CHEETAH

OWNERS MANUAL

CHEETAH MS800
DIGITAL WAVE SYNTHESER MODULE

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CHEETAH MS800 DIGITAL WAVE SYNTHESIZER MODULE

OWNERS MANUAL

Thank you for choosing the CHEETAH MS800 DIGITAL WAVE SYNTHESIZER MODULE.

The MS800 uses digital sound generation techniques combined with wave sequencing technology to bring you sounds with a movement and depth rarely found in synthesizers today.

To assure you that your MS800 will give you many years of enjoyment, please be sure to read this owners manual carefully before attempting to operate the MS800.

FEATURES

* Digital Wave Sequencing Synthesizer - sounds may be programmed to sequence through changing waveforms as the note plays, giving exceptional movement and character to your music.

* 15 Note Polyphonic

* Velocity Sensitive

* Multi-Timbral - any Patch assignable to any of 16 MIDI channels

* 50 ROM Patches (Patch 01 to Patch 50)

* 49 Non-volatile RAM Patches (Patch 51 to Patch 99)

* 50 Non-volatile RAM Tones (Tone 01 to Tone 50)

* 49 ROM Tones (Tone 51 to Tone 99)

* 21 Digital Waveforms

* Fully programmable from the front panel

* Stereo Output

* MIDI Overflow

* MIDI System Exclusive Load/Save

* MIDI IN, OUT & THRU

* LED display

GETTING STARTED

The MS800 is a MIDI synthesizer module, which must be controlled by another MIDI device. Any MIDI controller such as a MIDI Master Keyboard, MIDI Guitar, MIDI Drum Machine, MIDI Sequencer or Computer with MIDI etc. will be suitable provided that it conforms to the MIDI standard.

No sound will be produced by the MS800 unless a MIDI device of some type is connected.

Connect the MIDI IN socket on the rear of the MS800 to the MIDI OUT of your MIDI controller.

Set your MIDI controller to transmit on MIDI channel 1.

For the best effect, connect Outputs 1 and 2 on the rear of the MS800 to the audio L & R inputs of a suitable amplifier. If only one lead is connected to Output 1, a mono L+R signal will be directed to Output 1. If both the Outputs are connected, stereo will be possible, with the L signal at Output 1, and the R signal at Output 2.

Connect the power supply lead to the socket on the MS800 marked POWER, plug the power supply into the mains socket and switch on.

Switch on the MS800 using the front panel switch marked ON/OFF.

MS800 FRONT PANEL
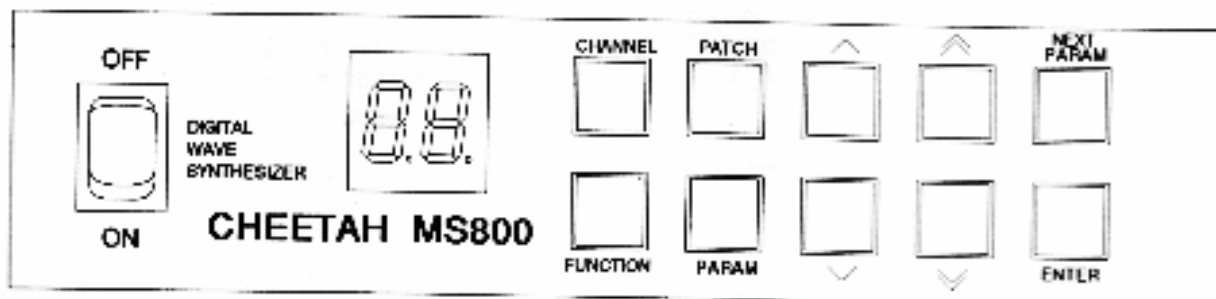
MS800 REAR PANEL

OPERATING THE MS800

When power is supplied to the MS800, it automatically enters Play mode, and Patch 01 is selected as shown below :-

```
0.1
```

The dot on the left digit of the display indicates that the number displayed is a Patch number.

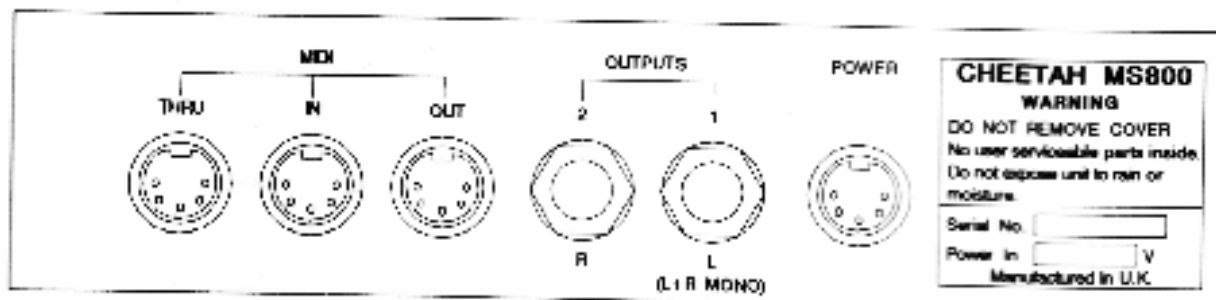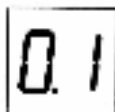Playing any of the notes on your controller causes sound to be produced by the MS800. The sound produced is the one shown in the LED display.

Hold a note or chord for a while, and let the note develop. The sound changes as you hold the note(s). This is exactly what the MS800 is designed to do, giving real depth and character at a fraction of the cost normally associated with this technology.

The dots in the LED display will flicker when a voice is activated by MIDI. If you can't hear any sound produced by the MS800, first check to see that the MS800 is getting the MIDI data, and then check your audio connections.

The MS800 is velocity sensitive, and will respond to velocity data if the patch selected is programmed to do so.

Provided that your MIDI controller can transmit velocity data, altering the velocity with which you play the MIDI controller will result in a corresponding response from the MS800. In this way it is possible to recreate some of the dynamic capabilities of real instruments.

No effect will occur with non-velocity sensitive MIDI controllers.

CHANGING PATCH

The MS800 allows recall of 99 different patches from memory. The MS800 uses Patch numbers, numbered 01 to 99.

To change sound from this point, simply press one of the UP ARROW buttons on the front panel keypad.

Pressing the single ARROW buttons will change the number in the display by ONE, while the double ARROW buttons change the number in the display by TEN for each press.

An UP ARROW button will increase the number in the display up to a maximum of 99 if pressed repeatedly, and a DOWN ARROW button will decrease the number in the display to 00 if pressed repeatedly.

Patch 00 produces no sound, and is used for switching off an individual MIDI channel.

Playing any notes on your MIDI controller will now play a different sound from the MS800.

