

# EMUL

ELECTRONIC MUSIC UTILITY



AMSTRAD CPC 464/664/6128

WHEN YOU HAVE MADE THE

# DISCOVERY

NOTHING ELSE COMES CLOSE

# INTRODUCTION

Welcome to the **ELECTRONIC MUSIC UTILITY** from **DISCOVERY**.

EMU is a Music and Sound Effects generator that will take a great deal of the hard work, and mystery, away from programming the Amstrad Sound Chip. Moreover, all your creations can be Saved in a form that lets you use them in your Basic or Machine Code programs, totally separate from the EMU environment, and in such a way that your own program carries on working while your Music plays, automatically driven by the computer's Interrupts.

EMU is a fairly large and very comprehensive utility, and it is going to take time to become fully conversant with all its many features. We suggest that you work through these instructions, following the examples where they are given, and you will soon become familiar with the patterns of operation.

Despite its complexity, EMU has been kept very simple to use. Almost everything is achieved by means of MENUS and by the use of the cursor keys to move around these Menus.

Although ICONS (pictures on the screen that represent a given function) are currently very popular in computer software, they can be confusing or unclear in their meaning, and they do take up a lot of screen space. EMU does not use ICONS – instead, the Menus all contain words which are instantly clear in their meaning, and this also allows the maximum information to be given at all times.

The Sound Chip in your Amstrad can give you up to 3 simultaneous sounds of differing pitch, volume and duration, but programming it from Basic is very time consuming and complex as you are dealing with large quantities of numbers. To calculate these numbers correctly you will probably work through quite a large amount of paper (and still get it partly wrong).

EMU shows you graphically on the screen what these numbers mean and lets you experiment with changes to the numbers and hear the results instantly. You can generate MUSIC in full 3-part harmony with different voices or with percussive effects and with a screen display in correct musical notation. You can create single sound effects – explosions, alarms etc. – for games, with graphs on the screen showing the shapes of the Volume and tone ENVELOPES you have defined. You can Save and Load all the data you have defined, in its EMU format so that you can carry on working on your masterpiece another day. But most important of all, you can Save this data for use in your own programs.

The small loudspeaker inside your Amstrad will not do justice to the sounds you can create with EMU and we strongly recommend that you connect better speakers (via an amplifier) or headphones to the Stereo jack output. Amstrad's own SSA-1 works very well, and gives you a separate Speech Synthesiser as well, even though the speakers are quite small.

Although you can compose music, or copy it from a published score, without a detailed knowledge of Musical Notation, it will be a help to you in editing the music if you do have at least a basic understanding of how music is written.

## **LOADING EMU**

### **1) Cassette:**

Insert the cassette with Side A uppermost in the Datacorder of your CPC 464 and press CTRL and the small ENTER key to produce RUN" on the screen. Press the PLAY key on the Datacorder and the ENTER key. EMU will load a title screen and then go on to load the main program. When loaded, the tape will stop moving, and the MAIN MENU of EMU will appear on the screen. Press STOP on the Datacorder and wind the tape forward to the end. If this is the first time you have loaded EMU, turn the cassette over to Side B and read the instructions for "FIRST STEPS" and work through the examples.

### **2) Disc:**

Insert the EMU Disc into DRIVE A, with Side A uppermost, type RUN "EMU and press ENTER/RETURN. EMU will load a title screen and then load the main program. When the program has loaded, the title screen will remain on the screen for several seconds before the program itself is accessed, showing you the MAIN MENU. You can press any key on the keyboard to access the MAIN MENU rather than wait for the delay to end. If this is the first time you have loaded EMU, then leave the Disc in Drive A, and read the instructions for "FIRST STEPS" and work through the examples.

Once EMU is loaded, you cannot return to BASIC except by pressing CTRL/SHIFT/ESC together to reset the machine. Doing this will erase EMU from memory.

## **A WORD ABOUT MENUS**

### **MAIN MENU**

As was stated in the Introduction, the whole of EMU is linked by MENUS, and the most important of these is the MAIN MENU presented to you after Loading the program. To go between the various SECTIONS of EMU you must return to this MAIN MENU and select the new SECTION.

One name in the MAIN MENU will always be highlighted in inverse video (white letters on a black patch) and this PATCH can be moved up or down by using the ↑ or ↓ cursor control keys. When the SECTION you require is highlighted, press the large ENTER/RETURN key to access that SECTION.

## **SECTION MENU**

All SECTIONS have a horizontal menu block at the top of their screen (called a SECTION MENU) in which the left hand choice is always MENU. This selection returns you to the MAIN MENU to access a new SECTION. The currently selected FUNCTION in a SECTION MENU is highlighted by an Inverse PATCH, and if no selection has yet been made, the name in the PATCH flashes. To access a FUNCTION, press the large ENTER/RETURN key and the name in the menu stops flashing, but remains highlighted. To EXIT from a function back to the SECTION MENU, press ESC and the highlighted name in the SECTION MENU starts to flash again. Use the → and ← cursor control keys to move the highlight PATCH only if that menu name is flashing in a SECTION MENU.

Some SECTIONS have SUB MENUS, usually in Vertical format and will be explained as they occur.

In general, in any MENU, if a name is flashing, the MENU is waiting for you to make a selection. Use the cursor control keys to highlight the menu FUNCTION you require and press ENTER/RETURN to access that FUNCTION.

Some MENUS have two vertical columns of choice where a FUNCTION only has two options. In these MENUS, use all four cursor control keys to highlight the correct options, and use ESC to return to the SECTION MENU.

Always use ESC to go from a SUB MENU to a SECTION MENU, or from a FUNCTION back to the SECTION MENU.

From now on, the large ENTER/RETURN key will be referred to as ENT/RET and the small ENTER key associated with the number keypad will be referred to as ENTER.

## **FIRST STEPS**

EMU is supplied with some examples of MUSIC and VOICE (Sound effects) data. This will be found on SIDE B of the cassette, or on SIDE A of the Disc. FIRST STEPS will take you through the main areas of EMU using these examples. Don't worry too much about details yet, or about the more complex features of EMU, but follow the numbered instructions below to get an idea of what EMU is capable of, and how the MENU system works.

### **To play some MUSIC:**

1. Access the MAIN MENU.
2. Using the ↑ and ↓ cursor keys, move the highlight PATCH to SAVE/LOAD – DATA.
3. Press ENT/RET. The screen will clear, and the SAVE/LOAD screen will appear. The SECTION MENU at the top of the screen will show LOAD highlighted and flashing.

**N.B.** At the top right hand side of the screen you will see a SUB MENU titled MODE which shows the DISC/TAPE Status. If you have a CASSETTE version of EMU *and* have Discs attached to your computer, this SUB MENU will show DISC.IN and DISC.OUT highlighted and you will need to change the top one to TAPE.IN to load the examples from cassette. To do this, move the SECTION MENU patch to MODE and press ENT/RET. DISC.IN in the MODE menu will flash. Press → cursor key and the Patch will move to TAPE.IN which will flash. Press ESC to go back to the SECTION MENU and use the ← cursor key to highlight LOAD again.

If you have a Disc version of EMU you will not need to change the MODE, or if you have a cassette version and no Disc drives attached, you will also not need to change the MODE.

4. With LOAD highlighted and flashing in the SECTION MENU, press ENT/RET. LOAD will stop flashing and remain in the inverse video PATCH.

You are now in the LOAD SUB MENU, and ENV DATA will be highlighted and flashing.

5. Use ↓ to highlight MUSIC DATA and press ENT/RET. MUSIC DATA will stop flashing and a CURSOR blob will appear in the box marked FILENAME. Use the keyboard as normal to type in the filename to be loaded. The first example we will look at is called "Demo". While typing in this name, you can use all the normal editing functions of cursor control keys, CLR and DEL (CTRL → and CTRL ← don't work however as filenames are never more than 16 characters long).

Press ENT/RET. The MUSIC file called "Demo" will load, with any messages (i.e. the normal cassette messages) appearing in the box marked "Messages".

When the file has loaded, MUSIC DATA will flash again in the SUB MENU.

6. Press ESC to go from the SUB MENU back to the SECTION MENU, where LOAD will again flash. Use the ← cursor key to highlight MENU and press ENT/RET to access the MAIN MENU.

