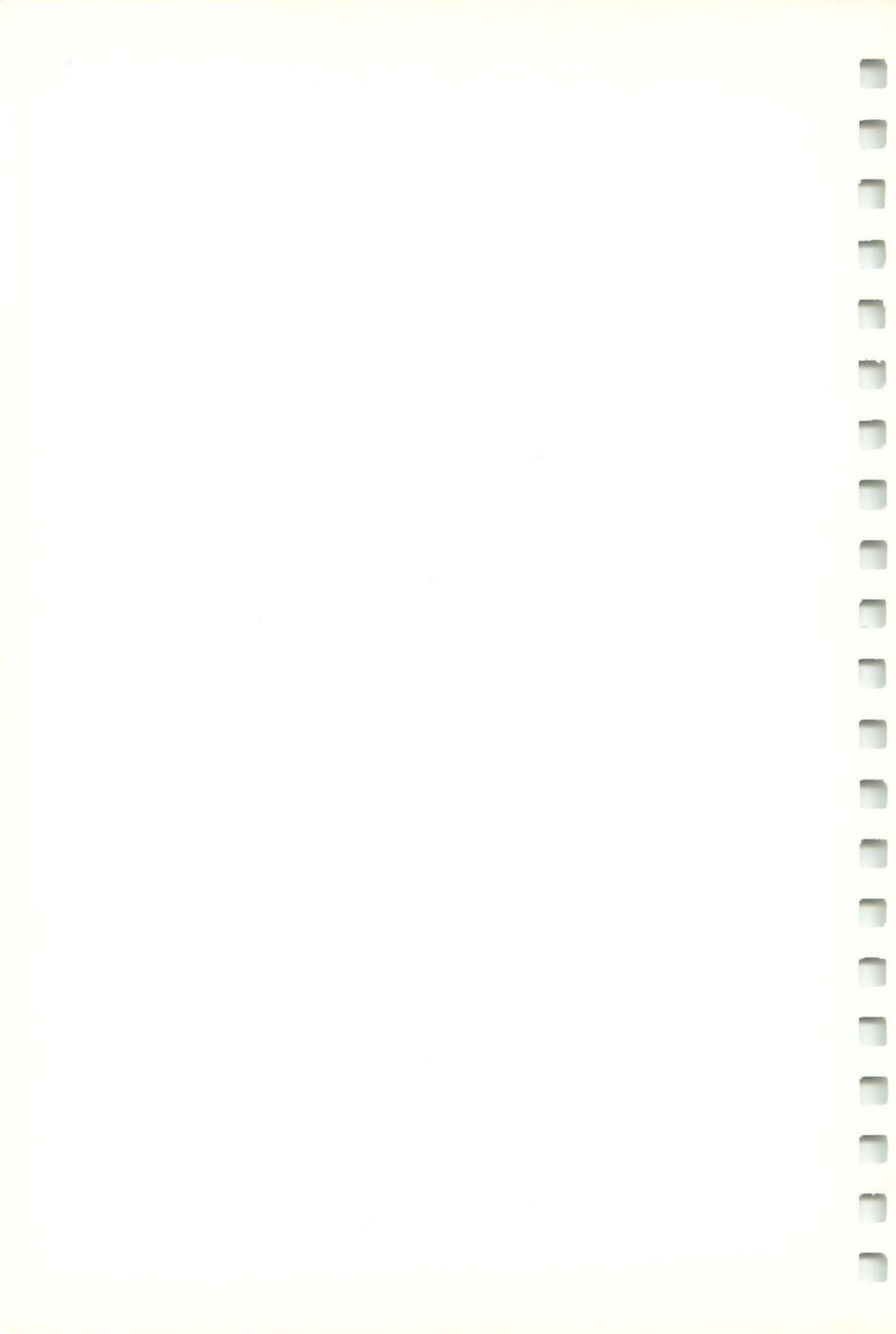

COMMODORE
64/128K

THE MUSIC SYSTEM



USER

MANUAL



TMS DEVELOPMENT TEAM

Back in April 1983 Phil Black at Sheffield University finished work on a program for the Acorn BBC/B computer called the Music Editor. The program was the first music screen editor to be developed for the machine. It allowed music to be written directly onto staves. Other innovations included the defining of sound envelopes within the program, three voices, six different tempos and the ability to write in any key.

This program was launched commercially by SYSTEM, the Sheffield based software house. The same month Black joined SYSTEM as a senior programmer.

The requirement for a program that would ease the difficult process of creating and editing envelopes was met by Geoffrey Ellis. The program was marketed by SYSTEM in August 1983 under the name of The Envelope Generator.

In October 1983 Adrian Boot from ISLAND LOGIC made contact with SYSTEM to co-develop a project which would create a fully integrated music package. The specification would include an Editor, Envelope generator (now known as The Synthesiser) and Keyboards. The package was to be written entirely in machine code to incorporate a four-voice Editor with many facilities, including automatic transposition, and animation of musical notes as they played.

By January 1984 an enhanced version of the Editor had been fully specified. The over-all specification of the package was revised to include the Linker and Printer modules. Preliminary coding using System's A.D.E. (Assembler, Debugger, Editor) began to establish the feasibility of such a project.

In the same month The Music System hit vinyl!! SYSTEM's Envelope Generator was used on an album by Jamaica's leading reggae group Black Uhuru (courtesy of Island Logic's sister company, Island Records). The resulting album, Anthem was released the following July. These early trials at Island's Fallout Shelter Studio provided many ideas for the specification.

February 1984 saw the start of intensive programming both at SYSTEM and ISLAND LOGIC. The Music System Development team was born. Design work on the 'front end' of TMS was underway. An integrated 'user interface' with pop-up/icon graphics was defined and

implemented. A Control program was developed to handle each of the separate modules and provided a fully integrated package. In October 1984 The Music System was launched for the BBC/B micro.

By December 1984 The Music System development team had specified an improved version of TMS for the Commodore 64 micro. It included a complete new module, MIDI, which would allow external keyboard/synthesisers to be used within TMS. All the modules were redesigned to take advantage of the Commodore's superior sound hardware and additional memory.

In November 1984 Nicky Johns joined the ISLAND LOGIC end of the development team to coordinate each of the modules and to integrate them under a common filing system and Control Screen. A development environment for the new system which effectively used The BBC/B linked to a Commodore 64 was devised. This environment enabled the team to write this highly complex system.

Most of the work on the pop-up/icon graphics was completed in early February. Prototypes of the EDITOR and MIDI were being tested, and a text Editor was added to the PRINTER module allowing the user to enter and print Lyrics along with music files.

Between March and August 1985 intensive coding, testing and re-coding culminated in the completion of this new enhanced version of TMS. During this time SYSTEM completed work on a Simplified version of TMS for release on tape. This 'simplified' version includes the more important facilities of the Editor, Keyboard and Synthesiser modules, and provides an easy upgrade route to the advanced version. The TMS development team is currently working on improvements and new versions for other 8-bit machines as well as the new generation of computer hardware. The work continues.

Philip Black	(SYSTEM)	SOUND/VMW/ ADVANCED EDITOR TMS KEYBOARD/ EDITOR/SYSTEM DESIGN
Adrian Boot	(ISLAND LOGIC)	CONCEPT/SYSTEM DESIGN/USER MANUAL
David Ellis	(SYSTEM)	CONCEPT/SYSTEM DESIGN/USER MANUAL
Nicky Johns	(ISLAND LOGIC)	FILING/ INTEGRATION/DESIGN/ UTILITIES
Geoffrey Ellis	(SYSTEM)	DESIGN/ SYNTHESISER
Ewan Hayward	(SYSTEM)	ADVANCED LINKER
JOEY	(ISLAND LOGIC)	ADVANCED MIDI
Ching Man Wong	(ISLAND LOGIC)	COMMAND LINE/ KEYBOARD/GRAPHICS
Steve McGarry	(ISLAND LOGIC)	ADVANCED PRINTER
Shaun McGarry	(ISLAND LOGIC)	DEVELOPMENT SUPPORT/PRINTER

Additional design/help/support/encouragement from:

Brian Jones (ISLAND LOGIC)	Keith Shaw (SYSTEM)
Sue Shaw (SYSTEM)	Steve Swallow (SYSTEM)

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THE MUSIC SYSTEM

**COMMODORE
64/128K**

INTRODUCTION

The Music System is a sophisticated microcomputer based music program for creating, editing and playing music. These facilities are contained in two programs which are available on opposite sides of the cassette or disc. Both cassette and disc versions are identical except for the starting up instructions and loading and saving tunes. Where differences occur a cassette symbol means 'cassette users only' and a disc symbol 'disc users only'.

On side one of the TMS cassette or disc is the KEYBOARD. You can tinkle on the 'keyboard' and change sounds just like an electronic synthesiser; record up to three tracks on the multitrack recorder emulating different instruments on each track; watch the notes appear on the staves as you play; scroll through each track and edit the notes on the staves or enter tracks or complete tunes directly on the staves. The whole tune will even scroll past as it's playing. Of course you can save your musical masterpieces on cassette or disc or even load in some prerecorded compositions.

On side two is the SYNTHESISER module. This provides the means of creating and editing the sounds used in the KEYBOARD. It also features a real time sequencer which allows tunes to be played back while changing or editing the sounds.

TMS is full of useful and interesting features, some of which may take a little while to learn how to use. The system is very friendly and we try very hard not to let you get in a tangle. If you have a problem, be patient and consult the manual.

The KEYBOARD and SYNTHESISER Modules have been designed to be used quite independently of each other. However you will certainly want to use both to get the best out of the system. This manual has been written assuming that you will want to try out the KEYBOARD first before experimenting with sounds in the SYNTHESISER. Many of the functions are exactly the same eg. Filing and Info so you will probably greet the SYNTHESISER like a long lost uncle! However you may need to refer to earlier sections on the KEYBOARD if you get in a muddle.

TMS has a larger relation called The Advanced Music System (AMS) available only on disc. AMS has six different modules including EDITOR, LINKER and MIDI and a host of additional features. A brief outline of extra facilities are given at the end of this manual. If we do

tempt you to buy the whole system you can rest assured that you can take all your favourite tunes with you they will play just as well on AMS.