Alternatively, you can send the MS800 a MIDI Patch Change message from your MIDI controller, which will change the patch on the MS800 directly to the one selected, on the MIDI Channel the Patch Change was sent on.

Patch Change messages above 99 are ignored by the MS800.

The 49 ROM Patches are from 01 to 49. The more powerful ROM sounds are arranged between 01 and 30.

The 50 RAM Patches are from 50 to 99. The more powerful RAM sounds are arranged between 50 and 80.
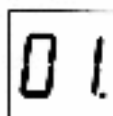
CHANGING MIDI CHANNEL

The MS800 can play sounds on each of the 16 MIDI Channels.

At the moment, you are only playing a sound on Channel 1.

The MS800 allows you to select each MIDI Channel and assign a Patch to it. The default setting is with Patch 01 selected for MIDI Channel 1, with the Patch selection turned off (Patch 00) for all other MIDI Channels.

To assign a Patch to another MIDI Channel, press the CHANNEL button on the front panel, which will display the following :-

```
01.
```

The dot by the right digit indicates that the number displayed is a MIDI Channel.

Use the ARROW buttons to select another MIDI Channel, number 2 for example, then press the PATCH button. This displays :-

```
0.0
```

where the dot on the left digit of the display indicates that the number displayed is a Patch number.

Patch 00 will produce no sound, and confirms that this MIDI Channel is turned off at the moment.

Use the ARROW keys to select a Patch between 01 and 99 to play on this Channel.

Play some notes on your MIDI controller, and you will hear the Patch you just selected on MIDI Channel 2. Remember to change the MIDI Channel you are transmitting from your MIDI controller to 2, or you will still hear the Patch you last selected on Channel 1.

You can assign a Patch to each of the 16 MIDI Channels in the same way, by selecting a Channel, and assigning a Patch to it as before, or assigning Patch 00 to turn off a MIDI Channel.

This is one of the most common operations you will perform with the MS800, by first selecting a MIDI Channel using the CHANNEL button and then the ARROW buttons, and then assigning a Patch to play on that Channel using the PATCH button, followed by the ARROW buttons again.

The Patches you assign can all be different, or all the same, or in any arrangement you like. In this way the MS800 can play multi-timbrally on different MIDI Channels.

We hope that many users will find all the sounds required are already stored in the memory of the MS800. In that instance, you need not concern yourself with most of the rest of this manual.

There follows a section on the Utility Functions, and after that, the MS800 Programming Guide.

If you wish to experiment and create some sounds of your own, first read the next two sections carefully, and try editing some sounds we've already made for you, before you attempt to create a Patch from scratch.

THE MS800 UTILITY FUNCTIONS

The Utility Functions are used for general facilities which affect the whole synthesizer. Functions 3 to 8 are explained below.

Functions 1,2,9 and 10 are Patch and Tone Edit functions used during sound Programming. They will be explained in the MS800 Programming Guide.

TO SELECT A FUNCTION

To select a Function, press the FUNCTION button on the front panel of the MS800.

Any notes you were playing are stopped while in Function mode, and the last selected Function is displayed as shown below :-

```
0. 1.
```
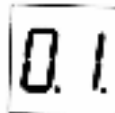
Both dots in the LED display are lit to show that it is a Function which may now be selected, rather than a Patch or a MIDI channel.

You can use the ARROW buttons to select Functions between 1 and 10.

Functions 1,2,9 and 10 are Patch and Tone Edit functions used during sound Programming. They will be explained in the MS800 Programming Guide.
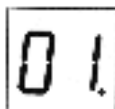
Select Function 3.

When you have selected the Function you require, press the ENTER button.

FUNCTION 3   **VELOCITY ON/OFF**   **Range 00 or 01**

00 = VELOCITY SENSITIVITY OFF.
01 = VELOCITY SENSITIVITY ON.

The display shows :-

```
0 1.
```

The right dot is on to signify editing a Function.
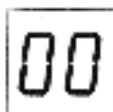
Use the ARROW buttons to select Velocity Sensitivity on or off for the MS800.

The default setting is 01 (ON).

With the Velocity Sensitivity turned off, the MS800 will not respond to MIDI Velocity data, and all notes played will be of the same loudness, regardless of the information received from your MIDI controller.

If your MIDI controller is not Velocity Sensitive, try both settings. One may produce a larger signal at the outputs of the MS800.

Once you have selected the setting you require for this function, press the ENTER button, and the display will show :-

```
00
```

The MS800 is returned to Play mode, and may now play notes again as before.

To select another sound, first press the CHANNEL button and select the MIDI Channel you require using the ARROW buttons as before, and then press the PATCH button followed by the ARROW buttons to select the Patch you require as before.

To select another Function, press the FUNCTION button as before, and use the ARROW buttons to select the.Function you require.

00 = MIDI OVERFLOW OFF
01 - MIDI OVERFLOW ON

One excellent feature of the MS800 is the MIDI overflow function. If this function is set to ON,   and all voices are busy being played, and additional notes over the number the MS800 can play at one time are re-transmitted via the MIDI OUT socket to a second MS800 synthesizer module.   In this way, two MS800'S can produce up to 30 note polyphony when the first is set to MIDI overflow. Three MS800's gives up to 45 note polyphony. Imagine additional MS800's connected to produce a monster set-up capable of playing dozens of notes and dozens of different sounds simultaneously.   This can be reality if you get some more MS800's, and because of the MS800's affordable price, you needn't upset your bank manager.

Normally, with this Function turned off, when all voices are being used, any additional notes played will cause the earliest note to be stopped, and the voice(s) re-assigned to the most recent note you have just played. This is Last Note Priority.

The MS800 can play a maximum of 15 notes at any one instant. Depending on the Patch however, the number of different notes playable at any one time will vary according to the Patch you have selected, as many Patches use more than one voice for each note, giving lesser available polyphony.

The display shows :-

```
 ___  ___
|   ||   |
| | || | |
|_|_||_|_|.
```
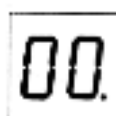
and the right dot is on to signify you are editing a Function.

Use the ARROW buttons to select MIDI overflow on or off for the MS800.

The default setting is 00 (OFF).

Once you have selected the setting you require for this function, press the ENTER button, the MS800 will return to Play mode and the display will show :-

```
 ___  ___
|   ||   |
| | || | |
|_|_||_|_|
```

FUNCTION 5   **PITCH BEND**   **RANGE 00 TO 24**

00 = NO PITCH BEND
24 = MAX PITCH BEND

Use this parameter to control the effect of your MIDI controllers pitch bend wheel on the pitch of the MS800. This is the amount of bend when the wheel is moved to its greatest extent, in semitones.

When set to 24, the pitch bend wheel will bend the pitch of notes by two octaves at its full movement.

