· INSTRUCTION · MANUAL ·

THE MUSIC SYSTEM

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YOU AND THE MUSIC SYSTEM

The Music System is a sophisticated piece of software. For simplicity's sake, think of it as a collection of discrete computer programs, each with its own special function. All of them supervised by a master control program.

This control program (or Control Screen as it's called in this manual) is a collection of subroutines managing everything from the unique high-speed icon graphics to the pop-up message windows. The Control Screen will even change the colour scheme on all TMS screens to blend with your decor.

If you have one of the cassette versions of TMS, only part of this manual will be of direct use. To help you find the instructions that count, all the important pages are clearly marked with icons (easy-to-remember symbols). The rest of the manual will give you an insight into the full potential of TMS: maybe we can tempt you to buy the other cassette or even the disk version.

Most of the files created via one version of TMS can be loaded by the other. If, for instance, you expand your BBC B computer to a disk system, there will be no problems transferring your cassette files. Details on how to connect the computer to your hi-fi or guitar amplifier are provided, although for most purposes the internal BBC B speaker is adequate.

As you become familiar with TMS and each of its modules, you are sure to discover techniques not even mentioned in this manual. As with any complex instrument, it is only the user that can demonstrate its true potential. Although we have provided a Song & Sound Library – containing a whole bunch of musical examples – the real power of TMS is limited only by your imagination.

Although we have tried to take account of most of the tangles that you could get yourself into, we cannot promise that the system will operate correctly unless it is used under the direction of this manual. Please don't let this discourage you from experimenting with the system. The system is very friendly; pop up messages will warn you of most impending disasters.

If you have a problem be patient and consult the manual. TMS, because of its complexity, has its quirks. It can't always detect every fault or oddity within your BBC-B computer (you may be running, for instance, a strange disk operating system). If you have a serious problem, please WRITE to us. We're user-friendly, too.

THE MUSIC SYSTEM

Please return the User Registration Slip to Island Logic. The address is on the back of your instruction leaflet. We'll then be able to keep you informed of any development on TMS.

If you do write to us, however, please quote your software version number as displayed on the Copyright Screen.

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INTRODUCTION

TMS is a comprehensive microcomputer-based music program for creating, editing, playing and printing digital music. The system allows easy input and storage of music which can then be played back through the system or printed out in proper musical notation.

The music is entered via an extremely versatile EDITOR in written music format or via a piano KEYBOARD emulator. The types of sound that can be generated are almost unlimited due to the flexibility of the SYNTHESISER module. This allows you to create the shapes of the sounds simply and quickly. A full graphic representation of each sound makes this easy and fun to use. The sound shapes are incorporated into the music using the EDITOR or KEYBOARD to give you amazing versatility over your compositions.
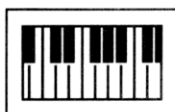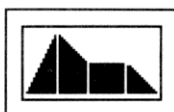
EDITOR   KEYBOARD   SYNTHESISER   PRINTOUT   LINKER

The five modules are directly accessible from the Control Screen. Each module is identifiable by its own symbol or icon and all relevant data is clearly presented by its Status Screen. The selection of data source, music and sound files etc. is very easy and often quite automatic when moving from one module to another. A summary of each of the five modules appears at the end of the introductory section.
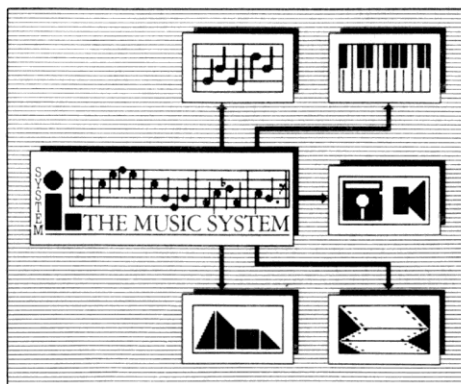
THE CONTROL SCREEN

Moving around the Music System

TMS is loaded from disk using the usual **SHIFT BREAK** method. After the title and copyright page The Control Screen is displayed. From here any of the five modules may be selected. When moving from one module to another, you must always pass through this screen. Each module is represented by a distinct symbol (or icon). The highlighted icon is the one which may be run. Press **SPACE** to select the next symbol. Keep pressing **SPACE** to get back to the original. Once selected the required module can be run by pressing **RETURN**. Each module is stored separately on TMS disk. This disk must be available in DRIVE Ø. If the system disk is not found an error message will be displayed. Make sure that the system disk is in drive Ø and try again. Error messages always appear in pop up windows.

The cassette versions of TMS are loaded in the usual way, rewind, type CHAIN"" and press **RETURN**. Be careful not to try and save any music or sound files onto the TMS cassette. Use a different cassette to store your own music and sound files.

Each module is entered via its Status Screen. There will be a slight pause as the screen goes blank when moving from one section to another whilst the screen is being drawn. Status Screens contain all the necessary information concerning the data files, key signature, tempo, printer type etc. for each module. Some of this information is automatically passed from one module to another to make life easier. Each of these parameters may be changed at any time. TMS does not allow you to enter illegal values for any of its parameters.

Several of the Status Screens display additional information such as the amount of free memory space available for notes, or the number of notes and bars in each voice. This additional information cannot be changed from the Status Screen. Diagrams of each of the five Status Screens are given in the relevant sections.

Return to the Control Screen from each module is usually through its Status Screen. To return to CONTROL and hence to any other module press **CTRL-ESCAPE.** TMS disk must be available in drive Ø at this stage. If not found, an error message "Insert System" will appear, you will need to try again after making sure that the system disk is correctly placed in the boot drive.

In general **CTRL ESCAPE** will return you to the next highest level of control; the Control Screen itself being the highest. If TMS is busy with a task at the time (eg. playing or printing music) then **ESCAPE** may be used to stop it. Similarly **RETURN** is generally used to go forwards to the next level.

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The Status Screen has other important functions. All music and envelope files are loaded and saved from the Status Screen. The function keys **f6** to **f9** are used for this purpose. For example; if **f6** (load music file) is pressed while in the EDITOR then TMS will attempt to load the music file currently displayed on the Status Screen from the currently displayed data source. If TMS cannot find that file then an error message will be displayed.

Apart from being able to load and save music and envelope files, the Status Screen is used to catalogue a cassette or library disk in order to find out what files are on it. Function key **fØ** is used for this purpose. A pop up window will appear showing the files on the current data source. Similarly function keys **SHIFT-f1** and **SHIFT-f2** can be used to delete and rename files from TMS. Again the necessary information will appear in a pop-up window. The SYNTHESISER Status Screen has several other functions for moving and swapping individual envelopes. Many of the disk file operations are of course not available on cassette versions of TMS.

All other sections of each module are accessed from their respective Status Screens. The SYNTHESISER, KEYBOARD and LINKER modules use **RETURN** to move on. The EDITOR also uses the function keys **f1** to **f4** to access its various screens. The PRINTOUT module operates solely from its Status Screen.

Files

All music composed with TMS is only temporarily stored within the microcomputer's memory. To save this permanently it needs to be written onto floppy disk (or cassette). Similarly envelope files also need to be stored for future use, facilities for doing this are built into the Status Screen as described above. When moving from one module to another it is usually necessary to save the current music of envelope files for further work. On pressing **CTRL ESCAPE** from the Status Screen to return to the Control Screen TMS will prompt you if you have not saved the current files. Press **Y** to continue and return to the Control Screen *WITHOUT* saving the files. Press **N** to abort the command and remain within the Status Screen. Once you have left a module all music and envelope files will be lost and cannot be recovered. You cannot store any of your compositions on TMS disk and will need to use another formatted disk as a data disk. The Song and Sound Library disk already contains a selection of tunes and envelopes. There is a similar library on the reverse side of your cassette version. Again you must not use this cassette to store your own compositions.

TMS automatically labels files with a unique prefix or file directory code. This is so that you can distinguish between the different types of file.

File types

m.	....	Music file
e.	....	Envelope file (Music System format)
b.	....	Envelope file (BBC format)
l.	....	Linker (large music) file
k.	....	Keyboard file.

Each filename may have up to seven characters after its unique prefix. TMS will not allow you to specify files with longer names. TMS will not allow you to load incompatible files. For example, music files cannot be loaded (or saved) as envelope files. The error message "wrong file type" is displayed where TMS cannot successfully identify a file as the correct file type, or "wrong file data" if file contains incorrect information.

Disk file operations and the Status Screen

TMS keeps a record of both the music and envelope filenames currently in use as well as various other information such as screen colours so that you do not have to reset them on entering a module. If no filenames have been entered, then a default set of music and/or envelope parameters are set within each module when it is entered. The current filenames will be blank.

If you have loaded or saved files (in any module except the LINKER) then these filenames are transferred when you enter another module. On entering a Status Screen the system will try and load the relevant files from the current data source.

Data source	drive Ø
Music file	m.
Envelope file	e.

Key signature	G 1 Sharp
Time signature	4
	4
Tempo	1ØØ beats/min
Bar	1

Voice	Bars	Notes
1	1	Ø
2	1	Ø
3	1	Ø
4	1	Ø
Free space 86Ø		

THE EDITOR STATUS SCREEN

If you have dual drives then you should keep the system disk in drive Ø and use drive 1 (and/or drive 3) for your library disk. The specified files will then be loaded (if located) automatically. On single drive systems the data source will have to be either Ø (or 2 if double sided). In this case the files cannot be loaded automatically

and the error pop-up "Insert library" will be displayed. Replace the system disk with the relevant library disk; press **SPACE** to clear the error pop up and press **f6** or **f8** to load either a music or envelope file.

Status Screens

Both the disk and cassette versions of TMS use Status Screens. Each of the five modules are entered via their respective Status Screens. The Status Screens are of a similar design and manner of operation. They display various parameters such as data source and tempo which may be simply and easily edited.

One of the parameters will be highlighted at a time. A particular parameter can only be edited when it is highlighted. Use the ↑ and ↓ cursor keys to roll the highlight up and down the Status Screen. When it reaches the top it will wrap round to the bottom and vice versa.

There are two types of parameter: filename and fixed option parameters. To edit a filename simply type in the new filename. The original name is erased as soon as a legitimate key is pressed. A filename can consist of up to seven alphanumeric characters. Spaces, full stops etc. are not allowed. You do not have to press any other key to enter the filename.

All other parameters have a fixed number of different options. To edit these, use the ← and → cursor keys to flip through the options until the required option is found. Keep pressing to circle round to the beginning again.

Common disk file operations

All file operations are carried out from the Status Screens. Music and envelope files may be loaded where appropriate from disk. Files can usually also be saved to disk. Disks may be catalogued and files renamed or deleted. Relevant error messages are displayed in all cases where loading or saving is unsuccessful.

Loading files from disk

Set the data source to the appropriate disk drive number (∅ to 3). The particular file must be on a library disk. Ensure that the library disk is in the selected drive. You may catalogue the library disk in the current drive to have a look. Type in the required filename.

To load a music (or LINKER) file press **f6**. To load an envelope file press **f8**. A confirm pop up will be displayed. Press **Y** to confirm the command; **N** to abort. In the case of the SYNTHESISER Status Screen you will be asked to select which file you want to load. Then press **RETURN** to confirm the command or **ESCAPE** to abort.

If TMS locates the file on the current drive and it is a legitimate file it will be loaded into memory overwriting any previous file . TMS checks to see if the file is of the correct type so you should not be able to load non-envelope files into the

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SYNTHESISER for instance.

Saving files

To save a music file with the filename shown on the Status Screen simply press **f7** . A pop up will ask you to confirm that you want to save this particular file. To save an envelope file (from the SYNTHESISER only) press **f9** . You are asked to select the envelope set you want to save. Then press **RETURN** to save the file; **ESCAPE** to abort. If you try to save a file with the same filename as one already on the library disk, a confirm pop up will ask you whether you want to replace it with the current file in memory. Press **Y** to overwrite the file on disk; **N** to abandon the save command. An error pop up will indicate any problem. Files may be saved with a different filename to any available data source. Set the data source and filename before pressing **f7** or **f9** .

Summary of The Music System Modules

TMS consists of five distinct modules all linked to the Control Screen. These are summarised below. A more detailed description of each module function begins on page 14.

The Editor

The EDITOR includes many features for the easy writing and editing of tunes. It allows the input, editing and display of musical compositions in classic music notation.

The EDITOR has a range of four octaves on the music staves. Music can be composed in any key and transposed instantly into any other key. Accidentals include sharps, flats, naturals, double-sharps and double flats. Music can be entered automatically in practically any time signature and played back at tempos ranging from 3∅ to 2∅∅ crotchet beats per minute. Note lengths from demi semi quavers to dotted breves are catered for, as are triplets and tied notes (disk only). Music is shown on treble and bass staves together with the appropriate key and time signatures. Up to three voices or parts may be entered with a single percussion or rhythm track (disk only). Notes are entered directly on the staves with one keypress. The duration, volume and sound envelope are easily selected and edited using a minimum of keys. Each voice can be scrolled through on the screen with or without sounding the notes.

All voices can be separately displayed and edited with facilities for instantaneously moving between voices at the same point in the tune.

THE MUSIC SYSTEM

Individual voices may be played back while the notes are scrolled past on the screen. Facilities are included for incorporating repeats, first and second time bars and tied notes (disk only). Barlines are automatically put in according to the time signature, if required.
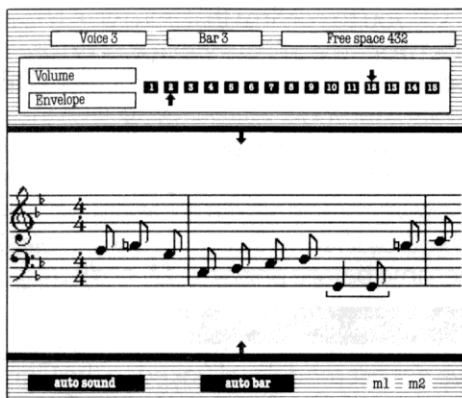
EDITOR SCREEN

The Synthesiser

The SYNTHESISER module allows for fifteen different sound shapes to be designed and saved as a set of 'music envelopes'. The pitch, amplitude, modulation and frequency limits can be easily controlled to give a wide variety of sounds. Each note from any of the three music voices can be given any of the fifteen sound shapes from the set of envelopes and played at any of the fifteen available volume levels. The percussion voice (disk only) has fifteen predetermined percussive sounds to choose from. Tunes may be played back using any set of music envelopes.

The SYNTHESISER provides the means of creating shaped sounds which may be used in the EDITOR, LINKER or KEYBOARD modules when entering or playing back musical compositions. The sound is defined by a group of 19 parameters collectively called an *ENVELOPE*. Both the pitch and amplitude of the sound may be shaped with the option of repeating the pitch pattern. A special feature of TMS is that the notes are 'in tune' over the whole note range of four octaves. Another feature is that sounds can be modulated; the modulation frequency and amplitude being controlled by the sound envelope. Yet another special feature of TMS is the ability to set the frequency foldover limits.

The envelope parameters are easily edited on screen. Each parameter is identified on screen by its own symbol or icon. The resulting sound can be heard

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immediately. The frequency and amplitude graphs of each sound can be quickly displayed. Envelope parameters may be edited from the graph screen and the graphs instantly updated.

The SYNTHESISER sounds or envelopes can be saved as two files, each containing fifteen envelopes. These envelope files can then be loaded into either the EDITOR or the KEYBOARD modules where they may be incorporated into musical compositions.

Data source	drive Ø
Envelope file 1	e. ENV 1 ←
Envelope file 2	e. ENV 2
File type	**music format**
Volume	15

Save envelopes

← 1-15

‹Space› changes
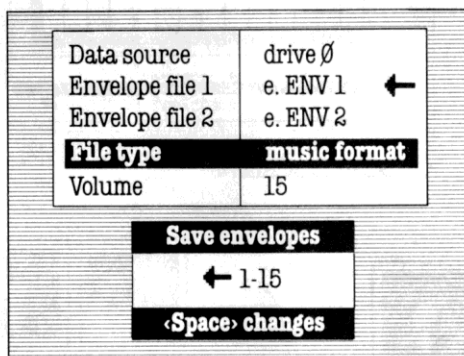
SYNTHESISER

The Keyboard

The KEYBOARD module provides yet another way of creating music. In conjunction with the SYNTHESISER it provides a powerful and flexible method of experimenting with electronic music, its multi track digital recorder providing a unique mini studio capability.

