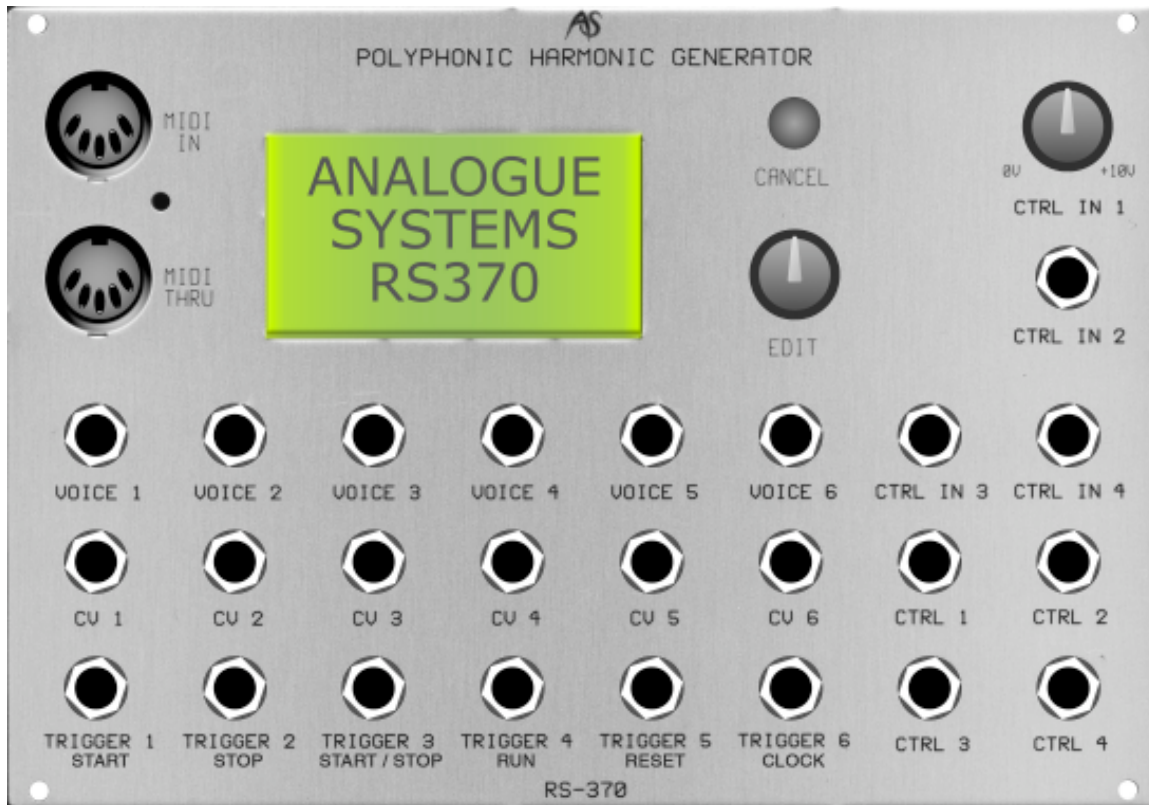




# RS370 V3.7

## POLYPHONIC HARMONIC GENERATOR



## INTRODUCTION


The RS370 v3 - which can be differentiated from its predecessor by the second line of annotation under the bottom row of sockets (START, STOP, START/STOP... and so on) is an updated version of the original RS370, with more facilities, a full implementation of wavetable synthesis, and an improved selection of factory sounds.

The principles of its operation are identical to those of the original RS370, but the menu structure is significantly enhanced, so this chapter describes its operation in full, rather than attempting to 'bolt on' the new menus and commands to the information contained in the previous chapter.

*Note: All versions of the RS370 can be upgraded to v3.x capabilities by a simple firmware update.*

## ABOUT WAVETABLE SYNTHESIS

Imagine creating dozens of similar waveforms and placing them in some sort of order in digital memory. Now imagine that you can tell a sound generator to use any one of these waveforms as the basis of a sound, or even to sweep backward and forward through the memory, using one waveform for a fraction of a second, and then the next, and then the next...



