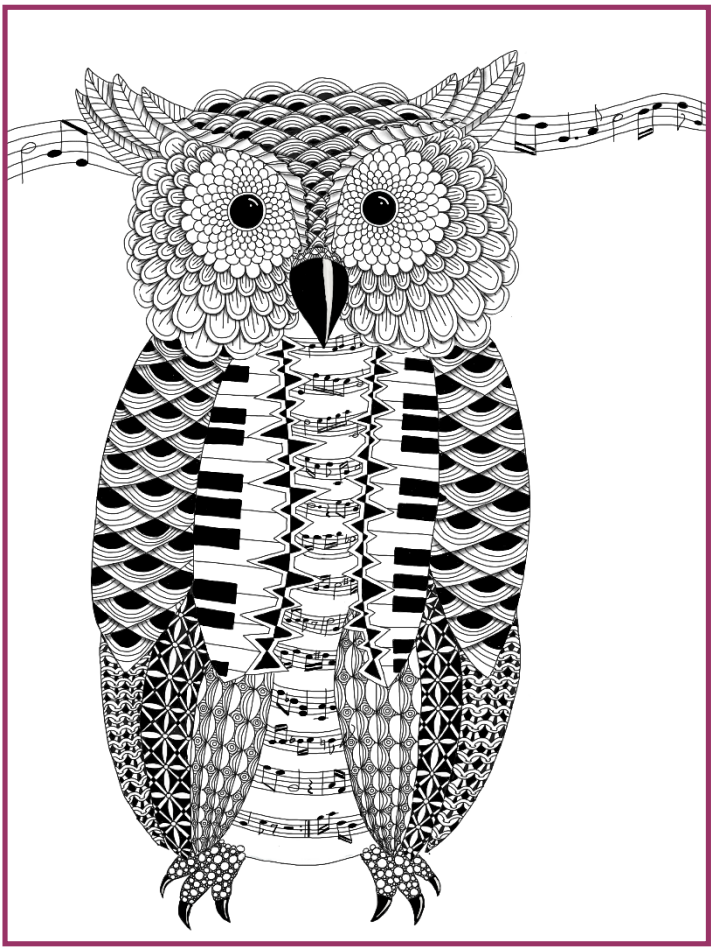
# BeebOPL

## For the BBC Microcomputer System

# USER GUIDE



## Includes full assembly instructions


## For the BBC Microcomputer System

# USER GUIDE

## Including full assembly instructions

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# Introduction

Before you start using BeebOPL, check that you have all the following items:

- A BeebOPL board (either ready assembled or in full or partial kit form)
- A 34-way ribbon cable with female IDC connectors at either end
- A 5V DC power supply with a connecting cable terminated with a 2.1mm centre-positive barrel plug
- The supplied software disc images: DROPLAY.SSD and JUKEBOX.SSD
- A BBC Model B, B+ or Master Series Microcomputer, fitted with a suitable filing system

## About this manual

You will notice that some letters, words and phrases in this manual have been printed differently from the rest of the text. This is to help you to tell the difference between explanatory text, words which appear on the computer screen (including BASIC keywords), and certain keys on the computer keyboard.

- Ordinary text appears like this, or *like this* for emphasis.
- Text typed in at the computer or displayed on the screen or BASIC keywords appear `LIKE THIS`.
- Words like <RETURN> mean that you press the key marked RETURN rather than actually type the letters R E T U R N.

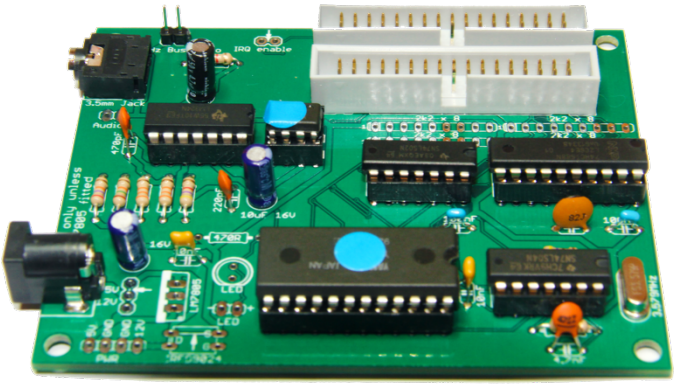
# Welcome to the world of FM synthesised music

This manual describes the assembly, installation and use of the BeebOPL Music Synthesiser Card. This easy to assemble and install card transforms your computer into a powerful synthesiser which will faithfully reproduce the sound of a single instrument or an entire orchestra.

