PRINT"I....16 X 48   (TOP)
150 PRINT"J....16 X 48   (BOTTOM)
160 PRINT"Choose your format (keys A - J)";
170 GOSUB360:PRINTCHR$(26):KE=K:IFK-64<0ORK-64>10THEN40
180 PRINT:PRINT:PRINT"Press    <N>  for normal screen
190 PRINT:PRINTTAB(9)"<I>  for Inverse screen
200 GOSUB360:IFK<>78ANDK<>73THEN200
210 V=0:IFK=73THENV=128
220 ONKE-64GOSUB240,250,260,270,280,290,300,310,320,340
230 RUN
240 POKEA,63:POKEB,0:POKEC,208:POKED,192:POKEE,215:POKESC,V+0:RETURN
250 POKEA,47:POKEB,12:POKEC,208:POKED,192:POKEE,215:POKESC,V+2:RETURN
260 POKEA,31:POKEB,96:POKEC,208:POKED,96:POKEE,211:POKESC,V+4:RETURN
270 POKEA,31:POKEB,32:POKEC,212:POKED,224:POKEE,215:POKESC,V+5:RETURN
280 POKEA,23:POKEB,101:POKEC,208:POKED,101:POKEE,211:POKESC,V+6:RETURN
290 POKEA,23:POKEB,37:POKEC,212:POKED,229:POKEE,215:POKESC,V+7:RETURN
300 POKEA,63:POKEB,0:POKEC,208:POKED,192:POKEE,211:POKESC,V+8:RETURN
310 POKEA,63:POKEB,0:POKEC,212:POKED,192:POKEE,215:POKESC,V+9:RETURN
320 POKEA,47:POKEB,12:POKEC,208:POKED,204:POKEE,211:POKESC,V+10
320 RETURN
330 POKEA,47:POKEB,12:POKEC,212:POKED,204:POKEE,215:  POKESC,V+11:RETURN
350 SC=56960:A=546:B=547:C=548:D=549:E=550:RETURN
360 POKE11,0:POKE12,253:X=USR(X):K=PEEK(531):RETURN
```

NOTES

Locations 546-550 are CEGMON screen handler values. See CEGMON book, Page 3. Always POKE546 (width) with WIDTH -1.

The above routines are set up for a UK101. Some OHIO machines may require the valu if B and D to be decremented by 12 to centralise the display - it depends which CEGMON you originally fitted.

Lines 240 to 330 define the screen scroll area for the various formats. Format A is on line 240, B is on 250 and so on. The variable SC is the SEK software switch, and V decides whether the screen is normal or inverse. Line 360 is the usual halting getkey routine.

If you POKE the wrong format for the screen layout chosen, you will in all probability lose the cursor! To recover from this , either type blind POKE56960,0, or enter the monitor and type DE80 then 00.
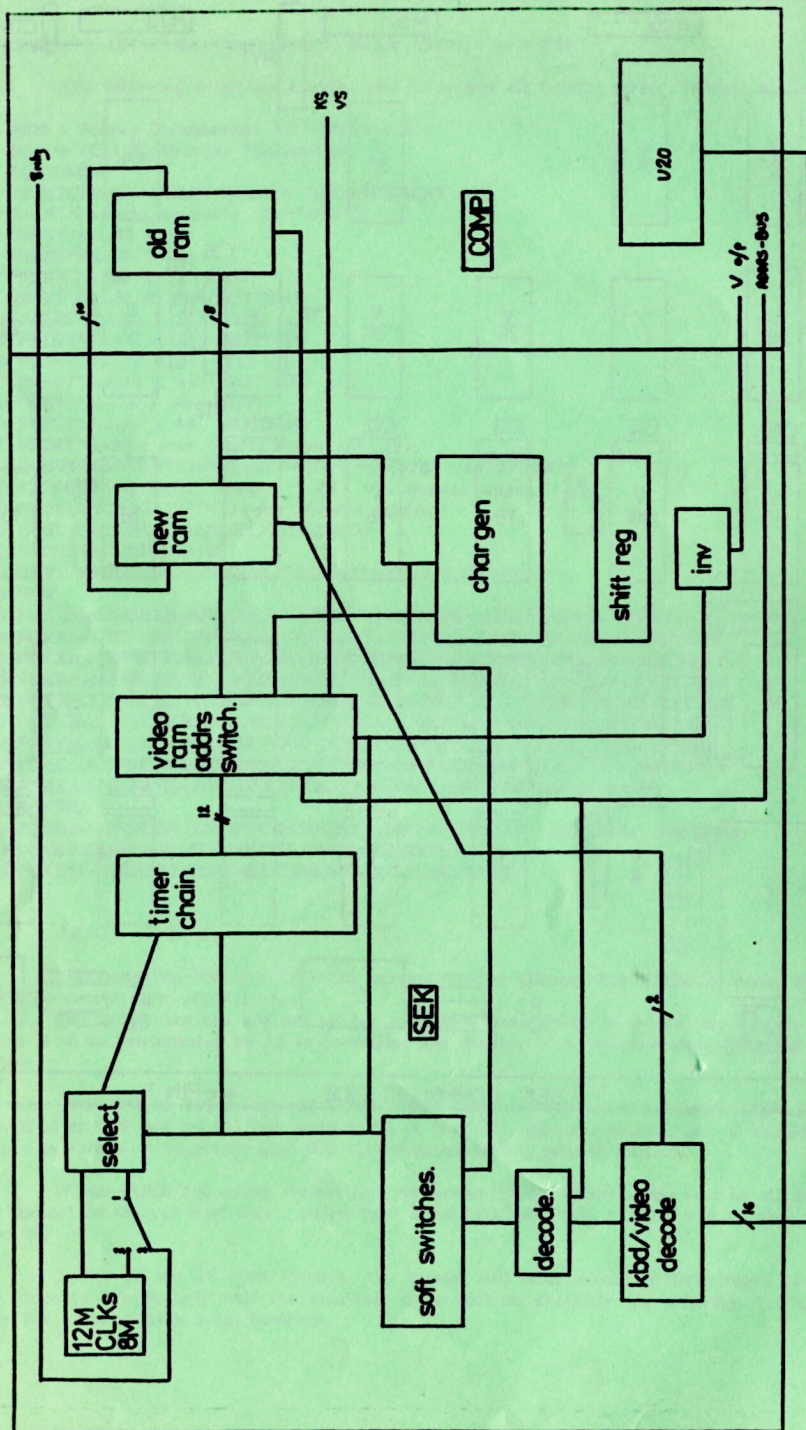
In the 32 and 24 wide formats, the screen will still scroll in sixty-fours (even if you set the width to 32), so only half the available lines will be available for printing. You can still POKE over the whole display area, however.