7. Use ↑ to highlight MUSIC and press ENT/RET. The MUSIC screen is accessed and will show the beginning of the MUSIC DATA file just loaded.

8. The SECTION MENU will have EDIT highlighted and flashing. Use → to highlight PLAY and press ENT/RET. PLAY will stop flashing and the MUSIC CURSOR (✓) will appear above the left hand note of the top Stave of music.

The three Staves are for the three sound channels (or HARMONIES) and you will be able to write music to any or all of them.

Don't worry too much about the bottom third of the MUSIC screen, below the three Staves. All the information here will be explained later when the EDITING functions are explained.

9. To hear the music you have loaded, press COPY and adjust the volume control on your computer or amplifier to a suitable level.

The MUSIC CURSOR will follow the current note being played and the screen will update when the cursor reaches the right hand side of the screen. The whole composition will play through to the end.

If you want to stop it before the end, press ESC once and hold it down until the music stops. If you wish, you can now use the → and ← cursor keys to move the music cursor backwards or forwards a note at a time. CTRL and ← will reset the music cursor to the start of the music. Pressing COPY will start the music playing from the current music cursor position.

10. When the music has ended, (or if you have pressed ESC to stop it), try a different tune from the examples supplied. Press ESC to leave the PLAY FUNCTION which will cause PLAY to flash in the SECTION MENU. Use ← to highlight MENU and press ENT/RET.

11. You will now be back in the MAIN MENU. The music you have just played is still in memory and will remain there until you specifically DELETE it or overwrite it with a different piece. To load the next example, follow instructions 2 to 9 above, but this time type in the filename DEMO 2 in item 5.

12. There are three music examples on the Cassette/Disc and the third of these is called FUNK, so to hear this, follow instructions 2 to 9 above again, using the filename FUNK in item 5.

### **Let's now try some of the example VOICES or Sound effects.**

13. Go back to the MAIN MENU and highlight SAVE/LOAD – DATA again and press ENT/RET.

14. Press ENT/RET to access the Load SUB MENU, and then highlight the function VOICE DATA. Press ENT/RET.

15. Type in the filename VOICES and press ENT/RET. The voice data will load.

16. After the load is complete, ESC will return you to the SECTION MENU from which you should go back to the MAIN MENU.

17. Highlight the section name VOICE and press ENT/RET.

18. The VOICE screen will be displayed, with DEFINE flashing in the SECTION MENU. As you have just loaded previously defined VOICE data, use the → key to highlight SELECT so that you can choose some data to look at. Press ENT/RET to access the SELECT FUNCTION. An overlay window appears on the right hand side of the screen showing the names of the VOICES just loaded, and ENV (volume envelope) and ENT (Tone envelope) numbers assigned to each. ENV and ENT will be explained more fully later.

19. The top name in this list has a cursor (◀) against it. The ↑ and ↓ cursor keys will move that cursor up and down. ENT/RET will select that VOICE data as being the current data. Having made a selection, one or two graphs will appear in the central area of the screen. The top one is the shape of the VOLUME envelope (ENV) and the lower one is the shape of the TONE envelope (ENT).

Some VOICES in the list may have only one graph, others will use both graphs. While you are still in the SELECT function, you can hear the currently selected VOICE by pressing COPY once. Some of these VOICES are single sound effects that you would use as such (e.g. ALARM), whereas others would be used as VOICES in a MUSIC composition (e.g. ATTACK).

Try several voices from this list, but remember to press ENT/RET to actually select that VOICE as current before you press COPY to hear it.

By now, you will have a good idea of how EMU has been designed and how the MENU system works.

From now on, specific details of using MENUS will not be given unless a new concept is introduced.

Initially the screen layout for some of the sections, particularly MUSIC, may look very busy and confusing. As you read through the following sections of these instructions, all of the features are explained, and the screen displays will fit together in a very logical and usable way. By keeping the maximum of information on the screen at all times, and by using the minimum of overlays, you will be able to make the most effective use of EMU.

## **MEMORY ALLOCATION**

EMU will dynamically allocate its free memory for you when you are writing MUSIC or defining VOICES. There is no means provided of finding out where data is stored, and there is no need for this.

The only fixed size data areas are those for the definitions of ENV (Volume envelopes) and ENT (Tone envelopes). Up to 15 of each can be defined, Saved or Loaded at any one time.

The MUSIC section of EMU shows how many FREE notes worth of space is left, and this FREE SPACE will reduce each time you define a new VOICE and each time you add a VOICE into a piece of MUSIC.

The FREE memory can be used to write a large number of musical notes in just one Harmony (i.e. on one Stave) or to spread notes among two or three Harmonies and VOICE definitions. If you do not have Discs attached to your computer, you will have a maximum of around 2550 musical notes of space, but this drops to around 2250 notes with Discs attached. VOICE definitions do not use up a fixed amount of free memory and will only use as much as they require. This depends on how the ENV and ENT definitions for each voice are set out.

Save and Load buffers for Cassette/Disc operations are already allocated outside the main data storage area and are taken into account when calculating how much FREE space there is.

## INTRODUCTION TO MUSICAL TERMS

Although a knowledge of how music is written down and of the various parameters that affect how it is played is useful to be able to make the most out of EMU, it is not essential. This introduction to Music will only give a very brief outline describing the meaning of these terms.

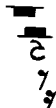
### Note Durations

Semi-Breve  
Minim  
Crotchet  
Quaver  
Semiquaver

### NOTE



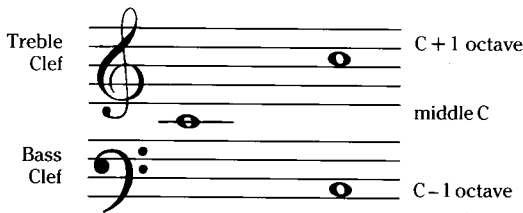
### REST



4 beats = 1 Semi-Breve  
2 beats = 1/2 Semi-Breve  
1 beat = 1/4 Semi-Breve  
1/2 beat = 1/8 Semi-Breve  
1/4 beat = 1/16 Semi-Breve

Note/Rest durations can be extended by 50% by adding a DOT after the note.

### Pitch



Notes are defined by a letter from A to G. Intermediate notes are defined by a sharp (#) or flat (b) sign preceding them. An OCTAVE is a doubling or halving of pitch, and there are 12 possible notes in an octave including all sharps and flats. Each interval is called a SEMI-TONE.

**Tempo:** This is usually shown as the number of crotchets per minute. So a tempo of 60 means 60 crotchets per minute, or 1 per second.

**Clef:** Either Treble or Bass Clef is available and determines the relative pitch of the notes on the Stave.

**Time Signature:** This indicates the number of beats in the bar and what fraction of a Semi-Breve each beat represents. A time signature of 4:4 means 4 beats of 1/4 Semi-Breve duration per Bar, or 4 crotchets per Bar. A time signature of 3:2 means 3 beats of 1/2 Semi-Breve per Bar or 3 minims per Bar.

**Key Signature:** This defines how many sharps or flats are defined in the key. Where they are defined this way, it is normal practise not to show those sharps or flats against each note. They are assumed to be there until a new key signature changes them and notes that are Sharpened or Flattened in the key signature are played as Sharps or Flats. It is a form of musical shorthand that helps the music to be more clearly read.

**Slurs:** (or tied notes). Where a note needs to be of a non-standard duration, it can be made up of two standard duration notes tied together. For example, a Minim plus a Quaver cannot be written as one note as no such note duration exists in musical notation. They would be written as two notes tied, but played as one note of the appropriate length.

**Bar Lines:** To maintain a regular rhythm to the music, as well as providing a means of counting beats quickly and accurately, music is divided into Bars, as defined in the Time Signature. If a note at the end of a Bar needs to be of a duration that is too long to fit into that Bar, it is written as two notes, tied (or slurred) together in such a way that Bar Lines are placed correctly. EMU automatically places Bar Lines in the correct place for you.