This module emulates a simple electronic synthesiser keyboard and multi-track recorder/sequencer. A keyboard is displayed on the screen; each note being highlighted when a key is pressed on the microcomputer keyboard. A percussive voice allows easy input of preset percussion and drum sounds. In conjunction with the SYNTHESISER, the KEYBOARD can emulate the sound of many musical instruments. This very flexible module provides a real time system for experimenting with rhythms, backing tracks and complex compositions. The KEYBOARD can be considered as a musical notepad; ideas can be tested before committing them to the EDITOR.

You can play back music already composed, delete or add another voice using the KEYBOARD at any time.
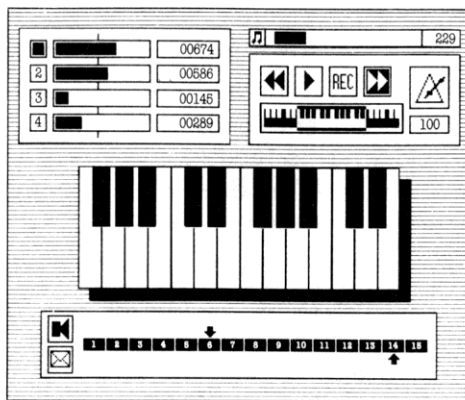
KEYBOARD SCREEN

The Linker

The system also offers a LINKER module (disk only) to allow the creation of larger and more complex compositions by linking smaller sections of music together and playing them back as one.

This (disk only) module allows large compositions consisting of up to ten separate files to be merged and played back as one piece of music. This allows key and tempo changes to be easily incorporated into a single composition. Separate music files can be saved as one large file, which can then be reloaded and played. Within each LINKER file, separate music files can be played back in any order, repeating each section as often as necessary up to a maximum of sixteen items in any playback sequence. The LINKER displays the file currently playing and progress through the sequence can be monitored. The sequence may be edited at any time, and saved as part of the LINKER file.

Data source	drive 1
‹a›	m. sonata
‹b›	m. puff
‹c›	m. scale 2
‹d›	m. baby 3e
‹e›	m. menu 6
‹f›	m. puff 1
‹g›	**m. bouree**
‹h›	m.
‹i›	m.
‹j›	m.
Free space	2132

LINKER SCREEN

The Printout

The PRINTOUT module allows the automatic printing of your compositions in musical notation.

It also provides a convenient means of printing three and four part musical scores from music files created by the EDITOR. There are three printout modes: aligned, condensed and single voice. In aligned mode selected voices (including any percussion track) are printed on staves one under the other. Each barline is aligned with the barlines in other voices. Scores are complete with key and time signatures and all associated symbols. A simple text editor allows a short three line description to be included on each PRINTOUT. Printing is in horizontal format on standard continuous paper. Epson RX, FX and Star Delta series dot matrix printers are compatible: Printer drivers for other models will become available in the near future.

Data source	Drive Ø
Music file	m.
Printer type	Epson FX80
Align Bars	Yes
Print mode	High res
Voice 1	Empty
Voice 2	Empty
Voice 3	Empty
Voice 4	Empty

PRINTOUT SCREEN

THE EDITOR

The EDITOR is the heart of the TMS. It is used to input, edit, display and playback musical compositions. Music is entered and displayed using proper musical notation on treble and bass staves.

The EDITOR is entered from the Control Screen by selecting the EDITOR icon and pressing **RETURN**.

The Editor Status Screen

The EDITOR Status Screen is displayed on entering this module. This may be returned to at any stage from within the EDITOR by pressing **CTRL ESCAPE**. Make sure that the system disk is in drive Ø before attempting to return to the Status Screen. The EDITOR itself consists of four Edit Screens, one for each of the four voices. (The tape version of the EDITOR only has three voices). Each screen is accessed by pressing the corresponding function key. **f1** will access the Edit Screen for voice one; **f2** for voice two and so on. Pressing **RETURN** will also access the voice 1 Edit Screen. Each voice can be accessed directly from any of the other screens. You do not have to return to the Status Screen to change voices.

The EDITOR Status Screen displays the current music and envelope files residing in TMS together with the data source; the current key; time signature; tempo and bar. All these parameters may be altered from the Status Screen.

LEFT AND RIGHT CURSOR KEYS		UP AND DOWN CURSOR KEYS

Data source

This may be set to drive Ø, 1, 2, or 3. The data source indicates the disk drive to which files are sent or are received. To change the data source, highlight the data source parameter on the Status Screen and use the ← and → cursor keys to flip through the four options. The data source is only read by TMS when loading or saving music or envelope files. With cassette versions the data source parameter is fixed.

Music file

Music files must have a directory code m. and must have been created using TMS. This, of course, includes the demonstration tunes contained in the Song and Sound Library. When the EDITOR is first entered from the Control Screen (without having been to the KEYBOARD or PRINTOUT) a default set of parameters will be loaded. The music and envelope filenames will be blank indicating that no files

have been loaded. The default parameters include a set of envelopes, the key signature (C), time signature (4/4), tempo (1ØØ beats/minute) and bar (1).

To change the music filename highlight the music file and type in the new filename.

Data source	drive Ø
Music file	**m.**
Envelope file	e.

Key signature	C
Time signature	4
	4
Tempo	1ØØ beats/min
Bar	1

Voice	Bars	Notes
1	1	Ø
2	1	Ø
3	1	Ø
4	1	Ø
Free space 86Ø		

EDITOR STATUS SCREEN (DEFAULT PARAMETERS)

Envelope file

Envelope files must have a directory code e. and must have been created by the SYNTHESISER. The default envelope set contains fifteen envelopes showing some of the different sound shapes that may be designed using the SYNTHESISER.

To alter the envelope filename, highlight this section and type in the new filename. The same restrictions apply as for the music filename. When a music file is loaded from disk, the current envelope file is automatically replaced by the envelope file previously saved with that music file. However envelope files may be loaded by the EDITOR quite independently of the current music file. An envelope file containing the instrument sounds you require for a musical composition can be created with the SYNTHESISER using the swap and replace commands on existing files, or created from scratch. The LINKER module can be used to provide even greater flexibility in the use of envelopes within compositions.

Key signature

This is normally set before entering notes on the Edit Screens. The current key signature is always displayed on the Edit Screens. You may switch between displaying the major key and corresponding minor key name by pressing **K** before entering any notes. The minor key is denoted by 'm' after the key name. The EDITOR cannot transpose between major and minor keys and once
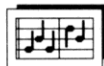
notes have been entered in voices 1, 2 or 3, the key cannot be switched to the relative major or minor.

However, the key may be switched if there are notes entered in voice 4 only to allow rhythm tracks to be loaded and used in either major or minor keys.
N.B. This function is only active when the highlight is on the key parameter. The key switch does not operate in the cassette version of the EDITOR. In this case use the corresponding major key.

When entering notes they are automatically put in the selected key. The key may be changed at any time from the Status Screen. If notes have already been entered then they are transposed to the new key if possible. See the section on Transposition for further details.

The current key signature is saved with the music file. To alter the key, highlight the key signature parameter on the Status Screen and use the ← and → cursor keys to flip through the options. The key names and number of sharps or flats are displayed. The options are given below (in order of appearance).

MAJOR	MINOR	
C	A	
G	E	1 sharp
D	B	2 sharps
A	F$^{\#}$	3 sharps
E	C$^{\#}$	4 sharps
B	G$^{\#}$	5 sharps
F$^{\#}$	D$^{\#}$	6 sharps
C$^{\#}$	A$^{\#}$	7 sharps
F	D	1 flat
B♭	G	2 flats
E♭	C	3 flats
A♭	F	4 flats
D♭	B♭	5 flats
G♭	E♭	6 flats
C♭	A♭	7 flats

Time signature

The default value is 4/4. This means that there will be four crotchet beats in every bar. The current time signature is always displayed on the Edit Screen. If in autobar mode the EDITOR will automatically enter bar lines according to the time signature. The current time signature is saved with the music file.

The time signature consists of two numbers. The top one gives the number of beats in the bar. Available numbers are 2, 3, 4, 5, 6, 7, 8, 9, 12, and 16. The bottom number gives the note value for each beat. The allowable values of 2, 4, 8 and 16 represent the notes:

respectively.

To change the time signature, highlight the appropriate number and use ← and → to select the required value.

The time signature may be changed at any time from the Status Screen although it is usually set before entering notes as it affects where the barlines will be entered whilst in autobar mode. If changed after music has been entered then any current barlines (if present) will not necessarily be in the correct positions. **SHIFT B** can be used to adjust the current barlines automatically if required. Any further barlines will be entered correctly from the end of a voice according to the new time signature. See the section on barlines for further details.

The time signature cannot be reset for part of a tune. The LINKER can be used to provide changes in time signature within a musical composition.

Tempo

The default value is 100 crotchet beats/minute *andantino*. The current tempo is saved with the music file. It may have values ranging from 30 to 200 beats/minute. The allowable values are shown below together with their musical terminology.

200	prestissimo	71	adagissimo
166	presto	67	larghetto
143	vivace	63	larghetto
125	allegro	59	largo
111	moderato	56	largo
100	andantino	50	larghissimo
91	andante	45	lento
83	andante	40	lento
77	adagio	35	grave
		30	grave

The current tempo is changed by highlighting the number and using the ← and → cursor keys to move up or down the tempo scale. Any music already entered will be played back at the new tempo. The **T** key can be used to switch between beats/minute and the more familiar Italian notation. Some of the names appear twice so that when moving through them with ← or → cursor keys they

will not always change. The default is beats/minute. This function is only active when the highlight is on the tempo parameter.

Bar

The bar parameter displays the latest position reached in the tune when the Status Screen was entered. If not altered whilst in the Status Screen the same bar will be entered when returning to any of the edit or display screens. This enables you to go to the Status Screen and return to the same position in a tune if required. The bar parameter cannot be greater than the number of bars in the longest voice. If a particular voice has less bars than the bar number then that Edit Screen will be entered at the last available bar. The current bar will then be updated. The bar parameter is also used to set the starting point when playing back a tune with **SHIFT TAB**. See "Playing a Tune"

To change the bar, highlight the number and use the ← and → cursor keys to increment or decrement the bar number. When the maximum bar number is reached the number wraps round to 1 again and vice versa.

Note data display

The display shows the number of notes and bars in each of the available voices. Rests are included as notes. The number of bars in each voice provides a measure of the musical length of each voice. 'Free space' gives the maximum number of notes that may be added to the composition.

Editor file operations

Music and envelope files may be loaded from disk. Music files only may be saved from the Status Screen. Envelope files cannot be saved from the EDITOR.

To LOAD a music file (prefix m.), set the data source and filename and press **f6**. A pop-up window will ask you to confirm the load command. The new file will overwrite any music already residing in TMS thus losing it for ever! The current envelope file is replaced by the file previously saved with the new music file. The key and time signatures, tempo and note data will be updated. The loaded music file can be played back from the Status Screen by pressing **TAB**. Press **ESCAPE** to stop the playback.

To LOAD an envelope file (prefix e.) press **f8**. Confirm the command by pressing **Y**.

To SAVE a music file (prefix m.) press **f7** and confirm the save command by pressing **Y**. The music file will be saved together with the current envelope file and associated parameters.

The Library, Delete File, and Rename File options are all available from the Status Screen.

Playing a tune
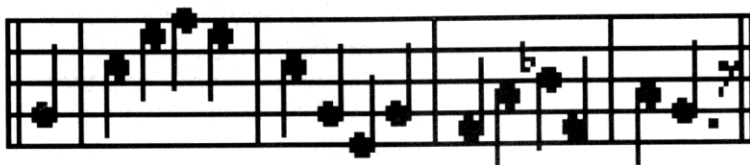
Musical compositions may be played from the Status Screen simply by pressing the **TAB** key. All voices will be played from the beginning. Pressing **ESCAPE** will stop the playing immediately. It will continue including all repeats, 1st and 2nd time bars until the end. You may start playing from any bar by setting the BAR parameter in the Status Screen and pressing **SHIFT TAB**. If you start playing within a repeat section, the current repeat markers will be ignored.

Individual voices may be played when in one of the Edit Screen's four voices (disk only) Press **TAB** to play from the cursor position. Any repeat markers will be ignored and the notes will be played in sequence as they appear on the screen. Hold down **ESCAPE** to stop playing. However, if you have a long voice composed of lots of very short notes and play these back from the Edit Screen, the animated display can occasionally get out of sychronization with the sound. This will probably not be noticed until the end of the voice where the cursor will halt a few notes short of the end. Don't panic, it just means that the poor computer has run out of steam due to frantic playing and whizzing of notes across the screen! Press **ESCAPE** (or BREAK) to continue.

Transposition

A piece of music may be transposed from one key to another by editing the key signature from the Status Screen. TMS will not actually transpose the tune until any key except the ⬅ and ➡ cursor keys is pressed. It is normal practice to press **TAB** to start playing the tune after the new key has been selected. If it is not possible to transpose the tune then an error pop up will be displayed 'Can't transpose.' Press **SPACE** to return to the original key. If a tune has been successfully transposed then the new key signature, note positions and accidentals will all be set correctly in the Edit Screens.

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. This

can be achieved from the Status Screen by pressing **CTRL-f2** to increase the pitch of all notes by 1 octave or **CTRL-f3** to decrease the pitch of all notes by 1 octave. Notes cannot of course be moved up or down if they go outside the pitch range of TMS. (See the section on editor macros for further details.) If music is transposed by exactly 1 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. Music can be transposed from one key to any other key. Each transposition 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 TMS 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 pitch range 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, then the error message 'Can't transpose' is displayed. The tune will still be at the original pitch in the original key. On pressing **SPACE** the original key signature is shown. Because of the differences in pitch interval a particular piece of music could quite possibly be transposed into some keys but not others.

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 seminote 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 seminote. It therefore becomes as 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.

Accidentals				
♯	)(	♭	♭♭	♮
sharp	double sharp	flat	double flat	natural

The Edit Screens

The DISK version of TMS has four Edit Screens, corresponding to the four available voices. The cassette version does not support voice 4 (percussion). Voices 1, 2 and 3 allow input of music on treble and bass staves. Voice 4 is a percussion track, with a range of fifteen different preset noises available. Enter an Edit Screen by pressing the corresponding function key ... **f1** for voice one ... **f4** etc. The system disk must be located in drive ∅ at this point. If not found then a pop-up will display an error message 'Insert system' asking you to replace the system disk. TMS will need to access the program disk on returning to the Status Screen so leave it in drive ∅ whilst entering or editing a tune.
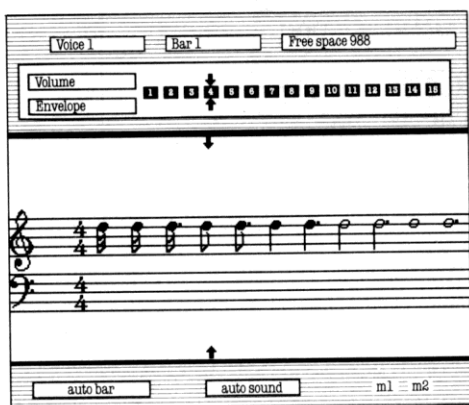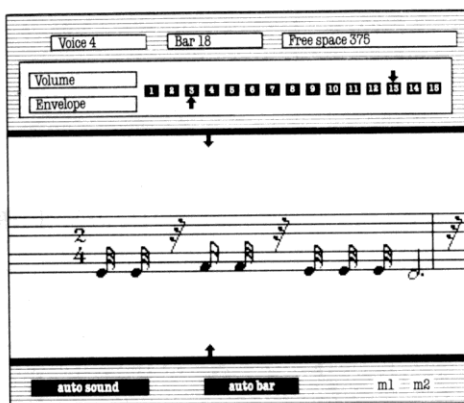
VOICE 1 EDIT SCREEN   VOICE 4 EDIT SCREEN

An Edit Screen will be entered at the current bar number (Status Screen). If there are less actual notes in that voice, then the end of the voice will be displayed and the current bar number reset. Each Edit Screen displays the voice number, bar number and overall free space available for notes. Each voice is not restricted to a certain proportion of the total available notes. For instance, one voice could contain 8∅∅ notes and another 6∅ notes. The other two voices would then be empty. Below these parameters are the volume and envelope/noise scales. These indicate the current settings which may be easily changed.