Getting Started with the KEYBOARD



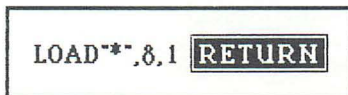
Disconnect any hardware add-ons and disc drive. With side A (KEYBOARD) facing up, load the cassette in the cassette recorder and rewind to the beginning if necessary. Hold down the **SHIFT** key and press the **RUN/STOP** key once. Press **PLAY** on the cassette recorder.



Remember to remove the program cassette **BEFORE** attempting to save a tune. **ALWAYS** use a blank cassette tape to store your tunes on.



Insert the program disc in your disc drive with side one (KEYBOARD) uppermost, type **LOAD "*" ,8,1** and press the **RETURN** key. A copyright screen will soon appear and the program will load and run automatically.



Replace the program disc with a formatted data disc **BEFORE** attempting to save a tune. Data discs may be created in the usual way.

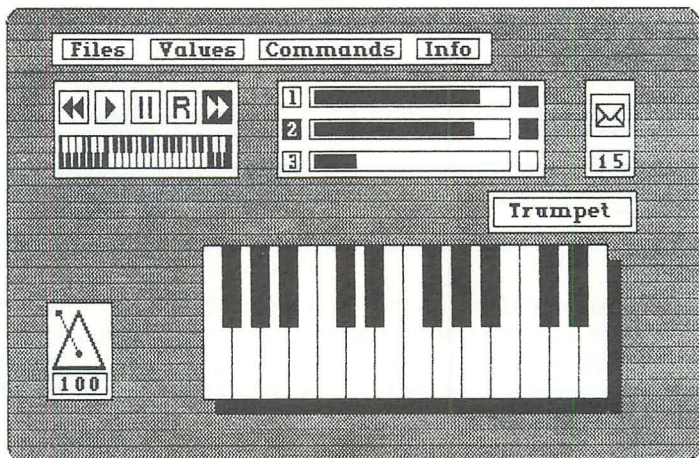
e.g. **OPEN 15,8,15,"NEW0:LIBRARY,01" RETURN**
CLOSE 15 RETURN

Warning: The disc filing system may not function correctly if additional, or worse still, exotic hardware add-ons are connected to your Commodore 64. The system may also be upset by a poor or fluctuating mains power supply. Large magnetic fields generated by some TV's and loudspeaker systems could also create problems. Keep your disc drive in good condition and operate it away from the above mentioned demons.

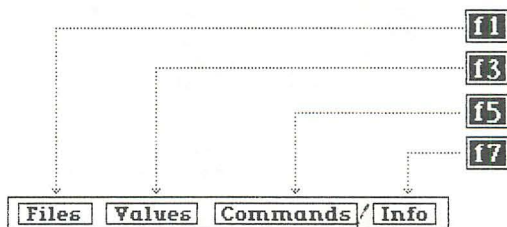
Introducing the KEYBOARD



The screen consists of a number of different blocks which we often call devices. We will briefly look at each device before getting down to the business of composing music.

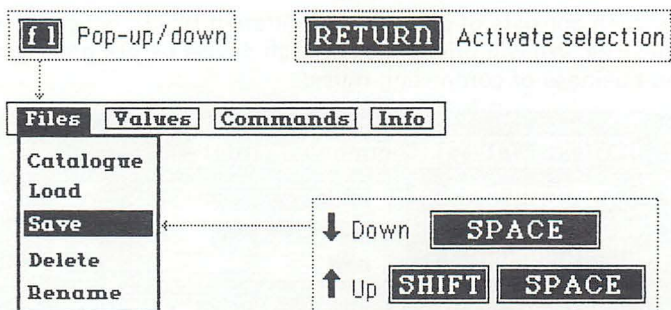


Along the top is the Command line which is used for all filing operations, for changing certain parameter values (eg tempo), accessing some commands and looking at the status information. Press each of the four function keys on the right of the keyboard to pop up the menus and status information.



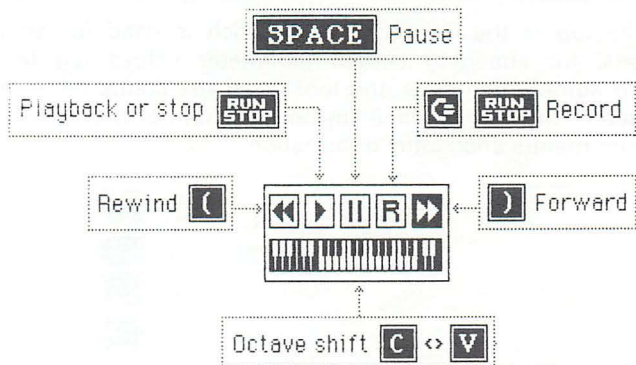
Pressing a function key again pops the window down again. For instance if the Info pop up is displayed press **f7** to pop it down.

You will notice that each of the pop ups except Info has a horizontal highlight bar which can be moved down by pressing the **SPACE** bar. The highlight bar can also be moved upwards by holding down **SHIFT**, and pressing **SPACE**. The highlight bar is used to select the function you intend to use or the value you want to change.

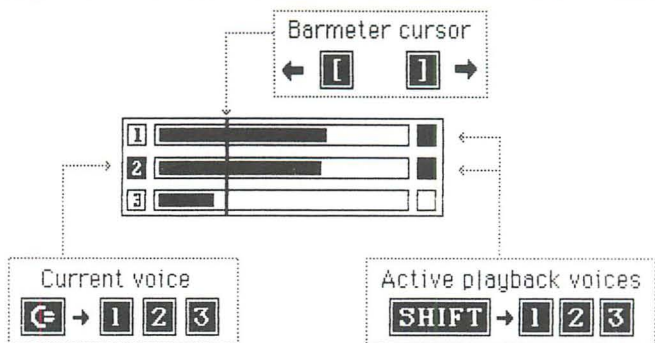


Let's leave the Command line until you need to use some of its facilities.

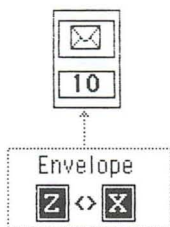
Below the Command line on the left is the control panel. This shows you whether you are recording, playing back or pausing for a breather! It also displays the octave range selected for the keyboard. The diagram below shows the keys used to activate the control panel. You don't have to remember them now, we'll introduce them again very soon.



Next to the control panel is the barmeter device. This gives a visual guide to the contents of each of the three voices. When music is recorded the bars extend across the device indicating the length of the voice relative to the others. The barmeter cursor shows you where you are within a tune and moves left and right as you rewind and fast forward through a tune. The highlighted voice number on the left indicates which voice you are recording and the small playback indicators on the right hand end are highlighted when voices are selected for playback (including none!)



To the right of the barmeter is the envelope device. Recognise the icon..... pretty neat idea, eh? There are 15 different instruments or sounds to choose from in each sound set. Just dial up the envelope number. The envelope name is shown below the envelope device. The names are given as a guide so don't expect the keyboard to always sound like a violin when the 'violin' envelope is selected.... it does also depend on the octave and filter settings! You can always design your own sounds with the SYNTHESISER after a little practice.



The piano keyboard responds to the top two rows of Q-W-E-R-T-Y keys on your Commodore 64. The Sight and Sound™ keyboard overlay can be used equally well (see page 41). As a key is pressed, a note sounds and the proper note name according to the key signature is displayed on the keyboard. e.g. note B in the key of Bb is shown as a B (natural). This is a tremendous help for those of us who cannot remember which notes belong to which keys!

The metronome at the bottom left provides a visual indication of the beat in crotchet time. The number underneath is the tempo in crochet beats per minute.

There is another very important device that isn't shown on the basic screen called the Voice Monitor Window. But we'll leave that to later on after you've mastered playing and recording.



Making music

The Music System **KEYBOARD** is a powerful composing tool with many features. Notes may be played directly from the piano keyboard or played directly on staves. We'll start with the piano keyboard and after you've discovered the delights of 'tinkling the ivories' and recording the odd musical masterpiece you can move on to using the Voice Monitor Window and entering and editing notes directly.

Notice that the metronome is moving with the beat which means that you can play along to it. Press a key on the second row of the computer keyboard (starting at **Q**). You should be producing a sound if not check the volume control on the TV. This row of keys represents the white notes on a piano. The row above are the black notes. Notice that there are gaps in the black keys on the piano keyboard so that not all the keys on this row will make a sound. If you are using a keyboard overlay then this is sorted out for you automatically. Press **X** to change the envelope or instrument and play a few more notes. There are fifteen envelope sounds to choose from try them all! If you want to silence the keyboard when tinkling press ←.

The tiny control panel keyboard shows you the pitch range of the piano keyboard. Use **C** and **V** to move it up and down an octave either way. To produce lower or higher sounds you need to change the voice octave setting in Values. Press **f3** to pop up Values and press **SPACE** to move the highlight bar down to *Voice*. You can change the voice number using **Q** and **W**. These keys are used to change any of

Files	Values	Commands	Info
	Octave	2	F # 6 sharps
	Filter	off	4/4
	Tempo		Presto
	Volume		15
	Filter number		1
	Voice		1

RETURN	Pop up/down
Q < > W	Change value



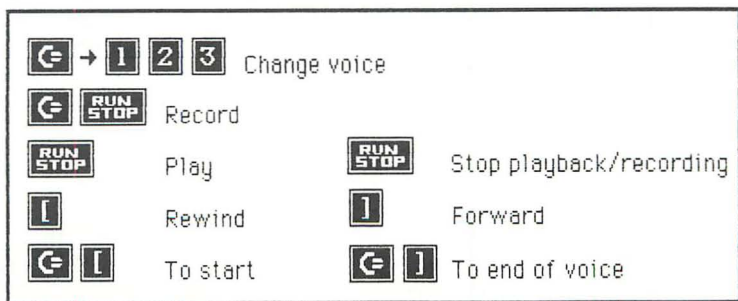
the parameter values in the pop up. Set it back to 1 and press **RETURN** to pop up the secondary window.