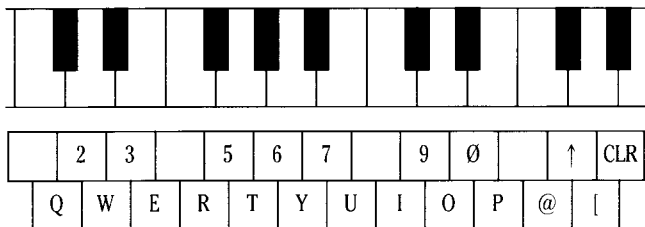
If you have no experience of musical notation, you can still use EMU but we would suggest that you do not try to use complicated combinations of key signature or time signature. EMU defaults to a Key Signature with no Sharps or flats (called C Major) and a time Signature of 4 crotchets per Bar (4:4).

## CREATING MUSIC

There are two ways of creating music using EMU.

Firstly, you can use the EDIT functions in the MUSIC section and copy notes from a published musical score. Many local lending libraries have popular musical scores, or books containing well known orchestral pieces designed for learning the piano, that do not contain very complex note structures, and these are an ideal source of music.

Secondly, by using the RECORD function in the MUSIC section, you can use the computer keyboard as a crude form of piano keyboard and play your music in real time. EMU will then convert what you have played into real musical notation. The top two rows of the keyboard are used to generate notes of varying pitch in the following way.



## RECORDING

Looking at this second method first, access the MUSIC section from the MAIN MENU, and access RECORD in the music section menu. The block of note symbols at the bottom left corner of the screen will be overwritten with a message panel which will tell you what is going on. If you have just been looking at the examples of music, or if you have some other music of your own creation on the screen, you should clear this from memory first. (You can add to existing MUSIC using the keyboard, but this will be explained later – start your first attempt with a clean slate).

To delete existing music (in EDIT and RECORD only), press SHIFT and DEL together. A message box will appear in the middle of the screen, and you should now press the Y key to delete all existing music. This may well leave the Key Signature, Time Signature and other parameters in the STATUS menu in an unfavourable state. You should now press ESC to return to the MUSIC SECTION MENU, and access the STATUS function.

Use the ↑ and ↓ cursor keys to select each item of the STATUS menu, and use the → and ← keys to change each STATUS line to give the display shown below. The Cursor keys repeat if held down.

| STATUS 0 |        |
|----------|--------|
| Key Sig  | C      |
| Time     | 4      |
|          | 4      |
| Tempo    | 60     |
| Clef     | Treble |

Now press CTRL and ENT/RET together. This will overwrite the STATUS data with your newly selected data, and return you to the SECTION MENU. A synopsis of all MUSIC functions and keystrokes is given in the last section of these instructions.

You can now re-access RECORD ready to start playing some music. The message box at the bottom of the screen now asks you to press COPY, to start. Press COPY, and nothing else this time, and listen. You will hear a regular beeping sound, and if you have set up the STATUS menu as shown above, you will hear one high pitched beep and 3 lower pitched beeps repeated. The beeps are one second apart. This is an audible form of METRONOME to help you keep in time. The higher pitched note is the first beat of the Bar, and the lower pitched beeps are the remaining beats. The speed of the beeps is determined by the TEMPO. Whenever you record, you will always hear one Bar of beeps *before* Recording starts to give you the tempo of the Recording. Now you've heard what happens, press ESC and hold it pressed until the beeps stop, to stop recording as you have by now probably recorded several Bars of Rests. The message box will now ask you if you want to store that recording or not. This time, press N, and no music will be added.

Now you know what to expect you can press COPY again, and when the introduction bar of beeps is over, you can start playing using the top two rows of keyboard keys as explained earlier.

Play a simple tune, or just a scale to start with. You must keep in time with the beeps as accurately as possible. The START of each new note pressed is the important part to get in tempo. If you can only play "one fingered", you can let go of each note about half way through and move your finger, but hit the next note as accurately to tempo as possible. You must hold a note down for about half its duration for it to be registered as a valid note, but the gap while your finger is moving is ignored.

If you have some experience of keyboard playing, you will probably hold a note for its full duration, and will press the next note before releasing the first. EMU will accept the new note when it is pressed, but will only accept a maximum of two keys pressed at one time. Again, the point at which a new note is pressed determines the duration of the previous note.

If you leave your fingers off the keyboard for a full beat, EMU will read that as a rest before the new note is pressed.

When you have finished your tune or scale, press ESC as soon as possible to stop recording, and if you are happy that you have recorded your tune as accurately as you can, press Y in response to the question in the message box. EMU will tell you it is UPDATEing the data, and will present you with a musical display of your tune, with the music cursor at the beginning.

EMU is fairly tolerant of inaccuracies in your playing tempo, but it is not clairvoyant. The slower the TEMPO you have set, the more likely you are to have success. It is always better to record at a slow tempo and change the tempo later than try to record at full speed.

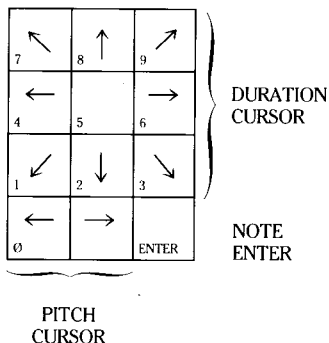
## **PLAYING**

To replay your tune, go back to the SECTION MENU and access PLAY. Press COPY to hear your tune. (PLAY has already been explained in "FIRST STEPS").

## **EDITING**

If you have recorded your tune with some Tempo inaccuracies, you may well see some odd note values – dotted notes, or tied notes – and these can be tidied up using the EDIT function.

In EDIT, you can step through your music note by note either using the → and ← cursor keys or by pressing COPY which will play just that note, and step the MUSIC CURSOR on by one note. Each time you step through a note, the displays at the bottom of the screen will change to show the note duration (crotchet, minim etc.) and the pitch of that note. The numeric key pad is used in EDIT as an extended cursor control pad for the Duration and Pitch menus.



Keypad numbers 1 to 9 (excluding 5) move the highlight patch around the note duration box. Keypad 0 and decimal point move the Pitch cursor (small square blob) over the piano keyboard graphic to indicate Pitch and which Octave you are in, and the small ENTER key will enter that note. To change a pitch or duration in EDIT, move the MUSIC CURSOR over the required note; change duration and/or pitch and re-enter the note with the small ENTER key. Duration and Pitch cursor keys will repeat if held down.

## RECORDING ANOTHER HARMONY

So far we have dealt with one channel of sound, or HARMONY. You may well wish to RECORD a second or third harmony to your tune and this is very simple to do.

Go back to the SECTION MENU and access RECORD again. The music cursor will still be where you left it in the first harmony. To put the music cursor into the next Harmony, press CTRL and ↓ cursor key together. The cursor will reset itself to the start of the next stave DOWN the screen (unless you are already on the bottom stave). Similarly CTRL ↑ will move to the start of the next Harmony UP the screen. SHIFT ↑ and SHIFT ↓ will move the cursor into the next Harmony up or down, but will leave the cursor at the current note instead of resetting it to the start of the Harmony.

You can now press COPY to start Recording. You will hear the introduction Bar of beeps, but then, instead of hearing the beep metronome as you did last time, you will hear your previously recorded tune. If you carry on recording in this second Harmony beyond the end of your first recording, the beeps take over again to keep you in tempo.

The keyboard lets you play an octave and a half, and the pitch of the first full octave of the keyboard is defined by the pitch cursor and OCTAVE setting. Before you start recording, you can use the 0 and Decimal point keys on the numeric keypad to change the OCTAVE.

## **COPYING from a SCORE**

At the beginning of this section, it was stated that you could copy music from a published score into EMU and this is very simply done by using EDIT. You should enter the whole of one Harmony at a time, using the numeric keypad to select note duration and pitch and to enter the note.

Set up the required STATUS for the music you are entering by accessing the STATUS menu, and by using ↑ and ↓ cursor keys to select the function, and → and ← cursor keys to change that function. When you have the correct STATUS, press ENT/RET on its own which defines a NEW STATUS, and returns you to the SECTION MENU.

## **OTHER MUSIC FUNCTIONS**

Most of the features of RECORDING, EDITING and PLAYING have now been covered, but a few still remain.

### **CURSOR functions:**

CTRL → moves cursor to end of current Harmony.

↑ and ↓ (EDIT only) increases or decreases the pitch of the current note at the MUSIC CURSOR by one interval or semi-tone.

