

Maldon Archaeological Group

Site Planning Program
for
48K SINCLAIR SPECTRUM

PITCALC

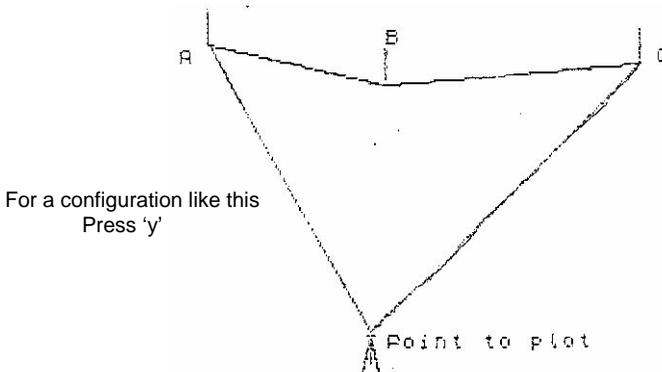
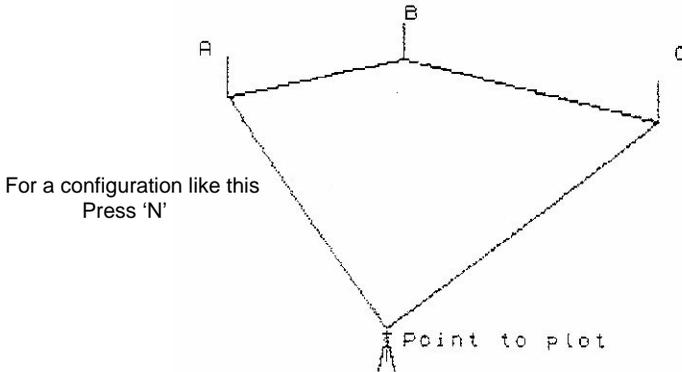
An archaeological planning utility program originally written to meet the needs of a specific site.

In a difficult rescue situation such as a large working gravel pit where the weather and landscape change from day to day it is often not possible to use a conventional grid system of planning. PITCALC is an adaptation of a surveying method which overcomes such difficulties and can give very accurate results, with a minimum of 'on site' effort.

A theodolite is positioned over the point to be plotted and bearings taken to fixed reference points in or around the site. Readings are written directly into the site note book. The reference points could include such objects as buildings, trees, telegraph poles or ranging poles. It will be necessary to find the exact distances between them either by measurements on site, plans or by calculation (see D overleaf)

A. THREE BEARING PITCALC converts three bearings into distances from the sighted points.

If the sighted points are not on a straight line there will be two possible sets of results from one set of three bearings. In order to know which set of distances applies to your case the program will stop and ask you to press Yes or No in answer to the question, "Is 'B' nearer to the point to plot than line A to C?"



Although only three bearings are necessary for an accurate plot it is recommended that at least one extra is taken to allow for an error check as in four bearing Pitcalc.

B. FOUR BEARING PITCALC does the same calculations as 'A' above but applied to combinations of four sighted points. All the resulting distances are displayed alone with an average figure. The order of these calculations is A,B,C; A,B,D, A,C,D; and B,C,D.

The figure shown as ERROR % is calculated by comparing the differences between the average and individual distances. It can be used as a check and record of the accuracy of the plot, i.e.. the lower the ERROR % the more reliable the result.

C. RING DITCH CALCULATIONS is a self-explanatory addition to the tape not directly related to the PITCALC plotting.

D. TRIANGLE CALCULATIONS. It is important that the distances between reference points is determined accurately especially if they are almost in a line. These triangle calculations will be useful in this.

E. BI-POLAR TO CARTESIAN CO-ORDINATE conversion could be useful to any site planner giving an instant and accurate result and doing away with the need to plot with a compass. When applied to PITCALC results it is possible to plot on a large scale plan which does not include the original sighted points.

A reciprocal conversion can be obtained using the TRIANGLE CALCULATIONS D, (B)

The program will request data at various times and your input will at first appear at the bottom of the screen. At this stage input can be deleted and edited in the usual Spectrum manner ie. using the 'CAPS SHIFT' and 'DELETE' keys together. Pressing the 'ENTER' key enters the data into the computer.

A decimal point or the spacing dot between Degrees and Minutes is selected by pressing 'SYMBOLS SHIFT' and 'M' keys together.

Pressing or entering just 'M' in most parts of the program will return the MENU.

Pressing 'M' with the MENU displayed will note or turn on the keyboard BEEP.

Those with a little knowledge of 'BASIC' programming will be able to extend the facilities offered by the basic PITCALC program. For example to print results on a Spectrum ZN Printer 'break' into the program when the results are displayed on the screen by pressing 'BREAK' and 'CAPS SHIFT' keys together. Press 'COPY' and then 'ENTER' and after the printing is finished press 'CONT' and 'ENTER' to return to the PITCALC program. Entering 'RUN' from any part of the 'broken' program will return the MENU.

ACCURACY & LIMITATIONS

Slight approximations are used to ensure numbers remain within the Spectrums handling capacity but for practical purposes these can be ignored. The greatest accuracy will be achieved when the angles between bearings are greatest, when the sighted points are precise and when the distances between them are most accurately determined.