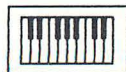
You can use **SPACE** to move the highlight in this window. Set it on *Octave* and use **Q** and **W** to change the octave setting. Press **RETURN** again to pop the secondary window down again and press **f3** to pop down the whole window. You will now be able to play even lower or higher than before on the keyboard.

Now you are used to the Values pop up, try changing *Tempo*. At faster tempos you will be able to play quicker. The keyboard does not allow you to play notes shorter than a certain note value so that your music will consist of proper notes and look reasonably tidy on the staves (we're coming to that later). The shortest note you can play is dictated by the *Resolution*. Pop up Values again and change *Resolution*. The shortest allowable notes for *beginner*, *standard* and *expert* are crotchet, quaver and semiquaver respectively. You will therefore be able to play a lot more notes in a beat as an *expert*.

Recording

Now to 'lay down a few tracks'. Make sure that you are in voice 1. The barmeter highlights the current voice number on the left. If not press **COMM-1** to put you in voice 1. Note that the envelope and octave settings can be different for each voice so the sound might change. Press **COMM-RUN/STOP** to record and away you go notice how the barmeter grows even if you are not playing (it's putting rests in automatically) and the control panel is highlighting the Record icon. Stop recording by pressing **RUN/STOP**. To see how many notes and bars you have played pop up Info (**f7**). Pop it down with **f7** again. Rewind to the beginning by pressing **[** and play back your masterpiece with **RUN/STOP**. A quicker way to move to the beginning or end of a voice is using **COMM-[** and **COMM-]**.





You can move backwards and forwards in a voice and play from any point. Watch the barmeter cursor to see where you are.

Change to voice 2. Because there are no notes stored the barmeter cursor moves to the beginning of the tune. Set up the envelope and octave to produce a different instrument sound and start recording again. Voice 1 will play back as well so try and keep in time! You can rewind and play them back together great? If you don't like your first attempt, rewind to the beginning or to wherever it went wrong and press **COMM-RUN/STOP** to over-record the whole or part of the voice. A pop up will ask you to confirm that you really want to record over part of the voice. It will wipe out all notes from the cursor to the end and start recording again. You can always record onto the end of a voice at any time.

It's now time to attempt a third track! Switch to voice 3 and set up a new instrument. You can turn off either or both of the previous tracks while you record this one you might like to add a rhythm pattern using the metronome as a guide. Press **SHIFT-1** to turn off voice 1, **SHIFT-1** for voice 2. Notice how the playback indicators on the barmeter change.

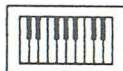
SHIFT → **1** **2** **3** Switch voice on/off for playback

Record another track and listen to the final masterpiece perhaps not Jean Paul Jarre, but after a little more practice? Remember that you can turn any of the voices on or off as it's playing back. You can also change the tempo and the octave settings for each voice before playing back.

The final item in this section is pause. Whilst recording press **SPACE**. The pause icon highlights in the control panel and you may then change the envelope or the pitch range before continuing by pressing **SPACE** again. To continue without a break hold down the next note key before pressing **SPACE**.

Saving a tune

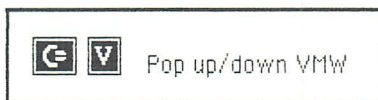
Saving your composition on cassette or disc is exactly the same except that you need to find a blank section on your data cassette before trying to save a tune. You will also have to press **RECORD** in the usual way. **DO NOT TRY AND SAVE A TUNE ON YOUR PROGRAM CASSETTE OR DISC.**



Select Files (**f1**) and move the highlight to *Save*. Press **RETURN** to activate this option and another pop up will appear showing the music file name. You can change this by overtyping and/or deleting. Use [and] to move the cursor backwards and forwards and **INST/DEL** to delete letters. Press **RETURN** when ready and confirm that you *really* want to save this tune! When saved, pop up Info and see that the music filename has been changed. Next time you save the file (after a few amendments perhaps) this filename will automatically appear. If you don't want to change it just press **RETURN**. On disc you will be asked if you want to replace the old file already on the disc.

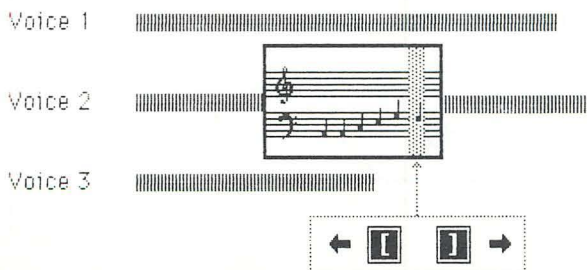
The Voice Monitor Window

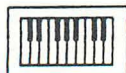
The Voice Monitor Window or VMW displays part of a tune stored in memory for viewing and editing and it will also display the notes input from the piano keyboard as you record them. Pop up the VMW by pressing **COMM-V** or accessing the *Show V.M.W.* option in Commands (**f5**).



The VMW is popped down by pressing **COMM-V** again. A tune can have up to three voices and the VMW can show a small part of one of those voices. The window can be flipped between voices by pressing **COMM-1,2** or **3** as before. The notes in that voice can be scrolled through the window using [and]. An extra control device pops up beside the metronome at the same time as the VMW. The number in the device shows which voice you are in.

The diagram below shows the VMW looking into part of voice 2.

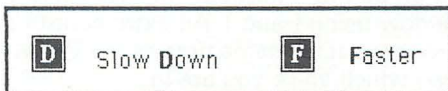




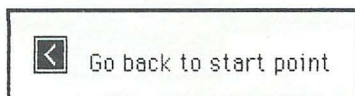
Inside the VMW there is a white vertical band called the note cursor. This marks the 'current note' - the one you can play from; record from or edit. When notes scroll by they sound when they pass the cursor on the right. When flipping between voices the current note in the new voice is the one that would have been playing at the same time as the current note in the previous voice. You can therefore flip easily between voices knowing that the notes always 'line up'. The VMW also displays the appropriate key and time signatures selected from Values (see page 19).

To see how the VMW works load in one of the sample tunes from your program cassette or disc (see page 17). and pop up the VMW. You can scroll through any of the voices and play from any note in any voice. Press **RUN/STOP** to play as before. All voices that are currently selected for playback will scroll past as they play! You can even turn voices on and off when they are playing and they will disappear! Press **RUN/STOP** to stop playing and the VMW will show the current voice again at the last note played. If you want to just play and scroll the current voice turn the others off for playback using **SHIFT-1,2, or 3**.

When the VMW is up the Command line is hidden so you can not pop up Values or Info etc. If you need to change anything pop down the VMW with **COMM-V**, change a parameter value and pop the VMW back up. For convenience you can alter the tempo directly when the VMW is up using **D** and **F**.



The other extra feature is the ability to return to where you last started playing from. For instance you might like to hear a certain phrase over and over again. Press **<** and you will go back to where you started.





Recording with the VMW

Again you can record music from any point in any voice. Press **COMM-RUN/STOP** and confirm that you want to overwrite the remainder of that voice and away you go. Of course if there is no music in a voice or if you are at the end of a voice you will begin to record straight away. As you play the piano keyboard the notes appear at the cursor position. If you don't press a key a rest will appear. Some notes will appear as a tied pair and bar lines will be inserted automatically according to the time signature. This can be changed in Values. It is quite a good idea to try recording at a slow tempo to start with. You can easily speed it up for playback. Remember that the *Resolution* determines the shortest allowable note length so that you will not be able to play anything less than a crotchet in beginner mode (see page 9).

The pause facility may be used with VMW up. The control icon displays the pause symbol rather than record. You can change the envelope and octave settings before continuing. Notice how the last rest is replaced by the first note you play after continuing: a rather cunning feature so that you can record continuously without a break.



Enter/edit



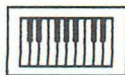
Play



Record



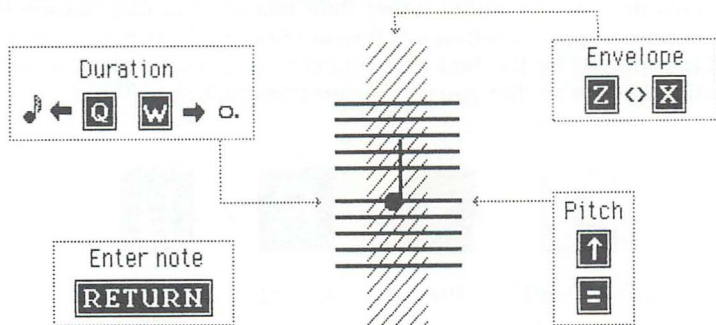
Pause



Entering notes and editing.

Instead of recording voices from the piano keyboard, notes may be entered directly on the staves. Of course you could edit keyboard tunes or use both facilities to create a tune. For instance, you might like to enter a rhythm or 'click' track using the edit facilities and add a top line from the keyboard.

If there are notes already in memory delete them by accessing Commands: *Delete voice* for each voice. Pop up Commands by pressing **f5** and move the highlight to Delete voice and press **RETURN** to activate the command. If you change your mind just press **f5** again to pop down Commands. You can then change voice and delete another voice. With no notes stored pop up the VMW. A single blue note will appear. A blue note has not yet been stored in memory and always appears at the end of a voice ready to be entered. The pitch, duration and envelope of this note can all be changed before it is entered as part of a tune.

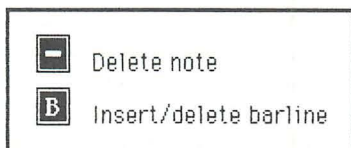


Enter the note by pressing **RETURN**. The newly entered note moves to the left and a similar note appears under the note cursor. Again this note may be edited and entered into memory by pressing **RETURN**. To hear the notes scroll back with [and press **RUN/STOP** to play. Once a note has been entered you can easily edit it by moving the note to the cursor position and changing the pitch, duration etc. This time the note will appear black because it is a real note stored as part of a voice. To remove a note (it must be a real one!) move it to the cursor column and press -.