Voices 1, 2 and 3 are displayed on treble and bass staves complete with the selected key and time signatures. Voice 4 is shown on a six line stave representing the fifteen different percussive noises. Below the staves are a set of indicator boxes for autobar, autosound and marker facilities. These are highlighted when active.

A feature of TMS EDITOR is the facility for switching instantaneously between the four voices whilst entering or editing a musical composition. Each of the voices

will be entered at the current bar if possible. This means that voices can be entered in parallel with one another with a quick reference to any voice.

Entering a note in voices 1, 2 and 3

Notes are entered directly on the treble and bass staves at the music cursor position. The cursor is an imaginary line between two arrows above and below the staves. The cursor is initially in the centre of the screen. For convenience it can be moved left or right. **CTRL ←** moves the cursor to the left, **CTRL →** to the right. The music cursor is shown as either empty or filled in arrows.
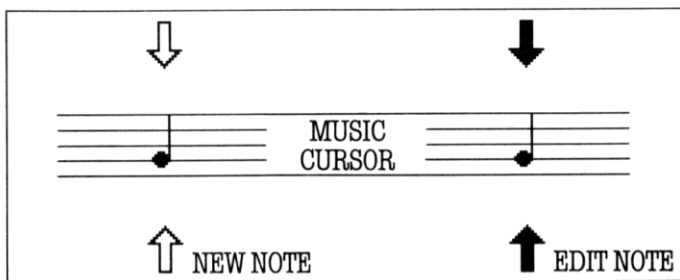
An empty arrow means that the note at the cursor position is not yet stored in memory. It always appears at the end of a voice. The pitch, duration, envelope and volume of this note can all be changed before this note is entered. Enter the note by pressing **RETURN**. If in autosound mode the note will be heard as it is entered. The newly entered note moves to the left and a similar note appears under the music cursor. Again this note may be edited and entered into memory by pressing **RETURN**. If you do not want a note to sound every time it is entered turn autosound off. This is done by pressing **V**. Press **V** again to switch the autosound back on. If you want to hear the note before it is entered press **@**. This is very useful when changing envelopes and volume.

Editor Functions

Once a note has been entered you can easily edit it again by moving the note to the cursor position and changing the pitch, duration, etc. This time the cursor arrow will be solid because this note is actually stored as part of the voice (see diagram). The following sections describe how to change each of the note parameters such as volume and pitch and how to add symbols like barlines and repeat markers.

Pitch

INCREASE   DECREASE
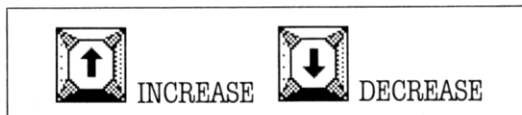
Notes may be entered over a pitch range of four octaves from F (1 ½ octaves below middle) to F(2½ octaves above middle C). To change the pitch of a note use the ↑ and ↓ keys. The note will move up and down the staves. Note that the EDITOR sounds every note one octave higher than actually written.

Accidentals

	#	)(	♭	♭♭	♮
CANCEL	SHARP	DOUBLE SHARP	FLAT	DOUBLE FLAT	NATURAL
J	K	L	H	G	U

Accidentals can be added to any note by pressing the relevant key. For instance, pressing **H** adds a flat to the note at the cursor position and **K** adds a sharp accidental. 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 **U**. You can change the accidental by pressing any of the above keys. If you decide that the note should not be an accidental and therefore be in the selected key, press **J**. This will clear any flat or sharp, etc.

Using the EDITOR, music is entered in proper musical notation. The usual convention of only showing accidentals once in a bar is adhered to. 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 any other accidental.

The EDITOR also uses double flats and double sharps. They do not appear in the most commonly used key signatures and are only usually used when transposing tunes from one key to another (see the section on Transposition for more details).

Duration

Q DECREASE	W INCREASE
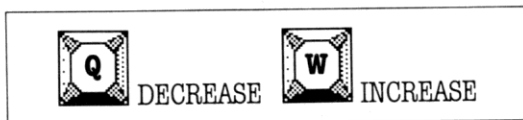
The duration of the note at the cursor is changed by pressing **Q** and **W**. The note will flip through all the allowable options from the shortest note length of a

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demisemi quaver to the longest note of a dotted breve. (6 crotchet beats). For other note lengths you can tie two notes together or select triplets (see below).

Volume

A DECREASE   **S** INCREASE
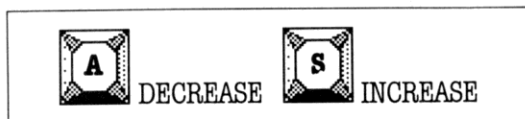
There are 15 different levels of volume which may be selected for any note. The current volume setting for the note at the cursor is displayed on the number scale above the staves. This is changed using **A** and **S**. When moving through a voice the amplitude number will be shown for every note. The volume is independent of the envelope or sound shape of the note in as much as any envelope can be either loud (15) or quiet (1). However, at the lower volume setting the quiet end sections of a note may not be heard. Refer to the SYNTHESISER section for further details.

Envelope Number

Z DECREASE   **X** INCREASE
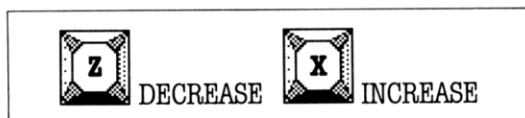
Each tune or part of a tune entered from the EDITOR or KEYBOARD can be written using up to 15 different shaped notes. Each sound shape is called an envelope and is numbered from 1 to 15. The current envelope number is displayed on the number scale below the volume. Use **Z** and **X** to change the shape of the note. It is often useful to use the **@** key to 'preview' the sound before entering it with **RETURN**. A whole set of envelopes may be loaded into the EDITOR and this could change the sound of all the notes already entered. The envelope number of any note can of course be changed at any time by moving the note to the cursor position and pressing **Z** or **X**.

Rests
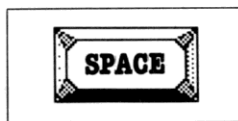
SPACE

The note at the cursor can be switched to a rest by pressing **SPACE** if it is not a dotted note. Dotted rests are not allowed. A rest can be switched back to a note by pressing **SPACE** again. In this way it is very easy to find the duration of any rest without knowing the precise notation. Whilst switched to a rest the duration can
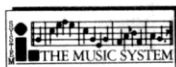
still be set using **Q** and **W**. The dotted note values are missed out this time! Any note below middle C will be switched to a rest on the bass stave, otherwise the rest will appear on the treble stave. Rests cannot be directly moved up and down but can appear within triplets. However, rests cannot be tied together or to notes.

In normal musical notation you cannot enter a dotted rest directly. The EDITOR adheres to this convention. In order to enter a rest of the duration equivalent to a dotted note, press **Q** to decrease the duration; press **SPACE** to switch this note to a rest and press **RETURN** to enter the rest. Press **Q** again to halve the duration of the rest shown under the music cursor and press **RETURN**. You will then have two rests equivalent in duration to the dotted note.

Ties
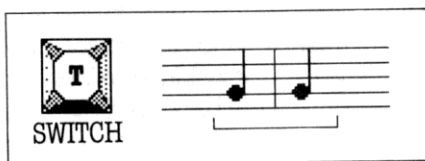
The note at the cursor may be tied to the previous note if it is of the same pitch, volume and envelope number. Rests may not be tied together. The tied pair will sound (and move) as one note with a duration equal to their total duration. Notes can be tied within triplets and triplet notes may be tied to any other note (of the same pitch, etc.). Notes may be tied across barlines but not across repeat markers.

Triplets
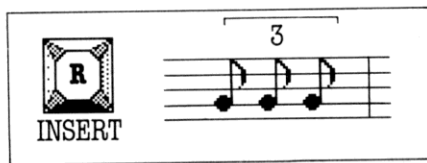
Semiquavers, quavers, crotchets, minims and semibreves can be changed into a set of three notes with the same overall duration called a triplet. If you want crotchet triplets, you must press the **R** key to turn your minim into 3 separate notes. Once entered, the pitch, volume and envelope number of any of the notes may be changed. You cannot change the duration! Rests may be entered within the triplet. You cannot delete any single note in a triplet ... the entire triplet will disappear!

Barlines

Pressing **1** will enter a barline to the right of the note/rest at the cursor position. Barlines may be entered at any point in a voice (except between triplets). In fact, there are no restrictions on the use of barlines in the EDITOR. However, there

are two ways of putting barlines in automatically. In autobar mode (the autobar indicator is highlighted when active) barlines are entered when a bar has the correct number of beats or greater according to the time signature. This means that the time signature is 4/4 for instance, and you have already entered 3 crotchet beats in the bar, entering another crotchet or any longer note will give a barline. The EDITOR does not automatically tie notes across a barline. The autobar facility can be switched on or off by pressing **B**.

The other method of automatically entering barlines is by using the adjust barline facility **SHIFT B**. The barlines are automatically adjusted or entered if none are present between the markers, according to the current time signature (see 'Using Markers'). The barlines adjust routine halts if it cannot fit the correct number of beats in a bar. The voice will move to the point where the error occurred and you can then sort out the problem 'by hand'. This might involve having to tie notes across a barline or inserting rests for instance. When sorted out press **SHIFT B** again and the EDITOR will adjust the bars from the start of the incorrect bar again to see if you have made appropriate corrections. If no errors occur the voice will move to the second marker.

N.B. Because the cassette version of the editor does not support markers barline adjust between markers is not possible.

Other barline symbols
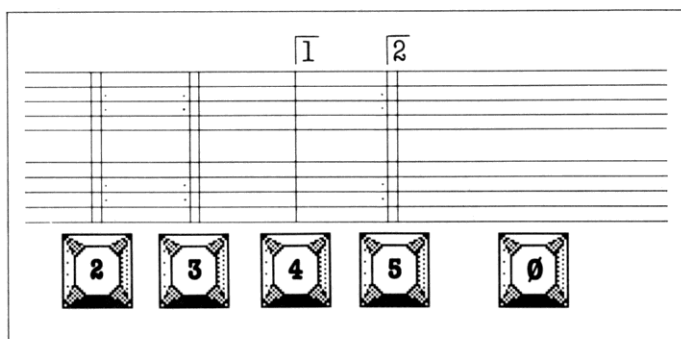
These symbols are entered after the note at the cursor by pressing the appropriate number key. To change a symbol simply press another key. To delete the symbol again press the same key. To delete any symbol press **Ø**. When notes are deleted the attached symbol is also deleted. Repeats cannot be nested. However, the voice will not stop playing if repeat markers are misplaced, it just might not sound like you expected!

For example:
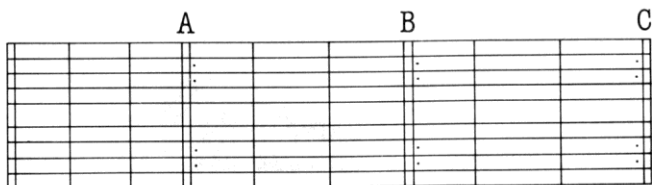
Plays A – C then B – C.
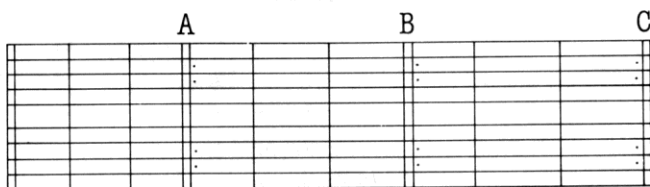
Play A – B, A – B, B – C then B – C
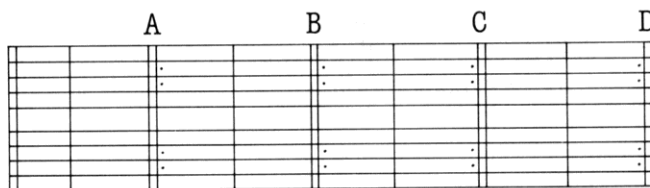
Play A – C, B – C, C – D then C – D.

The first time bar symbol (key **4**) marks the start of a first time bar. In fact there can be any number of bars before the end of repeat marker. If you forget to put in the repeat marker at the end of a first time bar the symbol will just be ignored. The second time bar symbol (key **5**) is normally used to mark the end of the first time bar.

When playing through a voice by pressing **TAB** the repeat markers and 1st and 2nd time bars will be ignored. The notes on the stave will be played purely in the sequence they appear. To hear the tune including the repeats play from the Status Screen.

Moving around a voice and editing

The following keys are used to move around a voice:

Move Backwards

SHIFT + ← Move to start of voice

Move Forwards

SHIFT + → Move to end of voice

TAB Play voice from cursor

ESCAPE Stop playback

As you scroll through the voice the volume and envelope numbers will display the correct values for each note that passes the cursor. The barline number will also be updated.

An aid to locating particular sections of a voice is the find symbol facility. To find the next occurrence of a particular symbol to the right of the cursor (e.g. barline, 2nd time bar) press **CTRL** together with the appropriate symbol number. Pressing **CTRL 1** will find the next barline including repeat markers and 1st time bars. Press **CTRL 1** again to find the next one. If the EDITOR cannot find the symbol the cursor will not move.

Inserting notes

+ Insert Note

Notes can always be added to the end of a voice if there are free notes available. Keep an eye on the 'free space' indicator on each edit screen and the note data on the Status Screen. Notes can be inserted into a voice by pressing **+**. An extra note is generated at the cursor position and the notes are pushed one space to the right. The extra note will be exactly the same as the one the cursor was originally pointing at. You can 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. If necessary you can use the barline adjust facility to correct the barlines following this bar.
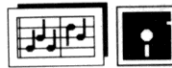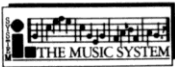
Deleting notes
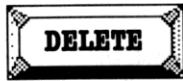
DELETE   Delete left   **—**   Delete right

Notes may be deleted forwards or backwards from the cursor position. **DELETE** deletes the current note and the notes to the left are pulled in from the left by one space. If **DELETE** is kept depressed the effect is to 'suck in' the notes from the left eventually arriving at the start of the voice. **—** deletes the current note and the notes are pulled in from the right by one space. If **—** is kept depressed you will eventually delete all the notes to the end of the tune. The delete operation removes any barline or other symbol which is to the right of the current note.

You cannot delete one part of a triplet. If you press **DELETE** or **—** whilst on any of the three triplet notes the whole triplet is erased. A note which is not yet entered at the end of a voice cannot of course, be deleted. However, pressing the ← cursor key will move the voice along and the unentered note will disappear. To delete large sections of a voice use the delete between markers facility.

Markers (disk only)

M   Switch marker ON/OFF   ■ Marker
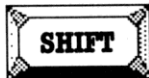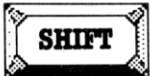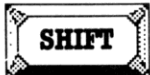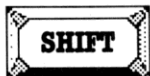
SHIFT **f6**   Delete both markers

One or two markers may be used in each voice to assist in the editing of a tune. Markers are inserted at the cursor position by pressing **M** and deleted by pressing **M** again. Markers are shown as square blocks below the bass stave. To delete both markers in a voice press **SHIFT f6**. The two markers are referred to as M1 and M2. The indicators at the bottom of the Edit Screen are highlighted when markers are set. Markers may be placed anywhere except at the music cursor with a new note indicated.
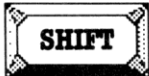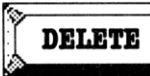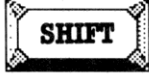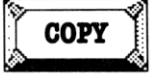
The following commands are used to move the markers:-

SHIFT	**f7**	Move markers to start and end of voice.
SHIFT	**<**	Move marker left of cursor to cursor position.
SHIFT	**>**	Move marker right of cursor to cursor position.

To quickly find a marker to the left or right of the cursor press **<** or **>** respectively. If a marker is not found in a particular direction the cursor will not move.

Markers are very useful for labelling the start of a particular section of a voice. If you need to play from a set point several times position a marker there and use the **<** **>** key to locate it again. Pairs of markers are used to specify a section of a voice for deleting, copying or adjusting barlines. In all these operations the marked notes are included in the section of voice to be deleted, etc. The following commands are used:-

SHIFT	**DELETE**	Delete all notes in marked section
SHIFT	**COPY**	Copy all notes in marked section to end of voice.