One quick method is to set up a very accurate baseline towards the centre of the site and then take bearings from each end of this to all the sighted points and the baseline itself. The part of the program that deals with triangles can then be used to find the distances between the points. This process need only be done once although we would suggest that it is useful to maintain the baseline if possible.

Three or four bearing PITCALC do not allow differences in bearings of less than 4 minutes or greater than 210 degrees.

SP MODE

Built into 3 and 4 bearing PITCALC is a facility that allows the storage of specific site details using up to nine sighted points around the site. Its use, which is very simple, will save a lot of time if using PITCALC on a large site or for a lot of calculations. When asked to input the distance from 'A' to 'B' enter "SPn" where "n" is the number of the first sighted point represented on the screen by "A". The other 'SP' numbers (numbers only) are then entered in a clockwise direction. It is only necessary to read the following paragraphs if you intend to use the SP mode.

The initial entry of data is more complicated and necessitates 'breaking' into the program, changing DATA statements, and then 'running' the program to transfer the data into an array. The modified program can then be 'SAVED' onto another tape in the usual way.

These are the program lines allocated on the PITCALC tape for the 'SP' Data.

PROGRAM LINE	SIGHTED POINTS									
	2nd	3rd	4th	5th	6th	7th	8th	9th		
6600 DATA 0,	0,	0,	0,	0,	0,	0,	0,	0,	1st	
6610 DATA 0,	0,	0,	0,					0,	2nd	
6620 DATA 0,	0,	0,	0,	DISTANCES				0,	3rd	
6630 DATA 0,				0, BETWEEN			SIGHTED		0,	4th
6640 DATA 0,	'Yes or 'N'o			0,		POINTS		0,	5th	
6650 DATA 0,	DATA					0,		0,	6th	
6660 DATA 0,	0,	0,	0,	0,	0,	0,	0,	0,	7th	
6670 DATA 128	64,	32,	16,	8,	4,	2,	1,	0,	8th	
6680 DATA 0	0,	0,	CHOSEN SP NUMBERS (ANY FROM 1 TO 9)							
1st	2nd	3rd	4th	5th	6th	7th	8th	9th		

CLOCKWISE ORDER

The data is stored according to the order of the sighted points rather than the actual number 1 to 9 which you can allocate in any order. Line 6680 stores the numbers which you choose in a clockwise order.

Line 6670 should not be altered except for its last part which stores the distance between the 8th and 9th sighted point. The latter parts of lines 6600 to 6660 store the other SP distances as shown above. Details of the 'Yes' or 'No' data (see A) is stored in the first part of lines 6600 to 6660 and this will require further explanation.

The standard PITCALC has all 'Yes' and 'No's set to '0' which gives a 'No' answer in all cases. 255 could be inserted to 'represent 'Yes'.

EXAMPLE (SEE OPPOSITE)

MIDDLE SP	LINE NUMBER									
2nd	6600	DATA	0,							
3rd	6610	DATA	0,	BIN	10000000					
4th	6620	DATA	0,	0,	0,					
5th	6630	DATA	0,	0,	0,	0,				
6th	6640	DATA	0,	0,	0,	255,	255			
7th	6650	DATA	0,	0,	0,	0,	0,	0,	0,	
8th	6660	DATA	0,	0,	0,	0,	0,	0,	0,	
		LEFT SP		1st	2nd	3rd	4th	5th	6th	7th

When a combination of 'Yes' and 'Nos' are required they are best entered in a 'BIN' statement.

```

BIN    1    000    0000    see line 6610 above
      YES  NO    UNUSED
                   BITS
  
```

Since a 'BIN' statement must always consist of eight bits there will always be 'spare' bits to the right. These 'spare' bits can be set to suit the effective ones.

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e.g.   BIN    1    0000000
      YES    UNUSED
                   BITS
  
```

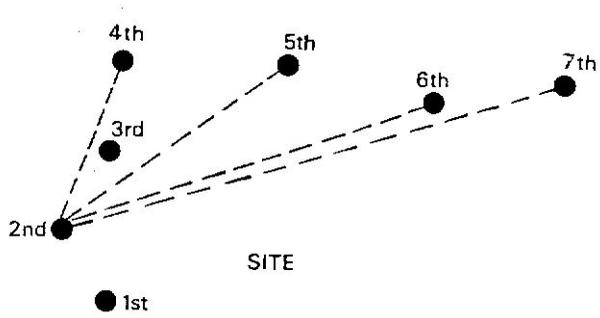
can be written as BIN11111111 or just 255 (see line 6640 above)

Should difficulties be experienced with insertion of sighted point data then send precise details of your site points including sketches and a SAE to Paul Brown, 152 Fambridge Road, Maldon, Essex. A listing showing your own site details will be returned.

* * *

PITCALC requires most of available memory in the 48K Spectrum

To load the program press LOAD " " ENTER



ACKNOWLEDGEMENTS

I am indebted to Robin Turner of the Essex County Council Archaeology Section for his helpful advice and to my wife who continued to sustain my body when my mind was away peeking and 'poking'.