As more notes are added to a voice barlines will begin to appear automatically according to the time signature. If the notes can not be fitted correctly in a bar the warning message 'Bar too long' is displayed. Press **Y** if you want an oversized bar, or **N** if you want to



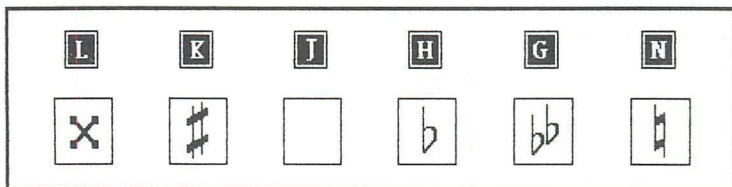
adjust the duration of the note(s) to make them fit. You can put in your own barlines wherever you want by pressing **B**. Press **B** again to remove a barline. If you delete a note any barline to the right of that note will also be deleted.



Having entered notes in one voice switch to another. You will be back at the beginning again because there are no notes in the voice. Add a few notes and switch backwards and forwards between the two voices to see how the parts line up. If you only want to play back the voice you are entering remember to switch off the other(s) with **SHIFT-1,2** or **3**. You can see which playback indicators are on as we've left the right hand end of the barmeter visible. To see the lengths of each voice pop down the VMW to look at the whole barmeter.

More on editing

Accidentals

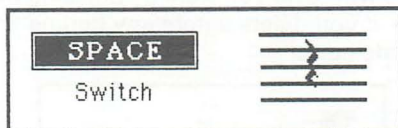


Accidentals can be added to any note by pressing the relevant key. Notes are automatically put in the correct key according to the selected key signature so there is no need to put in sharps and flats where they are already shown in the key signature. If you require a note to be a natural, press **N**. Press **J** to cancel any accidental and therefore leave the note in the selected key.

Music is entered in proper musical notation with the usual convention of only showing accidentals once in a bar. If a particular note, say C is made sharp (C#) any further C's at that pitch will be assumed sharp for the rest of that bar unless cancelled by a natural or other accidental.

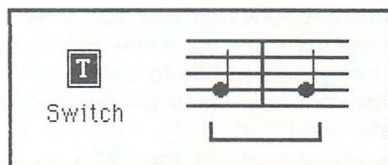


Rests



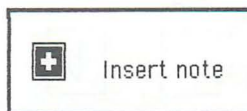
The current note can be switched to a rest by pressing **SPACE**. A rest can be switched back to a note by pressing **SPACE** again. You can move rests between staves using $\uparrow$ and $=$.

Ties



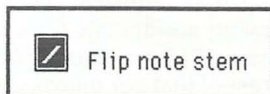
A real (black) note at the cursor may be tied to the previous note if it is of the same pitch. Blue notes can not be tied directly - they must be entered first. Remember that if you change the pitch of one note in the tied pair you need to change the other.

Inserting notes



Notes can always be added to the end of each voice if there is sufficient free space. Look at Info (f7) to see how much room there is left. Notes can be inserted into a voice by pressing **+**. The extra note is identical to the original one. You can then change the pitch, duration etc. in the normal way. Note that the bar you are in might not now contain the correct number of beats.

Note stem





The note stem will flip at a fixed point as you move a note up or down the stave. If you want to change the direction of the note stem simply press /. Press / again to flip back.

The Keyboard Command line

The command line is used for all Filing options, to set up user parameters in Values and to access Commands and status Information.

Files f1

There are two different types of file that can be loaded or saved from the Music System.

- | | | |
|----|-------------|---|
| m. | music files | can contain three voice tunes up to 999 notes long with associated sound file. |
| s. | sound file | contains 15 sound envelopes or instruments and a set of four filters. These can be loaded into or saved from sound set 1. |

It is important that you ensure, when loading and saving files, that the file is of the current type. It is possible that two files can have the same name but different file types ie. s.soul2 is a sound file whereas m.soul2 is a music file.

To select a filing option press **f1** and use **SPACE** to highlight the required option. Press **RETURN** to activate or **f1** to pop down again without any action. The cassette and disc filing are described separately below.



The *Catalogue* option allows you to search through a cassette for music or sound files and to then load any particular file you come across. Select *Catalogue* (by highlighting and pressing **RETURN**), press **PLAY** on your cassette recorder and answer the pop up questions on the screen.



To Load a file select the *Load* option. A small load window pops up and waits for you to type in a filename. The ← key can be used to change between loading music or sound files.

Press **RETURN** and then **PLAY** on your cassette recorder and the Music System will search for the file. Make sure that your cassette tape is rewound to the start of the file.

To save a file select the *Save* option. A small save pop up is displayed. Again you can use ← to change between saving the music file or sound set. Type in the filename (if different to the current filename) and press **RETURN**. Press **RECORD** on your cassette player and the file will be saved. Make sure that you use the correct file type. If you try to save a musical composition as a sound file (s.) then the current sound set will be saved and not the music.



The *Catalogue* option allows you to see which music and sound files are on the disc. If the window is full up use **SPACE** to scroll the filenames.

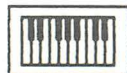
Load sound
m. sonata
m. rockroll
m. jazz
s. effects
s. woodwind
m. reggae

Save music
m. █

Change file type	
←	music
	sound

To load a file select the *Load* option. A pop up will appear with a catalogue of music and sound files. Move the highlight to the file you want to load and press **RETURN**. The top line of the pop up shows you what type of file you are loading. A sound file is always loaded into sound set 1.

Saving a file on disc is exactly the same as on cassette except that you will be warned if the file already exists. Press **Y** to overwrite the original file. You can not write files to the Music System disc. It is write protected. You will need a new data disc.



To rename a file select the *Rename* option. A catalogue will be displayed. Move the highlight to the file you want to rename, press **RETURN** and type in the new name. Press **RETURN** and the file will be renamed.

You may *Delete* a file in a similar way.

Do not attempt to **VALIDATE** a disc which contains music files, as this may result in the files being erased. Refer to your 1541 User manual for details.

Values f3

Files	Values	Commands	Info
	Key signature	F * 6 sharps	
	Time signature	4/4	
	Tempo	Presto	
	Resolution	average	
	Volume	15	
	Filter number	3	
	Voice	3	

Change value

The *key signature* may be changed at any time even when notes have been entered. This is called transposition. Because of the differences in pitch interval a particular piece of music could quite possibly be transposed into some keys and not others. It is quite possible that particular keys will be missed out and there may be some tunes which cannot be transposed into any other key.

The *Time signature* determines where barlines are inserted when recording and entering notes. If it is altered after notes have been entered the barlines will probably not appear in the correct positions.

The *Tempo* can be set between 30 crotchet beats per minute (grave-) and 200 beats per minute (prestissimo). When *Tempo* is highlighted you can switch between beats per minute and Italian notation by pressing ←.

The *Resolution* setting is intended to make recording from the piano keyboard easier for beginners. If set to *beginner* the shortest allowable note is a crochet. This means that notes will only sound on the beat making it easier to synchronise tracks.

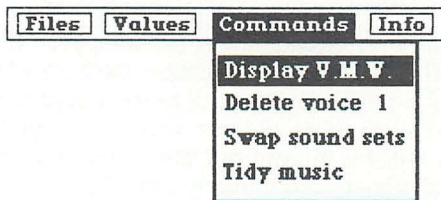


The *Volume* setting works just like the volume control on your TV. If you are annoying your neighbours just turn it down a little!

The *Filter number* can be set between 1 and 4. The four available filters are loaded and stored with the 15 envelopes as part of the sound set. Each filter can be used with any of the envelopes to change the sound. Experiment with different combinations of envelope and filter - you will be amazed by some of the sounds you can produce. Some of the special effects such as phasing and wahwah can only be produced with filters. There is only one filter available for all three voices but you can turn the filter on or off for each voice. To do this select *Voice* and press **RETURN**. A secondary pop up will appear showing the *Octave* and *Filter* values for that voice (see page 8). You can highlight and switch *Filter* on or off in the usual way. Press **RETURN** to pop down again.

With *Octave* set to 3 the pitch of the notes on the VMW is then correct as written. Selecting another will transpose the voice up or down.

Commands f5



Display V.M.W. is the same as COMM-V. The Voice Monitor Window is popped up for editing or seeing notes as you record.

Use *Delete voice* to delete all notes in the current voice.

Swap sound sets swaps the position of sound sets 1 and 2. The sound set names will also be swapped. These are displayed in Info. There are always two sound sets stored in memory at any time. The current envelopes and filters are always from sound set 1. To access the other set just select *Swap sound sets*. When a music file is loaded sound set 1 is replaced by the sound set which was stored with the music file. Likewise sound set 1 is always saved with a music file.



Tidy music can be used to tidy up your tunes entered from the piano keyboard. It attempts to remove unwanted rests by converting ALL single rests in all voices to notes and tying them to the previous note. The overall timing is not affected by this command. This command is not reversible so it would be advisable to save the tune before tidying it up. You can always use the edit facilities to tidy a tune further and change the odd note.

Info f7

This option gives information on the number of notes and bars in each voice together with other status information such as file names. Use Info to keep an eye on the available free space as you enter notes from the keyboard or editor.



Loading the SYNTHESISER

The SYNTHESISER module is found on the opposite side of the cassette or disc to the KEYBOARD. Follow the same instructions given at the start of this manual using side B of the cassette or disc.

Introducing the SYNTHESISER

The SYNTHESISER Module provides the means of creating and editing the sounds used in the KEYBOARD. It also features a real time sequencer which allows tunes to be played back while changing or editing the sounds.

Each sound is controlled by a set of parameters collectively called an envelope. The basic parameters consist of waveform (including pulsewidth where appropriate) and amplitude shape. The initial pitch and duration of the sound can also be edited so that the sound produced in the SYNTHESISER exactly mirrors the sound of notes on the staves in the KEYBOARD. There are 15 resident envelopes in the current sound set which may be used together with an optional filter. The filter parameters consist primarily of filter type, resonance and filter frequency.

Apart from the basic envelope and filter parameters the sounds may be controlled by the optional use of Dynamic Response Envelopes (DREs). The two DREs can transform the sound by independently modulating the frequency and/or pulse width and the filter frequency. The DRE is one of the more complex features of the SYNTHESISER and as such is left until the section 'More on creating sounds'.

