

PIP PROGRAM EDITOR

TECHNICAL DOCUMENTATION



THE PIP FILE STRUCTURE

The PIP floor robot is able to download programs to a BBC micro via the User Port using a program called UPLOAD. These programs are stored in a proprietary direct access file structure. The file has the name PIP0. The file has room for 19 programs and each program can take up to 1Kb of memory.

Programs from PIP0 can be uploaded to PIP at a later date using the UPLOAD program from the system disc supplied with the robot on purchase.

The file structure is shown in the table below.

LOCATION	CONTENTS
&0000 - &17FF	Instructions for use
&1800 - &1BFF	Program names Each name is 32 bytes padded with spaces. Can be up to 19 names. Names in as-entered order.
&1C00 - &67FF	PIP program instructions Each program can be up to &400 bytes Program starts &400 bytes from start of previous one Program starts with &A0 &01 and ends with &A0 &01 &A0 &01 Program instructions consist of two bytes, an Opcode and an Operand. The instruction is Opcode div 16 and the data required by the instruction is (Opcode mod 16) * 256 + Operand.

PIP PROGRAM INSTRUCTIONS

INSTRUCTION	DATA	DESCRIPTION
&10	&00 - &09	Play a note given by the data value
&20	n	FORWARD n centimetres
&30	n	BACK n centimetres
&40	n	Turn LEFT n degrees
&50	n	Turn RIGHT n degrees
&60	&01	END marker of a REPEAT loop
&70	n	FLASH LED light n times
&80	t	PAUSE t seconds
&90	n	REPEAT n times

n and t can have values in the range 0 to 999.

THE PIP EDITOR DISC

The original PIP system disc simply ran the UPLOAD program to download or upload PIP's programs. There was a single file, PIP0, on the disc and this could hold up to 19 different programs.

Whilst the UPLOAD program worked it was not very easy to change a PIP program once it had been written. This editor has been created to add the following functions to the system;

- A menu driven front end
- The ability to load a PIP program file and to edit or add PIP programs to the file
- The ability to manage multiple PIP program files on a single disc
- The ability to create a blank PIP program file for new programs

Each PIP program file is 24Kb in size. Although the system can work from a 40T floppy disc it is then limited to a single PIP program file. Using a 80T floppy disc, several PIP program files can be used on the same disc and each swapped into use as required.

In this way it is possible to have separate music files and movement files or files for different classes of children on the same disc.

User PIP program files are stored in the P directory of the disc. The distribution disc contains a file P.PIP0. This file is locked to protect it from being changed. It contains sample PIP programs and contains the instruction text needed by the UPLOAD program. When a new PIP program file is created these instructions are copied to the new file. **The file P.PIP0 should not be edited.**

The PIP Editor disc also contains the file P.SONGS, which is the collection of PIP programs from the PIP song book.

It is recommended that the editor disc is backed up before use to make a working copy and the original disc kept in a safe place. You may make as many copies of the original disc as you need.

Although a PIP program can be almost 1Kb in size, some 500 program lines, the editor can only handle the first 40 program lines. This is not a drawback in practice as almost all PIP programs seen to date fit easily into this 40 line limit. Programs written by young children will mostly be of less than 40 lines.

THE MAIN MENU

To start the editor place the floppy disc into drive 0 and perform a Shift-Break. After a couple of seconds the menu display of *Figure (i)* will appear.



Figure (i)

There are five options available.

OPTION 1 - Create a new program file

This option will create a new, empty program file. The instructions will be copied from the original PIP program file stored on the disc as P.PIPO. This file is read only and cannot itself be edited. After copying the instructions, the program name area is filled with spaces and the program code area is filled with zeros.

The option will create a file called P.PIPNEW. Once the file has been created, you will be asked to give it a name. The file P.PIPNEW will be renamed with the name you enter and the menu will appear again.

OPTION 2 - Use a program file

The UPLOAD program used to move programs to and from PIP expects the programs to be in a file called PIPO in the root (\$) directory. This option allows you to choose which PIP program file will be used with UPLOAD.

The contents of your chosen file are written over the existing PIPO file erasing any content it may have. It is important that you do not edit the PIPO file as any changes will be erased when using another PIP program file.

OPTION 3 - Delete a program file

This option can be used to remove a PIP program file completely. It should be used with care as the action is not reversible. It achieves the same effect as using *DELETE.

OPTION 4 - Edit a program file

PIP program files can be edited using this application. The editor allows program names to be changed and program commands to be changed. The editor provides a rapid and convenient way of writing PIP programs for later use.

OPTION 5 - Run the uploader

The UPLOAD program supplied with the PIP robot is used to both upload PIP programs from disc and to download programs from PIP. There is also an option to print a PIP program on an Epson compatible dot-matrix printer.

To exit the UPLOAD program press Ctrl-Break.

PIP PROGRAM EDITOR

When the PIP program editor starts you are asked to enter the name of a program to edit. PIP programs are by default stored in the P directory of the disc. Generally names must start with the P. prefix. However, the editor has been designed to allow editing of the PIPO file in the root directory as well.

Care should be taken when editing this PIPO file as any changes made will be lost the next time a different PIP program file is used. If the changes are needed the file \$.PIPO should be copied to another disc before using a different PIP program file.