### **EDITING functions:**

CLR deletes the note at the MUSIC CURSOR in the current Harmony only.

DEL deletes the note to the LEFT of the MUSIC CURSOR in the current Harmony only.

### **BLOCK COPY functions:**

A block copy feature exists in the EDIT mode only. It allows you to set a Beginning marker and an End marker anywhere within a Harmony, and to copy the marked section (including both marked notes) to any other location in any of the three Harmonies. You cannot copy to within the marked block, and the Beginning and End markers must be in the same Harmony.

After copying, the markers are not removed so that you can copy the same block a number of times. A separate command is given to delete all markers.


CTRL B will enter a Beginning marker at any note in any Harmony. If a Beginning marker already exists anywhere else in your music you will be given the option of deleting the old marker before placing the new one.

CTRL E will enter an End marker at any note in any Harmony. If another End marker already exists you will be given the option of deleting it before placing the new one. The Beginning and End markers *must* be in the same Harmony, and if a Beginning marker exists in another Harmony you will be given the option of deleting it before placing the End marker. Messages on screen guide you through the Block Copy commands. *(Note: You cannot place a Beginning and an End marker on the same note).*

CTRL D will Delete all block markers after giving you the option of changing your mind.

CTRL C copies the marked block, including both marked notes, and inserts the block before the Music Cursor. You can copy up to 1000 notes at a time, and may see a "Memory Full" message if it applies. The markers are not removed after copying, and the Music Cursor remains at the end of the inserted block of notes.

#### **MUTE:**

If you need to hear any of the Harmonies in isolation, or for some reason wish to silence any of them, you can MUTE any or all Harmonies. The MUTE menu box shows a  symbol for those harmonies that you will hear, and nothing for those that are MUTE.

SHIFT 1, SHIFT 2, SHIFT 3 will flip-flop the mute status for Harmonies 1, 2 or 3 respectively. You cannot access the MUTE menu from the SECTION MENU.

**MODE:** This menu is accessed from the SECTION MENU. A function is selected using ↑ and ↓ cursor keys and is changed using → and ← cursor keys.

a) OVER/INSERT. Entering music either in EDIT or RECORD can be in either mode. INSERT will add notes immediately before the MUSIC CURSOR. OVER will overwrite the current with the new Pitch/Duration/Status defined.

b) NORM/SLUR. Defines whether a note will be tied forward to the next note. The Duration of the next note is added to that of the current note when the note is PLAYed. The Pitch of the next note is ignored.

c) **BEGIN/ADV.** Affects the resolution of **RECORD**.

**BEGIN:** (Beginner). The shortest Note resolved is half the beat rate i.e. in 4:4 time, the shortest note is a quaver; or in 3:2 time, the shortest note is a crotchet. The shortest Rest resolved is equal to the beat rate.

**ADV:** (Advanced). The shortest note resolved and the shortest Rest resolved is a semi-quaver. In other words you need to be reasonably accurate in your tempo and to be able to play better than "one-fingered".

d) **S.ON/S.OFF.** In **PLAY**, where you have short note durations at fast tempos, a tiny gap may be heard in the music when the screen updates. This Mode turns the screen display On or Off (effective in **PLAY** only). Turning the screen OFF will minimise these gaps and probably eliminate them. Moving the **MUSIC CURSOR** into the Harmony with the greatest number of notes will also help to eliminate any gaps.

**NOTE/REST:** In **EDIT** mode only, you can flip-flop between a Note duration symbol and its equivalent Rest symbol when entering music note by note. **SHIFT 9** (on the main keyboard) will do this.

## Introduction to VOICES

As far as **EMU** is concerned, a **VOICE** is simply a combination of a volume envelope (**ENV**) and a tone envelope (**ENT**). A **VOICE** can be used on its own as a single sound effect, such as an alarm sound or the sound that might be used in an arcade game. A **VOICE** can also be used to create different sounds for use in a piece of **MUSIC** such as a Vibrato or Tremolo effect or to give a sound an attack and decay.

Most musical instruments do not produce a constant volume of sound that starts and ends instantly. The beginning of the note will increase in volume from nothing to maximum volume and this is called the "attack". The note will either then hold a constant volume for a short while and then decay slowing to nothing, or it will decay straight away. The volume shape can be defined in your computer using a volume envelope (**ENV**) and you can define up to five separate sections to the whole envelope.

Similarly, many instruments can produce minute variations in pitch (called tremolo) which make the sound more interesting and lyrical and this can be simulated in your computer using a tone envelope (**ENT**). Again, up to five sections can be defined in the whole envelope.

## DEFINING ENVs

The principles of defining ENVs and ENTs using the available five sections, each of STEP COUNT, STEP SIZE and PAUSE TIME, are given in the Amstrad Basic Instruction Manual, and it is a good idea to read that section of the manual again. Defining these envelopes from Basic can be very much a hit-and-miss affair, but EMU will give you a graphic representation of each envelope as you define or change it, and will let you hear the effects of what you have done.

Access the MAIN MENU and highlight ENV. Press ENT/RET to access the ENV section.

You will see a large box at the bottom left of the screen containing 15 smaller boxes set out as five vertical columns (one for each section of the ENV), each column having three rows named STEP COUNT, STEP SIZE and PAUSE TIME. Above this are two more rows marked FINAL and LENGTH which show the end result of the values you have defined in the three boxes below for each section. FINAL shows the final volume of that section and is the product of the STEP COUNT and STEP SIZE. LENGTH is the product of the STEP COUNT and PAUSE TIME.

The SECTION MENU shows six functions, including MENU which is common to all Sections. DEFINE and CHANGE allow you to move a cursor (◀) around the 15 ENV definition boxes and experiment with various values.

The only difference between DEFINE and CHANGE is that DEFINE will reset all the values in the boxes to null values, whereas CHANGE leaves the existing values there. TEST lets you change the SOUND parameters in the box in the bottom right of the screen for Channel, Tone etc. These values are not stored with your envelope definitions and are only there to provide an environment in which to test the envelope. STORE, as its name implies, stores the envelope parameters you have defined along with a 10 character name for easy identification, in one of 15 slots. SELECT lets you select a definition from the current 15 definitions so that you can change it or continue work on it.

### a) **DEFINE and CHANGE:** (ENV)

Highlight one or other in the SECTION MENU and press ENT/RET. A cursor (◀) will appear in the top left box of the 15 boxes you can change. → and ← increase or decrease the value in that box. ↓ steps the cursor down to the next box (or to the box at the top of the next column if it is in the LENGTH box). ↑ moves the cursor up a box or to the bottom of the previous column. All four cursor keys have repeat facilities, and approx. 1/2 second after you release a key, the graph display will update, showing you the current envelope shape.

There are 15 steps of volume level between minimum and maximum volume, and the vertical axis of the graph reflects the 15 steps. The horizontal axis represents time, and is scaled automatically to keep the graph as large as possible, but all on the screen. Neither axis is marked with a scale as the graph is only designed to be a guide to the shape of the envelope.

The number of sections you have defined is shown in the box marked 'No. of Sections'. Using the ↑ and ↓ cursor keys you can move through the boxes for the section you have defined, plus the next undefined section only.

If you define a section with a STEP COUNT of zero, the STEP SIZE then becomes an absolute value, held for the PAUSE TIME in 1/100 of a second, otherwise COUNT, SIZE and PAUSE TIME all work as described in Amstrad's Basic Manual.

To hear your envelope, press COPY once.

If you try to enter DEFINE from the SECTION MENU with data already in the boxes that has not been stored, or that has been changed since you last stored it, an error message to that effect will appear under the SECTION MENU. If you tried to enter DEFINE by mistake, nothing is lost, but you can over-ride the error message by holding down the CTRL key and pressing DEL. DEFINE will continue to flash in the SECTION MENU, but you will now be able to access DEFINE which will erase the data in the boxes.

#### **b) TEST.**

Access TEST from the SECTION MENU, and a cursor (◀) will appear next to the CHANNEL data in the bottom right menu on the screen. The values in this box are to define the sound data around your ENV for test purposes.