Any of the envelope and filter parameters may be changed and the resulting sound heard instantly. The SYNTHESISER allows you to give a name to each of the 15 envelope sounds eg piano, violin or bass. These names may be used within the KEYBOARD to provide a useful description of the sound.

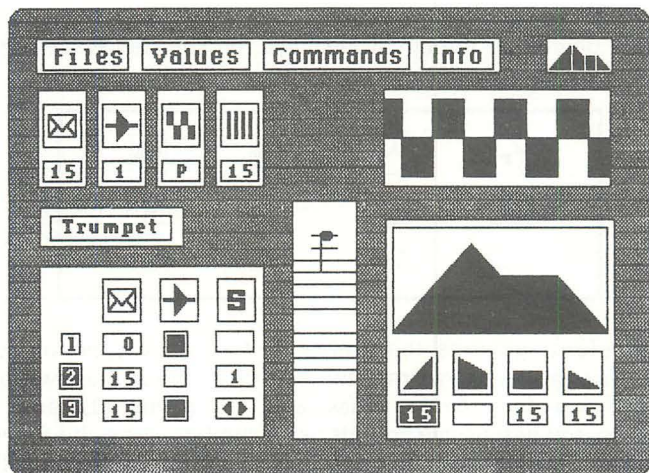
The sequencer can play up to 3 voices or tracks from the resident music file. Particular envelopes can be selected for each voice together with an optional filter.

The SYNTHESISER screen consists of a number of basic devices; envelope number, waveform, filter number and envelope name together with the amplitude, sequencer and mini VMW device



windows. The filter parameters and DREs are additional pop up windows and do not appear on the basic screen.

The following sections briefly describe each of the devices on the basic screen. The more advanced features are described later in 'More on creating sounds'.



The devices are arranged in a circular manner. Only one device can be edited at anytime; this is shown highlighted by a white background. Pressing **SPACE** moves onto the next device in a **CLOCKWISE** direction. Pressing **SHIFT-SPACE** moves in the opposite direction (**COUNTERCLOCKWISE**).

Envelope number

This device displays the number of the selected envelope from the current sound set (1). The envelope parameters and filter associated with this envelope are displayed and may be edited. You can change the current envelope number at any time using **Z** and **X**. It is also included on the 'circuit' and may be changed with **Q** and **W**; the normal editing keys (see 'creating sounds-a quick guide').



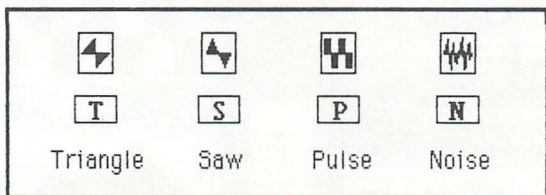
When changing the envelope number all the parameters are updated including the filter. The new sound will be heard when ***** is pressed.



Changing the envelope number itself has no effect on the sequencer. However, the filter stored with that envelope will become the new global filter and may therefore effect voices which have filter selected (see 'The Sequencer').

Waveform

The next device on the circuit displays the selected waveform icon and letter for the current envelope.



The waveform governs the timbre or frequency spectrum of the sound. Triangular waveforms tend to give rather mellow sounds, sawtooth waves provide brass and string sounds and noise waveform, the percussive sounds like a cymbal. The pulse waveform is perhaps the most interesting since you can vary the proportion of the different harmonics by changing the pulse width. If pulse width is selected the pulse width device is displayed alongside. This is then included in the circuit.

When highlighted the pulse width may be changed using **Q** and **W**. Some example pulse waveforms are given below.



minimum pulse width
(DC wave)



perfect square wave



intermediate pulse width



Filter number

The filter number device displays the filter associated with the current envelope. The filter facility allows you to change the tone of the sound produced by any envelope. There are four filters in the sound set and these can be edited in the same way as envelopes. For any envelope the filter can be off () or set between 1 and 4.

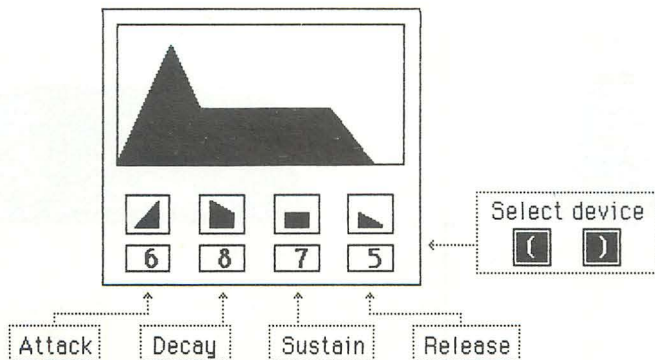


The sound can only be passed through one filter at a time. Although you can select any of the four filters with each envelope and sound the note (*), when playing a tune there is only one filter available for all the envelopes. The filter may be on or off for each voice. This should be kept in mind when designing sounds for use in a musical composition.

When using the sequencer to play back a tune, the filter number device displays the one available filter. This could, of course, be set to off.

ADSR

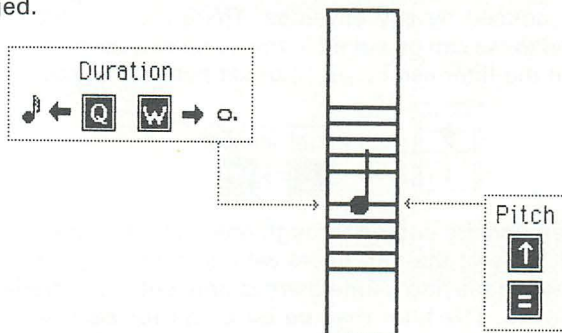
The block graph in the bottom right of the basic screen represents the amplitude shape of the sound. The devices below the graph show the four parameters that control the shape for the ADSR graph. Highlight the appropriate parameter using [and]. Change its value using Q and W.



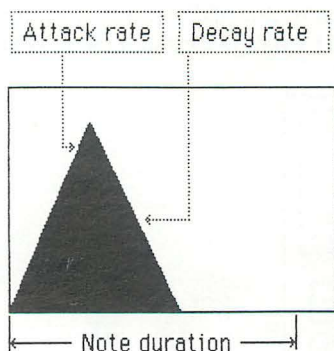


Mini VMW

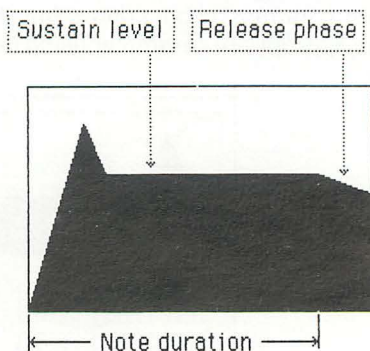
The mini Voice Monitor Window behaves in exactly the same way as in the KEYBOARD module. The pitch and duration of the note can be changed.



This note sounds when you press *. When the sequencer is playing the mini VMW is replaced by the Dynamic Envelope Device. The octave setting of this note is determined by the *Voice 1-octave* number given in Values. The duration of the note governs the time before the release phase starts. With a large decay rate and zero sustain level the sound level will possibly reach zero before the note has finished. In the other extreme a short note with a low release rate can continue to sound for much longer than the actual duration while the sound fades away.



Sound finishes before end
of note

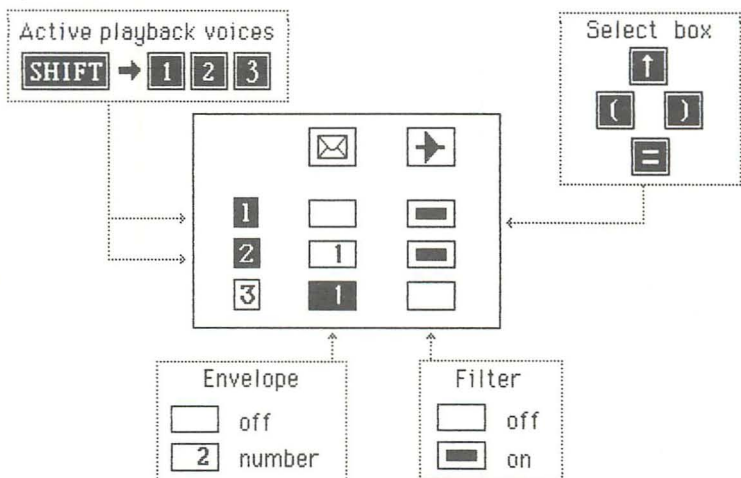


Sound continues past end
of note



Sequencer

The sequencer panel controls the playback of music files within the SYNTHESISER. The active playback voices are shown as highlighted numbers on the left. **SHIFT-1** is used to switch voice 1 on etc. The sequencer panel is part of the circuit and when selected one of the values is highlighted. This value is changed using **Q** and **W**. Move the highlight around the panel using $\uparrow$ = [, and]. The envelope and filter may be set for each voice.



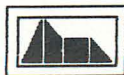
If an envelope value box is blank (ie. off) that voice will play back using the original envelope values in the music file. These are displayed in real time by the Dynamic Envelope Device. Any value between 1 and 15 plays ALL the notes in that voice using that envelope. The filter can be on or off for each voice.

Envelope name

Each of the 15 envelopes can be given a name to correspond with the particular sound. You are allowed to type in up to 8 characters when this device is highlighted. Note that you can not enter spaces since **SPACE** will move you onto the envelope number device in the circuit! To change the envelope number while on the envelope name use **SHIFT-Z** and **SHIFT-X**. Note that you can not be in the middle of editing a name so press **RETURN** first.

TROMBONE

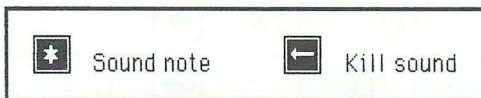
Creating sounds - a quick guide



Sounds can be designed on their own or in conjunction with the sequencer. This section deals with the basic method of creating simple sounds dynamic effects such as tremelo, wahwah and phasing are covered later on.

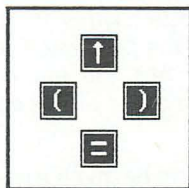
Press * to sound the current envelope. You can change the volume in Values. If you do not hear a sound make sure that the volume on your TV is turned up!