These commands are not active unless there are two markers present. There may be limits to the size of section that can be copied. It depends on the amount of free note space available within the EDITOR. Obviously, you should not attempt to copy a section of a voice onto the end of that voice if there is insufficient free space available for the extra notes.

To move a section of a voice to the end of that voice use **SHIFT COPY** followed by **SHIFT DELETE.**

The other marker function is adjust barlines. Pressing **SHIFT B** will automatically enter or adjust barlines according to the current time signature (see 'Barlines' above).
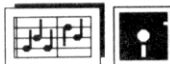
Editor macros (disk only)

The EDITOR macro facilities are provided to make the editing of tunes quicker and easier. Most of them can be used to adjust certain note parameters such as volume, pitch and envelope throughout either the whole tune, or all or part of one voice. They are called macros because they can operate over many notes instead of one, as with the normal editing facilities. There are two types of macro command. The first type operate over the whole tune (all voices) when used from the Status Screen, and between the markers in the current voice from the Edit Screens.

CTRL	**f0**	Increase volume of every note by 1.
CTRL	**f1**	Decrease volume of every note by 1.
CTRL	**f2**	Increase pitch of all notes by 1 octave.
CTRL	**f3**	Decrease pitch of all notes by 1 octave.
CTRL	**f4**	Increase volume of first note in every bar by 1.
CTRL	**f5**	Decrease volume of first note in every bar by 1.

The **CTRL f0** and **CTRL f1** commands act as master volume controls over the whole tune when used from the Status Screen. Pressing **CTRL f0** once will increase the volume of every note in all voices by one increment. If any notes are currently at maximum volume, their volume will not be increased. Pressing **CTRL f0** when in one of the Edit Screens will increase the volume of all notes between the markers in that particular voice by one increment (if possible). Conversely, pressing **CTRL f1** will decrease the volume by 1 increment.

To increase the volume of all notes in a particular voice set the markers to the start and end by pressing **SHIFT f7** and press **CTRL f0**.

The **CTRL f2** and **CTRL f3** macro commands are used in a similar way to transpose either the whole tune or notes between markers in one particular voice by one octave. These commands do not operate in voice 4 (the percussion track). Use **CTRL f2** to increase the pitch by one octave and **CTRL f3** to

decrease the pitch by one octave. The key signature does not change when a tune is transposed by exactly one octave (see section on Transposition). Individual notes will only be transposed if they remain within the upper and lower pitch limits. Otherwise they remain at the original pitch. Care must be taken when using the transposition macros because the pitch pattern of a particular tune might change if some of the notes are transposed and others not. Once the pitch pattern has been changed in this way transposing the tune in the other direction will *NOT* reset the tune back to normal.
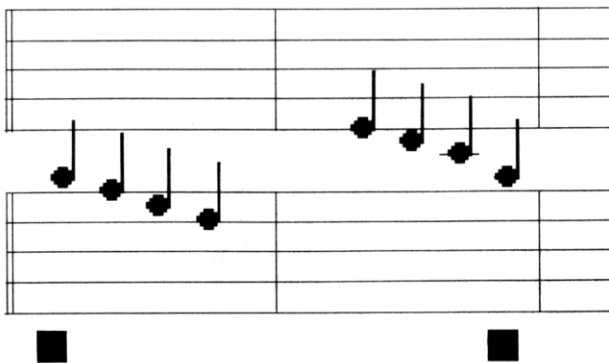
THE EFFECT OF TRANSPOSITION MACRO ON PITCH PATTERNS
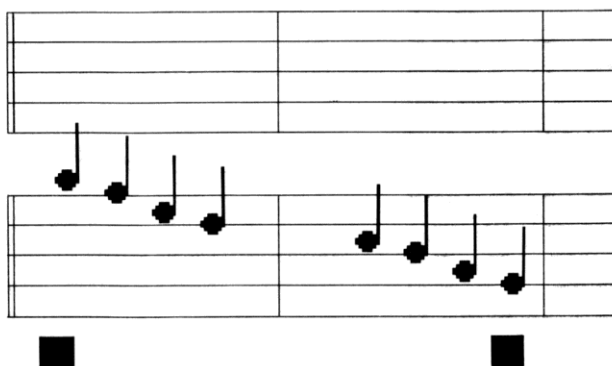
‹CTRL›-‹f3› Transpose downwards by one octave........becomes:

and:

THE MUSIC SYSTEM
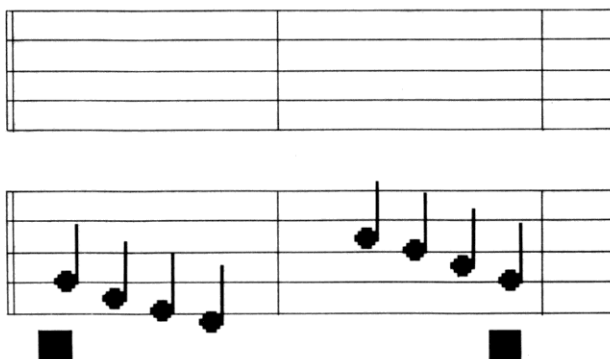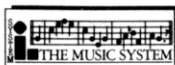
‹CTRL›-‹f2› Transpose upwards by one octave........becomes:

Volume control macros

The **CTRL f4** macro commands is used to accentuate the first beat of each bar by increasing the volume by 1 increment. Press **CTRL f4** once for each additional increment. Again the volume will not increase beyond the maximum. The **CTRL f5** macro can be used to restore the volumes back to the original values by decreasing the volume of the first beat of each bar by 1 increment. The original patterns will be obtained only if the volumes have not reached the maximum. When used from the Status Screen all voices are operated on (including voice 4), when used from the Edit Screens, only the notes between the markers will be affected. Note that the first marker should always be positioned AT THE START OF A BAR since the volume of the note at the marker position will be increased/decreased.

The volume macro commands can be used to reset all volumes to the same value either within a whole piece of music or part of one voice. For instance, to set all the notes to a volume of 8, press **CTRL f1** at least 14 times or hold the key down for several seconds so that it will auto-repeat sufficiently. This will set all volumes to the minimum (1). Then press **CTRL fØ** seven times to increase all of the note volumes to 8 again. This strategy can also be used to set the volumes of the first notes in each bar to the same value.

SHIFT	f3	Transfer volume to next note.
SHIFT	f4	Transfer envelope to next note.
SHIFT	f5	Transfer volume and envelope to next note.
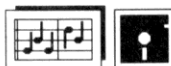
The second type of editor macros only operate within the Edit Screens and are used to set the volume and/or envelope parameters of small numbers of notes to particular values. They do not operate in conjunction with the markers. The envelope macros do not operate in voice 4.

To set a series of consecutive notes to the same volume position the music cursor on the first note and set the required volume. Pressing **SHIFT f3** will move to the next note (on the right) resetting the volume to that of the previous note. The pitch, envelope and duration of the note will not be changed. Pressing **SHIFT f3** again will reset the volume of the next note, and so on. Of course, the volumes of all the notes in one voice may be reset to the same value by starting at the beginning and holding **SHIFT f3** down. This macro command operates in all voices.

In a similar way **SHIFT f4** may be used to set the envelope number of consecutive notes to the same value. This can only be used in voices 1, 2 and 3. This is a useful method of resetting the envelope numbers for a whole voice or large sections of a voice. Another method of doing this is to swap envelopes in the SYNTHESISER module.

The **SHIFT f5** macro command resets both the volume and the envelope parameters in one go. Again, this does not operate in voice 4.

Using voice 4 (disk only)

Voice 4 is used as a percussion or sound effect track. It is entered from the Status Screen by pressing **f4**. Voice 4 is very similar to the other voices, the major differences being that there is a fixed set of 15 noise effects available. These can be selected in the same way as selecting envelopes in the other voices using **Z** and **X**. The pitch keys ↑ and ↓ arrow cursor keys as used in the other voices do not actually change the pitch directly. Instead they are used to change the noise number as an alternative to **Z** and **X**.

Voice 4 displays a modified stave with 6 lines and a time signature. The key signature and accidentals are not relevant to the percussion voice. The 15 noise effects are shown in different 'pitch' positions on the stave with noise 1 at the bottom and noise 15 at the top. The volume and duration of each noise note may be altered as in the other voices. Rests, ties, triplets, barlines and other symbols are also used in the same way. Editing voice 4 and using markers is also similar.

Voice 4 can be used in conjunction with another voice, say voice 3, to produce a combined rhythm track. A series of special percussive envelopes may be designed for the voice 3 part and the noise effects used in voice 4. Notes may be entered quite easily by flicking between the two voices. Of course you could emulate a whole drum kit by using all four voices together.

Note that some of the noise effects will sound very similar when played for short durations since you will only be hearing the first part of the noise. To test the noises set a long duration and go through each noise using the **@** key.

THE SYNTHESISER

The SYNTHESISER module provides the means of creating shaped sounds which are subsequently used in the EDITOR, LINKER and KEYBOARD modules. Each sound is defined by a set of nineteen numbers collectively called an envelope. The set of numbers in each envelope control both the volume and frequency of one sound shape.

Through the many possible combinations, there are a vast choice of possible sounds, the full range of which can only really be seen by experimenting with the SYNTHESISER.

The SYNTHESISER allows the loading, saving and editing of up to 3Ø different envelopes. These are stored in data file (on disk or tape) in sets of 15, for use with the other modules. Two sets of envelopes may be held in the SYNTHESISER at any one time. Thus, together with the built-in copy and swap facilities, sets of envelopes may be made up from numerous different envelope files.

Data source	drive Ø
Envelope file 1	e. ENV 1 ←
Envelope file 2	e. ENV 2
File type	**music format**
Volume	15

Save envelopes

← 1-15

‹Space› changes

SYNTHESISER STATUS SCREEN

SYNTHESISER PARAMETER SCREEN   SYNTHESISER GRAPH SCREEN
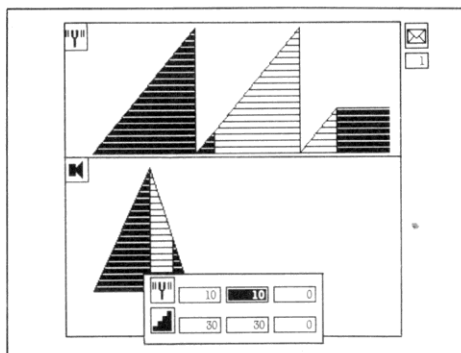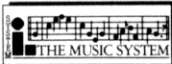
The Synthesiser Status Screen

The SYNTHESISER Status Screen is displayed on entering the module. This may be returned to at any stage from within the SYNTHESISER by pressing **CTRL ESCAPE**. The SYNTHESISER itself consists of a Parameter Screen and a Graph Screen. The Parameter Screen is accessed by pressing **RETURN** and the Graph Screen by pressing **RETURN** again. The Status Screen displays the current pair of envelope files residing in TMS together with the data source; the file type (used when saving files) and the master volume control (to avoid annoying the neighbours!). All these parameters may be altered from the Status Screen.

Data source: The current location for loading and saving files.

Data Source	Drive Ø
Envelope File 1	e.
Envelope File 2	e.
File Type	Music Format
Volume	15

This may be set to drive Ø, 1, 2 or 3. The data source indicates the disk drive to which files are sent or are received. To change the drive number highlight data source and use ← and → cursor keys to flip through the four options. The data source is only read by TMS when loading or saving an envelope file. This parameter is fixed in the cassette version.

Envelope files: The current pair of envelope files.

Data Source	Drive Ø
Envelope File 1	**e.**
Envelope File 2	e.
File Type	Music Format
Volume	15

Envelope files must have a directory code 'e'. for loading into the SYNTHESISER. Envelope files may be saved in the standard BBC microcomputer format under the directory code 'b', but these cannot be reloaded again (see File type below). There are two envelope filenames; Envelope file 1 and Envelope file 2, which refer to envelopes 1-15 and 16-3Ø respectively. Each set can be loaded or saved independently (see File operations).

To alter an envelope filename highlight the required file and type in the new filename. Try and use meaningful file names, eg. e.piano or e.organ etc.

File type: The current envelope file type when saving files

Data Source	Drive Ø
Envelope File 1	e.
Envelope File 2	e.
File Type	**Music Format**
Volume	15

The specification for the envelopes used within TMS is different to that commonly used by the BBC B microcomputer. TMS files have a directory code 'e'. Programmers will therefore not easily be able to use these envelope definitions in their own programs. In order to allow this facility the SYNTHESISER will save a set of envelopes in BBC microcomputer format. These can be used

THE MUSIC SYSTEM

directly in BASIC or machine code programs. These files, designated by their 'b', directory code, can *NOT* be reloaded into TMS since their specification is different.

To switch the file type highlight this section and press ← or → cursor arrows. This parameter is only read by TMS when saving files. The default setting is 'music format' and care should be exercised when changing to 'BBC format' because files saved in this format cannot be reloaded.

Volume: The current master volume setting.

Data Source	Drive Ø
Envelope File 1	e.
Envelope File 2	e.
File Type	Music Format
Volume	**15**

The VOLUME may be set between 1 and 15. The volume setting provides a means of decreasing the sound output from the microcomputer when sounding the envelopes. It affects all envelopes equally and only operates within the SYNTHESISER. It has no effect on the amplitude graph and should be regarded as a volume control similar to that on a radio or TV.

File operations

Envelope files in music format may be loaded from disk or cassette. Envelope files may be saved in either music format or BBC format.

To LOAD an envelope file set the data source and the relevant filename (file 1 or 2) and press **f8**. A pop-up window will appear showing the set of envelopes to be loaded. To change from set 1-15 to set 16-3Ø press **SPACE**. Press **SPACE** to switch back again. An arrow also points to the selected envelope file to show which file is being loaded. After selecting the required set press **RETURN** to confirm the command. Pressing **ESCAPE** at any time will abort the command. If the file is successfully located and loaded the current set of envelopes will be replaced.

To save an envelope file set the File type, if necessary, and press **f9**. Again a pop-up will be displayed showing the set to be saved. Use **SPACE** to switch between

the sets. Press **RETURN** to confirm the command or **ESCAPE** to abort. The Library, Delete File and Rename File operations are all available from the Status Screen.

Copy and swap envelopes

Facilities are included for moving envelopes within the two sets (1-15 and 16-3∅). Press **SHIFT f9** to Copy one envelope onto another. A pop-up will appear prompting you to enter the required envelope numbers. Type in the source envelope number and press the ➡ cursor arrow. Type in the destination number and press **RETURN** to confirm. Press **ESCAPE** to abort the command at any stage. You will not be able to enter an incorrect number and may use **DELETE** to edit each number. Note that this is a destructive command so use it with care.

To Swap one envelope with another press **SHIFT f8** Again a pop-up will appear. This time type in the two envelope numbers (in either order). Press **RETURN** to confirm the command; **ESCAPE** to abort.

To make up a new set of envelopes from several files, load each source file into envelope set 1 and transfer the required envelopes into set 2 (16-3∅). Finally save envelope file 2 as the new combined set.

Do not perform these operations on your Song & Sound Library disk/cassette. Instead copy the required envelope sets onto a new disk/cassette.

The Parameter screen

The Parameter Screen is entered by pressing **RETURN**. Pressing **CTRL ESCAPE** returns to the Status Screen; pressing **RETURN** again enters the Graph Screen. The Parameter Screen displays 21 different envelope parameters, 19 of which may be edited for any one of the 3∅ different envelopes. The current envelope number is shown in the top left hand corner of the screen. The other parameters are grouped into three sections; the frequency, time and amplitude sections. The frequency section consists of three linked windows, the others having one window each.

Selecting parameters

When initially entering the Parameter Screen, the envelope number is highlighted. Press **SPACE** to move to the first frequency section window. Pressing **SPACE** again moves it clockwise through the windows returning it to the envelope number. To select a parameter within each window, use the cursor arrow keys:

```
┌──────────────────────────────────┐
│  ⬅    ➡    ⬆    ⬇              │
│ LEFT  RIGHT  UP   DOWN           │
└──────────────────────────────────┘
```
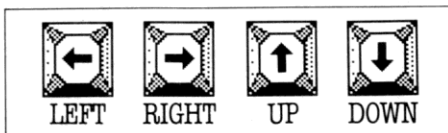
The highlight will not move outside of the window when using the cursor keys. When moving between windows the highlight will always return to the last parameter previously selected in that window. This means that you can easily flip between, say, two parameters in different windows just using **SPACE**.