(i) CHANNEL: a number 1 to 7:

1 = channel A)

2 = channel B)

4 = channel C)

or any combination

(ii) TONE: The pitch 'period' – as described in Amstrad's Basic Manual.  
The larger the number, the lower the pitch. (Range 0 to 4095).

(iii) DURATION: 0 = full length of ENV definition.

Positive number = number of 1/100ths of a second duration  
which truncates ENV total length.

Negative number = repeating ENV.

The envelope is repeated by the number of times indicated.  
e.g. -4 gives four full repeats of the ENV. (Range -32768 to +32767)

- (iv) VOL: The starting volume of the ENV. Changing this alters the starting point of the Graph and can affect the overall 'shape' of the sound. (Range 0 to 15).
- (v) ENV: Arbitrary value of ENV under test. (Range 0 to 15).
- (vi) ENT: Value of already stored ENT to test with this ENV. Error if ENT is not yet defined and stored. (Range 0 to 15).
- (vii) NOISE: 0 = No noise added  
1 to 31 = noise of different 'colour' added to sound.  
(Range 0 to 31).

To move the cursor, use ↑ and ↓ keys.

To change a value against the cursor, use → and ← keys.

COPY lets you hear the ENV in this context.

### c) **STORE**

Access STORE from the SECTION MENU, and an overlay window appears on the right hand side of the screen displaying the ENVs already defined and Stored and the envelope number assigned to it.

A cursor blob will appear in the box marked NAME, and you should type in a name to identify the current ENV definition. Once the name is typed in, hold the CTRL key down and press the → key. The name cursor will move to the number box to the right of the name. Use the → and ← keys to set the ENV number in which you want to store this ENV, and then press ENTER. The ENV name is added to the list. There is space for a maximum of 15 ENVs, but you can over-write existing stored definitions if you wish.

### d) **SELECT**

Access SELECT from the SECTION MENU and an overlay window appears on the right of the screen. A cursor (◀) will appear beside the top name on the list and can be moved up and down using the ↑ and ↓ keys. When the cursor is against the ENV name you wish to select, press ENT/RET and the ENV data boxes and the graph will be updated.

You can hear that sound by pressing COPY, or make changes to it using CHANGE. If the current data in the ENV boxes has not been Stored, you will see an error message under the SECTION MENU when you try to access any other data from the Select list. You can over-ride the error by holding down the CTRL key while pressing DEL.

## DEFINING ENTs

This section is almost identical in operation to the previous one for defining ENVs. The screen layout is almost identical and the Sections available from the SECTION MENU are the same. The differences only will be described.

a) Graph. The vertical axis represents a range of Tone Periods and the vertical position of the graph shows pitch changes, based on a starting point defined by TONE in the TEST menu.

b) DEFINE. The maximum and minimum values permissible in the data boxes have different values:-

Step Count: (i) values 0 to 239 are treated as the number of steps as normal.

(ii) values 240 to 255 combined with STEP SIZE give an absolute value for the Tone Period.

$$\text{PERIOD} = ((\text{Count} - 240) * 256) + \text{SIZE}.$$

c) TEST (i) Use any ENT number.

(ii) Use an ENV number of a previously defined and stored ENV.

(iii) A negative ENT number defines a repeating ENT. The envelope will repeat continuously for the duration of sound.

d) FINAL shows the final TONE PERIOD at the end of that Section.

## CREATING VOICES

Access VOICE from the MAIN MENU and you will see the VOICE screen that you saw in "FIRST STEPS", where you experimented with pre-defined VOICES.

To define a VOICE, you must combine an ENV and an ENT from those you have already defined and stored.

**ENV:** Access ENV from the SECTION MENU and an overlay window on the right of the screen will show the ENVs currently in memory. Use the ↑ and ↓ cursor keys to identify the ENV you require and press ENT/RET.

**ENT:** Press ESC to re-access the SECTION MENU and select ENT. An overlay window on the right will show the ENTs in memory. Choose an ENT from memory and press ENT/RET. The two mini-graph areas should now show your ENV/ENT graphs. Press ESC to access the SECTION MENU.

**DEFINE:** Highlight DEFINE and press ENT/RET. A cursor (◀) will appear in the Sound Data menu at the bottom right of the screen, and you can set up the various sound parameters you require. The values are stored with your voice data as they form an integral part of the complete voice. If you intend to use the VOICE as a stand-alone sound effect, the Sound Data values are those that will be used in the final sound, so make sure that the voice sounds exactly as you require it, and that the CHANNELS used are correct.

However, if you intend to use the Voice in the MUSIC section, some of the Sound Data values will be overwritten by MUSIC to fit the note pitch, duration and channel (or Harmony), but the overall shape of the VOICE as defined by ENT, ENV, NOISE and VOL will remain unchanged.

The ENV and ENT numbers you define in the Sound Data menu will always be those finally used by the VOICE, and can be changed to any value between 1 and 15 without altering the Envelope selected. This allows you to create Voices using envelopes from different ENV/ENT files without a conflict of Envelope numbers. If you are going to use the VOICES you create in MUSIC, make sure that different ENV and ENT numbers are defined in different VOICES, as MUSIC will set up all the Voices in a given piece of music at the beginning of PLAY. If you use the same ENV or ENT number in different Voices, there will be a conflict of envelope definitions and one or other voice will not sound correctly.

**STORE:** This function will show you an overlay on the right hand side of the screen giving the names and ENV/ENT numbers already defined. A cursor blob will appear in the NAME box at the bottom of the screen, and you should type in the VOICE name and press ENT/RET. The new name will be added to the list. You can overwrite an existing name by typing in that name when storing the new data. A message under the SECTION MENU will ask if you wish to overwrite the original. Press Y for Yes or N for No.

**SELECT:** The overlay window appears on the right of the screen, and you can select a previously defined VOICE to study or modify it. If the current data in memory has not been stored at any stage, a warning message is displayed under the SECTION MENU which can be over-ruled by holding down CTRL and pressing DEL. You will then need to re-select the new data to overwrite the old data. The mini-graphs will be updated, as will the Sound Data menu.

COPY allows you to hear the new data. To make changes to the new data, re-access DEFINE from the SECTION MENU. The screen will only show a maximum of 15 voices, but if you have defined more than 15, the Select menu will update when you move the select cursor off the bottom or top of the menu.

## CREATING VOLUME DYNAMICS IN MUSIC

When you define an ENV or a VOICE, you can alter the VOL parameter in the Sound Data menu which will act as an offset to the ENV shape.

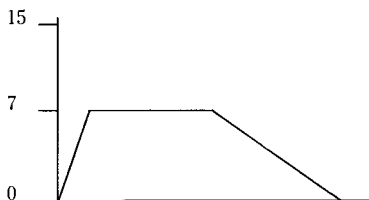


FIG.1

|          |     |
|----------|-----|
| CHANNEL  | 1   |
| TONE     | 284 |
| DURATION | 0   |
| VOL      | 0   |
| ENV      | 1   |
| ENT      | 0   |
| NOISE    | 0   |

TABLE 1

The graph in Fig. 1 would be defined as an ENV using 3 setions, with a maximum FINAL Vol of 7 and with a VOL setting of 0 in the Sound Data menu. By increasing the value of VOL, up to a maximum of 8, the graph shape will remain the same, but will be offset further up the graph axis. With a VOL of 6, for example, it will look like Fig. 2.

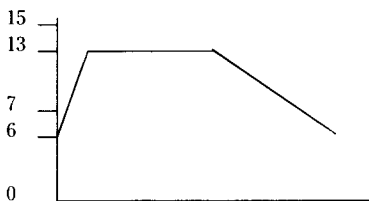


FIG.2

|          |     |
|----------|-----|
| CHANNEL  | 1   |
| TONE     | 284 |
| DURATION | 0   |
| VOL      | 6   |
| ENV      | 1   |
| ENT      | 0   |
| NOISE    | 0   |

TABLE 2

Try altering the value of VOL, and listen to the effects (by pressing COPY) after each change. The effective volume of the sound will rise as the value of VOL increases. Altering VOL in the VOICE section of EMU has the same effect, and any ENT associated with the VOICE will still also be effective.