Change envelope with **Z** and **X** and listen to some of the other effects that can be achieved. Notice how the numbers and graph change as you move to another envelope number. If a sound continues too long (some envelopes last indefinitely!) then kill the sound with ←.



Some of the sounds are probably using Dynamic Response Envelopes and perhaps a filter. These are covered later. To make things easier access Commands: *zero envelope*. The current envelope is reset to the basic sound shape with the filter off. Move around the devices by pressing **SPACE**. Now press **SHIFT-SPACE** and go round the other way.

When a device is highlighted you can edit the value(s) with **Q** and **W**. If there is more than one value box within a device window move the highlight around using the usual TMS up-down-sideways keys.



Move onto the waveform device and move through the four options. Notice that the letters might help you identify the different waveforms.....Triangle.....Saw.....Pulse..... you will probably instantly recognise the **Noise** waveform! Whenever pulse is selected the pulsewidth device appears. This is now part of the circuit so **SPACE** along and use **Q** and **W** to change the pulse width. See how the sound goes from 'hollow' like a clarinet when the blocks are equal (called a square wave) to 'thin' like an oboe when the blocks are



almost entirely on one side (called a DC wave).

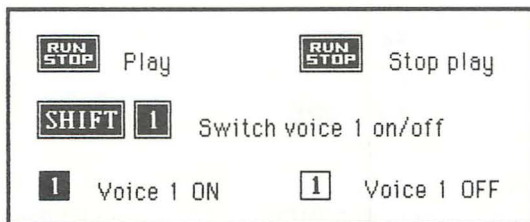
Leaving the pulse width move onto the ADSR window. The graph shows the amplitude shape of the sound. As you increase or decrease the values of the **Attack**, **Decay**, **Sustain** or **Release** parameters the graph and the sound change shape. Experiment with different shapes.....it's fun. Remember to press * to hear the new shape. If you set the release parameter (the one of the far right) to zero the sound might continue for ever! Press ← to relieve you of the agony!

Leaving the graph looking similar to how you found it move on to the mini-VMW. Change the duration of the note with **Q** and **W** and move the note up and down the staves with ↑ and = as in the Voice Monitor Window of the KEYBOARD.

Finally move onto the envelope name (we'll look at the sequencer next) and type in the name of your new sound. The whole of sound set 1 comprising of the 15 envelope definitions and 4 filters can be saved in the normal way through Filing.

The Sequencer

The sequencer allows you to edit envelopes and filters whilst playing a tune giving an instant response to parameter changes. The sequencer plays music files just like the KEYBOARD. Load a music file and press **RUN/STOP** and it will play from the beginning. As the tune is playing try turning voices on and off. Press **SHIFT-1** to switch voice 1 on/off etc. The tune will continue to play until you press **RUN/STOP** again even with all the voices turned off!

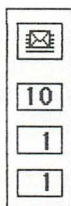


The tune will automatically restart when all voices have finished. This gives you plenty of time to change envelopes and filters. You can access the Command line while the tune is playing but if meanwhile the tune ends it will not restart until you pop down again. Try

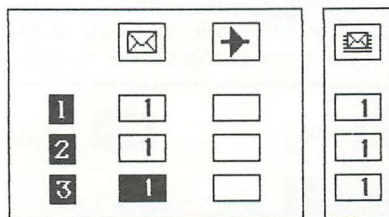


popping up Values and changing *Tempo* or *Voice 1-octave* for instance. You can also access Commands whilst playing. However, it is not safe to access files since the results are not very predictable!

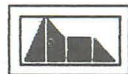
When a tune is playing you have probably noticed that the mini VMW has been replaced by another pop up device. This is the Dynamic Envelope Device (DED). It monitors the envelopes that are playing with each note in every voice. If your tune has many envelope changes they provide a fascinating real time display.....who wants flashing disco lights?



Highlight the sequencer panel and move to one of the envelope boxes. If the box is blank the notes in that voice will be playing with the envelopes set in the KEYBOARD. Press **W** to set all notes in that voice to envelope 1. Notice how the DED displays envelope 1 for that voice. Now set the other voices to envelope 1. Use **Z** and **X** to dial up the envelope 1 parameters. You can always change the envelope number whatever device is highlighted. The sequence panel and DED should now look like this:-



As the tune is playing move round the devices and change the waveform (pulsewidth) and ADSR graph.....you can also change the *Tempo* and *Octave* settings for each voice. Great fun isn't it? When you are changing parameters make sure that the envelope number device shows one of the numbers you have set in the sequencer panel, otherwise you will not hear any changes.



You can experiment with different envelopes for each voice and try turning voices on and off to hear the changes better (**SHIFT-1** etc).

If there is a filter on (a number appears in the filter number device) try turning the filter on and off in each voice. The next section deals with actually editing filter parameters.



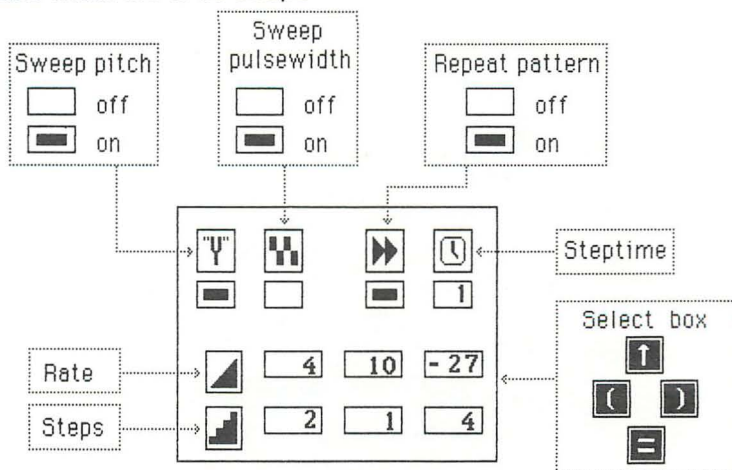
A more complex but very powerful feature of the TMS sound system is the ability to sweep the pulse width, pitch and filter frequency of any note in any voice. Unlike the ring modulation and synchronisation effects normally associated with the CBM64, TMS does not require another voice to modulate these parameters. Instead, two Dynamic Response Envelopes (DREs) control the sweeping of the pitch and/or pulse width and the filter frequency. Tremelo, phasing, wahwah and flanging effects are all within the scope of TMS and can be used in all 3 voices at the same time.

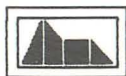
D Pop DRE up/down

A pitch/pulse width DRE is part of each envelope definition whereas a filter frequency DRE is associated with each set of filter parameters. A DRE is popped up over the ADSR graph by pressing **D**. Pop it down by pressing **D** again. Alternatively access Commands: *DRE up/down*. If the filter devices are being displayed (see below) the filter frequency DRE will be popped up. Otherwise the pitch/pulse width DRE will appear.

Pitch/pulse width DRE

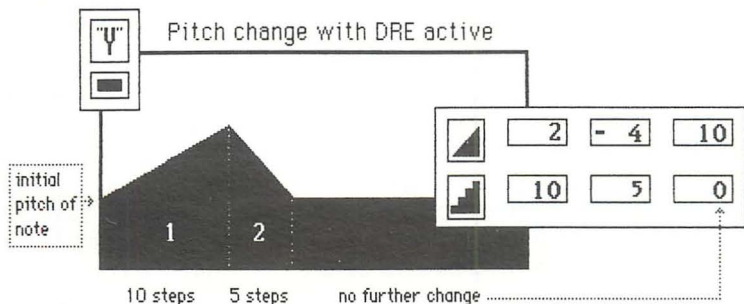
This DRE can sweep the pitch and/or the pulse width of the note. Pulse width can only be modulated if the pulse waveform is selected. There are separate devices for selecting whether the pitch and/or pulse width are to be swept.



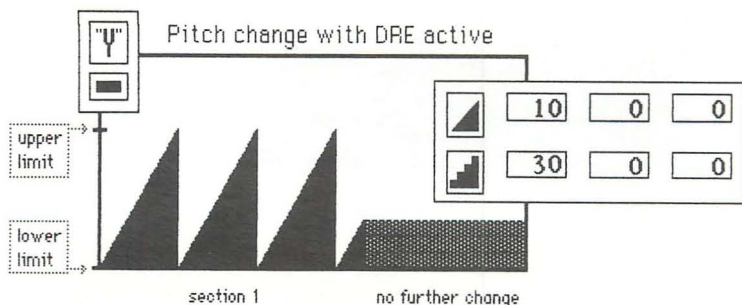


There are three independent sections each of which are specified by a step height (or rate) and a number of steps (section length). There is an overall step time which governs the actual rate of change of the pitch/pulse width with time. The smaller the step time the greater the rate of change.

A DRE section is ignored if the step number is zero. Each section follows on from the next.



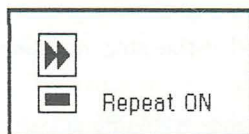
If the pitch reaches the upper pitch limit then it automatically folds down to the lowest pitch limit and vice versa. The pitch then continues to increase or decrease at the same rate. This effect is called foldover or wrapround.



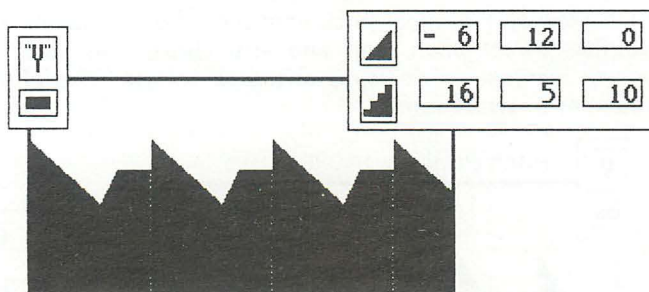
Changing the pitch up and down rapidly produces a vibrato effect. This can be slowed down by increasing the step time. A slow change in pitch gives a glissando effect. If you want the note to stay in tune make sure that the upward change in say DRE section 1 is the same as the downward change in DRE section 2. You could of course have more complicated pitch patterns involving a third DRE section. Pitch changes are especially effective in percussive effects using the noise waveform.



A phasing effect used to great effect by synthesiser players is achieved by sweeping the pulse width. The step time can be used to slow down or speed up the effect. Both the pitch and pulse width can be swept together using the same DRE sections.