The default setting is 02.

Once you have selected the setting you require for this function, press the ENTER button, the MS800 will return to Play mode and the display will show :-

$$\boxed{00}$$

NOTE :   At the top end of the MS800's note range, the Pitch bend wheel will increase the pitch of a note, up to but not beyond the pitch of the highest note which may normally be played. At the very top note in the MS800's note range, no Pitch bend upwards will occur, but Pitch bending down from the highest normal note will have the usual effect.

FUNCTION 6   **MIDI SYSTEM EXCLUSIVE SAVE**

Select this Function to dump the contents of the MS800 RAM via the MIDI OUT to another MS800 or to a MIDI data storage device.

Select Function 6 as before, and when you are ready to transmit the data, press the ENTER button.

As soon as you press the ENTER button, the MIDI data will be transmitted, and once it is complete,

```
33.
```

is displayed to show that the dump has finished.

Press the ENTER button, the MS800 will return to Play mode and the display will show :-

```
00
```

FUNCTION 7   **MIDI SYSTEM EXCLUSIVE LOAD**

Select this function when you wish to load a new selection of RAM sounds via the MIDI IN socket, into the MS800. The new sounds will overwrite the existing sounds in RAM.

Select Function 7.

Press the ENTER key only when you are ready to load the MIDI data.
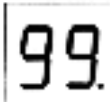
Once receiving the data, the display will show rapidly changing numbers, until all the MIDI data has been sent.

The display will show

```
00
```

to confirm that the data has been received successfully.

If the data was not received successfully,

```
99.
```

will be displayed. Check your connections, and try again.

If you need to escape from this function once you have pressed the ENTER button to load the MIDI data, switch the MS800 off.

Otherwise, press the ENTER button, the MS800 will return to Play mode and the display will show :-

```
00
```

FUNCTION 8   RESET

This function may be used to return all Utility Parameters, and each MIDI Channels' Patch assignments to their default settings.

Select Function 8.

Press the ENTER key.

The MS800 will return to Play mode and the display will show Patch 01 selected :-

```
0.1
```

Utility Functions 1, 2 9 and 10 are used during programming of the MS800.

Functions 1 and 2 are used to edit Patches and Tones respectively, and Functions 9 and 10 are used to copy Patches and Tones respectively, saving time when programming similar sounds.

MS800 VOICE ARCHITECTURE

Before explaining each function of the MS800's programming, here is some general information about the MS800 voice architecture.

The simplest sound which the MS800 can produce is a single waveform, played for as long as the note is held.

This is a very simple example of a Tone.

A Tone uses one of the 15 voices of the MS800 to be played.

More complex tones may be programmed on the MS800, allowing sequences of different waveforms to be played in succession, giving a dynamic sound with great movement.

Tones can be programmed to have many stages where the volume of the tone changes by separate and different amounts. Loops can be programmed to repeat a cycle of wave sequences and/or volume changes.

In order for you to hear a Tone, you must create a Patch which uses the Tone you have programmed.

A Patch which uses just one Tone will be 15 note polyphonic.

Patches can be programmed to have more than one Tone for each note, and each Tone can be different, allowing rich Tone combinations to be programmed into a Patch.

The more Tones used in a Patch though, the less polyphony will be available, as each Tone requires a voice to play it. Thus a Patch which uses three Tones (as shown in the diagram over page) will be 5 note polyphonic. A Patch which uses 14 Tones will be monophonic.

In a Patch, you can assign the Output number for a Tone and can choose to detune a Tone in relation to another Tone in the Patch.

You can assign a different velocity curve to each Tone within a Patch, balance the volume levels between each Tone within a Patch, and transpose Tones in relation to other Tones within a Patch.
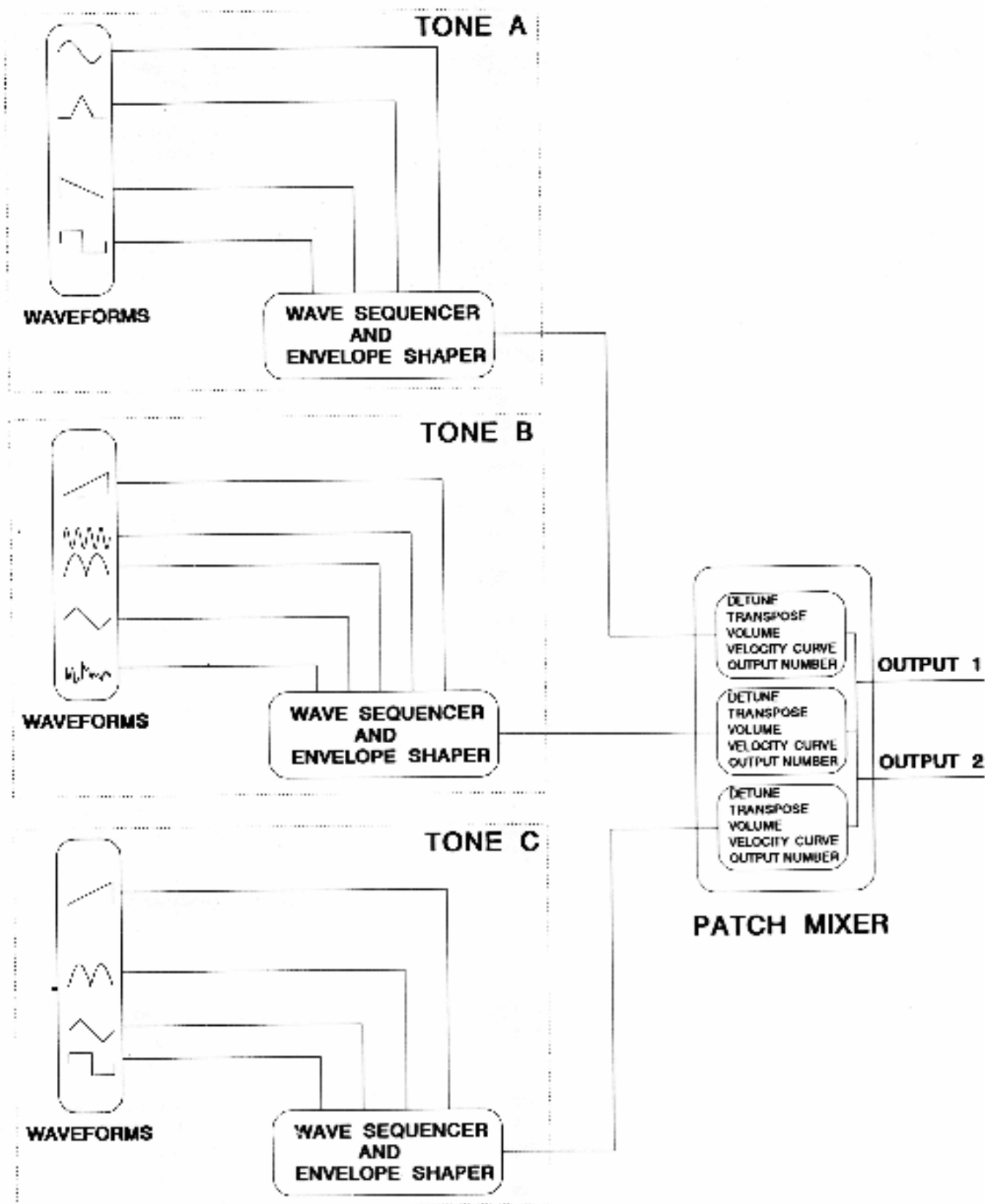
FUNCTION 1   **PATCH EDIT**

Select Patch 31 on MIDI Channel 1, as explained previously.

