# PINEAPPLE SOFTWARE

## PCB

This program has been designed to enable any model (including Master & Compact) 32k BBC micro to be used to produce high quality artwork for the direct production of PCB's.

The program code is supplied on 16k EPROM which enables the maximum amount of code to be stored without reducing the availability of RAM in the computer.

Apart from the limitations of board size (8" * 5.6"), there are virtually no limitations to the complexity of PCB that can be produced using this program. The minimum track width is nominally .025" but a special technique is used to enable tracks to pass between I.C. roundels, and there is no limit to the number of tracks that can be layed on either side of double sided boards.

The program has two main stages which will be described separately. Stage one is the component placement stage, and after specifying the overall size of the board required, the outline of the board is displayed on the screen together with a selection of standard component shapes.

There are three standard sizes of roundels, and any of the component shapes may be expanded in size both horizontally and vertically to provide an easy way of coping with various I.C. pin configurations, component sizes etc. The expand function may also be used on single roundels to produce multiple roundel configurations for edge connectors etc.

Roundels are automatically placed on a 0.1" invisible grid, and except when in line drawing mode the cursor always moves in 0.1" steps. (In line drawing mode it moves in 0.025" steps).

After placing a component on the screen it may be 'picked up' and moved at any time during the designing of the PCB to enable the best board layout to be obtained.

Component numbers maybe added at this stage in either standard or reduced size lettering, and the letters may be printed in any one of four orientations. These component 'strings' may also be 'picked up' and moved at any time.

Other features on this stage include line drawing to enable modification of the board outline, and component outline shapes. A circle drawing routine and flood fill routine are also available.

Moving on to stage two, the program removes all the component outline shapes from the screen leaving only the roundels present and a new selection of options are available.

Moving on to stage two, the program removes all the component
outline shapes from the screen leaving only the roundels present and a
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This stage is the track layout stage and tracks may be drawn in
either red or blue to represent tracks on the upper or lower surface
of double sided PCB's. Three standard track widths are available,
.025", .050" and .075", but wider tracks may be easily produced using
the flood fill routine. Tracks are drawn by selecting the required
width and colour, placing the cursor over a roundel and then using the
cursor keys to draw in horizontal, vertical, or 45 deg. angled lines.
At any time before completing a track, the DELETE key will erase
backwards over the track regardless of how complex a route it took.

Tracks of one colour may be drawn over or erased over tracks on the
other side of the board, and crossing points appear yellow the same as
roundels to indicate that copper will be present on both sides of the
board at these points.

One powerful routine available here is the flood/empty routine.
This is basically a flood fill routine which can also be used to
delete areas. To delete a track after it has been drawn, it is a
simple matter of placing the cursor over the track and pressing a
single key to instantly delete the track, however complex a route it
took, and regardless of whether it passes over tracks on the other
side of the board.

The ASCII component numbers which were added during stage one, and
also the component shape outlines may be superimposed on the tracks to
aid identification of roundels, and it is also possible to remove
temporarily the display of either side of the board layout to make
track routing clearer on complex boards.

By using the circle drawing routine to place a ring around
roundels, and the flood fill routine, 'ground plane' type PCB's may be
produced very easily.

Also available on this stage is ASCII printing, and characters
maybe printed in four orientations on either side of the board, the
characters on the underside automatically being produced as 'mirror'
writing.

Single roundels may also be added or deleted during this stage to
enable tracks to be continued on the other side of the board via a
'plated through' hole. It is also possible at any time to return to
stage one if I.C.'s or other component groups of roundels need to be
moved.

Another powerful routine available on both stages is the
copy/delete area routine. Any rectangular area may be defined and then
copied to elsewhere on the display (or be deleted) and this can
greatly simplify the production of boards with busses or other

repeated areas.

Printouts of either board surface may be obtained on any FX compatible printer, and the complex print routine produces very accurate 1:1 scale (actual size) or 2:1 scale (twice actual size) printouts using a very dense triple pass technique which actually expands the resolution of the computer screen by six times. This means that diagonals have smooth edges and a special technique is included to detect where lines pass between roundels, to enable reduction of track width and roundel size, as can be seen from the sample printouts.

It is also possible to define a small area of board and obtain a very quick sample printout of this area to check for track clearances etc. in congested areas of board.

Boards can easily be produced directly from the printouts either by photocopying the original and spraying with WD40 or Iso-Draft to give a transparent positive, or by printing directly onto draughting film. It is also possible to photo-copy the original printout directly onto draughting film to provide a high contrast positive. The 2:1 printouts may of course be photo-reduced to provide even higher quality artwork.

The sample printouts show most of the available features of the program, - this particular PCB took only two hours to produce. If you would like an actual printout rather than the photocopy, please give us a ring and we will supply one.

COMPUTER REQUIREMENTS:-

1. Standard BBC model'B' or B+ or Master or Master compact computer.

2. Any Disc interface & disc drive (DFS, ADFS or Network).

3. Medium resolution colour monitor. (Note that it is possible to use a black & white monitor when you are familiar with program operation).

4. Epson FX compatible printer. (One with the quadruple density graphics command available - ESC"Z"). E.g. Kaga-Taxan, Canon PW1080A, Epson FX80, LX80, RX80 are all O.K. - but not MX80.

PRICE:- £85.00 + VAT P&P free.