In fact, it uses the same digital sound technology as the best electronic keyboards, so you hear rich, rumbling base, crystal clear highs, and true up-front mid-range. It also has up to 11 discrete channels for up to 11 different instruments and game sounds playing at once. You can listen to the sound straight from the speaker of your BBC Microcomputer and with the built in pre-amplifier and output jack you can even listen to it on your home stereo.

The capabilities of BeebOPL are well demonstrated with the Juke Box playback program. This program enables you to hear a variety of compositions from classical, through jazz, to rock.

For education, creative self-expression, or just plain fun, BeebOPL affords virtually limitless possibilities for you and your BBC Microcomputer System.



# Assembling BeebOPL

## Introduction

It is assumed that the reader is familiar with the basic principles of soldering and has the necessary equipment and materials to proceed. A tutorial on soldering is outside the scope of this manual.

## Parts required

Please check that you have the following parts before proceeding. All of these parts are included in the complete kit and are required for the standard build of BeebOPL.

### PARTS LIST

| | |
|---|---|
| ***Capacitors*** | |
| **C1** | 82pF (82) |
| **C2** | 4.7nF (472) |
| **C3, C7** | 10nF (103) |
| **C4, C5** | 100nF (104) |
| **C6, C8** | 10µF 16V (electrolytic) |
| **C9** | 470pF (471) |
| **C10** | 220pF (221) |
| **C11** | 4.7µF 35V (electrolytic) |
| | |
| ***Resistors*** | |
| **R1, R2** | 470R (yellow, violet, brown, gold) |
| **R4, R5** | 33k (orange, orange, orange, gold) |
| **R6** | 15k (brown, green, orange, gold) |
| **R7** | 27k (red, violet, orange, gold) |
| **R8, R9** | 4k7 (yellow, violet, red, gold) |
| | |

| *Integrated circuits* | |
|---|---|
| **IC1** | 74LS02N |
| **IC3** | 74LS04N |
| **IC4** | 74HCT688N |
| **IC5** | YM3812 |
| **IC6** | LM324N |
| **IC7** | Y3014B |

| *IC sockets* | |
|---|---|
| **IC1, IC3, IC6** | 14-way 0.3” DIL socket |
| **IC4** | 20-way 0.3” DIL socket |
| **IC5** | 24-way 0.6” DIL socket |
| **IC7** | 8-way 0.3” DIL socket |

| *Connectors* | |
|---|---|
| **J1, J2** | 34–way IDC box header |
| **J3** | 2.1mm centre-positive power jack socket |
| **J6** | 3.5mm stereo jack socket* |
| | |
| *Crystal* | |
| **Q1** | 3.579MHz |

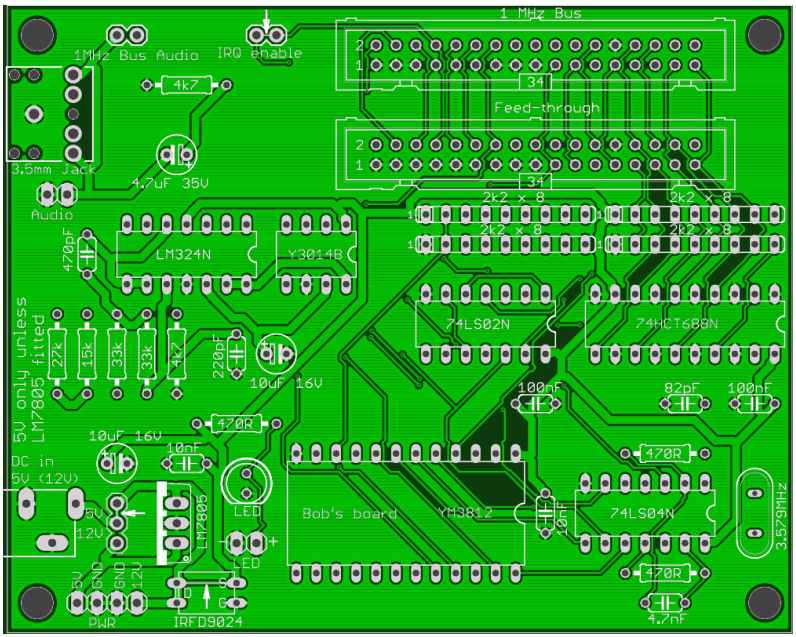
| *Selectable link* | |
|---|---|
| **S3** | 2-way pin header and miniature jumper link |

*Note: there is no ‘standard’ form factor for 3.5mm jack sockets. It is essential that you use a part that matches the footprint on the PCB. A suitable choice would be Rapid Electronics order code: 50-1507.