Then select Function 1, and press the ENTER button once.

The display shows :-

$$0.0$$

The dot by the left digit in the display when using Function 1 indicates that a Parameter number is being displayed. In this case Parameter 00 is the Parameter being displayed.

On the MS800, the Patch being edited is automatically the one on the MIDI Channel which was last selected.
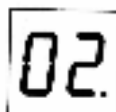
At this point, you may use the ARROW buttons to proceed directly to the Parameter you wish to edit within Patch 31.

Patch 31 has 13 Parameters programmed.

Different patches can have more or less Parameters programmed, according to how many Tones are used in the Patch.

In this case, select Parameter 00 to be edited.

When you have selected the Parameter number you wish to edit, press the ENTER button again, the display will show :-

$$02.$$

The dot by the right digit in the display when using Function 1 indicates that a Value is being displayed. In this case a Value of 2 for Parameter 00 is being displayed.

At this point you have four possible options of how to proceed.

OPTION 1

Use the ARROW buttons to change the Value of Parameter 00 and then return to Play mode by pressing the ENTER button, allowing you to hear the change you have made.

This is possible within RAM Patches, but not within ROM Patches such as this one, which we are using for illustration only, and precisely because the Values cannot be changed here accidentally by you.

ROM Patches can be copied into RAM Patch locations however, and this will allow Value changes to be made. How to do this will be explained in Functions 9 and 10.

OPTION 2

Press the NEXT PARAM button to display the Value of the next Parameter in Patch 31. This can be repeated for as many times as there are different Parameters within the Patch you have selected. This allows you to see the Value of each Parameter, as you step through the Patch.

If you wished to change any of the Values displayed (in a RAM Patch), you could use the ARROW buttons here to do so, and then return to Play mode by pressing the ENTER button, allowing you to hear the change you made.

As we are in a ROM Patch, remember that the Values cannot be changed.

OPTION 3

Press the PARAM button to select directly with the ARROW buttons, the Parameter number which you wish to edit, and then press ENTER to display the Value of the Parameter you have selected.

You could then use the ARROW buttons to change the Value of the Parameter (within a RAM Patch), and then return to Play mode by pressing the ENTER button, allowing you to hear the change you have made, or repeat OPTION 2 or 3 again.

As we are in a ROM Patch, remember that the Values cannot be changed.

OPTION 4

Return directly to Play mode by pressing the ENTER button, without changing or editing anything.

THE PATCH EDIT PARAMETERS

Now it is time to explain each of the Patch Edit Parameters individually.

PARAMETER 00   Number of Tones used in this Patch   Range 1 to 14

This has a direct effect on the number of subsequent Parameters which make up the Patch, and the Polyphony available for this Patch, as explained earlier.

For each Tone used in a Patch there are six related Parameters, so in a simple Patch using just one Tone, Parameters 0 to 6 will be specified, and these relate to that Tone. These other Parameters will be explained after the explanation of this one. In a more complex Patch using three Tones, Parameters 0 to 18 will be specified, Parameters 1 to 6 relating to the 1st Tone used, Parameters 7 to 12 relating to the 2nd Tone, and Parameters 13 to 18 relating to the 3rd Tone.

In a Patch which just uses one Tone, Parameters higher than Parameter 6 may still be accessed and edited, but they will have NO effect on the sound of the patch. Parameter 0 tells the MS800 exactly how many other Parameters it needs to use, and any other Parameters are ignored.

PARAMETER 01   Output Number for 1st Tone used   Range 1 or 2

This Parameter specifies the Output socket number for the 1st Tone used in this Patch. If the Patch uses more than one Tone, then you can put subsequent Tones on the other output, giving a stereo effect.

PARAMETER 02   Detune for 1st Tone   Range 0 to 15

```
0  = MAX NEGATIVE DETUNE
8  = NO DETUNE
15 = MAX POSITIVE DETUNE
```

With this Parameter you can adjust the pitch of a Tone by a slight amount to be sharp or flat relative to the pitch of another Tone used in the same Patch. This creates a very pleasant chorus type effect due to the beat frequency produced when both Tones are used. Smaller Values generally produce the most pleasant effect.

PARAMETER 03   Velocity Curve for 1st Tone   **Range 0 to 3**

0 = No Velocity response
1 = /
2 = /
3 = \

Use this Parameter to specify the way you wish velocity data to affect the volume of the Tone when a note is played.

Setting 0 has no velocity response.

Setting 1 increases the volume of this Tone linearly with increasing velocity.

Setting 2 increases the volume of this Tone more gradually at first, and then more rapidly with increasing velocity, when compared to Setting 1.

Setting 3 decreases the volume of this Tone linearly with increasing velocity. This setting is useful in Multi-Tone Patches for programming Velocity Cross-fades between Tones.

With a Tone on setting 3, and a second Tone on setting 1, gentle notes will have the first Tone louder than the second, and as you play notes with greater velocity, the first Tone will become quieter than the second Tone.

Some adjustment of the Volume settings for individual Tones may be required, to achieve a successful Cross-fade.

PARAMETER 04   Volume for 1st Tone   **Range 00 to 99**

00 = No Volume Attenuation
49 = Max Volume Attenuation
50 = Max Volume Gain
99 = Min Volume Gain

You may use this Parameter to adjust the levels of Tones relative to each other, by reducing the volume of each Tone independently. If you wish to reduce the loudness of this 1st Tone, increase the level of Attenuation in this Parameter above 00.

PARAMETER 05   Transpose of 1st Tone   **Range 00 to 99**

00 = CENTRE TUNE
01 = +1 SEMITONE
49 = +49 SEMITONES
50 = -1 SEMITONE
99 = -49 SEMITONE

This Parameter allows the pitch of this Tone to be adjusted by up to semitones from the centre frequency, in semitone steps.