The symbols or icons used in the Parameter Screen are described in the appendix.

The Parameters

Q ⟷ **W** CHANGE PARAMETER   **@** SOUND ENVELOPE
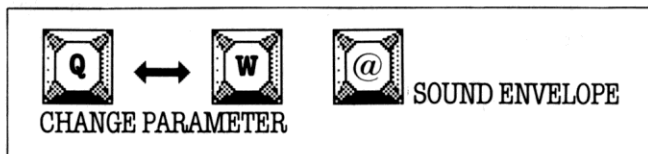
The effect of changing parameters can be heard at any time by pressing **@**. However, the Graph Screen is extremely useful for actually 'seeing' the frequency and amplitude shapes in the form of graphs. The diagrams below refer to these graphs. All the parameters may be seen (in sections) and edited from the Graph Screen. See notes on the Graph Screen for full details.

⊠ Envelope No

Press **W** or **Q** to flip through each of the sets of envelope parameters. When 3Ø is reached the envelope number returns to 1 and vice versa. Remember that envelopes 1-15 are saved as envelope file 1 and envelopes 16-3Ø are saved as a different file (envelope file2). You may use the copy and swap facilities from the Status Screen to move envelopes around and change the order.

Frequency Parameters

CHANGE IN PITCH   NUMBER OF STEPS
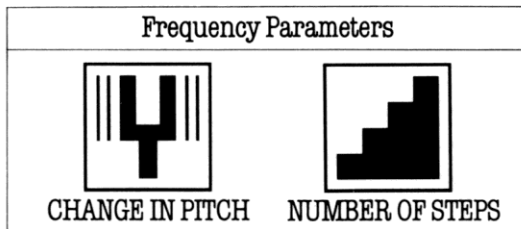
The pitch changes can be split into 1, 2 or 3 sections. There are two parameters for each section: change in pitch and number of steps. Each step is one time unit long (see time parameters). The change in pitch is shown as the number of pitch

(or frequency) units increased or decreased during each step. This is equivalent to the rate of change of pitch with time. The actual rate will of course depend on the length of each step. A frequency section is ignored if the step number is zero. Each frequency section follows on from the next.

Frequency (pitch) Graph diagram

		2	−4	1Ø
		1Ø	5	Ø

①

②

→10 Steps   →5 Steps   →No further change
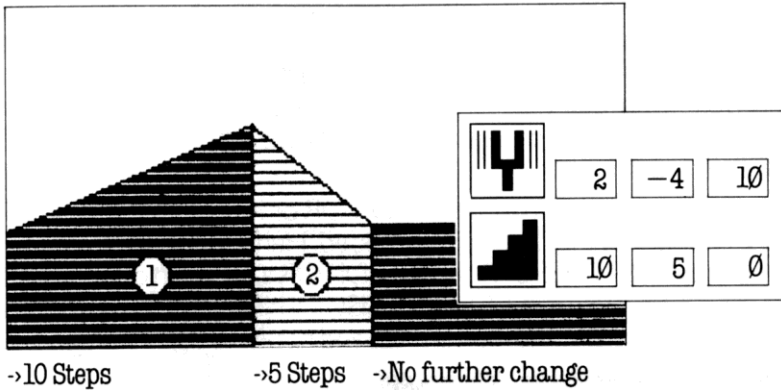
If the pitch reaches the upper foldover limit or 255 (which ever is the lower) then it folds down to the lower foldover limit or Ø (which ever is the greater) and vice versa. The pitch then continues to increase or decrease at the same rate. This is called foldover or wrapround.

		1Ø	Ø	Ø
		3Ø	Ø	Ø

UPPER LIMIT

INITIAL
PITCH

LOWER LIMIT

|←——— SECTION 1 ———→| NO FURTHER CHANGE
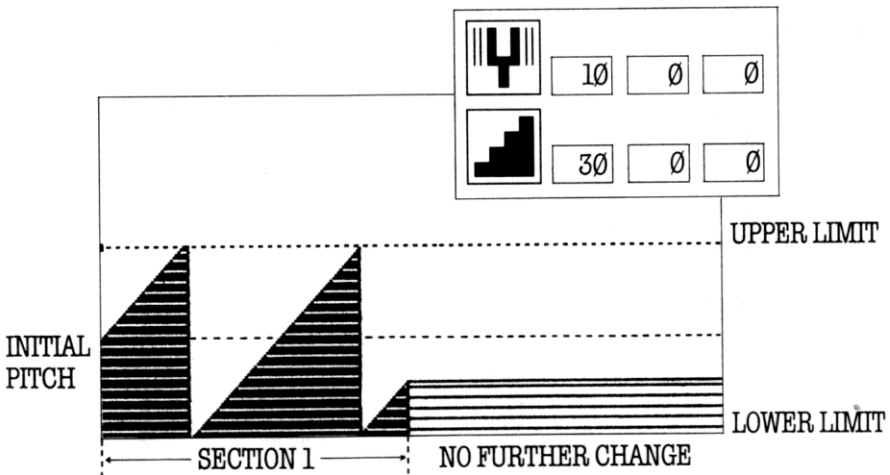
The frequency sections may also be repeated to give a continuous pattern. Any sections with a step number of zero will be ignored.
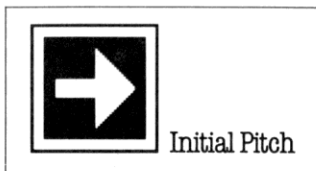
Initial Pitch

The Initial pitch is displayed in either frequency number units or Hz (cycles/second). Press **H** to switch between them. The initial pitch is the starting pitch of the first active frequency section (usually section 1). It can be anywhere over the entire pitch range of 1-255 frequency number units (123-4836 Hz). If the section(s) are repeated the starting pitch of the first active section is reset to the initial pitch.

When notes are played from the EDITOR or KEYBOARD the Initial pitch is set to the given pitch of the note being sounded. Hence envelopes will only sound the same in the SYNTHESISER and the EDITOR if the pitch of the note is the same as the initial pitch given in the SYNTHESISER. This is particularly relevant when foldover occurs at some intial pitches and not others

Upper and lower foldover limits

The foldover limits are only displayed as frequency number units due to the problems caused by the non-linearity of the Hz scale. The limits are both relative to the initial pitch and shows the maximum upper and lower pitch differences from the initial pitch. If the foldover limits are outside of the normal pitch range (1-255) then they will not be effective.

|			
⬆	255	100	50
➡	100	100	100
⬇	255	120	20
	Both upper and lower limits not effective over entire range of initial pitch	Upper limit now effective	Both limits effective

Since the limits are both relative to the initial pitch, changing the initial pitch can change the effectiveness of the limits. This should again be borne in mind when

42

designing envelopes for use in the EDITOR and KEYBOARD. The limits are most effective when foldover occurs since they can be used to great effect in limiting the frequency range of a sound.

| 54 |
| 136 |
| 16 |

UPPER PITCH LIMIT

LOWER PITCH LIMIT

Repeat frequency section
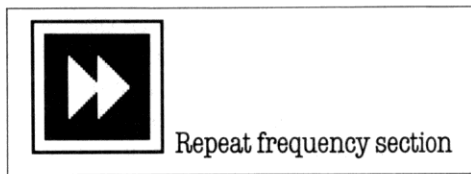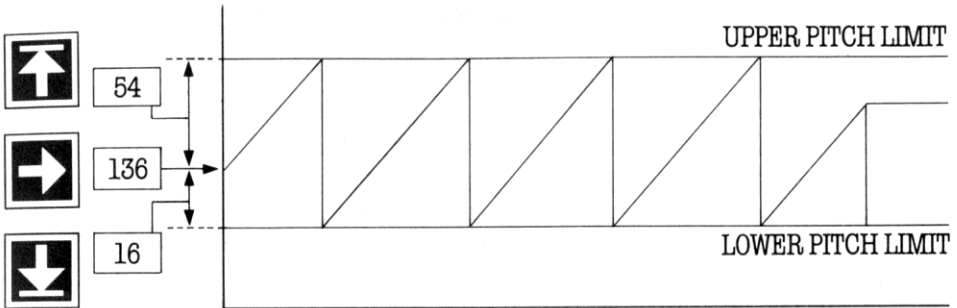
This can be either ON or OFF. If set OFF each frequency section will only be active once. If ON the whole sequence of frequency sections will be repeated until the end of the sound (i.e. when the amplitude goes to zero). Only frequency sections which have non-zero step numbers will be included in the frequency pattern. Patterns consisting of 1, 2 or 3 frequency sections can be repeated. The initial pitch will be reset at the beginning of each new pattern. If the amplitude goes to zero before the pattern is completed then the repeat parameter has no effect.

| −6 | 12 | 0 |
| 16 | 5 | 10 |

◄— Section repeated twice —►
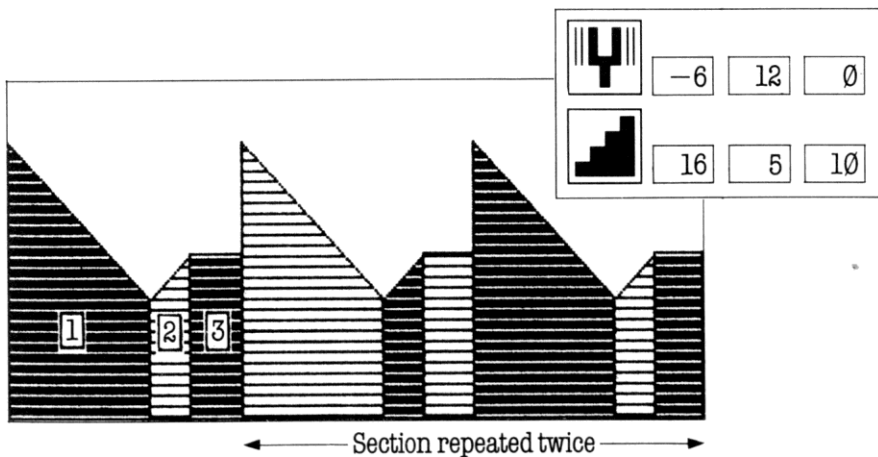
Modulation

CHANGE IN PITCH   FREQUENCY

There are two parameters which control the modulation of the frequency; the change in pitch and the modulation frequency. Modulation is imposed directly on top of the unmodulated frequency pattern determined by the other parameters. The foldover limits still limit the pitch range so that modulation can create foldover or wrapround. Modulation can create an extremely complex frequency pattern by superimposing one pattern upon another. For this reason modulation is not shown on the frequency graph.

The change in pitch gives the pitch increment or decrement (in frequency number units) for every step in the modulation cycle. The step length is one hundredth of a second. Modulation imposes a triangular wave over the original frequency pattern. The greater the change in pitch the greater deviation from the original. The absolute 'vertical' deviation depends upon the modulation frequency. This gives the frequency of the imposed triangular wave. In effect it determines the number of step lengths for each cycle. The minimum time for one cycle is 1/25th second (4 steps). This is equivalent to a modulation frequency of 25Hz. The following diagrams show the effect of these parameters.
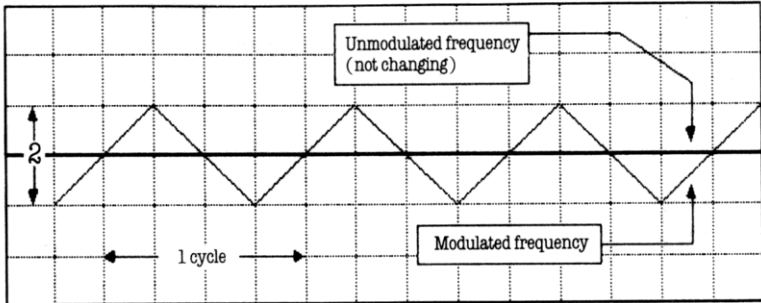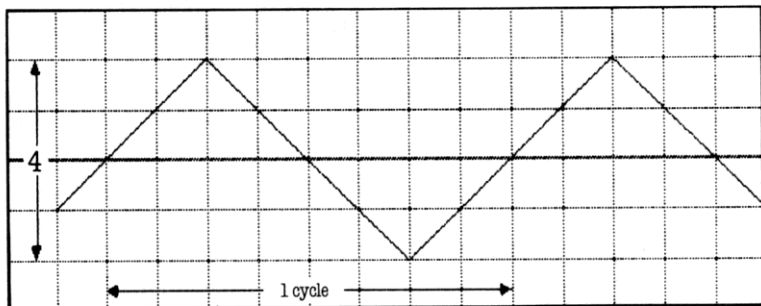
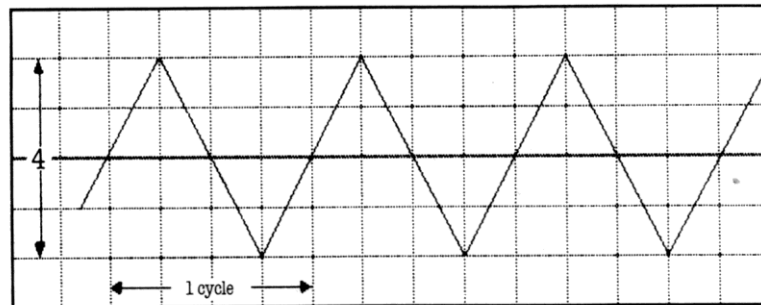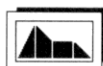## SYNTHESISER MODULATION

1

25.0

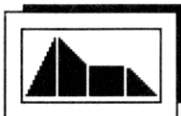Unmodulated frequency (not changing)

2

Modulated frequency

1 cycle

1

12.5

4

1 cycle

2

25.0

4

1 cycle

45

SYNTHESISER
MODULATION

4

12.5

Modulated frequency

Unmodulated frequency
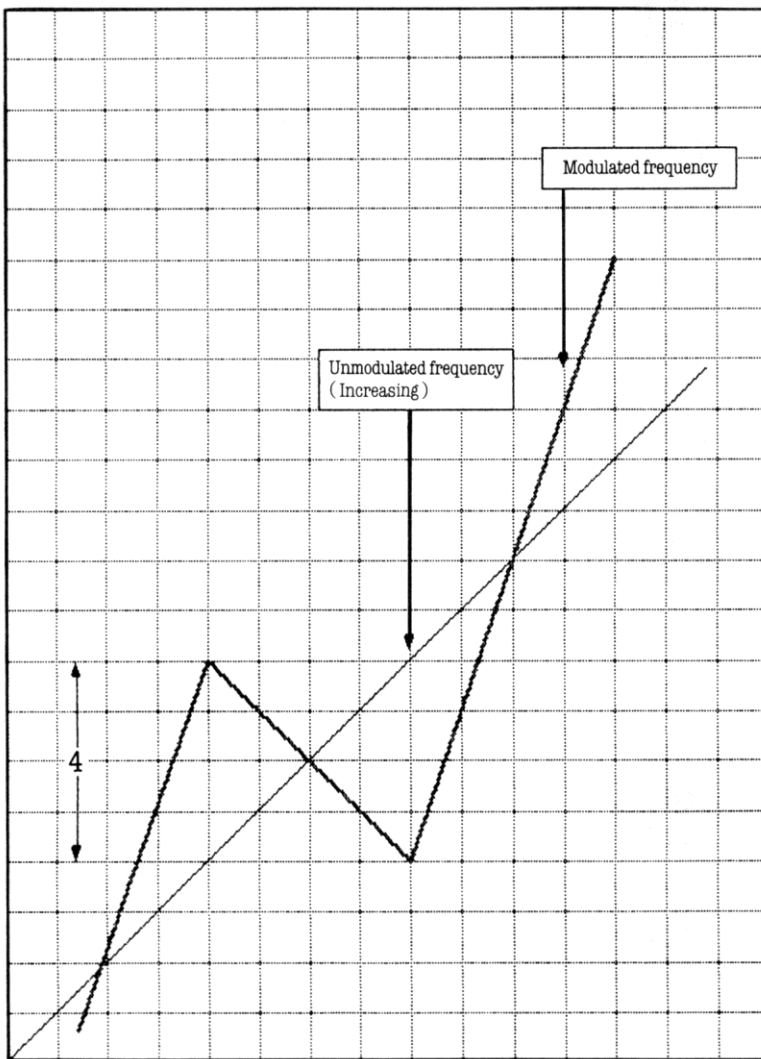(Increasing)

4

Time parameters

Time unit for each step

Both the frequency and amplitude parameters are given in terms of step units. The rates of change are given as a change per step and the length of each section is calculated in steps. If the time unit is increased the length of these sections will also be increased and the sound pattern slowed down. The time unit does change the total number of steps (displayed) available within a given total duration.