Please check that you have all of these items. If you purchased a complete kit and any items are missing or damaged, please make contact through the StarDot forum (handle: **lazarusr**) for replacement.

Each of the two Yamaha chips should be marked with a small coloured sticky dot. This indicates their source and that they have been tested and confirmed functional. Feel free to remove these. But do keep a note of the colour(s) of the dots. This information will be of assistance if any problems develop.

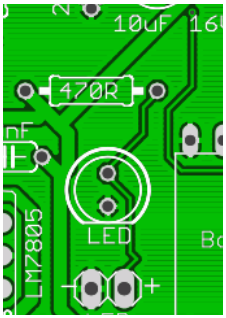
## Assembly




The surface of the PCB has been finished with lead-based HASL. Accordingly, you should use a lead-based solder for this project. In addition, lead-based solder is generally easier to work with. Such solder is readily available from reputable web-based vendors. A popular choice is Multicore 60/40 available in a variety of sizes (see, for example, Rapid Electronics order codes: 85-6215 or 85-6210).

All of the component locations are clearly labelled on the board and placement should be straightforward.

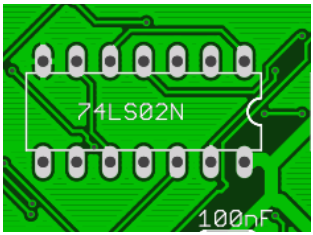
Note that the 470R resistor, immediately to the north of the LED, is the current limiting resistor for that LED. It is only required if the LED is to be added; it is not required as part of the standard build.




## Orientation

Some of the components must be orientated correctly. There are three electrolytic capacitors. The positive terminal is indicated by the longer lead and the negative terminal by a vertical stripe on the body of the capacitor. The correct placement of the positive lead is shown on the PCB by a '+' symbol.

Make sure that the DIL sockets (and, in turn, the ICs) are orientated so that the ‘notch’ corresponds with the notch marking on the PCB. All of the ICs face in the same direction, with the notch orientated east.




The Y3014B does not have a notch. Instead, pin 1 is indicated by a small dot embossed into the IC package. Pin 1 should be placed so that it is at the same end as the notch marking on the PCB.

Correct orientation of the two 34-way IDC headers is straightforward. The headers have a notch or key in the shrouding. The key should correspond with the small box (marked with a ‘34’) on the PCB. In addition, pin 1 is usually marked on the header with a small triangle or arrow. This should correspond with pin 1 which is clearly marked on the PCB.

Some of the components may be difficult to retain in the board and/or keep in an upright position whilst it is turned over for soldering, most notably the pin header for the 1MHz Bus audio. These can be held in place with a small piece of Blu-Tack. Try to ensure the Blu-Tack only comes into contact with the plastic part of the header. If it is in contact with the metal posts, the transferred heat from the soldering iron can cause the Blu-Tack to melt; making it harder to remove when soldering is complete.

## Optional components

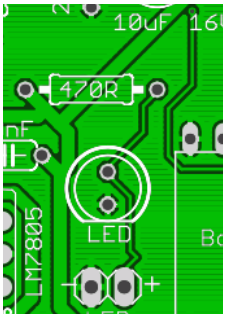
A number of optional parts can be installed in addition to those listed above. None of these are essential and they are not included in the kit.

| OPTIONAL PARTS | |
|---|---|
| ***Power LED*** | |
| **LED1** | Standard 5mm LED |
| **R3** | 470R (yellow, violet, brown, gold)* |
| | |
| ***Bus terminators*** | |
| **RN1 – 4** | 2k2 2% 9-pin commoned resistor network |
| | (may be used with four 9-pin SIL socket strips to facilitate easy insertion and removal) |
| | |
| ***Input protection*** | |
| **IC2** | LM7805 |
| **S2** | 3-way pin header and miniature jumper link |
| **TR1** | IRFD9024 |
| | |
| **$\overline{\text{IRQ}}$ enable** | |
| **S2** | 2-way pin header and miniature jumper link |
| | |
| ***Wire to board connectors*** | |
| **J4** | 4-way ‘floppy’ power connector |
| **J5, J7** | 2-way pin header |

### LED

The LED illuminates when power is applied to the board. It serves no other purpose.

The LED should be orientated correctly. The anode (+ve) is indicated by a longer lead and the cathode (-ve) by a shorter lead and a slightly flattened edge on the LED body. The cathode should be orientated so that that flattened edge corresponds with the flattened marking on the PCB.