PARAMETER 06　　　　**Tone Number of 1st Tone**　　　　**Range 01 to 99**

This Parameter is where you choose the Tone Number to be used as the 1st Tone in this Patch. The previous five Parameters refer to this Tone Number.

In a more complex Patch using three Tones, Parameters 7 to 18 will need to be specified, Parameters 7 to 12 relating to the 2nd Tone used, and Parameters 13 to 18 relating to the 3rd Tone.

The number of Parameters in a Patch depends directly on the number of Tones you want to use.

Remember, even if you program the Parameters for additional Tones, if you don't change the Value of Parameter 00 to correspond with how many Tones you are using, you won't hear the extra Tones.

Also, if you change Parameter 00 to have a higher number of Tones than you have programmed Parameters for, you may get some strange results.

PARAMETER MATRIX

When programming a Patch using many Tones, it may help you to refer to this matrix which will tell you which Parameter is which in a Multi-Tone Patch.

The Numbers in the matrix are the Parameter numbers for each Tone used in a Multi-Tone Patch.

For example, to change the Velocity Curve of the 5th Tone in a Multi-Tone Patch, you would need to change Parameter 27.

No. of Tones Used = Parameter 00

PARAMETER	TONE USED IN PATCH													
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th
Output Number	01	07	13	19	25	31	37	43	49	55	61	67	73	79
Detune	02	08	14	20	26	32	38	44	50	56	62	68	74	80
Vel Curve	03	09	15	21	27	33	39	45	51	57	63	69	75	81
Volume	04	10	16	22	28	34	40	46	52	58	64	70	76	82
Transpose	05	11	17	23	29	35	41	47	53	59	65	71	77	82
Tone Number	06	12	18	24	30	36	42	48	54	60	66	72	78	84

RAM PATCH 51

RAM Patch 51 is shown below to illustrate the way in which the Parameters are used.

PARAMETER	VALUE	MEANING
00	02	TWO TONES USED IN THIS PATCH
01	01	OUTPUT NUMBER FOR FIRST TONE
02	06	DETUNE FOR FIRST TONE
03	01	VELOCITY CURVE FOR FIRST TONE
04	00	VOLUME FOR FIRST TONE
05	00	TRANSPOSE FOR FIRST TONE
06	12	TONE NUMBER FOR FIRST TONE
07	02	OUTPUT NUMBER FOR SECOND TONE
08	10	DETUNE FOR SECOND TONE
09	01	VELOCITY CURVE FOR SECOND TONE
10	00	VOLUME FOR SECOND TONE
11	00	TRANSPOSE FOR SECOND TONE
12	14	TONE NUMBER FOR SECOND TONE

Now that you have seen the way a Patch is programmed on the MS800, try editing some of the RAM Patches, which are numbered 51 to 99. Start off with some of the simpler ones between 81 and 99, and start by substituting different Tones for the ones already used. Then change other parameters as you become familiar with the effect of each one in turn.

NOTE :   You can also use Tones which are used in the ROM Patches 01-50 within your RAM Patches.

The RAM Memory of the MS800 is arranged so that different Patches can have greater or fewer Tones used in them.

RAM Patches 51 to 54 can have up to 14 Tones used, and have the most Parameters available for programming. RAM Patches 81 to 99 however can have just two Tones used in them, and therefore have fewer available parameters to be used in programming. As a result you will not be able to program Patches 81 to 99 to use more than two Tones.

The number of Tones which may be used in the RAM Patches is arranged as follows :-

RAM Patch No.	Max No. of Tones	No. of Parameters Available
51 - 54	14	85
55 - 60	7	43
61 - 70	5	31
71 - 80	3	19
81 - 99	2	13

Once you have become familiar with editing and creating your own Patches, you will be ready to start programming your own Tones to use in them.

FUNCTION 2   TONE EDIT

As mentioned previously, the simplest Tone which the MS800 can produce is a single waveform, played for as long as the note is held.

This is a very simple Tone.

Each Tone uses one of the 15 voices of the MS800 to be played.

More complex Tones may be programmed on the MS800, allowing sequences of different waveforms to be played in succession, giving a dynamic sound with great movement.

Tones can be programmed to have many stages where the volume of the Tone changes by separate and different amounts. Loops can be programmed to repeat a cycle of wave sequences and/or volume changes.

In order for you to hear a Tone, you must create a Patch which uses the Tone you have programmed.

In this Function, you can edit and program Tones to suit your individual taste.

Select Patch 91 on MIDI Channel 1, in the usual way.

Then select Function 2, and press the ENTER button once to display :-

$$0 \, 1.$$

The dot by the right digit in the display when using Function 2 indicates that a Tone number is being displayed. In this case Tone 01 is the Tone being displayed.

Use the ARROW buttons to select the Tone you wish to edit.

NOTE :   At this point it is worth reminding you that as any of the 99 Patches in the MS800 can use combinations of any of 99 different Tones, remember that to hear any of the changes you make to a Tone when you return to Play mode, make sure you have selected a Patch which actually uses the Tone you have just been editing.

It is very easy to forget to first select a Patch which uses the Tone you are editing or Programming.

Also, remember that individual Tones can be and are used in many different Patches, and so a change to a Tone can have an effect on more Patches which use that Tone, than you may at first appreciate.

Patch 91 uses just one Tone, which is Tone 41, so select 41 using the ARROW buttons, and then press ENTER. The display shows :-

```
0.0
```

The dot by the left digit in the display when using Function 2 indicates that a Parameter number is being displayed. In this case Parameter 0 is the Parameter being displayed.

At this point, you may use the ARROW buttons to proceed directly to the Parameter you wish to edit within Tone 41.

Tone 41 has 10 Parameters programmed.

Different Tones can have more or less Parameters programmed, according to how complex the Tone is, and/or up to the maximum number of Parameters which may be programmed into the particular Tone selected. This varies in a similar way to the Patches, with different Tone memories having different numbers of Parameters available for programming.

Select Parameter 00 to be edited.

When you have selected the Parameter number you wish to edit, press the ENTER button again. The display shows :-

```
00.
```

The dot by the right digit in the display when using Function 2 indicates that a Value is being displayed. In this case a Value of 0 for Parameter 00 is being displayed.

At this point you have the same four possible options of how to proceed as you had in Patch Edit.

OPTION 1.

Use the ARROW buttons to change the Value of Parameter 00 and then return to Play mode by pressing the ENTER button, allowing you to hear the change you have made.

ROM Tones cannot be changed.

ROM Tones can be copied into RAM Tone locations however, and this will allow Value changes to be made. How to do this will be explained in Functions 9 and 10.

OPTION 2.

Press the NEXT PARAM button to display the Value of the next Parameter in Tone 41. This can be repeated for as many times as there are different Parameters within the Tone you have selected. This allows you to see the Value of each Parameter, as you step through the Tone.