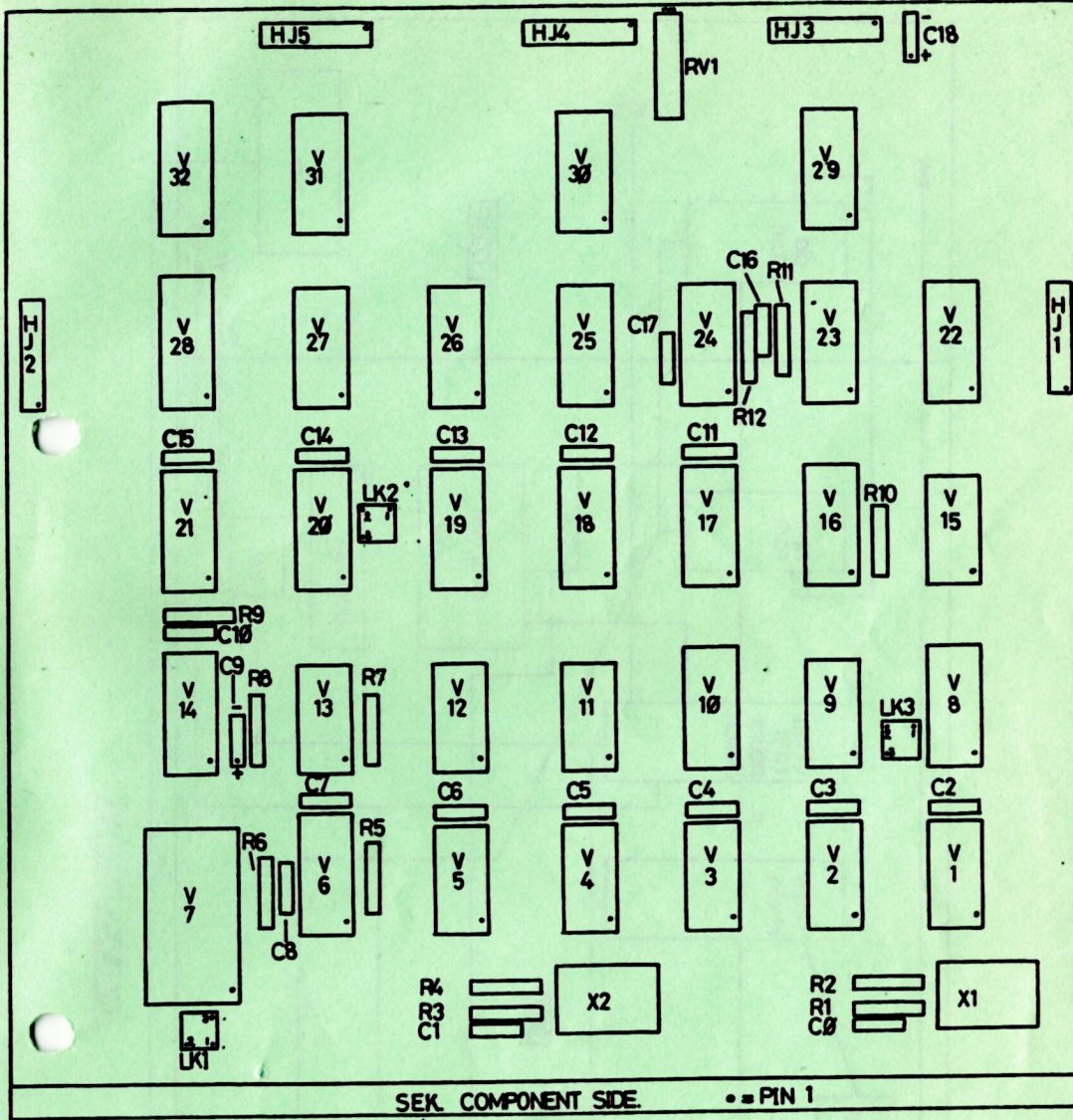
SEK. COMPONENT SIDE.   • ∎ PIN 1

SEK BLOCK DIAGRAM.