Alternatively, if you intend to place the BeebOPL board in a case, the LED can be panel mounted. There is a provision on the PCB for a pin header to facilitate connection to the LED. The location for connection of leads from the anode and cathode are clearly indicated.

In either event, the LED requires the use of a current limiting resistor as shown on the PCB. *The precise value of the current limiting resistor is calculated by reference to the forward voltage ($V_f$) and forward current (I) of the LED. The formula is $R=(5-V_f)/I$. For a 'typical' 5mm red LED, this will result in a value of about 220Ω.

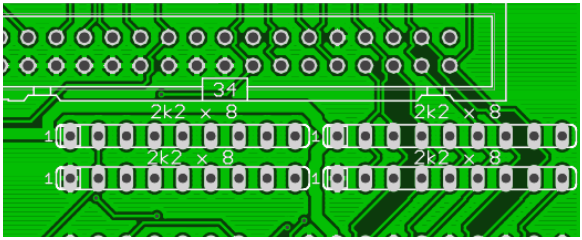
However, this formula calculates a value for R which will result in the LED drawing its maximum safe current (and, therefore, being at maximum brightness). Additionally, you may not know the specifications of the LED you have available. In practice, the recommended value of 470Ω is likely to be suitable for most LEDs and result in a sensible brightness level.

## Bus terminators

Acorn Computers Ltd recommend the use of bus termination on the last daisy-chained device connected to the 1MHz Bus. In practice, however, BeebOPL (even together with other 'daisy-chained' devices) may be fully functional without these terminating resistors. Note that only the terminal device connected to the 1MHz Bus should be fitted with these resistors. A number of

popular devices (notably the Acorn Teletext Adapter and the RetroClinic DataCentre) are already fitted with terminating resistors and are intended to always be used as the terminal device.

Four 2k2 by 8, 'commoned', resistor networks can be installed just to the south of the 34-way box headers. Each resistor network is configured in a 9 pin SIL package. Pin 1 is normally indicated with a white dot. This should correspond with the pin 1 marking on the PCB. You may wish to install SIL socket strips so that the resistors can be inserted and removed at will. Inserting the resistor networks the wrong way round is unlikely to cause any damage. However, BeebOPL (and other devices on the 1MHz Bus may not function correctly).



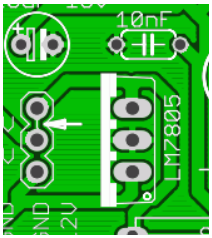

## Power protection

### *Voltage regulator*

An LM7805 voltage regulator can effectively be used as protection against over-voltage up to a maximum of 35V. Over-voltage risks damage to the components on the BeebOPL board and possibly to your computer.

Using a voltage regulator in this way has two main disadvantages. First, a higher supply voltage is required. This can be anything above 7V but is nominally referred to as 12V on the PCB and in this manual. Secondly, the LM7805 will consume extra power which it will discharge in the form of heat. This should not be a significant concern, as BeebOPL draws less than 30mA when in use. Of course, a better solution would be to take care not to connect the wrong power supply in the first place.

Make sure that the regulator is oriented so that the metal heatsink faces west on the board (as indicated by the broad marking on the PCB).




It is then necessary to cut the track between the north and central pads immediately to the west of the regulator. The track is clearly marked with an arrow. It is essential to check that this track has been fully divided. If 12V is supplied with this track intact, it is likely that BeebOPL will be damaged (and possibly your computer). It is advisable to check the track using a multimeter in its resistance or continuity mode.

A connection should then be made between the central and south pads. This should be done with a short piece of narrow gauge, single core, equipment wire.

Once this configuration is in place, BeebOPL will not function correctly unless supplied with a voltage at the minimum level of the voltage regulator as explained above.

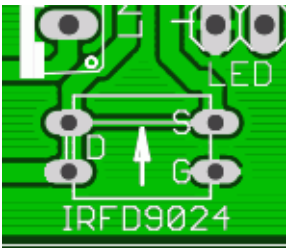
It is possible to add a 3-way pin header and use a miniature jumper link to make the connection between the central and south pads. This can then be used to switch between 12V and 5V modes. However, if a 12V supply is connected in the 5V mode, damage will be sustained as described above (thereby frustrating the whole point of using the voltage regulator as a mechanism to protect against over-voltage). You are strongly advised against using a 3-way pin header and to solder a permanent link as described above.