Total Duration

This is the total duration of the note *BEFORE* the Release phase (if any). The Attack, Decay and Sustain sections in the amplitude pattern will stop when the duration time limit is up (whatever section is currently active). The Release phase will continue from that point. On the other hand the amplitude may reach zero before the time limit is up in which case there will be no Release phase.

This is very noticeable when playing notes from the EDITOR or KEYBOARD. If a note has a short duration then only the first part of the envelope may be heard. Conversely if the note duration is long then the sound may finish way before the note actually ends. The frequency pattern is not directly stopped when the time limit is reached. However you will not hear any pitch changes if the amplitude is zero! The total duration changes the available number of steps.

Number of steps

This parameter cannot be edited directly. It is calculated from the time unit and total duration and rounded down to the nearest whole number. It cannot be less than 1. You can use the number of steps (up to the time limit) to estimate the proportion of the total time given to each frequency and amplitude section although this is easier to visualise on the Graph Screen.

Amplitude parameters

Target level   Rate of change

The amplitude pattern is split into four distinct sections although a particular sound may not include all the sections

ATTACK   DECAY   SUSTAIN   RELEASE
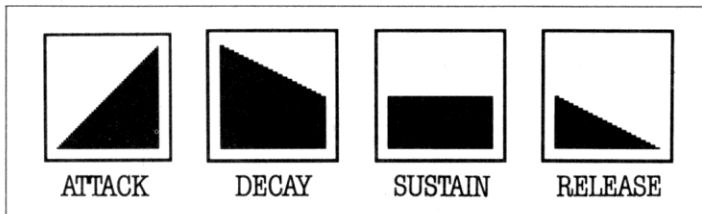
The basic amplitude sound pattern is shown below, together with suitable parameters. It assumes that the total duration and time units are such as to provide sufficient steps to complete the pattern and not cut it off at the time limit.

| 4 | −2 | −1 | −2 |
| 126 | 68 | | |

Amplitude graph

ATTACK ⟶ DECAY → SUSTAIN ⟶ RELEASE
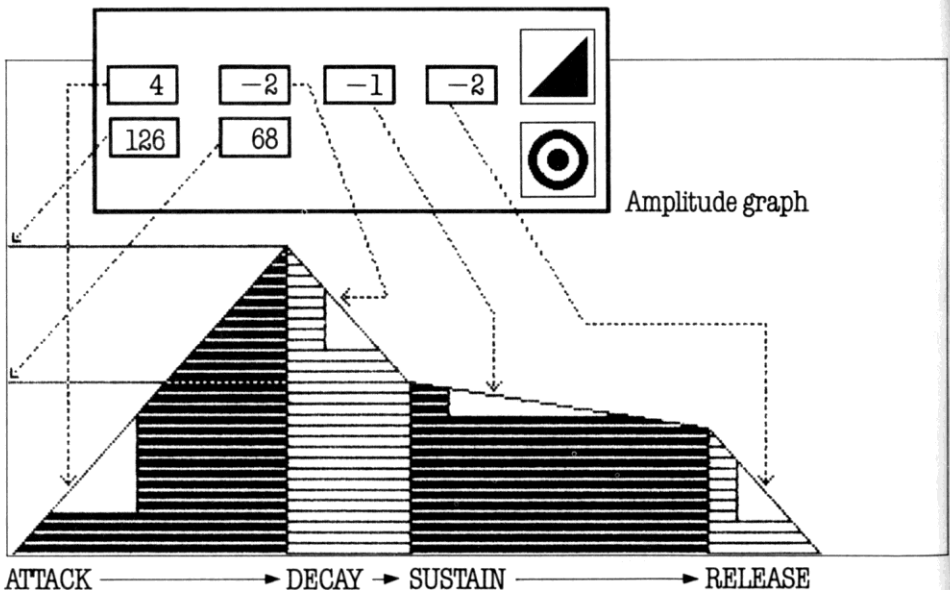
Each amplitude section has a rate of change; the attack rate of change must be positive the other three may be zero or negative. The initial amplitude is always
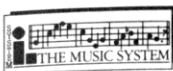
zero but increases for as many steps as it takes to reach the target level. In this case 32 steps to reach an amplitude of 126. The attack target level is set at 126 units and cannot be edited. The amplitude will then decrease to the decay target level (unless it is equal to 126). In this example the target level is lower and the rate of change is negative (although it could be set to zero).

The EDITOR and KEYBOARD play notes at different volumes ranging from the maximum of 15 to a minimum of 1. At maximum volume the attack target level is set to 126 units, equal to the level set in the SYNTHESISER. At lower volume setting the target level is decreased. The decay target level is also decreased by the same amount. The amplitude parameters are always set as if the volume setting was at its maximum. To reduce the overall sound level use the master volume control from the Status Screen. This will not affect the parameter settings or the graph although it could change the amplitude pattern especially at low volumes.

When the decay target level is reached, the sustain section starts. There is no target level for this section and the amplitude change according to the rate of change parameter, until either the time limit is reached, or the amplitude reaches zero. If the amplitude is not zero the Release phase is entered. Again there is no target level and the amplitude changes according to the rate of change parameter until the amplitude reaches zero. Of course if the rate of change is zero the amplitude will never reach zero and the sound will not stop!

If you sound a note with a continuous Release phase don't panic, set the Release rate of change to a negative value and press **@** again. You will NOT be able to stop the sound by pressing **ESCAPE** or any other key.

The Graph Screen

The Graph Screen is entered from the Parameter Screen by pressing **RETURN**. Go back to the Parameter Screen again by pressing **CTRL ESCAPE**. The Graph Screen displays both frequency and amplitude graphs of the current envelope together with the envelope number and one of the parameter windows. Press **SPACE** to move through the windows exactly as in the Parameter Screen. Each window appears as a pop-up sometimes overlapping part of a graph. To switch that window off to look at the whole graph press **DELETE**. Press **DELETE** to turn it on again. Pressing **SPACE** will always display the next window. Edit the parameters in exactly the same way as on the Parameter Screen and use **@** to sound the envelope. The parameters may not be changed if the window is not displayed.

On entering the Graph Screen the graphs show the frequency and amplitude patterns corresponding to the current set of envelopes. If you edit any of the parameters then one or both of the graphs will need to be updated. This is shown by the copy symbol. Press **COPY** and the relevant graph(s) will be redrawn.

Whenever the copy symbol is displayed the graphs may not be a true representation of the sound.

The graphs may be displayed with any of three different shading patterns. Flick through the patterns by pressing **SHIFT fØ**. The graph will not change until they are updated. The easiest way of seeing the patterns is to press **SHIFT fØ** and then cause an update by pressing **Q** then **W**. Press **COPY** to redraw the original graphs with a different shading pattern.

The frequency graph
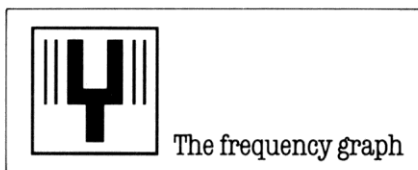
The frequency graph displays an unmodulated frequency pattern up to a point beyond the time limit. The frequency pattern will in fact continue until the sound stops especially if the repeat parameter is ON. Each active frequency section is shown in alternate shading patterns for ease of identification. In cases where the foldover limits are close together the graph may take longer to draw.

The amplitude graph
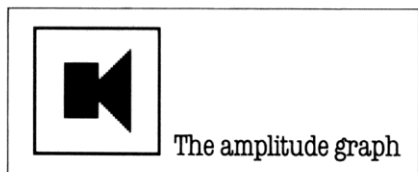
The amplitude graph displays the amplitude pattern just beyond the time limit: i.e. into the Release phase (if any). Both graphs are matched in terms of their timescales. It is therefore very easy to match, say, frequency and amplitude peaks. Again each section is shown in an alternate shading pattern.

If the pattern is shorter than the time limit then a marker is displayed along the bottom (time) axis of the graph indicating the time limit. In such cases there will be no Release phase. The graphs rescale themselves so that the time limit is always in the same position. Therefore a short note and a long note may look the same.

THE KEYBOARD

The KEYBOARD is the micro equivalent of a piano keyboard, using the computer's **Q-W-E-R-T-Y** keys to play the notes. The KEYBOARD has a built-in multi-track record and playback facility. Envelope files can be edited by the SYNTHESISER and loaded into the module providing an unlimited range of sounds and effects. During recording a metronome moves back and forth, clicking on each beat, providing a real time tempo. Setting the tempo at the Status Screen sets the rate at which the metronome ticks. Like the EDITOR, there is a volume control as well as envelope and octave range selection.

The KEYBOARD is entered from the main menu by selecting the KEYBOARD icon using **SPACE** and pressing **RETURN**. This will bring you into the Status Screen.

The Keyboard Status Screen

DATA SOURCE	DRIVE Ø
Keyboard file	k.
Envelope file	e.
Tempo	1ØØ Beats/min

Voice	Notes	Time
1	Ø	Ø
2	Ø	Ø
3	Ø	Ø
4	Ø	Ø

The Status Screen consists of two windows. The uppermost window displays the current keyboard and envelope files, together with the data source and tempo. These four parameters may be altered from within the Status Screen. To alter the parameters, move the status cursor (the highlight bar) to the desired parameter using the ↑ and ↓ cursor arrow keys and change it with the ←/→ cursor arrow keys. The lower window cannot be edited directly. It displays the number of notes and a time value for each of the four voices.

Data source

The data source indicates which disk drive is to be used for the loading and saving of keyboard and envelope files. This may be set to drive Ø, 1, 2 or 3 for disk version. (In the cassette version it displays 'cassette' and *cannot* be altered.) Use the ←/→ cursor arrow keys to step through the four options.

Keyboard file

Keyboard files MUST have a directory code 'k'. To alter the filename, move the highlighted status cursor to the keyboard file. Immediately a flashing text cursor will appear following the 'k'. This is prompting you to key a filename of up to seven characters from the keyboard. The **DELETE** will delete the last character and **CTRL U** clears the filename. Keyboard files can either be loaded to or saved from a library disk. The function keys: **f6** is used for loading and **f7** is used for saving keyboard files.

Envelope file

Envelope files must have a directory code 'e'. for loading into the KEYBOARD. To alter the envelope filename, follow the same procedure for altering a KEYBOARD filename. Envelope files can only be loaded into the KEYBOARD. The function key **f8** is used for loading new envelope files.

Tempo

Tempo affects the speed of the metronome in the Keyboard Screen. The speed is measured in beats per minute. Use the ←/→ cursor arrow keys to step through the different options available. The tempo can *only* be set when there is no music in memory. Once set, it will remain until any music saved into memory via the tape recorder emulator is cleared.

The tempo is provided as a real time device to help you keep time during the recording of music from the KEYBOARD. The metronomès click becomes inactive once music data is recorded on voice 4 (percussion).

File operations

The disk or cassette indicated by the Data Source parameter can be catalogued by pressing the function key **fØ**. If a Library disk or cassette is available to the data source, a window will appear in the middle of the screen displaying the directory. Pressing **SHIFT** will scroll through the remaining files in the directory (if any), **SPACE** will exit the command. To exit back to the Control Screen press the two keys **CTRL ESCAPE**. If some notes have been recorded or a file is modified then the warning message "Music not saved" will appear and wait for a confirmation. Pressing **N** will abort the command and pressing **Y** will proceed. Assuming a confirmation; if the TMS disk isn't found in the drive then the error message "Insert system" will appear. Insert the TMS disk and press **SPACE**. You should then be back in the Control Screen.

All file operations are processed in the Status Screen. After entering the desired keyboard filename, press **f6** to load the file. A window with a confirm load file message will appear and wait for you to press **Y** or **N**. Pressing **N** will abort the

command and pressing **Y** will proceed to load the file. If the file exists then the file is loaded and the Status Screen will be updated to show the new tempo and the number of notes and time for each voice. The envelope filename is also updated because the keyboard file saves the envelope filename and the envelopes with it. If for any reason the keyboard file has the wrong format or does not exist then an error message will appear. Saving a keyboard file is the same as loading one except that you press key **f7** instead of **f6**. To load an envelope file press **f8**. As before, a confirm message will appear. Press **Y** to load the file.

The Keyboard Screen

Pressing **RETURN** while in the Status Screen will take you into the Keyboard Screen. You will be greeted with a screen of what looks like a short piano keyboard and three other windows. For the moment the KEYBOARD emulates a portion (the middle two octaves) of a conventional piano/electronic organ style keyboard. Below is a diagram of this keyboard with the respective BBC keycaps imprinted on top. The second and third rows of keys on your computer are used to emulate the black and white piano keys.
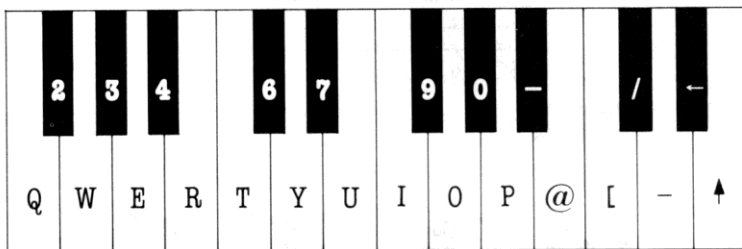

Try playing the keys **Q-W-E-R-T-Y**. You will hear the corresponding notes. Each time you press a key notice that the note value is displayed on the KEYBOARD. Now try the rest of the keys. You are in practice/playback mode. Practice and familiarise with the KEYBOARD for a while.

At the bottom of the screen and below the KEYBOARD is a window with a volume (loudspeaker) and envelope icon. The keys **S** and **A** are used to increase and decrease the volume respectively. Upon changing the volume the arrow will slide left and right of the scale. The keys **Z** and **X** are used to select the fifteen different envelopes. On entering the KEYBOARD a default set of envelopes is loaded with it. However if a piece of music is created using the default envelopes and then an envelope file is loaded via the Status Screen any music on playback will have the right pitch and tempo but could sound somewhat unpredictable. A new set of envelopes can however be loaded from the Status Screen before a music file is created. Some unusual and interesting effects can be produced when used in conjunction with the SYNTHESISER.

At the top right hand corner of the screen just above the keyboard is a window containing various icons. The long KEYBOARD icon is a view of the conventional piano KEYBOARD. The middle two octaves are highlighted to show you the portion of the KEYBOARD that is currently being emulated. The keys **C** and **V** are used to slide the emulated KEYBOARD left and right one octave respectively (octave shift). Playing the keyboard after depressing one of these two keys will produce notes of higher or lower pitch. To the left of this is the metronome icon with the tempo number displayed underneath.
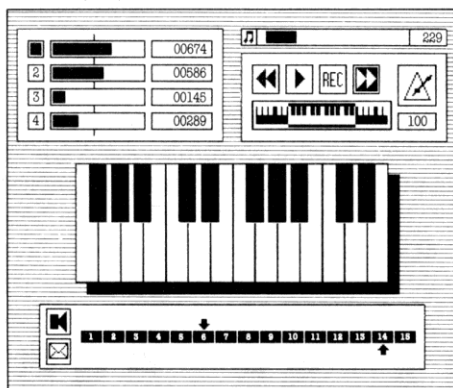
KEYBOARD SCREEN

4-Track Recorder
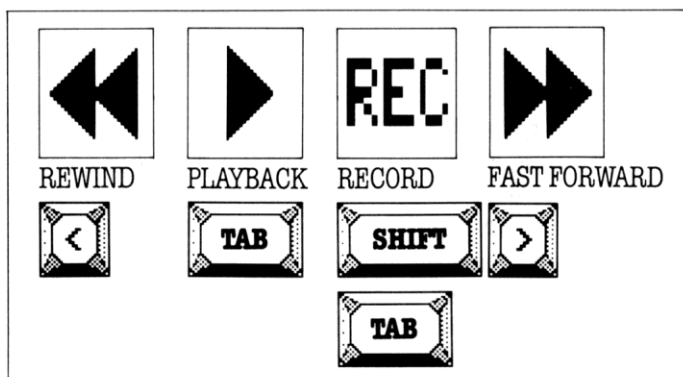
Above the KEYBOARD icon are a set of four icons which control the tape recorder emulation. Starting from the left: the first is the rewind icon which is acti-vated by pressing the key **<**. This will rewind the tape after a recording for selective playback. The second is the playback icon which is activated by pressing the **TAB**. This will play the tape from the cursor line or 'tape head' position. The third is the record icon which is activated by pressing the **SHIFT-TAB**. Pressing

these two keys enters the record mode which highlights both the play icon and record icon. The fourth icon is the fast forward icon which is activated by pressing the 〉. This will fast forward the tape to the end.