By defining several voices (with different names, but with identical ENV/ENT numbers) that contain various VOL settings, you can provide MUSIC with a number of identical voices of varying volumes. By using these VOICES at different places in your MUSIC, you can balance the loudness of the three musical Harmonies. You can use the same ENV/ENT numbers because the envelope definitions will be identical, and no clash of definitions will occur in PLAY.

## USING VOICES IN MUSIC

Having already defined some voices in the VOICE section of EMU, you can now use those voices in your music. Access MUSIC from the MAIN MENU and type in some music. Move the MUSIC CURSOR to the note at which you want the VOICE to start. Press ESC to access the MUSIC SECTION MENU and select VOICE. An overlay window at the right hand side of the screen will show the VOICES available. Use the ↑ and ↓ cursor keys to identify the VOICE required and press ENT/RET. The VOICE name will appear in the VOICE box and you will see that the STATUS number on the top line of the STATUS menu will change.

STATUS and VOICE are closely linked. To keep the amount of memory used by each note to a minimum, the STATUS information for each note is stored as a STATUS number (0 to 255), because many notes are likely to share the same STATUS. VOICE data is stored as an extra function of STATUS, so although you have not changed STATUS, the addition of a VOICE will create a new STATUS number.

When you add a new VOICE (or a new STATUS) to your music by pressing ENT/RET in the VOICE function or the STATUS function, EMU will store the new VOICE/STATUS definition, give it a number, and will then work through that Harmony in your MUSIC, from the MUSIC CURSOR position, changing the STATUS byte for each note to the new number, until it finds a previous change in STATUS, or to the end of the Harmony if that is found first.

Each time you step through your music in EDIT, either by using the → and ← cursor keys, or by using COPY, the STATUS and VOICE displays will update for each note along with the DURATION and PITCH displays.

You can change a STATUS/VOICE definition without creating a new STATUS number. If, for example, you had made a slight change to a VOICE to improve its sound, and had already used that VOICE in some music, instead of adding that VOICE to your MUSIC by pressing ENT/RET as described above (which would use up memory to create a new STATUS), you should hold down the CTRL key and press ENT/RET. The STATUS number byte associated with each note of MUSIC is not altered, but the STATUS definition is, so any note in any Harmony that uses that STATUS will be affected, and the original STATUS/VOICE definition in MUSIC is lost.

It is worth mentioning at this point, that when you use a VOICE in MUSIC, the whole VOICE definition is copied into the MUSIC data area. This allows you to combine VOICES in your MUSIC that are stored in different VOICE files on Cassette or Disc. You do not even need to have any VOICE definitions loaded or stored in the VOICE section of EMU to use the voices you have already defined in your MUSIC.

## **SAVE/LOAD – DATA**

The data stored in each of the sections of EMU can be saved and loaded to and from cassette/disc in separate sections. Each section of EMU will contain all the necessary information from other sections for features such as VOICES and their ENV/ENT definitions to work properly, even though there may be no data, or different data in those other sections.

EMU is fully compatible with Discs if you have them attached to your computer, and the MODE menu will show the current status regarding Cassette/Disc functions. Use of this menu was briefly covered in "FIRST STEPS", and is totally self-explanatory. Use ↑ and ↓ cursor keys to select the function (flashing) and use → and ← cursor keys to change the status of that function. Any messages such as error messages, or the cassette "Start Tape..." messages appear in the MESSAGES window at the bottom of the screen.

*LOAD* in the SECTION MENU accesses the LOAD Sub-Menu as described in "FIRST STEPS", and *SAVE* accesses the SAVE Sub-Menu, which operates in exactly the same way. Type in the appropriate filename and press ENT/RET. The header record saved with each file contains an identity flag which stops you loading the wrong type of data into memory, and a "Wrong File Type" error is displayed if you try to do this.

When Saving and Loading using Discs, the file extension (.BIN, .BAS etc.) is automatically set for the current type of data. The extensions are '.ENV', '.ENT', '.VOX', '.MUS'. Using Cassettes, these filename extensions are not used, and you should include an indication of the file type in your filename.

*DIR* in each sub-menu will produce a Disc Directory in the bottom half of the screen, using the appropriate Disc Drive (i.e. if *MODE* shows 'LOAD from A' and 'SAVE to B', the *LOAD DIR* will access Drive A and the *SAVE DIR* will access Drive B if it is fitted.

If you do not have Discs attached, or have accessed *TAPE.IN* or *TAPE.OUT* in *MODE*, then *DIR* will do a Cassette Catalogue as appropriate.

Cassette and Disc filenames must follow the normal Amstrad conventions as described in the Amstrad Basic manual and Disc manual.

If you have a CPC 464, with no Discs, the *MODE* menu will show *TAPE.IN* and *TAPE.OUT* and these cannot be changed. The 'LOAD from A' and 'SAVE to A' functions of *MODE* can be changed, but have no effect on Cassette operations.

## **SAVE – RSX**

Having given you a means of creating your masterpiece, it seemed sensible to let you save all that hard work in a format that you could incorporate into a Basic or machine code program of your own. And that is the purpose of this extra *SAVE* section.

You may already have come across the term *RSX*, but in case you have not, here is a brief description.

*RSX* stands for Resident System Extension, and is controlled by the Amstrad operating system ROM. An *RSX* is an extra command that Basic or machine code can access by name. It will usually be a machine code program that is loaded into memory before your own program, and to access it a special symbol called a *BAR* (accessed by *SHIFT* and *@*) is typed before the *RSX* command name. Hence the *RSX*'s other name of *BAR COMMAND*.

It need not worry you how *RSXs* work, but the next part of these instructions explains how to use the *RSXs* you create.

So this Section of *EMU* will let you select from the *VOICES* and *MUSIC* that you have created, and will join them together, with a controlling piece of machine code, to form an *RSX* that can be used independently of *EMU*.

Access SAVE – RSX from the MAIN MENU and you will see the SAVE – RSX screen. In the top right corner of the screen will be the MODE MENU from the SAVE/LOAD-DATA screen, and it works in an identical fashion here. As ENVs and ENT's are only component parts of a VOICE and cannot be used in isolation, this Section will only allow you to Save VOICES and MUSIC and the SECTION MENU contains these options. There is the usual 'Messages' window, a Filename window and a shortened LOAD MENU, all working in the same way as in SAVE/LOAD-DATA. The window on the left, headed 'Sent to RSX' will contain the names of the VOICES and MUSIC that you choose to Save from this Section, and names are added here when they have been added to the output file.

The way data is Saved is similar to using the Basic commands OPENOUT : WRITE #9 : CLOSEOUT, and between opening an RSX file and closing it, you can Load other data (VOICES or MUSIC) so that your RSX file can contain data from a number of EMU files. Once an RSX file is open (and it is opened automatically when you try to save the first piece of RSX data) you cannot leave this Section of EMU without using CLOSE to close the file properly or to Abandon it. Also, once an RSX file is open, you must not change the MODE parameters relating to SAVE (i.e. DISC.OUT/ TAPE.OUT or SAVE TO A/B or SPEED WRITE) so it is important that MODE is set up FIRST.

A message under the SECTION MENU will tell you the state of the RSX file, its current name and its length in bytes.

If you have VOICE or MUSIC data already in memory, access either function from the SECTION MENU. If there is no data in memory, use LOAD from this SECTION MENU to Load VOICE or MUSIC data in exactly the same way as in SAVE/LOAD-DATA.

## **VOICE**

Access VOICE from the SECTION MENU, and the Voice selection window you have seen before will overlay the right hand side of the screen. Use the ↑ and ↓ cursor keys to place the cursor (◆) against the VOICE you wish to save. The VOICES you will be saving here will have been designed as stand-alone sound effects. You can save VOICES that have been designed for MUSIC if you wish, but there seems little point. Having placed the cursor, you can now hear the VOICE by pressing ENT/RET to select it, and COPY to hear it. Neither of these actions will output the VOICE data to the Cassette or Disc. To do this, hold down CTRL and press ENT/RET.

If this is the first RSX data you have selected you will be asked to type in the Filename for the RSX Save file. Type it in to the Filename box and press ENT/RET. The message under the SECTION MENU will update to show that the RSX file is OPEN, and the VOICE name will be added to the 'Sent to RSX' window. Any Disc/Tape error messages will appear in the 'Messages' window. The filename is automatically given an extension type of '.BIN' for Disc files.