The repeat device can be either on or off. When off each DRE section will only be active once. When on, the whole sequence of DRE sections will be repeated continuously until the end of note duration. DREs are not active during the release phase. Only DRE sections which have non-zero step lengths will be included in the sequence. Patterns consisting of 1, 2 or 3 frequency sections can be repeated. The initial pitch or pulse width value is reset at the beginning of each cycle. If the volume reaches zero before the sequence is completed then the repeat device will have no effect.

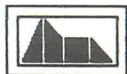


DRE section repeats until end of note duration.....

Filters

Filters can alter the tone of a note by allowing only a certain range of frequencies to pass through. TMS allows you to define 4 filters to be used with the set of 15 envelopes. However, the CBM64 sound hardware only lets you use one filter for all three voices. You may set the filter number off, or select one of the four filters available. The filter number device displays the current filter that can be used by the sequencer.

A filter is defined in a similar way to an envelope. There are three main parameters: filter type, resonance and filter frequency. A DRE may be used to sweep the frequency. The filter devices are popped



up by pressing **F** or accessing Commands: *Filter up*. They are then included in the normal circuit. These devices are popped down in the same way.



Pop filter up/down

The filter frequency DRE can only be popped up when the filter devices are displayed. Otherwise the pitch/pulse width DRE is displayed. The filter type device allows you to select one of the four available filter types. They are identified by an icon and a letter.



L

low pass



B

band pass



H

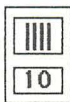
high pass



N

notch

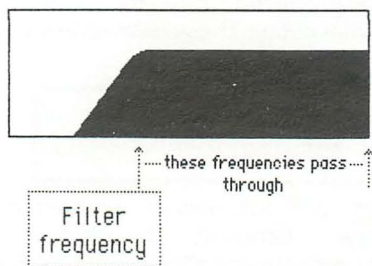
The low pass filter allows everything below a certain frequency to pass through, cutting out most of the higher frequency sound. This means that high pitched notes might sound very quiet if heard at all! The high pass filter works in the opposite way. The band pass filter restricts the frequency range to near the filter frequency. The volume and sound of a note passing through a band pass filter depends a great deal on how far the pitch of the note is away from the filter frequency. The notch filter is opposite to the band pass.



Resonance

The filter resonance determines how effective the filter will be. With a low resonance the filter effects might not be very marked, however with a high resonance the effect will be more noticeable.

The filter frequency graph gives an indication of the effect of the particular filter. The black area of the graph shows which frequencies will pass through unaffected. Move the graph using **Q** and **W** in the normal way.



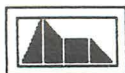
The filter frequency can be modulated with the filter DRE. Press **D** to pop it up. Note that it will appear automatically when you press **F** if the pitch/pulse width DRE is already displayed. Sweeping the filter frequency can produce amazing sounds such as the 'wahwah' effect loved by many electric guitarists. This is achieved by sweeping the frequency of the band pass filter up and down. You can alter the rate using the step time device. 'Flanging' is achieved by slowly changing the filter frequency of a high or low pass filter. All these effects are based upon triangle, saw or pulse waveforms. However the noise waveform (white noise) can be filtered to give what is known as pink noise. Sweeping the filter frequency can produce dramatic sounds.

The SYNTHESISER Command line

Apart from the normal filing operations and status information, the Command line is used to access the many commands available from within the SYNTHESISER. These are described below.

Files f1

TMS stores two sound sets in memory. Only the envelopes and filters in sound set 1 are immediately available for use within the modules. The SYNTHESISER always displays this set. The sound set can be swapped in at any time by accessing Commands: *Swap sound sets*. Individual envelopes or files may also be swapped or copied between the sets. Sound sets are always loaded into set 1. Similarly sound set 1 is always saved as the sound file.



Values f3

Files	Values	Commands	Info
	Key signature	F # 6 sharps	
	Time signature	4/4	
	Tempo	Presto	
	Volume	15	
	Voice	3	

The *Key signature* and *Time signature* can not be changed in the SYNTHESISER. They are displayed for reference purposes only.

Tempo and *Volume* can be changed while you are playing a tune in the sequencer. To change the octave settings for each voice, highlight *Voice* and press **RETURN**. The *Octave* for that voice can then be changed. Press **RETURN** to pop the secondary window down again.

Commands f5

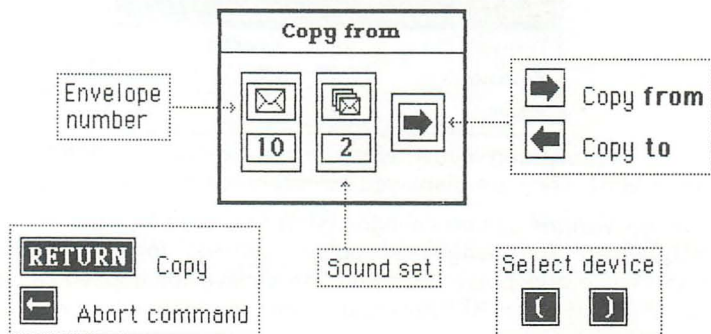
Files	Values	Commands	Info
		DRE up (down)	
		Filter up (down)	
		Copy envelope	
		Swap envelope	
		Copy filter	
		Swap filter	
		Zero envelope	
		Zero filter	
		Zero all envs	
		Zero all filters	
		Reset all envs	
		Reset all filters	
		Swap sound sets	

DRE up (down) displays or hides the Dynamic Response Envelope. This is equivalent to pressing **D**. If the filter devices are displayed the filter frequency DRE will pop up. *Pop up (down)* pops the filter devices up or down. This is equivalent to pressing **F**.

Copy envelope allows you to copy the current envelope parameters (which are always in sound set 1) to any other envelope in either sound set 1 or sound set 2. You may also use this command to copy



the parameters **from** any other envelope to the current envelope. A pop up appears under the Command line. Move between the devices with [and], changing the values with Q and W. Press **RETURN** to copy. You may escape from this command by pressing ←.

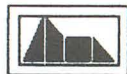


Use *Copy filter* in exactly the same way to copying filter parameters. The copy operations are very useful for making up a new sound set from envelopes and filters in other sets. The easiest method if to *Zero all envs* and *Swap sound sets* to get a 'blank' set in sound set 2. Then load your sound sets into set 1 and copy the required envelopes from each one to the new set in 2. Remember that you have to be on the required envelope number (use Z and X to change) before accessing *Copy envelope*. Use a similar procedure for making up a filter set.

Swap envelope and *Swap filter* are very similar to the copy commands except that there are only two devices in the pop up for specifying the envelope or filter to be swapped with. Again you may abort the command by pressing ←.

Zero envelope and *Zero filter* can be used to reset the current envelope/filter to a standard set of parameters. These may be used as a base for creating a new envelope or filter. *Zero all envs* and *Zero all filters* resets all the envelopes/filters in sound set 1 to the same standard values. All envelope/filters will then be identical. This is particularly useful when starting to create new sounds from scratch.

Reset envelopes resets all the envelopes in sound set 1 to the default values that were initially loaded into set 1 when entering TMS. *Reset filters* replaces the current set of filters with the original default set. After the *reset* commands the envelopes/filters will all be different



unlike the *zero* commands above.

Swap sound sets swaps set 1 completely with set 2. If you want to hear and edit the alternative sound set (2) you have to first swap it into set 1. After editing you can always swap back in the original sound set 1. If you want to try a new set of envelopes and filters with a particular tune using the sequencer swap sound sets before loading the music file (the sound set associated with the music file always loads into set 1). Then swap your new sound set back into set 1 to use with the tune. This avoids having to reload the sound set again.

Info f7

The normal music file information is displayed. Use Info to see which sound set you are currently using.

Hints & tips

Transposition

When a piece of music is transposed the music sounds and is written at a different pitch from the original. The simplest form of transposition is by one octave. Individual voices may be easily transposed by changing the octave number from Values. Increase the octave number to transpose up by one octave. If the music is transposed by exactly one octave then the key signature is not changed.

If a piece of music is transposed by less than an octave then the key signature changes. Each transposition from one key to another will give a different pitch interval between the original and transposed notes. For instance, if transposing from the key of G to the Key of C the pitch of each note will decrease by five notes. From C to B the pitch of each note will increase by seven notes.

When The Music System transposes a tune it will first try and transpose the notes in the correct direction (either increasing or decreasing the pitch). If this is not possible because there are notes which would go outside the pitch range on the VMW then it tries transposing in the other direction. This is equivalent to transposing and increasing or decreasing the pitch by one octave. If this is not possible for the same reason that particular key is not available to be transposed to and it will not be shown in Values.

Transposition is very simple if the music contains no accidentals (sharps and flats) because the notes are simply moved up or down the staves to the new positions corresponding to the new key signature. In transposing from G to B flat for instance, every note on a G line will appear on the B line as a B flat. Because of the key signature the B note will not require a flat symbol. However, where a tune contains accidentals, for each accidental in the original there must be a corresponding one in the transposed version. Each of these new accidentals will have the same effect as the corresponding one in the original but it will not necessarily be the same accidental since we have to allow for the new key signature.

For example, in the key of B flat a B natural has been raised by one semitone from the given key. If the music is transposed to the key of G (which includes an F sharp) then the note will now be a G but its

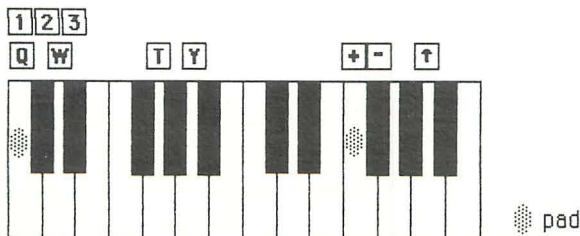
pitch will have to be raised by one semitone. It therefore becomes a G sharp. The situation can be rather more complicated in transpositions between certain pairs of keys and can give rise to double-sharp and/or double-flat symbols in addition to the normal sharps, flats and naturals. This is in accordance with normal music nomenclature.