The memory that contains the waves is called a "wavetable", and when you create sounds by sweeping through the table, the result is called "wavetable synthesis". This has existed since the late 1970s, and reached its zenith in the mid-80s in the form of the PPG2.2, a synthesiser that delivered a whole new palette of brittle and glassy sounds that had never been heard before.

By adding fifteen new wavetables and menu 2.1.10 (Morph table) to the RS370, it has become a true wavetable synthesiser as well as an additive synthesiser, and is now capable of a huge range of PPG-esque sounds, and many more besides.

*Even if you have already owned and used an earlier version of this module, perhaps obtaining this version as a firmware upgrade, you should investigate the new capabilities thoroughly. The enhanced RS370 is a completely new synthesiser!*

## GETTING STARTED

You should hook up your RS370 so that you can obtain sound from it *before* you begin to experiment with the commands and controls described in this chapter. Follow the instructions below. This will help you to obtain a full grasp of the module as you work through the menus.

1. Read the "Introduction to the RS370 family" in the previous chapter, and as well as the general description of the module.
2. Read the section "Navigating the RS370" so that you know how to follow these instructions.
3. Connect a MIDI cable from the MIDI output of a controller keyboard to the MIDI In of the RS370.
4. Ensure that the MIDI Transmit channel of the keyboard is the same as the MIDI Receive channel of the RS370. (Menu 7.3.)
5. Connect the "VOICE 1" output to the input of a receiving device such as a mixer or the input to an audio amplifier.
6. Check that all six voices are being sent to the VOICE1 output by selecting "All outputs mixed" in menu 2.1.6 - Synthesiser / Voice outputs / Output mixing.
7. Select menu 1 (Copy from memory) and choose any of the patches that takes your fancy.
8. Play. If no sound is produced, check that the MIDI activity LED flashes as you the press keys on the MIDI keyboard, and that all the connections are correct.
9. Play. If you still have no output, ensure that you have not sent a MIDI CC#7 (Volume) = 0 to the RS370. This will silence the module, even if all other settings appear correct.
10. Play again.

When used in this way, the RS370 acts like any other 6-voice polyphonic synthesiser, generating and shaping up to six notes simultaneously.

*Note: Some of the factory patches are monophonic, so do not panic if your RS370 appears only to produce a single note. Select an alternative patch, and all should be well.*

## MODES

Before starting, it's important to understand that the RS370 offers four modes of operation, and that the menu structure may differ slightly depending on which mode is selected.

You can split the modes into two groups: *polyphonic*, and *real-time*:

- The two polyphonic modes allow you to play all six voices simultaneously, but neither allows you to modify the harmonic content of additive waveforms while playing.
- The two real-time modes allow you to modify the harmonic content of additive waveforms in real-time (hence the name) but you are restricted to just a single voice, thus transforming the RS370 into a monophonic synthesiser.

### THE MODES ARE:

#### Polyphonic MIDI

Polyphonic: The RS370 acts as a 6-voice polyphonic sound generator.  
MIDI: The RS370 also acts as a 6-channel MIDI/CV converter. The sockets marked CV1 to CV6 and TRIGGER1 to TRIGGER6 therefore become MIDI/CV outputs.

#### Polyphonic analogue

Polyphonic: The RS370 acts as a 6-voice polyphonic sound generator.  
Analogue: The sockets marked CV1 to CV6 and TRIGGER1 to TRIGGER6 become analogue inputs.