### *Power MOSFET*

A power MOSFET can be installed at TR1 in a reverse configuration (effectively acting as a diode, but with minimal voltage drop). This acts as protection against reverse voltage. Again, however, a better solution would be to take care not to connect a wrongly configured power supply in the first

place. Reverse voltage risks damage to the components on the BeebOPL board.

*Before* installing the MOSFET, it is necessary to cut the track that runs between the S and D pins. This is clearly marked by an arrow on the PCB. Please then check the continuity of the track using a multimeter in its resistance or continuity modes. If the track remains intact, the MOSFET will be bypassed and will provide no protection.



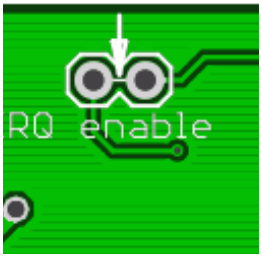

When installing the MOSFET note that the two ‘D’ pins are comprised of a single wide leg. This side of the MOSFET must be orientated to the west of the board, as indicated by the double mark on the PCB silk screen.

## $\overline{IRQ}$ enable

The $\overline{IRQ}$ line from the YM3812 is connected directly to the corresponding line on the 1MHz Bus. During initial development of BeebOPL, it appeared that this could cause the BBC Microcomputer to ‘hang’. Accordingly, in the original BeebOPL prototype, the $\overline{IRQ}$ connection was left open and had to be ‘made’ with a selectable link.

It has now become apparent that the problem was in fact caused by an incomplete understanding of the correct way to program the YM3812. In fact, connection of the $\overline{IRQ}$ line is essential to the operation of the supplied software.

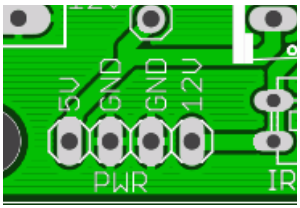
Despite this, out of an abundance of caution, an option has been provided to break this link (by cutting the track indicated by the arrow) and installing a pin header with miniature jumper. Note that once the track is broken, the supplied software will not function unless the link is made by installing the jumper.



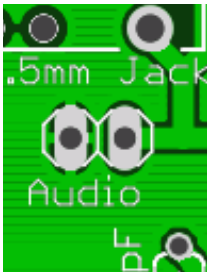

There does remain one small issue with this connection. $\overline{\text{IRQ}}$ has to be held high to avoid asserting an interrupt. Accordingly, booting the computer with BeebOPL connected, but not connected to power, may cause an apparent interrupt that the computer will not know how to handle, causing it to hang. Always ensure that power to the board is on, before switching the computer on.

## Optional connectors

A 4-pin 'floppy' style power connector may be installed as an alternative to the 2.1mm barrel connector. This may be more convenient if installing BeebOPL in a case or inside the computer. The connector has separate lines for 12V and 5V. However, it is intended that only one of those lines should be 'live' (depending on whether the voltage regulator is installed; there being no reason to have both live.) It is unlikely that any harm will arise if both lines are live. However, damage will almost certainly occur if this connector is incorrectly orientated or the corresponding plug is not correctly wired. Do not attempt to use this connector unless you are fully familiar with its proper orientation and configuration.



Similarly, there is a 2-way pin header location available for audio out.



# Connecting BeebOPL to your computer

With the computer powered off and BeebOPL disconnected from its power source, connect a 34-way IDC ribbon cable to either one of the box headers on the BeebOPL board. (Suitable cables are available from a number of specialist online vendors such as RetroClinic – http://www.retroclinic.com – and eBay vendors.) Connect the other end of the cable to the 1MHz Bus connector underneath the BBC Microcomputer. Warning: make sure that you do not connect the cable to the disc drive connector as damage may result.

Next, connect a suitable regulated 5V power supply to the BeebOPL power connector. An easy option is to use a spare USB phone charger with an adapter cable (such as Rapid Electronics order code: 19-8992). **Warning: do not connect such a cable to the USB output of a computer or other valuable device**. (For a chilling example of what can happen when a device that does not comply with the full USB specification is connected to a computer see: https://youtu.be/5pP8TLwO_Ks.)

Alternatively, there is a wide range of suitable plug-in units. BeebOPL draws less than 30mA of current; so just about any regulated 5V power supply will suffice, provided it has the right connector. (An example would be Rapid Electronics order code: 90-2648). Make sure that power to BeebOPL is switched on *before* turning on the computer.