Above this set of icons, in the top right hand corner is the note meter. This shows the number of notes recorded in memory. It also gives a visual indication of the memory left for note storage by means of a note (black) bar moving from the left to right as the memory is filled. The maximum number of notes that can be stored will vary between versions (around 860 notes).

In the top left hand corner of the screen is another window containing the status of the four track tape recorder emulator. The function keys **f1, f2, f3** and **f4** are used for changing to voices one, two, three and four respectively. The current active voice has its voice number highlighted. The number on the right hand side of each voice is the measure of time for that voice. It's like the tape counter on a conventional tape recorder. During recording of a voice a time (black) bar moves from left to right headed by the tape head position marker a thin black cursor line crossing all four voices. When the time bar reaches the right it is rescaled along with the other voices to fit. This could be considered similar to the relative position of a tape recorder head along a four track magnetic tape.

To record a voice: press **SHIFT TAB**, the playback and record icons are highlighted. The metronome will begin to tick at the selected tempo. Playing a tune now will record it onto the current voice or track. Pressing the **SPACE** will enter the pause mode upon which the metronome will stop, the playback icon will be turned off but the record icon will stay highlighted. While in pause mode, you can practice the next piece of music. You can also select a new volume and envelope value as well as shifting the octave up or down the piano keyboard. Pressing **SPACE** again will re-enter the record mode. To stop recording, press **ESCAPE**. Once a voice is recorded, rewind the tape by pressing 〈 until the tape position marker is at the left edge of the time bar. To playback the recorded notes just press the **TAB** key. The **TAB** key will play all four voices. If you want to play the one voice then select the desired voice and press **CTRL TAB**. To record a second voice, select a new voice and press **SHIFT TAB**. The notes of the other voices will start playing through the speaker. Use these and the metronome tick to synchronise the voices. Voice four is for percussion. The second row of black keys on the BBC keyboard is used for this. The fourteen keys **Q-W-E-R-T-Y** are used for the different envelopes and are the only playing keys active in this voice. The voice four noise envelopes are preset and unlike standard envelopes cannot be edited. In spite of the limited BBC B noise (voice 4), when used in conjunction with one of the other voices fairly good drum kit effects can be created.

If at any one time you decide to delete a voice then select the desired voice using the function keys and press **CTRL DELETE**. This deletes the current voice for re-recording.
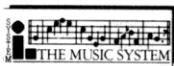
If during recording, the note meter fills then a window will appear in the middle of the screen saying "Enough!!!" to indicate the buffers are full and will not record any more notes. It will wait for a **SPACE**. Afterwards, any attempt to record notes will produce the same error message. To re-enter the Status Screen for saving and/or loading of files press **CTRL ESCAPE**.

THE LINKER

The LINKER enables large compositions consisting of up to ten separate music files to be played back as one piece of music. The music files are created using the EDITOR. Each of the separate music files are played back exactly as they were written; at the specific tempo and key and with the set of envelopes saved with the music file. This allows key and tempo changes to be easily incorporated into a composition. The sequence in which the separate files are played back can easily be entered and edited. There is a maximum of 16 steps in any sequence providing the opportunity of repeating some of the sections. The separate music files can be saved as one large or LINKER file (prefix I.) and played back with the same or a different sequence. The LINKER is entered from the Control Screen by selecting the LINKER icon and pressing **RETURN**. There are two LINKER screens: the File Screen and the Sequence Screen.

The LINKER File Screen

The File Screen is displayed on entering this module. To return to the Control Screen press **CTRL ESCAPE**. To proceed to the Sequence Screen press **RETURN**. A confirm pop-up 'Enter sequence' will appear giving you the option of aborting the command and remaining in the File Screen by pressing **N** or proceeding to the Sequence Screen by pressing **Y**. It is important *NOT* to move on to the Sequence Screen until all files have been entered (if necessary) since there is no way of returning to the File Screen from the Sequence Screen except via the Control Screen. If you intend to load a LINKER file (with the 'I.' directory code) then proceed straight to the Sequence Screen by pressing **RETURN** followed by **Y** to confirm.

The File Screen displays the current data source and has space for up to 10 music files to be entered together with the free space available in the LINKER for further files.

Data source

The current location for loading music files.

This may be set to drive Ø, 1, 2 or 3 and is the data source for all the music files being loaded into the LINKER. To change the data source use ← and → cursor arrow keys to flip through the four options. All the separate music files *MUST* be located on the same data disk. Once the disk drive has been specified and one of the music files entered and located on the disk you may not change the data

source. This is because the LINKER will load all the separate music files in sequence from the same disk when the Sequence Screen is entered. To change the data source you will have to delete any file name which has been entered (see below). If no music files are being entered because you are loading a LINKER file, then the data source need not be set at this stage.

Music files

The music files must have a directory code 'm'. To enter and edit music filenames use the ↑ and ↓ cursor arrow keys to highlight one of the filename positions which are labelled from (a) to (j) and type in the filename. The filenames can be entered in any order and in any position. It does not matter whether there are gaps in the list. Filenames may also be repeated. To move on to the next position, press one of the ↑ or ↓ cursor arrow key. TMS will search for the specified file and, if found, will move on to the next position. If not found on the specified data source an error pop up will be displayed 'File not found'. Pressing **SPACE** to continue deletes the incorrect file name and leaves the cursor on the same file letter.

The Free space gives the amount of note storage still available. As each file name is entered and checked on the disk the required storage space is deducted from the Free space. The music file is not read into memory at this stage. You will be warned if there is insufficient room to store the whole file and you will not be able to enter that name.

File names may be deleted by pressing **DELETE** or replaced by overtyping the name. If you happen to press **RETURN** by mistake, press **N** to abort from the confirm pop-up. Remember to press an ↑ or ↓ cursor arrow key to confirm the name and move to the next position. The Free space will be adjusted accordingly.

The LINKER Sequence Screen

The Sequence Screen is always entered from the File Screen. If no music files have been entered then no files names will be displayed on the screen. The data source will be the same as that shown on the File Screen. If music files have been entered they will be loaded automatically in sequence from the one data disk.

LINKER files may be loaded at any time and will overwrite any files currently in memory. Set the data source by highlighting the data source and using the ← and → cursor arrow keys to flip through the options. Highlight the music file and type in the filename. The LINKER file must have the directory code 'l'. Press **f6** to load the file. If located, the file names are displayed in the correct order. The current sequence saved with the file is also displayed.

The current set of music files either loaded as one LINKER file or set up from the File Screen, can be saved at any time on to any data disk. Note that these files can

be quite large so make sure that there is sufficient room on the data disk. Set up the data disk. Set up the data source and LINKER file name and press **f7**. Appropriate error messages will be displayed but no confirmation pop-up will appear as from the Status Screens in the other modules. Note that if additional or replacement music files are required in a composition then the LINKER file will need to be set up again from the File Screen. This can only be returned to via the main menu. Press **CTRL-ESCAPE** to return to the main menu.

The Sequence

The current playing sequence for music files.

Up to 16 parts may be played in a sequence and any file (referred to by one of the letters from (a) to (j) may be used more than once or not at all. To enter the sequence, use the ↑ and ↓ cursor arrow keys to highlight 'sequence' and type in the required letters using the → cursor arrow key to go on to the next position. Only letters referring to named music files may be entered. Any part of the sequence may be edited by moving the flashing cursor over the letter and retyping. The last letter in the sequence may be deleted using **DELETE** and the ← cursor arrow key to move backwards. If an earlier part of the sequence needs deleting or an extra part added midway in the sequence, then delete backwards to the required position and re-enter the letters.

The sequence is played by pressing **TAB**. The flashing cursor follows the part being played. Playing may be aborted at any time by pressing **ESCAPE**.
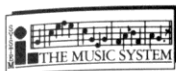
THE PRINTER

The PRINTER driver enables you to print out any music which has been composed with the EDITOR. Single voices as well as multiple voices can be printed either as a low resolution draft or as a high resolution manuscript. Unlike other modules in TMS, the PRINTER module consists of only one screen. This is similar to a Status Screen in the way it is used. ↑ and ↓ cursor key arrows are used to move a highlight between parameters. ← and → cursor arrow keys are used to change the parameters.

As in the other modules the Data Source should be set for drive Ø to 3. This parameter is fixed in the cassette version.

Select the tune which you wish to print out by moving the black 'cursor' highlight to the line labelled 'Music file m.'. Then type in the music (m.) file name of the piece of music you wish to print. You can catalogue the disk by pressing **fØ**.

To load the music file press the function key **f6**. If there are no mistakes you will be asked to confirm the fact that you want to load this piece of music. Press **Y** and the music will be loaded.

The display in the lower half of the screen indicates which of the voices will be printed. If the window has 'Empty' on a line this indicates that the music loaded did not contain any music in this voice. If you do not want to print a particular voice move the cursor down to the relevant voice using the cursor keys, then use the ←/→ cursor keys to change the condition to 'No print'. This voice will not be printed when you print the piece of music, you can do this to any voice.

The program will work with most Epson compatible printers. If you own an Epson FX-8Ø, Epson RX-8Ø or a Star Delta IØ just move the cursor to the line labelled 'Printer type', then select the required printer using the cursor keys. It is essential that you select the correct printer, otherwise unpredictable effects will be induced in the print out. If you own any other type of printer, e.g. Epson MX-8Ø or an Epson compatible try to print a piece of music, it may print perfectly normally. If it does not, change the printer type to Star Delta IØ and try again, if this fails, then your printer is not compatible.

Be sure that your printer is configured for normal operation. Consult the user guide for your printer if this appears to be a problem.

The program produces printed music which has the bars in the musical score lined up as you would expect in printed sheet music, however this uses more paper and takes quite some time to print. If you wish to produce output which does not have the bars lined up then move the cursor to the line labelled 'Align Bars' parameter and toggle the question to 'No' using the ←/→ cursor keys. This produces a more compact printed output.

The quality of the output is adjustable by the 'Print mode' line and toggling the mode between 'High res' and 'Low res' printout. The major advantage of low res

is that it prints a piece of music in approx 2/3 the time of high res mode.

The large window at the bottom of the screen is provided to allow you to enter a three line title or header to your music print out. Move the cursor bar to this box using the ↑/↓ cursor keys. The box itself highlights and a small cursor appears in the top left hand corner of this window. Whatever you type into this window will appear on the first page of the printed manuscript in exactly the same format. Delete is used to remove the last character typed, the space bar will blank out the next character.

To start printing the piece of music press the **COPY** key. You will be asked to confirm that you actually want to print the music. Press **Y** and the program will begin to print the music. You can stop the print out at any time by pressing **ESCAPE** key. The print out can take a long time! This is because the PRINTER is operating in graphic or bit-image mode rather than the usual character mode. If all you want is a rough draft be sure to select the Low res mode as described above.

TECHNICAL SECTION

Every effort has been made to ensure that TMS will operate without the need for any hardware modifications. The design of the system is an exercise protecting you, the user, from the less friendly machine level/operating system end of the BBC B computer. However it is possible that under certain conditions your hardware could interfere with the correct operation of TMS.

The Control Screen provides keys which let you control the TV or monitor screen. Function keys **f0** and **f1** have already been described earlier in this manual. These keys control the background pattern and colour of TMS screens through all the modules.

f0, function key.   Background pattern control.

One of three different background patterns can be selected each time this key is pressed. The default setting provides a stripe pattern suitable for all TVs/Monitors, etc. The other two patterns can provide a more pleasing background effect only if used with high or medium resolution monitors. These higher resolution patterns may cause unpredictable effects if used with a normal TV.

f1, function key   Colour scheme selection.

Each time this key is pressed the screen changes colour. The default colour scheme for TMS is black and cyan. If this is not to your liking then you can choose between a selection of colour combinations. This function may also be used to provide control over the display contrast when TMS is used with a monochrome TV or monitor.

Two other, less obvious, features are provided on the Control Screen. You should never be concerned with these features, but they are provided anyway. They are as follows:

f2, function key   Interlace control.

This key switches the display interlace on and off. Refer to your BBC B user guide to find out more about interface, else just forget that this key exists.

CTRL ←/→/↑/↓   Centre display.

This combination of the CTRL key and one of the cursor arrow keys will allow the user to shift the whole screen display either up and down or across the screen. This way you can centre the display on the screen.

Hardware Problems

If you have an early model Acorn BBC, perhaps a BBC A that has been converted to BBC B spec. It is possible that a chip will be missing from the computers PCB. This chip is IC69 (the user VIA). In this case the system will cease to operate and an error message may suggest that IC69 is faulty. The fix on this involves getting your dealer to insert or replace missing or faulty chip.

THE MUSIC SYSTEM

If you are using an exotic disk operating system we cannot promise that the system will function correctly. TMS is tested on a wide range of disk configurations etc. but we're not clairvoyant.

Current versions of TMS will not operate through the tube – disconnect second processors etc.

Hardware Modifications – Audio Output

One unfortunate design oversight with the BBC B computer is the absence of an audio output. The BBC B speaker will provide enough volume and fidelity for most users. However the more advanced user may wish to connect the system up to either an external loudspeaker or even a Hi-Fi amplifier. Unless you are fully confident that you are able to dismantle and modify your computer WE DO NOT RECOMMEND that you attempt to fiddle with the BBC B's complex and fragile electronics. It is, however a worthwhile modification. Your local computer/ TV repair shop should be able to undertake one of the small modifications described below at minimum cost. This indeed provides spectacular results. TMS through your HI-FI.

But be warned, a botch job could be costly in repair bills. Acorn computers will not guarantee equipment damaged as a result of the user attempting such modifications.

1. A simple method of providing TMS with an external sound output is described in the diagram below. The pair of wires from the BBC B loudspeaker connect via a plug to a connector **PL15** on the main PCB (under the keyboard). The diagram shows how the BBC B speaker could be replaced by an external loudspeaker (8 ohms). Note that the BBC B internal speaker becomes inactive as a result of this modification.

SUITABLE EXTERNAL LOUDSPEAKER

RED AND BLACK PAIR OF WIRES

BBC B LOUDSPEAKER

CONNECTOR

PL 15

BBC MAIN CIRCUIT BOARD (UNDER KEYBOARD)
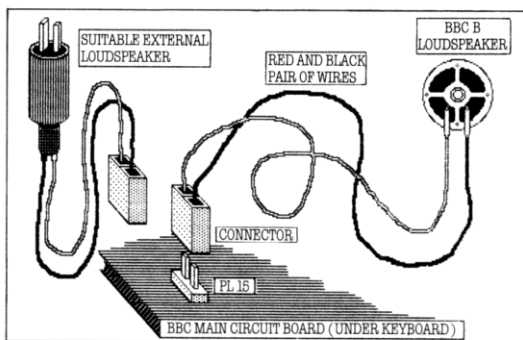
2. A more substantial modification can be achieved by taking a co-ax cable from the two unused socket holes **PL16** on the main PCB to a socket fixed into a spare hole in the back of your BBC B (eg. econet expansion hole). It is important that the polarity of the cable is correct. The cable must be soldered in to **PL16** using a 'plate-through-hole' technique. This work must be done by a qualified technician.

TMS development team have plans for expansions such as MIDI/External keyboard interface etc. Registered users will be advised of such developments as and when they occur.