Using the sequencer

One of the uses of the sequencer in the SYNTHESISER is to create the right sounds for a piece of music after notes have been entered using the KEYBOARD. You will already have chosen or designed a sound set for use with a tune but you might want to experiment further once the tune is in. If you only want one sound per voice then use the same envelope number for all notes in each voice, e.g. voice 1 can use envelope 3 and voice 2, envelope 9. Play the tune back in the sequencer and either change the respective envelope parameters or try out completely different envelope numbers. If you decide that, say, envelope 5 sounds better for voice 1 than envelope 3, use the *Swap envelope* command to change them over. When you save the music file from the SYNTHESISER the new sound set is saved with it so that it will sound exactly the same if you load it back into the KEYBOARD.

The Keyboard overlay

The Sight and Sound™ plastic keyboard overlay can be used directly with the Music System. The overlay can be clipped over the CBM64 in the normal way and most of the control keys are still available directly. There are a number of keys which are used both as 'piano' keys and as control keys and others which are 'hidden' by the overlay. To make the keyboard fully compatible with all the commands there are a few minor modifications that would be useful.



Label the control keys as above so that you can press the piano keys instead of the CBM64 keyboard keys. You cannot access key 1 or + directly without putting a pad under the white keys as indicated in the diagram. This is so that two keys such as 1 or Q can be depressed at the same time by pressing one piano key. Blutak™ or similar material is ideal for this.

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APPENDIX

On the each side of your cassette or disc are some sample music and sound files. These are provided as examples of what TMS can do.

The Music

- Breaker - A hip hop special from Mark Harrison.
- 2 Minuette - Beethoven rolls over - courtesy of Tony Selinger
- 3 Fugue - Bach arranged by Nicky.
- 4 Rag - A Scott Joplin tune.

The Soundsets

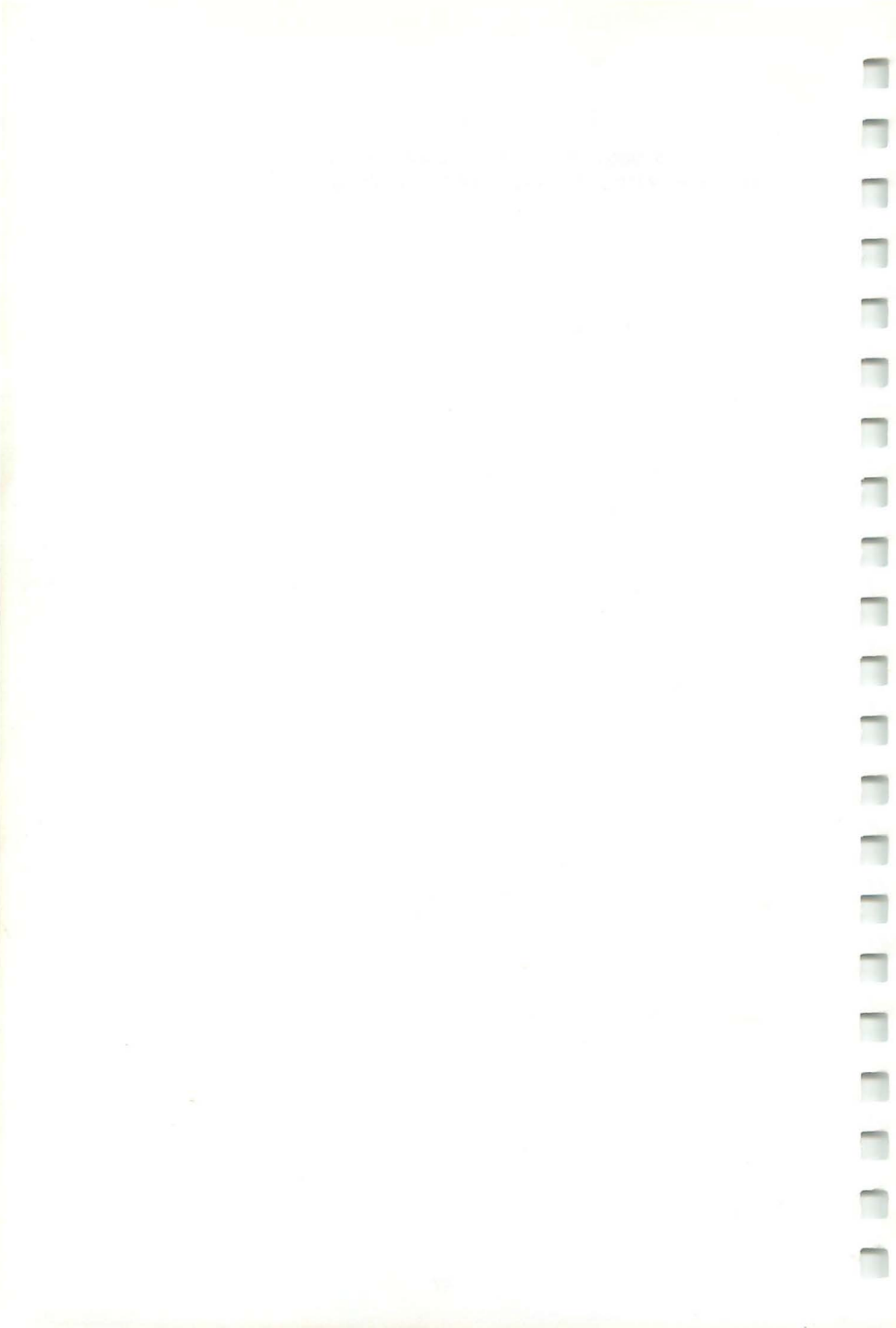
Electro pop (included with Breaker)

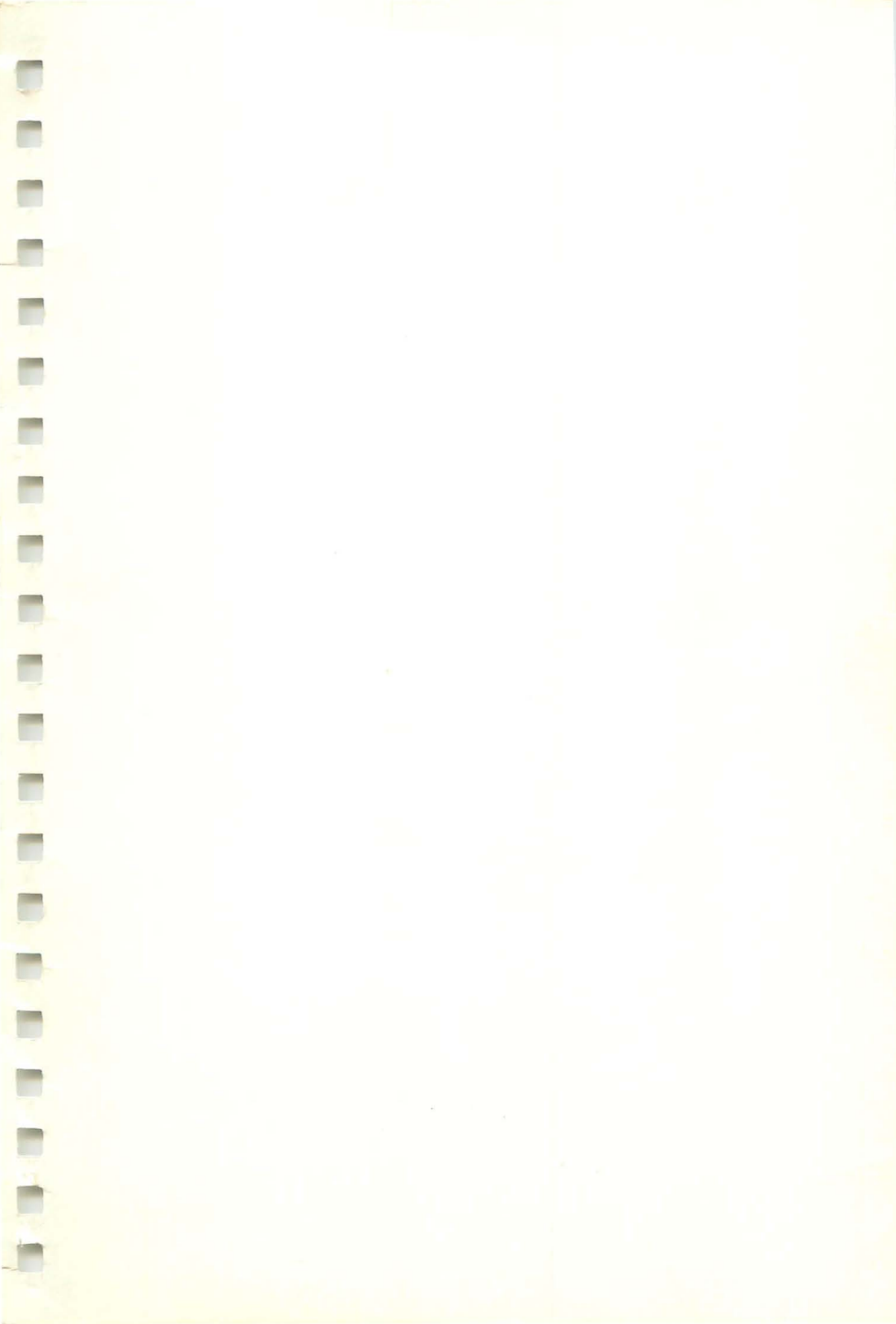
- 1 Hihat
- 2 Accent
- 3 Snare
- 4 Bassdrum
- 5 Scratch
- 6 Syndrum
- 7 Electro bass
- 8 Lead 2
- 9 Worp
- 10 Lead 1
- 11 Attack
- 12 Burble
- 13 Lead 3
- 14 Lead 4
- 15 Tremelo

Orchestral (included with Minuette)

- 1 Violin 1
- 2 Violin 2
- 3 Cello
- 4 Doublebass
- 5 Clarinet
- 6 Oboe
- 7 Bassoon
- 8 Flute
- 9 Saxophone
- 10 Trumpet
- 11 Trombone
- 12 Piano
- 13 Harpsichord
- 14 Harp
- 15 Percussion

Also included with the soundsets are some sample filter settings. These will enhance the sound of the envelopes provided.







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