## Testing the card

Using your preferred filing system, place the DROPLAY disc, or DROPLAY.SSD disc image in the default drive and type `*DROPLAY -TEST`. You should see a message as follows:

```
BeebOPL card found
```

If DROPLAY fails to identify a card, the following is displayed:

```
BeebOPL card not found
```

If you see this message, check that the card is connected to the power supply and that the power is turned on. Check that there is a firm connection between

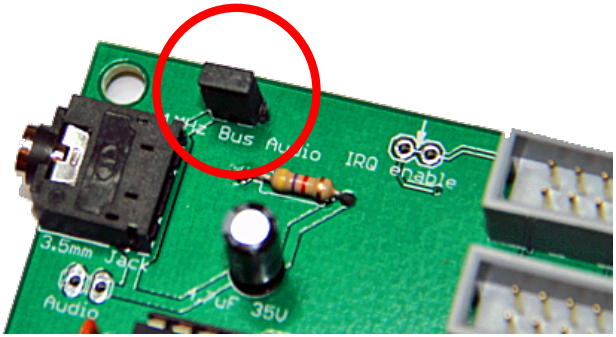
the IDC cable and the box header on the BeebOPL card. Similarly check that there is a good connection between the cable and the 1MHz Bus connector on the computer. Sometimes the pins on this connector can become corroded. Try removing and re-inserting the cable multiple times as this may clear some of the corrosion.

If the message persists, you will need to check the BeebOPL card for faults. Make sure all the ICs are firmly seated in their sockets with the notches oriented as shown on the PCB legend. Make sure the electrolytic capacitors are correctly oriented. Check for missing or incomplete solder joints, dry (i.e. dull looking) solder joints and any solder bridges. Pay particular attention to solder pads at ground connections. Because of the large ground plane on the PCB, these points can be somewhat harder to solder.

Further fault finding is beyond the scope of this manual. For additional help, try posting details of the problem on the StarDot forum.

## Connecting to an audio system

BeebOPL has the facility to play audio directly through the built in speaker in your computer. To enable this, simply ensure that a miniature jumper is in place on the 2-way pin header marked 1MHz Bus Audio.




The BBC Master Series has the option to configure the 1MHz Bus so that the ‘Audio’ line is used for output only or is entirely disabled. In either of these configurations, audio from BeebOPL will not play through the built in speaker. To avoid this, check that the track is intact between the south and centre pads

(the ‘A’ position) at LK1 on your computer’s main board. If not, and you want to play BeebOPL audio through the built in speaker you will need to enable this link either with a short piece of narrow gauge, single core, equipment wire or by use of a 3-way pin header and miniature jumper. Sometimes a resistor is placed between pins 2 and 5 of the internal modem connector (PL9 and PL10). This is done to reduce the effect of noise on the 1MHz Bus becoming audible through the built in speaker. This resistor will need to be removed to enable BeebOPL to play through the built in speaker. Unfortunately, removing this resistor will also result in the return of the noise it was intended to defeat.

Whilst playback through the internal speaker is possible, this greatly diminishes the quality of the output. For the best results, audio should be connected to external powered speakers or a stereo hi-fi system. Many users will be familiar with similar options on the popular BeebSID card. However, the sonic characteristics of BeebOPL are rather different. The difference between internal and external playback for BeebOPL are several orders of magnitude greater than that for BeebSID. Put simply, you will never realise the full potential of BeebOPL if it is only ever connected to the internal speaker.

To connect to a stereo system, use a 3.5mm stereo audio jack cable. Although BeebOPL only produces a monaural output, use of a stereo cable is recommended to ensure that sound is played back through both speakers of a stereo system. To avoid distortion, the cable should be connected to a line-level input (typically labelled as ‘line in’, ‘auxiliary’ or ‘aux’). Do not connect to an input intended for a microphone.

# Using the supplied software

Software applications for use with BeebOPL can be downloaded from https://github.com/lazarusr/BeebOPL/tree/master/bin.

At the time of going to press, this software is very much in development, contains a number of bugs, and is not feature complete. It would be much appreciated if any issues you experience using the software could be reported at https://github.com/lazarusr/BeebOPL/issues.

The software is compiled to run on machines with PAGE at &1900 (i.e. a conventional Model B system with Acorn DFS). If your machine has PAGE at a higher level (as is typically the case when Acorn ADFS is installed) use the software in the 'high_page' folder. These variants of the software are designed to work with PAGE up to &2100.

All of the application source code is available on the BeebOPL GitHub repo at https://github.com/lazarusr/BeebOPL/tree/master/src. You are free to modify it as you wish. It is hoped that, in due course, talented programmers will develop software that will take much greater advantage of the full power of BeebOPL.