EDITOR SCREEN KEYS

ctrl **ESCAPE**	Go back to status screen
ESCAPE	Abort current command /Abort playback

tab	Playback current voice from cursor
f1 ↔ **f4**	As in Status Screen
ctrl **f0** ↔ **f5**	As in status screen between markers in current voice only
shift **f3**	Transfer volume to next note
shift **f4**	Transfer envelope to next note
shift **f5**	Transfer volume/envelope to next note
←	Scroll voice to left
→	Scroll voice to right
shift **←**	Go to start of voice
shift **→**	Go to end of voice
ctrl **←**	Move cursor to left
ctrl **→**	Move cursor to right
space	Switch between rest/note

return	Enter note (play if autosound on)
@	Sound note
delete	Delete note left
−	Delete note right
+	Insert note (left of cursor)
↑	Increase pitch of note (Noise in voice 4)
↓	Decrease pitch of note (Noise in voice 4)
Q	Decrease duration
W	Increase duration
A	Decrease volume
S	Increase volume
Z	Decrease envelope number (Noise in voice 4)
X	Increase envelope number (Noise in voice 4)

EDITOR SCREEN KEYS

MARKERS

	M	Insert/delete marker (switch)
shift	**f6**	Delete both markers
shift	**f7**	Set markers to start and end of voice
	<	Find marker (left of cursor)
	>	Find marker (right of cursor)
shift	**<**	Move left marker to cursor position
shift	**>**	Move right marker to cursor position
shift	**copy**	Copy notes between markers to end of voice
shift	**delete**	Delete all notes between markers
shift	**B**	Adjust barlines between markers

Auto bar line (switch)	**B**	
Auto sound (switch)	**V**	

ACCIDENTALS

H	Flat b	
G	Double flat bb	
K	Sharp #	
L	Double sharp)(	
U	Natural	
J	Cancel accidental	

BAR SYMBOLS

1	Bar line
2	Open repeat
3	Close repeat
4	First time bar
5	Second time bar
0	Delete symbol
ctrl **1** ↔ **5**	Find next symbol (to right)

T	Tie previous note (switch)
R	Select a triplet of the same total duration

THE MUSIC SYSTEM

EDITOR STATUS SCREEN KEYS

f0 Library–catalogue of library disk

f1 Enter voice 1

f2 Enter voice 2

f3 Enter voice 3

f4 Enter voice 4 (percussion)

f6 Load MUSIC file

f7 Save music file

f8 Load envelope file

shift + **f1** Delete file

shift + **f2** Rename file

shift + **tab** Playback all voices from bar.

ctrl + **f0** Increase volume of each note (+1)

ctrl + **f1** Decrease volume of each note (−1)

ctrl + **f2** Increase pitch of all notes (+1)

ctrl + **f3** Decrease pitch of all notes (−1)

ctrl + **f4** Increase volume 1st note in bar (+1)

ctrl + **f5** Decrease volume 1st note in bar (−1)

K KEY SIGNATURE (Switch between major and minor keys)

T TEMPO (Switch to Italian notation)

return Enter voice 1

ctrl + **ESCAPE** Go back to control screen

ESCAPE Abort music playback

tab Playback all voices

THE MUSIC SYSTEM

KEYBOARD STATUS SCREEN

f0 Library – catalogue of library disk

f6 Load keyboard file

f7 Save keyboard file

f8 Load envelope file

↑ Select parameter above

↓ Select parameter below

→ **←** Drive number/ Tempo select

return Enter keyboard screen

ctrl **ESCAPE** Go back to control screen

KEYBOARD SCREEN

A Decrease volume

S Increase volume

Z Select envelope to left

X Select envelope to right

C Select octave (left)

V Select octave (right)

space Active/Deactivate pause mode

f1 Enter voice 1

f2 Enter voice 2

f3 Enter voice 3

f4 Enter voice 4 (Percussion)

shift **tab** Activate record mode

ctrl **tab** Playback current single voice

tab Playback all voices

ESCAPE STOP – Record/Playback

ctrl **delete** Delete current voice

DIGITAL RECORDER

> Fast forward **<** Rewind

SYNTHESISER SCREENS

Summary of functions

STATUS SCREEN

return — Confirm / Enter to main Parameter Screen

ctrl **ESCAPE** — Go back to Control Screen

ESCAPE — Abort Consul

↑ Move cursor

↓ Move cursor

← → Change parameter

f0 — Library – catalogue of disk

f8 — Load envelope

f9 — Save envelope

shift **f1** — Delete file

shift **f2** — Rename file

shift **f8** — swap envelopes

shift **f9** — copy envelope

PARAMETER SCREEN

return — Enter graphs screen

ctrl **ESCAPE** — Go back to status screen

@ — Sound envelope

Q — Decrease parameter number or switch parameter

W — Increase parameter number or switch parameter

space — Select next parameter window

↑ Select parameter above

↓ Select parameter below

← Select parameter to left

→ Select parameter to right

ctrl **ESCAPE** — Go back to parameter screen

copy — Redraw/update graphs

delete — Switch parameter window (on/off)

shift **f0** — Change graph shading pattern

GRAPHS SCREEN

Parameter screen functions enclosed by common box also apply to graphs screen

H — Initial frequency parameter switch Hz/BBC units

PRINTER SCREEN

f6 load music file

↑ move cursor up

↓ move cursor down

← **→** Change parameter

copy Start printing

ESCAPE Stop printing

LINKER file Screen

f0 Library – catalogue disk or cassette

ctrl **ESCAPE** return to control screen
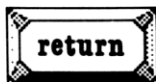
return Enter Sequence Screen

↑ move cursor up

↓ move cursor down

LINKER Sequence screen

tab Play sequence from start

f6 Load linker file

f7 save linker file

→ move forward to next sequence letter

← move backwards in sequence
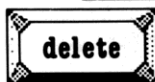
delete Delete last sequence letter

ESCAPE Abort playback

ctrl **ESCAPE** return to control screen

Q	W	SYNTHESISER ICONS Parameters
1 ↔ 30		ENVELOPE NUMBER
−128 ↔ 127		Change in pitch for each frequency position
0 ↔ 255		Number of steps in each frequency position
4 ↔ 255		Upper foldover limit (relative to initial position)
Frequency number 1 ↔ 255 Hz (cycles/sec) 123 ↔ 4826		Initial pitch
4 ↔ 255		Lower foldover limit (relative to intial pitch)
OFF ↔ ON		Repeat frequency sections
OFF ↔ 20		Modulation – Change in pitch (also ON/OFF switch)
1.2 ↔ 25.0 Hz		Modulation frequency
0.01 ↔ 1.27		Time unit of each step

Time parameters

0.05 ↔ 9.95		Total duration (before release period)
(Cannot be edited)		Number of steps

Rate			
1 ↔ 127	−127 ↔ 0	−127 ↔ 0	−127 ↔ 0
Attack	Decay	Sustain	Release

| 0 ↔ 126	Attack target level (cannot be edited)

Decay target level
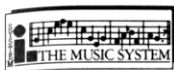
Pop-up messages

Pop-up messages occur from time to time indicating that an error has occurred or warning you of some impending disaster. During file operations pop-ups may also appear asking for confirmation of some operation or requesting data to be input etc.. The following list describes most of these pop-up messages. It is by no means exhaustive. Other pop-ups may appear, but should be able to explain themselves. In the cassette versions specific messages appear in situations such as file loading etc.

Library	
‹Shift›	
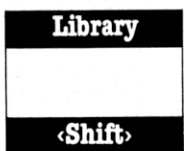
Press ‹f0› from the Status Screens.
Displays up to 8 filenames (prefix m. l. e. k.)

Press shift to scroll through catalogue.
At end of catalogue ‹Space› is displayed.

Press ‹Space› to continue.
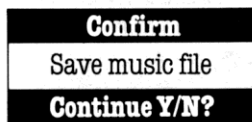

Warning
Music not saved
Continue Y/N?
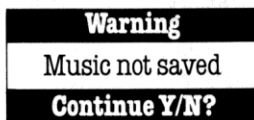
Displayed when exiting a Status Screen to CONTROL if music has not been saved since entering module. Press ‹Y› to override and return to CONTROL
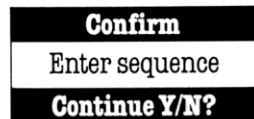
Warning
File not saved
Continue Y/N?
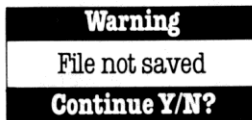
Occurs in the SYNTHESISER. Similar to 'Music not saved' message.

Confirm
Load music file
Continue Y/N?
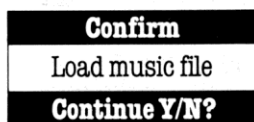
Appears after ‹f6› is pressed. Press ‹Y› to attempt to load file. An error pop-up eg. 'file not found' as an overlay to this

Confirm
Save music file
Continue Y/N?

Appears after ‹f7› is pressed. Press ‹Y› to attempt to save file. 'N' aborts. Can be followed by 'Replace file or an error pop-up'

Confirm
Enter sequence
Continue Y/N?

Linker:

Confirm
load envelopes
Continue Y/N?
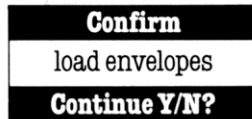
Appears after pressing ‹f8›. Press ‹Y› to attempt a load.

Error
No Music
‹Space›

Occurs in the PRINTER module if printing is attempted and music has not been loaded into memory (empty voices).

Error
Enough!
‹Space›

A KEYBOARD error. Occurs if the note buffer (memory) becomes full during recording.

Error

Insert Library

‹Space›

Appears when attempting a load/save operation to the system (program) disk. FORBIDDEN !!!

Error

Insert system

‹Space›

The music system disk could not be found in drive 0

Error

File not found

‹Space›

Appears if file not found on a legitimate data disk. ‹SPACE› aborts load operation.

Error

Read only

‹Space›

Disk error when attempting a load or catalogue on data disk.

Error

Write error

‹Space›

Disk error during a save operation to a disk.

Error

Wrong file type

‹Space›

Occurs when attempting to load a file without the correct file header. eg. music file must have m. prefix.

Error

Read only

‹Space›

If disk is write protected during a save operation.

Error

Catalogue full

‹Space›

Disk error on save operation.

Error

Can't transpose

‹Space›

Not possible to transpose composition to specified key due to note range.

Error

Printer fault

‹Space›

Printer faulty or not on-line.

Rename file

Type names

Enter filenames including directory code (m. e. k. l.). Can use delete and cursor arrows to edit. ‹RETURN› to confirm. ‹ESCAPE› to abort. Requires two filenames.

Delete file

Type names

Enter filename including code. ‹Return› to confirm. ‹Escape› abort.

Save envelopes
← 1-15
‹Space› Changes

On pressing ‹f9›. Press ‹SPACE› to switch
between sets (1-15) and (16-30). ‹RETURN›
to confirm. ‹Escape› abort.

Load envelopes
→ 1-15
‹Space› Changes

Appears on pressing ‹f9›.
Similar to save envelope pop-up.

Copy envelope
( ) ←→ ( )
Type numbers

Appears on pressing ‹SHIFT›‹f9›. Enter
1st number followed by the LEFT cursor arrow,
and then the 2nd number. Press ‹RETURN›
to confirm: ‹Escape› abort.

Swap envelope
( ) ←→ ( )
Type Numbers

On pressing ‹SHIFT›‹f8›. Similar to
Copy envelope pop-up.

THE MUSIC SYSTEM – A History

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

June 1983: Music Editor was launched commercially by SYSTEM, the Sheffield-based software house. The same month Black joined SYSTEM as a senior programmer.

July 1983: The Envelope Generator program, designed by Geoffrey Ellis at Manchester University, eased the difficult process of creating and editing envelopes. The Envelope Generator featured 'cursor key screen editing' for the parameters and matched frequency and amplitude graphs.

August 1983: The Envelope Generator was marketed by SYSTEM. The Music Editor was adapted to allow envelope files to be loaded from the Envelope Generator and vice versa. The pair of programs were an embryonic version of The Music System.

October 1983: Adrian Boot 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 and incorporated a four-voice editor with greatly enhanced facilities, automatic transposition and animation of muscial notes as they played.

November 1983: David Ellis and Phil Black specified an enhanced version of this Editor. Over-all specification was revised to include the Linker and Print-out. Preliminary coding using System's A.D.E. (Assembler, Debugger, Editor) began to establish the feasibility of such a project.

January 1984: 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 on July 2. These early trials at Islands' Fallout Shelter Studio provided many enhancements to the specification.

February 1984: Coding began in earnest. ISLAND LOGIC and SYSTEM built a programming team to work on The Music System. The 'front end' of TMS with its pop-up/icon graphics, was defined. Intensive design work produced prototype screens for the system.

April 1984: Shaun McGarry began initial development on a Keyboard/multitrack recorder emulation. Early versions of the printer were tested.

June 1984: Prototype versions of all the modules were successfully tested. Final specifications and modifications were agreed. The countdown began.

July 1984: Early versions of TMS as an integrated package were finished and distributed for field testing. The Control program was developed to handle the separate TMS modules.

August 1984: Igor Thomas began the complex task of integration. Debugging and testing of the system continued in earnest.

October 1984: After many sleepless nights, work was finally completed. The Music System was launched: the first product to be released by Island Logic. The work continues. TMS is here to stay.

The team
PHIL BLACK – ADRIAN BOOT – DAVID ELLIS – GEOFFREY ELLIS –
BRIAN JONES – SHAUN McGARRY – STEVE McGARRY –
STEVE SWALLOW – IGOR THOMAS – CHING MAN WONG.

INSTRUCTION · MANUAL ·
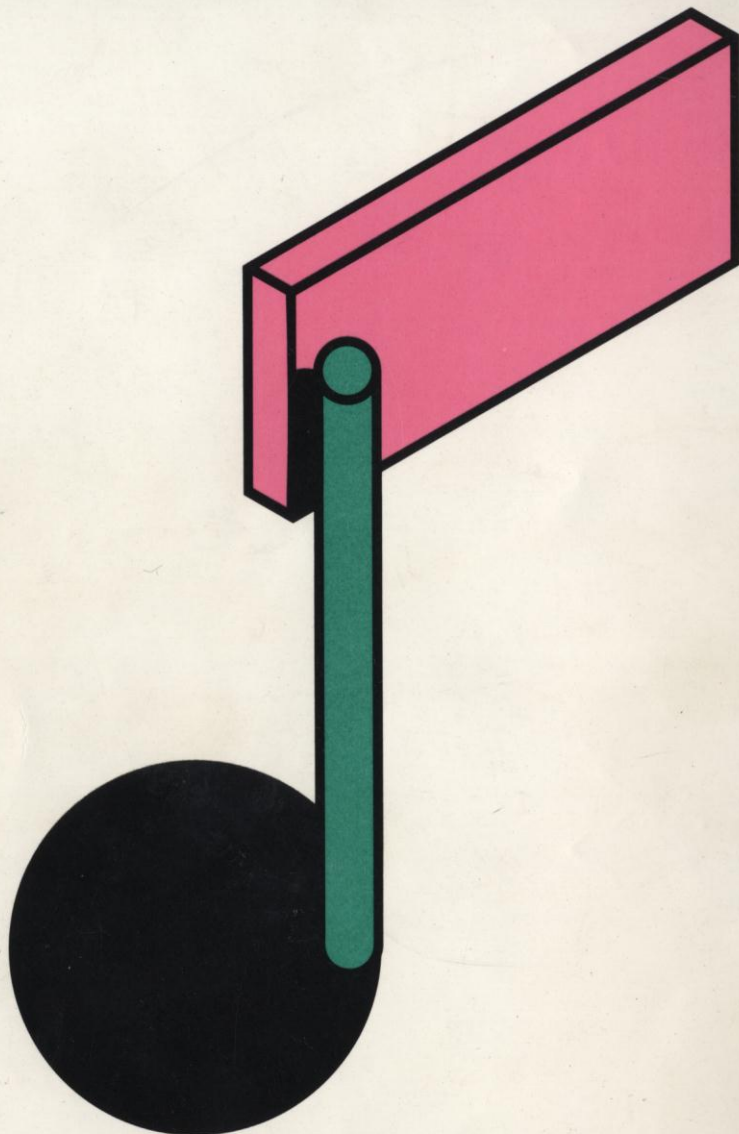
The disk version of the Music System is recorded on the highest possible quality disks, as supplied by MEMOREX