MUSIC 500

'If you want to make music with your Beeb and you'll accept nothing but the best, Music 500 has to be your choice'
'Performance is nothing short of spectacular'

Gabriel Jacobs, The Micro User, August 1985

'The Music 500 is a truly revolutionary piece of hardware'
'If you thought the envelope facility of the BBC Micro was flexible, you haven't heard anything yet'

Kevin Kilmore, What Micro, April 1985

'AMPLE knocks spots off all previous attempts at giving musicians their own programming language'
'The quality of sound is simply superb'

David Ellis, Electronics and Music Maker, December 1984

'As a BBC user the Music 500 is an answer to my prayers'
'AMPLE presents a standard for other manufacturers to follow'

Jeremy Vine, Electronic Soundmaker, February 1985

'AMPLE . . . is by far the neatest way of composing and playing music on a computer'
'The language is incredibly easy to use'

Clive Grace, A & B Computing, April 1985

'Put simply, the sound facilities of the 500 are stunning'
'. . . almost any sounds and effects can be programmed'

Noel Williams, Personal Computer World, May 1985

'It is possible to reproduce almost any sound that can be imagined'

Electronics & Wireless World, March 1985

The Acorn Music 500 is a complete hardware and software package which turns your BBC Micro into a sophisticated polyphonic music composition and performance system. Music 500 can be connected to a household stereo but it is equally at home in the recording studio or classroom.

Music 500 comprises a powerful digital synthesiser with

* 16 oscillator channels
* programmable waveforms
* programmable amplitude and pitch envelopes
* ring modulation, synchronisation and frequency modulation
* high-resolution amplitude and frequency control
* stereo outputs

and AMPLE, a versatile music programming language with

* textual music notation and sound commands
* concurrent processes for multi-part music
* envelope and waveform creation words
* procedures, loops, conditionals, arithmetic and strings
* user-defined extensions

Music 500 connects to the BBC Microcomputer Model B, via the 1 MHz bus. The stereo audio output connects to amplification or recording equipment (such as a home stereo) via a standard DIN lead.

Software

The synthesiser unit is controlled by AMPLE; a computer language created especially for sound and music. The music notation uses letters to represent note pitches, a change to a lower case letter representing a decrease in pitch from the preceding note, and a change to an upper case letter representing an increase. Numbers are used for note length, and short notes may be 'tied' together to make longer ones using '/'. Other symbols represent the full range of musical functions, including rests (^), accidentals (+ or −), bar lines (|), key signatures and chords.

A tune:

```
^/GBDGaF | G/g/g/^/ | ^/GBDGaF | G/g/g/!/ |
E//EE/EG | d//dd/dG | ceABDcbC | a/////!/ |
```

A rhythm:

```
X///Y//X X///YYYY X///Y//X X/Y///Y/ % X=drum, Y=cymbal
X///Y//X X///YYYY X///Y//X X//YXXXX
```

Chords:

```
c(GE) / c(AF) c(BG) | c(GE) / c(AF) c(BG) |
F(CA) / F(DB) F(EC) | c(GE) / c(AF) c(BG) |
```

A piece of music written in this notation forms an AMPLE program which performs the piece on the synthesiser when it runs. As in Logo, programs are constructed from 'words' which are used to define sounds, instruments and musical passages, to add new musical symbols or even to create completely new musical notations. Music words can also be entered directly to try out new tunes and sounds.

AMPLE provides multi-tasking so that up to eight 'players' can run at the same time, with keyboard commands still being accepted and executed. This allows parallel musical parts to be written and tested separately, and the instrument sounds, tempo etc. to be altered while the music is playing.

```
"play" [% piece with 4 separately-scored parts
4 PLAYERS% piece uses four players
1 PLAY( kit rhythm   )PLAY% player 1 uses 'kit' to play 'rhythm'
2 PLAY( bass riff    )PLAY% ... sound 'bass' and score 'riff'
3 PLAY( organ chords )PLAY% ... sound 'organ' and score 'chords'
4 PLAY( synth melody )PLAY% ... sound 'synth' and score 'melody'
GO ]% all players start
```

AMPLE also has a powerful set of programming language features which greatly expand the musical and sound possibilities. These include integer arithmetic, string operations, input/output functions, loops and conditionals. Music, sound and programming words can be mixed together freely, giving enormous potential for sound and music experimentation.