If you wished to change any of the Values displayed, you could use the ARROW buttons here to do so, and then return to Play mode by pressing the ENTER button, allowing you to hear the change you made.

Values in a ROM Tone cannot be changed remember, unless you copy the ROM Tone into a RAM location. How to do this is explained in the next section.

OPTION 3.

Press the PARAM button to select directly with the ARROW buttons, the Parameter number which you wish to edit, and then press ENTER to display the Value of the Parameter you have selected.

You could then use the ARROW buttons to change the Value of the Parameter, and then return to Play mode by pressing the ENTER button, allowing you to hear the change you have made, or repeat OPTION 2 or 3 again.

If editing a ROM Tone, remember the Values cannot be changed.

OPTION 4.

Return directly to Play mode by pressing the ENTER button, without changing or editing anything.

THE TONE EDIT PARAMETERS

Now it is time to explain each of the Tone Edit Parameters individually.

PARAMETER 00   Initial Volume Attenuation/Gain for Tone   Range 00 to 99

00 = No Initial Volume Attenuation or Gain
01 = Min Initial Volume Attenuation
49 = Max Initial Volume Attenuation
50 = Max Initial Volume Gain
99 = Min Initial Volume Gain

You may use this parameter to adjust the level of the Tone when the note is started, by refusing the initial volume of the Tone. If you wish the Tone to begin quietly, increase the level of Initial Attenuation in this parameter above 00.

PARAMETER 01   Parameter reserved for future expansion Value 7

This Parameter should be left at a setting of 7 at all times.

PARAMETER 02   Parameter to GOTO on Release of note   Range 00 to 99

This parameter defines the parameter number within the Tone which the MS800 will go to, at the point when the key is released.

As previously explained, the programming of a Tone on the MS800 allows as simple or as complex a series of parameters to be programmed as needed for the result you require. The number of parameters used in the Tone will vary according to the complexity of the Tone, and so will the parameter number which starts the release phase of the note.

In many instances, once the key is released, the Tone will simply be required to fade away. This can be programmed in subsequent parameters, and the parameter number which begins the release phase is defined here.

NOTE :   THE LAST PARAMETER VALUE YOU ENTER SHOULD BE 99, AS THIS
          SIGNIFIES THE END OF THE TONE. THIS SHOULD FOLLOW THE
          RELEASE PARAMETERS.

When programming a Tone from scratch, it will often be impossible to define the parameter to go to on release this early in the programming of the Tone, because you haven't really started programming it yet.

This doesn't matter, as long as you DO specify it before you attempt to HEAR the Tone you are creating. By all means come back to this parameter after you have finished programming the rest of the Tone. If you forget however, strange results may occur, and notes may hang on.

In many cases however, you will be programming simple Tones, for which this parameter can be defined in advance of programming the rest of the Tone.

PARAMETER 03   **Parameter reserved for future expansion Value 0.**

This Parameter should be left at a setting of 0 at all times.

PARAMETER 04   **First Waveform to play**   **Range 00 to 20**

In this parameter, you can choose the first waveform you want to hear in the Tone.

You can choose any waveform between 00 and 99.

Some higher waveform numbers will also produce sound, but will give inconsistent results across the note range when played. They may be useful for certain sounds at certain pitches, and it is certainly worth experimenting with out of range waveforms, which is why we mention this possibility. Some of the RAM and ROM Patches use waveform numbers above 20.

If your Tone only uses one waveform, this will be the only Parameter which specifies the waveform to be used.

Subsequent Parameters need then only be concerned with enveloping, as explained below.

If you wish to program a sequence of waves to be played, you will have to use additional subsequent Parameters to program your sequence, as explained below.

PARAMETER 05 AND ALL SUBSEQUENT PARAMETERS

0 - GOTO next Waveform, followed by Number of Next Waveform (Range 00 to 20), followed by Time duration of Cross-fade to the Next Waveform, in 60ths of a second (Range 1 to 99).

    or

1 = GOTO another Parameter, followed by Number of Parameter to go to (Range 0 to 99).

    - or

2 = Volume Attenuation/Gain, followed by the Size of Att/Gain step (0 to 99), followed by Time Duration before next Att/Gain step, in 60ths of a second (Range 1 to 99).

Once you have programmed the first waveform to be played, all subsequent Parameters are related to three possible choices of instruction.

In a simple Tone, a likely value for this Parameter may be 2.

A value of 2 programmed here will tell the MS800 that a volume change is about to be programmed, and that the subsequent two Parameters programmed after this Parameter will be related to this volume change instruction.

The volume change can be either an attenuation of the volume level, or a gain in the volume level.

This is programmed in the first related Parameter, which immediately follows.

This first related Parameter determines the size of step in the volume change, and the range is as previously explained in Parameter 0, from 00 to 99, with -ve and +ve settings assigned as before.

The second Parameter which follows, determines the Time Duration before repeating the volume change step, until the minimum or maximum volume level is reached.

To achieve a smooth, gradual volume change, ensure that the Step value is small. The Time Duration will determine if the change occurs quickly or slowly, so for long decays or attacks, a larger number for the Time Duration is required.

To achieve short decays or attacks, larger Step values combined with shorter Time durations will give more rapid volume changes. Once beyond a certain combination of Step size and Time duration, the rate of volume change may be sufficient to become audible in its own right, as a click. This is entirely normal.

So a simple, gradual attenuation programmed into a Tones list of Parameters would consist of a 2, followed by a 1, followed by another 1.

The next Parameter in this Tone could then be, as before, a 0, 1, or a 2 again.

Choosing another 2 would allow the volume to be raised back again, using the two subsequent related Parameters as before, with perhaps a larger gain Step each 60th of a second this time.

This could be a 2, followed by a 95, and then a 1.

In this way you could continue changing the volume of the Tone in different ways, until you have run out of available Parameters within the particular Tone you are using.

However, if you put a 1 instead of a 2 in the list of Parameters, then only the subsequent Parameter becomes relevant, and in a different way.

A 1 means GOTO another Parameter in the Tone, and the subsequent Parameter tells the MS800 which Parameter in the list to go to.

This allows loops of Parameters to be constructed, which will result in repeated sequences of events occuring.

Having played the first Waveform in Parameter 4, the MS800 will look to see what it is programmed to do next.

The MS800 will only play the waveform in Parameter 4 once, which will take a fraction of a second, unless it is instructed to play it again repeatedly, so that you may hear a sustained note.

So in Parameter 5, if you program a value of 1, and program a value of 4 in the subsequent Parameter 6, you will have programmed the MS800 to play the first Waveform you chose, and then to go and play it again, and then again, etc. etc. for ever.