Figure (ii)

To edit a file called SONGS in the P directory the file name should be entered as P.SONGS. To edit the PIPO file in the root directory of the disc enter the filename PIPO without and directory prefix.

PROGRAM NAME DISPLAY

```

PIP PROGRAM EDITOR V1.3
Program index for SONGS
A BAABAABLACKSHEEP
B THREEBLINDMICE
C ** EMPTY **
D ** EMPTY **
E ** EMPTY **
F ** EMPTY **
G ** EMPTY **
H ** EMPTY **
I ** EMPTY **
J ** EMPTY **
K ** EMPTY **
L ** EMPTY **
M ** EMPTY **
N ** EMPTY **
O ** EMPTY **
P ** EMPTY **
Q ** EMPTY **
R ** EMPTY **
S ** EMPTY **
Program to edit (A to C)?

```

Figure (iii)

After choosing the PIP data file to edit, a display similar to *Figure (iii)* appears. In this screen all the programs stored in the data file are listed. If the respective program slot is unused it will be shown as **** EMPTY **** in the list of programs. A maximum of 19 programs can be found in one data file.

To choose the program which is to be edited, press the letter at the start of the program name shown on the screen. The display will jump to the program edit screen, which will allow programs to be changed and saved back to the data file.

If an **** EMPTY **** slot is chosen the program index screen will ask for a program name before moving to the program edit screen. Program names can be up to 32 characters long. Only the **first** **** EMPTY **** slot may be chosen.

Program names can be changed using the Ctrl-<letter> command. To change the name of program B, THREEBLINDMICE, Ctrl-B would be pressed. This process is shown below in *Figure (iv)*.

PIP program editor

```
PIP PROGRAM EDITOR V1.3
Program index for SONGS
A BAABAABLACKSHEEP
B THREEBLINDMICE
C ** EMPTY **
D ** EMPTY **
E ** EMPTY **
F ** EMPTY **
G ** EMPTY **

Input new name for program
THREEBLINDMICE
?

N ** EMPTY **
O ** EMPTY **
P ** EMPTY **
Q ** EMPTY **
R ** EMPTY **
S ** EMPTY **

Program to edit <A to C>? B
```

Figure (iv)

Here the program name, THREEBLINDMICE, is being changed. Program names are always in capital letters and will be changed automatically after entry. If an attempt is made to rename a program to a name that already exists, an error message is displayed.

USING THE EDITOR

```

PIP PROGRAM EDITOR V1.3
Program THREEBLINDMICE
1 REPEAT 2
2 NOTE 2
3 NOTE 2
4 NOTE 1
5 NOTE 1
6 REPEAT 4
7 NOTE 0
8 END
9 END
10 REPEAT 2
11 NOTE 5
12 NOTE 5
13 NOTE 3
14 NOTE 3
15 REPEAT 4
16 NOTE 2
17 END
18 END
19 REPEAT 3
20 NOTE 5
21 NOTE 8
22 NOTE 8
23 NOTE 7
24 NOTE 7
25 NOTE 8
26 NOTE 5
27 NOTE 5
28 END
29 NOTE 3
30 NOTE 2
31 NOTE 2
32 NOTE 1
33 NOTE 1
34 NOTE 0
35 NOTE 0
36 NOTE 0
Ctrl-Q: save and exit

```

Figure (v)

To speed up program entry the BBC function keys have been programmed with all the PIP key words. A key strip is provided with the documentation.

The program editor screen will appear similar to that shown in *Figure (v)*. The editor is controlled by the following keys;

Cursor Keys

These will allow movement up and down the command list or movement within a command. When moving within a command, the input cursor cannot move out of the input field.

The up/down cursor keys will move to the next command above or below the current command. The cursor cannot move outside the command list which will show a maximum of 40 commands. The cursor position within the input field is preserved when moving up or down the list. When moving up or down the list, the command syntax is checked before the movement is allowed.

Delete key (Backspace key)

This key has its normal function deleting the character to the left of the current position. If the cursor is on the first character of the input field the delete key has no effect. As the character is deleted the whole input field shifts one place left and adds a space character to the right hand side.

Tab key

The Tab key is used to insert a space at the cursor position, shifting the characters of the input one position to the right and losing the rightmost character of the input field. **Ctrl-I** will also perform this function.

Letter and Digit keys

These are used to enter changes to the command highlighted by the input field. Letters are always converted to capitals (upper case). Letters and digits will overwrite the character at the cursor position. To insert space for extra characters use the Tab key.

Return key

This will end the edit of the current command and move to the next command below, setting the input cursor to the start of the input field. The current command syntax is checked before moving to the next command. If the highlight is on the last command the input field will not move.

Ctrl-A

To append a command to the program use Ctrl-A. This will move the input field to the next free position after the last command. If the command limit has been reached an error message will appear and the key press will be ignored.

Ctrl-A should be used to add new program instructions when first writing a program.

Ctrl-D

Ctrl-D will delete the command at the current highlight position and move all the commands below up by one position. If there is only one command in the list this key press will be ignored.

Ctrl-N

This will insert a blank command at the current highlight position moving all the commands below one space down the list providing the command limit has not been reached. If the command limit has been reached an error message will appear and the key press will be ignored.

Ctrl-Q

This is used to quit the program editor and save the changed program back to the data file.

Escape

Use the Escape key to abort the editing process. Any changes to the current program will be discarded. You will be returned to the menu program