The Synthesiser Unit

The synthesiser has 16 independently-controlled sound channels organised as up to 8 musical voices, i.e. up to 8 separate instruments playing simultaneously.

The pitch of each channel can be controlled in units of 1/16th of a semitone from 0 to 20 KHz. This means that the pitch can be varied in a smooth unbroken sweep across the entire audible range. Pitch envelopes can be defined, either by using basic standard shapes or by direct programming of up to 10 straight-line segments, to create effects ranging from subtle vibratos to pitch sweeps of over five octaves.

Amplitude envelopes can be defined in the same way as pitch envelopes, with which they are interchangeable. Amplitude is logarithmically controlled to give a large dynamic range.

Waveforms may be defined by setting the strengths of the first 16 harmonics, by creating a particular waveform shape, or by a combination of the two. Envelopes have separate once-only and repeating sections, so they can act as low-frequency oscillators.

Cross-modulation of the channels, frequency modulation, ring modulation and synchronisation can be used to create many effects including bell-like sounds, white and coloured noise and many complex tones.

The channel outputs can be panned individually to one of seven positions in the stereo field, from full left to full right.

OVERALL SPECIFICATION

Channels	Number	16
	Frequency range	0 to 20 KHz
	Frequency resolution	0.0056 Hz
	Pitch range	>10 octaves
	Pitch resolution	1/16 semitone
	Sampling rate	46.875 KHz
	Stereo positions	7
	Separate main pitch and transposition	
	Waveform selection	
	Pitch and amplitude envelope selection	
	Signal inversion	
Waveforms	Number	14
	Harmonic definitions	16 harmonics
	Geometric definition	128 points
Envelopes	Number	13
	Types	Pitch and amplitude
	Definition types	ADSR, cycle and segment
	Number of segments	10 max per envelope
	Segment duration	0 to 320 s
	Time resolution	10 ms
	Pitch range	0 to >5 octaves
Timebase	Range	0.26 to 655 ms/tick

Future Products

Music 500 is the first in a range of products that will form a low-cost integrated computer music system based on the BBC Microcomputer. Products under development include:

AMPLE Nucleus – an extensible version of AMPLE supplied in ROM to act as the nucleus of the integrated system. It provides general-purpose extension interfaces for additional hardware drivers (other synthesisers, musical keyboard, MIDI) and for utility modules such as panel-style, interactive editors for instruments, waveforms and envelopes.

Music 400 keyboard – a programmable 4-octave musical keyboard for use with Music 500. Notes played at the keyboard may be transcribed automatically into AMPLE score, thus allowing the keyboard to be used for direct music composition.

HARDWARE REQUIREMENTS FOR MUSIC 500
BBC Microcomputer Model B, B+ or B plus ARIES-B20/B32, with OS 1.2
Amplifier (e.g. home stereo)
Audio lead

WHAT YOU WILL GET
Music 500 synthesiser

Cassette containing:
1. The AMPLE language
2. Example programs
3. A set of example envelopes and waveforms
4. A program to transfer the software to disc

140-page manual which includes a step-by-step tutorial section, an advanced section, and an exhaustive reference section.

Ordering information

Music 500 may be ordered direct from Aries Computers at the address below. Please add £3.50 postage and packing and allow 21 days for delivery within the UK. If you are not completely satisfied with your purchase, we will refund your money in full, provided that you return the goods within 14 days of shipment, undamaged, and in their original packaging. Please enquire for overseas postage and insurance costs.

The Music 500 is designed by Hybrid Technology Limited and is produced by Acorn Computers Limited. AMPLE is a trademark of Hybrid Technology Limited.

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