This it will do, even if you release the note you are playing, unless you specified the Parameter to go to on release, and programmed a correct volume decrease for the release phase as explained earlier.

Loops around more complex Parameter instructions can produce a sequence of different waveforms to be played repeatedly by the MS800, using the other option of the three choices within the Tone Parameter list of values.

Choosing a 0 means GOTO the next Waveform.

The number of the Next Waveform (Range 00 to 20) is then specified in the Parameter immediately following the 0 just programmed.

This is then immediately followed by the next Parameter which specifies the Time duration of the Cross-fade to the Next Waveform, in 60ths of a second (Range 1 to 99).

When you have completed programming your wave change, the next Parameter could then be a 0, 1 or 2 as explained before, depending on how you wish the Tone to develop.

Using a series of waveform changes can produce a rich and complex sound character, which develops as you play the note.

Programming a loop around the wave sequence allows the sequence of wave changes to repeat, while some sounds may be preferable with the wave sequence just being played once during each note.

This is entirely up to you to program as you please.

Start your Tone programming as before, by first examining and editing some Tones already programmed in the MS800 until you get the hang of things.

RAM TONE 12

RAM Tone 12 is one of the Tones used by RAM Patch 51 (shown on page 20). The table below may help you in understanding just how the Tone Parameters make up a particular sound. If you select Patch 51, Tone 12 will play from Output 1.

NOTE :   Remember that if you only use Output 1, the signal from Output 2 will also be present (ie. L+R Mono), so to hear just Tone 12 at Output 1, both outputs must have a lead plugged in.

PARAMETER	VALUE	MEANING
00	89	INITIAL VOLUME FOR TONE
01	07	-------------- RESERVED ---------------
02	34	GOTO PARAMETER 34 ON NOTE RELEASE
03	00	-------------- RESERVED ---------------
04	15	WAVEFORM NUMBER

THE NEXT PARAMETER VALUE HAS ONE OF THREE OPTIONS, AND IS FOLLOWED BY EITHER 1 OR 2 OTHER PARAMETERS
(00 = GOTO NEXT WAVEFORM + WAVEFORM No. + CROSSFADE TIME)
(01 = GOTO PARAMETER + PARAMETER No.)
(02 = VOLUME CHANGE + VOLUME STEP SIZE + TIME DURATION OF EACH STEP)

05	00	GOTO NEXT WAVEFORM
06	00	WAVEFORM NUMBER 00
07	20	CROSFADE TIME = 20/60ths sec
08	00	GOTO NEXT WAVEFORM
09	21	WAVEFORM NUMBER 21
10	07	CROSSFADE TIME 7/60ths sec
11	00	GOTO NEXT WAVEFORM
12	22	WAVEFORM NUMBER 22
13	07	CROSSFADE TIME 7/60ths sec
14	00	GOTO NEXT WAVEFORM
15	18	WAVEFORM NUMBER 18
16	07	CROSSFADE TIME 7/60ths sec
17	00	GOTO NEXT WAVEFORM
18	22	WAVEFORM NUMBER 22
19	07	CROSSFADE TIME 7/60ths sec

PARAMETER	VALUE	MEANING
20	00	GOTO NEXT WAVEFORM
21	18	WAVEFORM NUMBER 18
22	07	CROSSFADE TIME 7/60ths sec
23	00	GOTO NEXT WAVEFORM
24	17	WAVEFORM NUMBER 17
25	07	CROSSFADE TIME 7/60ths sec
26	00	GOTO NEXT WAVEFORM
27	16	WAVEFORM NUMBER 16
28	07	CROSSFADE TIME 7/60ths sec
29	00	GOTO NEXT WAVEFORM
30	22	WAVEFORM NUMBER 22
31	07	CROSSFADE TIME 7/60ths sec
32	01	GOTO PARAMETER
33	08	LOOP TO PARAMETER 8 WHILE NOTE HELD

NOTE RELEASE PARAMETER

PARAMETER	VALUE	MEANING
34	02	VOLUME CHANGE
35	04	ATTENUATE VOLUME BY 4 EVERY STEP
36	01	TIME BETWEEN STEPS = 1/60th sec
37	99	END OF TONE

Now that you have seen the way a Tone is programmed on the MS800, try editing some of the RAM Tones, which are numbered 01 to 50. Start off with some of the simpler ones between 31 and 50, and start by substituting different waveforms for the ones already used. Then change other Parameters as you become familiar with the effect of each one in turn.

The RAM Memory of the MS800 is arranged so that different Tones can have greater or fewer Parameters used in them.

RAM Tones 1 to 10 have the most Parameters available for programming. RAM Tones 31 to 50 however can just have up to 20 Parameters used in them, and therefore have a lesser capacity for programming than Tones 1 to 30.

The number of Parameters which may be used in the RAM Tones is arranged as follows :-
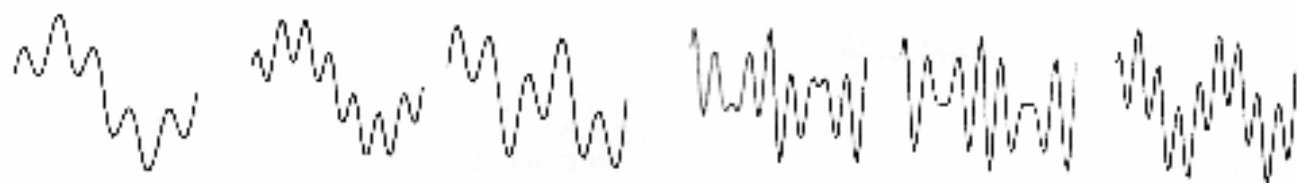
RAM Tone No.	Max No. of Parameters available.
1 - 10	60
11 - 20	40
21 - 30	30
31 - 50	20

Once you have become familiar with editing and creating your own Tones, you can start programming your own Patches to use them in.
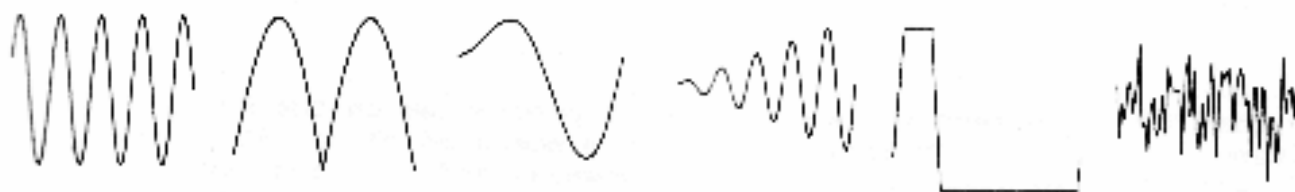
MS800 WAVEFORMS

Waveform 00   Waveform 01   Waveform 02   Waveform 03   Waveform 04   Waveform 05

Waveform 06   Waveform 07   Waveform 08   Waveform 09   Waveform 10   Waveform 11

Waveform 12   Waveform 13   Waveform 14   Waveform 15   Waveform 16   Waveform 17

Waveform 18   Waveform 19   Waveform 20

FUNCTION 9   **PATCH COPY**

This Function allows you to copy a Patch in the MS800 in either ROM
or RAM, to another RAM Patch memory location.