From now on, VOICE and MUSIC data is added to this output file without again asking you for the RSX Filename. The Length value shown on the screen will only have a valid value once you have CLOSED the RSX file, and you should make a note of this final Length as you will need it when loading the RSX back for future use.

If you wish to Save further VOICES, move the cursor (◀) to each such VOICE name in turn, and add each VOICE to the RSX with CTRL plus ENT/RET.

ESC will return you to the SECTION MENU where you can load other VOICE data, Load or Save MUSIC data or CLOSE the RSX file.

## **MUSIC**

Only one piece of MUSIC can reside in memory at any one time, but others can be loaded in for saving to the RSX file. On accessing MUSIC from the SECTION MENU you will be asked to supply a NAME for the MUSIC so that it can be identified in the RSX file. If the MUSIC in memory had at any time been Saved using SAVE/LOAD-DATA it will already have a name, which will be the name of the normal save/load file. When you save the MUSIC to RSX, you can use the same name, or alter it to a new name. Press ENT/RET when the Name is correct, and the 'Messages' window will tell you that EMU is converting the MUSIC data.

Once conversion is complete and the MUSIC has been added to the RSX file, its name will be added to the 'Sent to RSX' list. You will then be free to select another function from the SECTION MENU. With long pieces of MUSIC the conversion can take perhaps 10 to 15 seconds.

Keep an eye on the 'Messages' box, particularly if you are using Cassettes, as from time to time you will be asked to "Press PLAY and REC..." when the machine's output buffer is full. If you have just Loaded VOICE or MUSIC data from another Cassette, make sure that you have the CORRECT Cassette in the Datacorder for the operation requested. Disc operations are fully automatic, but beware of the normal restrictions of changing Discs when files are open. If you have ONE drive, all input and output MUST take place on ONE SIDE of a Disc otherwise AMSDOS will produce an error and abandon the RSX output file for you

## **CLOSE**

As was explained earlier, the RSX output file remains open until you CLOSE it, and you cannot exit from this SECTION until you either CLOSE or ABANDON the file.

Access CLOSE from the SECTION MENU, and respond to the question in the 'Messages' window.

If you press ENT/RET to CLOSE the file, the final part of the Save in the output buffer will have to be sent to Disc/Tape, and the appropriate Disc or Cassette must still be available. When the Disc/Tape has stopped you can access any other SECTION of EMU.

The FILE status message will then show the file as CLOSED and give the length of of the whole RSX file, including the machine code operating routine. MAKE A NOTE OF THIS LENGTH. You will need to know its value when you come to load the RSX back for use in your own program. Each time you access SAVE – RSX, the last File status and length is shown, and will only change when you open a new RSX file.

## **USE BY BASIC**

The RSX file you have saved from SAVE – RSX in EMU contains a short piece of relocatable machine code and a block of data defining your VOICE and MUSIC. This will live at the top of memory and will need to be set up as an RSX (BAR command). From then on, you need not know where the machine code lives or how it works, and you will simply access it by name.

If you already have some Basic in memory, you can load and set up the RSX by typing in each command in the Basic listing below as an immediate command without a line number.

Or, you could incorporate the Basic listing below at the beginning of your own Basic program, so that your program automatically sets up the RSX when it is run.

### **BASIC LISTING to load and set up RSX.**

```
10 H=HIMEM-LENGTH
20 MEMORY H
30 LOAD "name",H+1:CLOSEIN
40 CALL H+1
```

The variable shown as LENGTH in line 10 should be replaced with the actual value of the length given to you in the SAVE – RSX Section of EMU. The filename “name” in line 30 should be changed to suit the RSX Filename you have supplied. The Basic will lower the value of HIMEM by the length of your RSX code and load that code into memory above the new HIMEM. The machine code is accessed by the CALL instruction which sets up the RSX command. All VOICE and MUSIC parts of the RSX are accessed by a single Bar command:

### **!PLAY,@NAME\$,[HOLD/FLUSH]**

where NAME\$ = the name you gave to the VOICE/MUSIC

HOLD = 64 )

FLUSH = 128 ) optional parameters – use one or the other.

NAME\$ must be supplied, but HOLD/FLUSH is optional.

You can find out which VOICE/MUSIC names have been defined in your RSX by using the BAR command

### **!PCAT**

A list of all the VOICE/MUSIC names will appear on the screen at the current cursor location.

### **!PLAY**

When you execute the !PLAY,@NAME\$ command (without HOLD/FLUSH) the VOICE/MUSIC defined by NAME\$ starts to play immediately, provided that nothing else is playing. If another VOICE/MUSIC is still playing the new name is added to a queue, and will start playing as soon as the previous one stops. The queue has 15 spaces on it, and if there are already 15 names on the queue, a “Queue FULL” error is generated.

You can stop playing at any time by pressing ESC.

Do not change the Basic string variable NAME\$ while that sound is playing as the RSX can refer to the variable during playing. Use a new string variable name for each new !PLAY name. DO NOT use the Basic command RUN while !PLAY command is running as this will clear the string variable NAME\$ – use GOTO instead.

### **HOLD/FLUSH**

HOLD and FLUSH are explained in your Amstrad Basic manual and they can be used with EMU sounds by adding one extra parameter to the !PLAY command.

!PLAY,@NAME\$,64 will add HOLD to the command, and

!PLAY,@NAME\$,128 will add FLUSH to the command.

FLUSH will force the new sound to jump to the head of the queue, deleting all previous entries in the queue.

HOLD will cause that sound to wait, once it has reached the head of the queue, until you issue a RELEASE command. If you are not sure which channel the sound has been defined on, you can use RELEASE 7 which will release all sound channels.

# SYNOPSIS OF KEYSTROKES

## MAIN MENU

| MAIN MENU        |       |
|------------------|-------|
| ENV              |       |
| ENT              |       |
| VOICE            |       |
| MUSIC            |       |
| SAVE/LOAD - DATA |       |
| SAVE             | - RSX |

↑ ↓ to move Patch

ENT/RET to select Section

## ENV & ENT

### DEFINE CHANGE

|            |        |        |        |        |        |
|------------|--------|--------|--------|--------|--------|
| final      | 0      | 0      | 0      | 0      | 0      |
| length     | 0      | 0      | 0      | 0      | 0      |
| step count | 00     | 00     | 00     | 00     | 00     |
| step size  | 00     | 00     | 00     | 00     | 00     |
| pause time | 01     | 01     | 01     | 01     | 01     |
|            | Sect 1 | Sect 2 | Sect 3 | Sect 4 | Sect 5 |

↑ ↓ cursor move

← → change value

COPY to hear

### TEST

|          |     |
|----------|-----|
| Channel  | 1   |
| Tone     | 284 |
| Duration | 0   |
| Volume   | 0   |
| ENV      | 15  |
| ENT      | 0   |
| Noise    | 0   |

↑ ↓ cursor move

← → change value

COPY to hear

### STORE

|  |   |
|--|---|
|  | 1 |
|  | 2 |
|  | 3 |
|  | 4 |
|  | 5 |
|  |   |

Keyboard for Name

CTRL → to access number

← → to change number

ENT/RET to Store data

|               |   |   |
|---------------|---|---|
| Envelope Name | ■ | 0 |
|---------------|---|---|

## SELECT

|  |    |
|--|----|
|  | 1◀ |
|  | 2  |
|  | 3  |
|  | 4  |
|  | 5  |
|  |    |

↑ ↓ cursor move  
ENT/RET to Select  
COPY to hear

*All functions – CTRL DEL to over-ride Error Messages*

## VOICE

### DEFINE

|          |     |
|----------|-----|
| Channel  | 1◀  |
| Tone     | 284 |
| Duration | 0   |
| Volume   | 0   |
| ENV      | 15  |
| ENT      | 0   |
| Noise    | 0   |

↑ ↓ cursor move  
  
← → change value  
  
COPY to hear

### ENV/ENT

|  |    |
|--|----|
|  | 1◀ |
|  | 2  |
|  | 3  |
|  | 4  |
|  | 5  |
|  |    |

↑ ↓ cursor move  
  
ENT/RET to Select  
  
COPY to hear

### STORE

| TITLE | ENV | ENT |
|-------|-----|-----|
|       |     |     |
|       |     |     |
|       |     |     |
|       |     |     |
|       |     |     |

Keyboard for Name

ENT/RET to Store

|            |   |
|------------|---|
| VOICE NAME | ■ |
|------------|---|

# SELECT

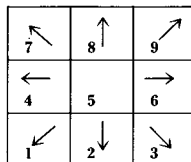
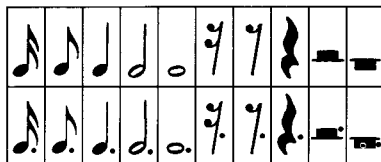
| TITLE | ENV | ENT |
|-------|-----|-----|
| ◀     |     |     |
|       |     |     |
|       |     |     |
|       |     |     |
|       |     |     |

↑ ↓ cursor move  
ENT/RET to Select  
COPY to hear

All functions – CTRL DEL to over-ride Error Messages.