## Juke Box

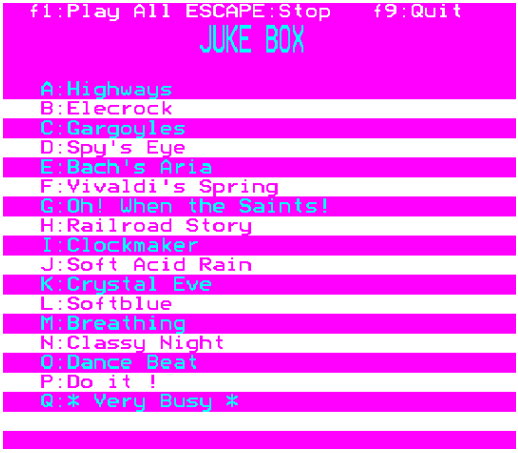
The original Ad Lib Sound Card for IBM PC and PC-compatible computers was supplied with software called 'Juke Box' that played sample tunes. This BeebOPL version of Juke Box contains the exact same sample tunes. Given that BeebOPL is based on the same hardware as the Ad Lib Sound Card, the music should sound virtually indistinguishable. Sadly, at the time of going to press, the user interface is very primitive and bears little comparison to the Ad Lib version. It is hoped that this will be improved over time.

The Juke Box program is specially designed to demonstrate the capabilities of the BeebOPL Music Synthesiser Card. It enables you to play pre-programmed songs of a variety of styles.

Using your preferred filing system, place the JUKEBOX disc, or JUKEBOX.SSD disc image in the default drive and type `CHAIN "JUKEBOX"`.

Alternatively, you can auto-start the software by holding down the <SHIFT> key whilst pressing the <BREAK> key.

You will be presented with a simple menu screen:




If you want to play all the tunes, press <f1>. Alternatively, you can select the tune you want by pressing the corresponding letter key. You can stop the current tune from playing by pressing the <ESCAPE> key. You will then be able to select another tune. If you want to quit the program, press <f9>.

You will notice that there is a timer in the bottom right-corner of the screen. DRO files contain data about the length of the tune. The timer works by loading this data and counting down. It takes its time from the MOS interval timer which is fairly accurate. You may notice that the timer sometimes reaches zero (00:00.00) moments before the tune has finished playing. This is due to slight timing issues with the underlying player software. It is hoped that this can be corrected in due course.

## DROPLAY

The DROPLAY utility is a relatively simple tool. However, as explained below, it is capable of playing just about any OPL2 tune that is capable of being played on a PC.

DROPLAY is intended to be run as a * command. It takes just one parameter, namely details of a file containing DRO version 2.00 data. DROPLAY streams data from disc and is not directly constrained by memory limitations. Provided you can fit the DRO file on to your preferred filing system, DROPLAY should be able to play it.

Unfortunately, there are limitations in the way that Acorn DFS handles loading of data chunks smaller than a whole file. If the whole DRO file will fit into memory, DROPLAY will load it and start playing almost immediately. However, if the file is too large to fit in memory, DROPLAY loads part of the file initially. Contrary to what one might expect, loading part of a file takes considerably longer than loading the whole file. This can take as much as 20 seconds or longer. Whilst this loading takes place, DROPLAY displays the following message:

```
Buffering. Please wait...
```

DROPLAY will the stream the remaining data direct from the disc. In some situations, streaming from the filing system can't keep up with DROPLAY. In such circumstances, DROPLAY stops playback with an error message. Fortunately, this occurrence is relatively rare and most tunes play without a problem.

The above is caused by a known problem with DFS (relating to OSGBPB calls). It is mostly unrelated to the limitations of any physical media. Tunes stored on a conventional 5.25" disc are streamed almost at the same speed as those stored on modern solid state media. The problem does not appear to be an issue with ADFS.

There are a number of sample DRO files on the DROPLAY disc image. A large selection of other DRO files of various genres are to be found on GitHub at https://github.com/lazarusr/BeebOPL/tree/master/music.

## Creating your own DRO files

DRO stands for 'DOSBox Raw OPL'. It is possible to convert any tune (that was originally designed to play on a PC with OPL2 hardware) into the DRO format, by use of the DOSBox application. The following instructions relate to the Windows version of DOSBox. However, DOSBox is available for many

platforms including Linux, RISC OS and macOS. Visit http://www.dosbox.com to download a copy and for further details.