This is useful when Programming the MS800, to allow Patch data to be
modified without changing the original Patch.

Patches in the MS800 have different numbers of Parameters in them.

The RAM Memory of the MS800 is arranged so that different Patches can
have greater of fewer Parameters used in them.

RAM Patches 51 to 54 have the most Parameters available for
programming. RAM Patches 81 to 99 however can just have up to 13
Parameters used in them, and therefore have a lesser capacity for
programming than Patches 51 to 80.

The number of Parameters which may be used in the RAM Patches is
arranged as follows :-

RAM Patch No.	Max No. of Parameters Available
51 - 54	85
55 - 60	43
61 - 70	31
71 - 80	19
81 - 99	13

NOTE :   *It is impossible to copy a Patch with a larger number of
available Parameters into a Patch location with a smaller
number of available Parameters. You cannot copy Patch 2
into Patch location 17 for example.*

*However, it is of course possible to copy Patch 17 into
Patch location 2, as Patch 2 has a greater Parameter
capacity.*

To copy a Patch (ROM or RAM) into another RAM Patch location, select
Function 9, by pressing the Function button, and then selecting 09 by
using the Arrow buttons as before.

Press Enter, and the display shows the Patch number of the last Patch
you selected, and the dot in the right hand LED signifies that the
number displayed here is a Patch number.

This number is normally the Patch number you will wish to copy, as it
may be the one you have just been listening to or editing, but you
may use the Arrow buttons to change the number to any other Patch
number at this stage.

When you have selected the Patch number that you wish to copy, press
the Enter button.

The display will automatically display a Patch number one higher than you selected, as a suggestion for the new Patch location into which you may wish to copy the Patch you selected.

ROM Patches cannot be copied into ROM locations of course, so if copying a ROM Patch, select a RAM Patch using the Arrow buttons at this point.

Also remember that a larger Patch cannot be copied into a smaller Patch, even if not all of the available Parameters are programmed, so ensure a suitable RAM location to copy into using the table of sizes previously given. ROM Patches vary in size, and will need to be checked individually to see how many Parameters they contain.

Once you have selected a suitable new Patch location for the first Patch to be copied into, press the Enter button.

If the Patch copy was performed correctly, the MS800 will return to Play mode, and the display will show :-

$$\boxed{00}$$

If you selected a Patch location which was too small, or a ROM location for the first Patch to be copied into, the following will be displayed to show the Patch copy as not being successful :-

$$\boxed{99.}$$

Press the Enter button again to return the MS800 to Play mode, the display then showing :-

$$\boxed{00}$$

Repeat the Patch copy process, and select a suitably sized Patch location for the Patch copy this time.

FUNCTION 10   TONE COPY

As with Patch Copy, this Function allows you to copy a Tone in the MS800 in either ROM or RAM, to another RAM Tone memory location.

This is useful when Programming the MS800, to allow Tone data to be modified without changing the original Tone.

Tones in the MS800 have different numbers of Parameters in them.

As previously explained, the RAM Memory of the MS800 is arranged so that different Tones can have greater or fewer Parameters used in them.

RAM Tones 1 to 10 have the most Parameters available for programming. RAM Tones 31 to 50 however can just have up to 20 Parameters used in them, and therefore have a lesser capacity for programming than Tones 1 to 30.

The number of Parameters which may be used in the RAM Tones is arranged as follows :-

RAM Tone No.	Max No. of Parameters Available
1 - 10	60
11 - 20	40
21 - 30	30
31 - 50	20

NOTE :   *It is impossible to copy a Tone with a larger number of available Parameters into a Tone location with a smaller number of available Parameters.*

You cannot copy Tone 4 into Tone location 12 for example.

However, it is of course possible to copy Tone 12 into Tone location 4, as Tone 4 has a greater Parameter capacity.

To copy a Tone (ROM or RAM) into another RAM Tone location, select Function 10, by pressing the Function button, and then selecting 10 by using the Arrow buttons as before.

Press Enter, and the display shows the same Tone number as the Patch number you last selected, and the dot in the right hand LED signifies that the number displayed here is a Tone number.

Use the Arrow buttons to select the Tone number you wish to copy at this stage.

When you have selected the Tone number that you wish to copy, press the Enter button. The display will automatically display a Tone number one higher than you selected, as a suggestion for the new Tone location into which you may wish to copy the Tone you selected.

ROM Tones cannot be copied into ROM locations of course, so if copying a ROM Tone, select a RAM Tone using the Arrow buttons at this point.

Also remember that a larger Tone cannot be copied into a smaller Tone, even if not all of the available Parameters are programmed, so ensure a suitable RAM location to copy into using the table of sizes previously given. ROM Tones vary in size, and will need to be checked individually to see how many Parameters they contain.

Once you have selected a suitable new Tone location for the first Tone to be copied into, press the Enter button.

If the Tone copy was performed correctly, the MS800 will return to Play mode, and the display will show :-

If you selected a Tone location which was too small, the following will be displayed to show the Tone copy as not being successful :-

Press the Enter button again to return the MS800 to Play mode, the display then showing :-

Repeat the Tone copy process, and select a suitably sized Tone location for the Tone copy this time.

We sincerely hope that having battled through the programming of the MS800, you have not become familiar with the exceptional potential of this synthesizer.

Have fun programming, and if you create any superb Patches and Tones which you feel deserve to be appreciated by other MS800 buyers, send a MIDI System Exclusive Dump of them, on a disc, to us at CHEETAH, and if we also think that they are superb, you could be rewarded for your efforts. Try us!

MS800 MIDI IMPLEMENTATION CHART

FUNCTION	RECOGNISED ?	TRANSMITTED ?	NOTES
MODE	3 - YES 1,2,4 - NO		
BASIC CHANNEL	1 TO 16 - YES		
NOTE ON	0 TO 127 - YES	YES	
VELOCITY	NOTE ON 0 TO 127 - YES NOTE OFF - NO	YES	
AFTERTOUCH	CHANNEL - NO KEY - NO		
PITCH BEND	0 TO 24 SEMITONES - YES	YES	
CONTROL CHANGE	64 - YES	YES	SUSTAIN
PROGRAM CHANGE	1 TO 99 - YES	0 TO 127 - YES	
SYSTEM EXCLUSIVE	YES	YES	

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