# MUSIC

## EDIT

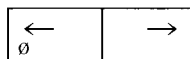


f1 to f9 to  
change Duration

# OCTAVE 1



C D E F G A B



f0 & f. to change Pitch



f ENTER to Enter note

→ ← MUSIC cursor move  
COPY to Play current note  
CTRL ↑ Change Harmony, reset to start  
CTRL ↓ Change Harmony, reset to start  
SHIFT DEL Delete ALL Music

CTRL → Cursor to end this Harmony  
CTRL ← Cursor to start this Harmony  
SHIFT ↑ Change Harmony, current note  
SHIFT ↓ Change Harmony, current note

## RECORD

|                             |
|-----------------------------|
| COPY to Start : ESC to Stop |
|                             |

### PLAY

→ ← MUSIC cursor move

CTRL ↑ Change Harmony, reset to start

CTRL ↓ Change Harmony, reset to start

COPY PLAY from MUSIC cursor

ESC to Stop PLAYing

COPY Starts Recording

ESC Stops Recording

Use keyboard like Piano keyboard

Follow messages in this box

(Cursor controls as in EDIT)

CTRL → Cursor to end this Harmony

CTRL ← Cursor to start this Harmony

SHIFT ↑ Change Harmony, current note

SHIFT ↓ Change Harmony, current note

## VOICE

| TITLE | ENV | ENT |
|-------|-----|-----|
| ◀     |     |     |
|       |     |     |
|       |     |     |
|       |     |     |
|       |     |     |

↑ ↓ Cursor move

ENT/RET to add Voice to new STATUS & update current Harmony up to next STATUS change, or end of Harmony.

CTRL ENT/RET to over-write current STATUS with selected VOICE.

Affects ALL notes in ALL Harmonies using current STATUS.

|       |      |
|-------|------|
| VOICE | NULL |
|-------|------|

Indicates current voice

## STATUS

| STATUS 0 |        |
|----------|--------|
| KEY      | C      |
| TIME     | 4      |
|          | 4      |
| TEMPO    | 90     |
| CLEF     | TREBLE |

↑ ↓ to move Patch

→ ← change value

ENT/RET create new STATUS with current voice and update current Harmony to next STATUS change, or end of Harmony.

CTRL ENT/RET over-write current STATUS including current VOICE. Affects ALL notes in ALL Harmonies using current status.

## MODE

| MODE  |        |
|-------|--------|
| OVER  | INSERT |
| NORM  | SLUR   |
| BEGIN | ADV    |
| S.ON  | S.OFF  |

↑ ↓ to move Patch

→ ← change Mode

ESC to return to Section Menu

## MUTE

| MUTE |    |
|------|----|
| 1    | ◀▶ |
| 2    | ◀▶ |
| 3    | ◀▶ |

SHIFT 1,2 or 3 to flip-flop status of Mute

◀▶ indicates ACTIVE harmony

## SAVE/LOAD – DATA

### SAVE/LOAD

| LOAD  |      |
|-------|------|
| ENV   | DATA |
| ENT   | DATA |
| VOICE | DATA |
| MUSIC | DATA |
| DIR   |      |

↑ ↓ to move Patch

ENT/RET to access function, then use keyboard to enter name. ENT/RET to execute Load/Save.

(DIR gives Disc directory or Cassette catalogue depending on IN/OUT MODE status.)

|          |   |
|----------|---|
| Filename | ■ |
|----------|---|

## MODE

| MODE        |             |
|-------------|-------------|
| DISC.IN     | TAPE.IN     |
| DISC.OUT    | TAPE.OUT    |
| LOAD from A | LOAD from B |
| SAVE to A   | SAVE to B   |
| SPEED 0     | SPEED 1     |

↑ ↓ to move Patch

→ ← to select Mode

ESC to return to Section Menu

## SAVE RSX

### VOICE

| TITLE | ENV | ENT |
|-------|-----|-----|
|       | ◀   |     |
|       |     |     |
|       |     |     |
|       |     |     |
|       |     |     |

↑ ↓ cursor

ENT/RET to make selected Voice into Current Voice

COPY to hear

CTRL ENT/RET to send RSX output

### MUSIC

|          |   |
|----------|---|
| Filename | ■ |
|----------|---|

Keyboard to type in Music name.

ENT/RET to send to RSX output.

### CLOSE

Follow messages in "Messages" window.

(**N.B.** You cannot access CLOSE unless the output file is already OPEN).

### LOAD

Identical to LOAD in **SAVE/LOAD – DATA**, but with shorter Menu

### MODE

Identical to MODE in **SAVE/LOAD – DATA**.

*All functions: Before first data is sent to RSX output, you will be asked to give a Filename for the RSX Save. The File is opened automatically.*

*Message under Section Menu shows RSX File status.*

# MUSIC KEYSTROKES

| KEY       | FUNCTION                               | RECORD | EDIT | PLAY |
|-----------|--|--------|------|------|
| CTRL ←    | MUSIC CURSOR to start Harmony          | *      | *    | *    |
| CTRL ↓    | MUSIC CURSOR to start next Harmony     | *      | *    | *    |
| CTRL ↑    | MUSIC CURSOR to start last Harmony     | *      | *    | *    |
| CTRL →    | MUSIC CURSOR to end Harmony            | *      | *    | *    |
| SHIFT ↑   | MUSIC CURSOR to last Harmony           | *      | *    | *    |
| SHIFT ↓   | MUSIC CURSOR to next Harmony           | *      | *    | *    |
| →         | MUSIC CURSOR to next Note              | *      | *    | *    |
| ←         | MUSIC CURSOR to last Note              | *      | *    | *    |
| ESC       | Escape to SECTION MENU                 | *      | *    | *    |
| COPY      | PLAY                                   | *      | *    | *    |
| SHIFT 7   | SCREEN ON/OFF                          | *      | *    | *    |
| SHIFT 1   | MUTE 1                                 | *      | *    | *    |
| SHIFT 2   | MUTE 2                                 | *      | *    | *    |
| SHIFT 3   | MUTE 3                                 | *      | *    | *    |
| SHIFT 4   | OVER/INSERT                            | *      | *    |      |
| SHIFT 6   | BEGINNER/ADVANCED                      | *      | *    |      |
| f0 and f. | MOVE PITCH CURSOR                      | *      | *    |      |
| SHIFT DEL | DELETE ALL MUSIC                       | *      | *    |      |
| ↑         | PITCH UP                               |        | *    |      |
| ↓         | PITCH DOWN                             |        | *    |      |
| SHIFT 5   | NORMAL/SLUR                            |        | *    |      |
| SHIFT 9   | NOTE/REST                              |        | *    |      |
| f1 to f9  | MOVE DURATION CURSOR                   |        | *    |      |
| f ENTER   | ENTER NOTE                             |        | *    |      |
| CLR       | Delete note AT MUSIC CURSOR            |        | *    |      |
| DEL       | Delete Note to LEFT of<br>MUSIC CURSOR |        | *    |      |
| CTRL B    | COPY beginning marker                  |        | *    |      |
| CTRL E    | COPY End marker                        |        | *    |      |
| CTRL D    | Delete COPY markers                    |        | *    |      |
| CTRL C    | COPY marked block                      |        | *    |      |