The current version of DOSBox is version 0.74, which was released on 12 May 2010. Notwithstanding the version number, this is a very stable and feature rich release. DROPLAY is capable of playing DRO files created by DOSBox versions 0.73 and higher. Earlier versions produce a DRO format that is not compatible with DROPLAY.

Full instructions on installing and configuring DOSBox are beyond the scope of this manual. The following instructions assume you have successfully installed DOSBox. Many DOS based applications and games are capable of outputting sound and music to a variety of different hardware. It is necessary to configure DOSBox in such a way that it behaves as if the only audio hardware available is OPL2 based. This will force compatible applications to produce audio in OPL2 format.

Once DOSBox is installed, locate the dosbox-0.74.conf file. This is typically located at `%appdata%\Local\DOSBox\`. The file can be opened in any simple text editor such as Notepad. Make sure the file contains the following settings

```
[midi]
mpu401=none
mididevice=none

[sblaster]
sbtype=sb1
sbbase=220
irq=7
dma=1
hdma=5
sbmixer=false
oplmode=opl2
oplemu=compat
oplrate=49716

[gus]
gus=false
```

Most, and probably all, of these settings will already be present in the file. So, just find the relevant sections and change the values where necessary.

You will then need to install the necessary audio applications in the DOSBox virtual environment. Instructions for mounting hard drives and other disc images (together with a host of other information) can be found at the DOSBox website, including on the dedicated wiki (http://www.dosbox.com/wiki).

Launch your chosen application within the virtual environment. Then press <CTRL> <ALT> <F7> to start the DRO capture routine. OPL data capture will then start once the first note is played. When the tune is complete, press <CTRL> <ALT> <F7> again. This will stop data capture. (If you don't stop data capture promptly, your file will be appended with a lengthy period of silence!) Your captured file can then be located in the 'captures' folder. This is usually to be found at `%appdata%\Local\DOSBox\capture\`.

The resulting file can then be played by DROPLAY without any further modification (save for ensuring that the filename complies with the requirements of your chosen filing system).

Using DROPLAY in BASIC programs

DROPLAY will use all of the available memory and will overwrite any BASIC program. In order to use DROPLAY in BASIC programs, you will need to recompile the DROPLAY code. The sources files can be downloaded from https://github.com/lazarusr/BeebOPL/tree/master/src/droplay. Your BASIC program should start by setting HIMEM at the lowest possible level, e.g.

```
10 HIMEM=&2400
```

Then you will need to compile your own version of DROPLAY to run at the same point in memory as HIMEM.

Compatibility

Please note that the software programs are designed to run on a host system. They will not run on any second processor. If you have a second processor. Please disable this first.

# *DROPLAY <fsp>

## Purpose

Plays music files in the DOSBox Raw OPL (DRO) format.

## Example

```
*DROPLAY MYTUNE1
*DROPLAY :1.Z.MYTUNE2
```

## Description

Plays a DRO file.

# *DROPLAY -TEST

## Purpose

Checks to see whether a working BeebOPL card is connected.

## Example

```
*DROPLAY -TEST
```

## Description

Checks for a working BeebOPL card

`BeebOPL card found`
is displayed if the test is successful

`BeebOPL card not found`
is displayed if the test fails

## Error messages

**17 Escape**

The <ESCAPE> key was pressed during music playback.

**65 Syntax: DROPLAY (<fsp>)(-TEST)**

You have failed to specify any file details or have not included the -TEST switch.

**66 BeebOPL card found**

The test function successfully completed.

**67 BeebOPL card not found**

Check that the BeebOPL card is properly connected to the 1MHz Bus and connected to power. If the message persists, this may indicate a fault with the card.

**68 Error opening file**

Either the DRO file could not be found or there was a fault with the filing system. Check that you have entered the details of the DRO file correctly and that the file is on the disc or other data device.

**69 Not a valid DRO file**

DROPLAY can only play DRO files. Other OPL file formats are not supported.

**70 Unsupported DRO version**

DROPLAY can only play version 2.0 DRO files created with DOSBox version 0.73 or later. Earlier versions are not supported.

**71 Wrong card version**

BeebOPL can only play tunes coded for OPL2. It does not support tunes coded for other hardware variants such as Dual OPL2 or OPL3.

**72 Compressed file not supported**

BeebOPL does not support compressed DRO files.

**74** `Buffer failure - filing system too slow`

The selected filing system is unable to stream data fast enough to play the file in question. Trying selecting a different DRO file or using another filing system such as ADFS.

**214** `File not found`

The DRO file could not be found. Check that you have entered the details of the DRO file correctly and that the file is on the disc or other data device.