#### MIDI real-time

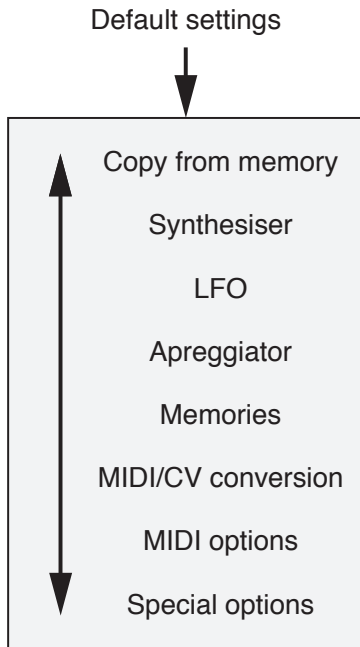
Real-time: The RS370 acts as a monophonic harmonic synthesiser with one voice comprising four oscillators. You can modulate the harmonic levels of a sound in real-time, immediately hearing the effect on the sound.  
MIDI: The RS370 also acts as a 6-channel MIDI/CV converter. The sockets marked CV1 to CV6 and TRIGGER1 to TRIGGER6 therefore become MIDI/CV outputs.

*Note: This mode is useful only when used in conjunction with the RS375 Expander.*

#### Analogue real-time

Real-time: The RS370 acts as a monophonic harmonic synthesiser with one voice comprising four oscillators. You can adjust the harmonic levels of a sound in real-time, immediately hearing the effect on the sound.  
Analogue: The CV 1 socket becomes a dedicated 1V/Oct pitch control input.

*Note: This mode is useful only when used in conjunction with the RS375 Expander.*



## NAVIGATING THE RS370

The RS370 is controlled by the menu displayed on its graphic LCD. This display is backlit to aid its use in darkened conditions.

- Navigate through the menu structure by **rotating** the EDIT knob.
- Select a menu by **pressing** the EDIT knob.
- Navigate through any menu by **rotating** the EDIT knob.
- Move "down" to select a sub-menu or list of options by **pressing** the EDIT knob.
- Alter a value by **rotating** the EDIT knob.
- Save a change (and, where appropriate, return to the previous level) by **pressing** the EDIT knob.
- Jump "up" a level by **pressing** CANCEL.
- Leave an option or parameter unchanged and return to the menu containing it by **pressing** CANCEL.

### Menu numbering

The menu hierarchy of the RS370 is quite extensive, so we rationalise it by thinking in terms of a major heading, followed by sub-menus, sub-sub-menus, and so on.

When you press one of the options in the start-up screen, you will enter one of the menus as follows:

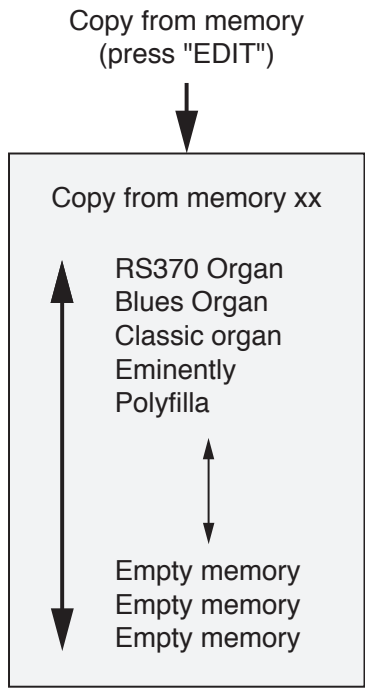
Menu 1:	Copy from memory
Menu 2:	Synthesiser
Menu 3:	LFO
Menu 4:	Arpeggiator
Menu 5:	Memories
Menu 6:	MIDI/CV conversion
Menu 7:	MIDI options
Menu 8:	Special options

In most cases you will now have the option to select further sub-menus that we refer to as "menu x.x".

For example, if you press EDIT to enter the "Synthesiser" menu, and then press EDIT again to select the "Voice outputs" sub-menu (which is the first item in the list), you enter menu 2.1. This in turn offers sub-sub menus, which are numbered 2.1.1... and so on.

### *A bit of advice...*

*The RS370 is a powerful module, so you may find it a little daunting at first. Nonetheless, it is remarkably simple to use once you have come to grips with the menu structures. Experiment freely, as this is the best way to learn the system. If you need help, please email Analogue Systems for support.*



**MENU 1: COPY FROM MEMORY**

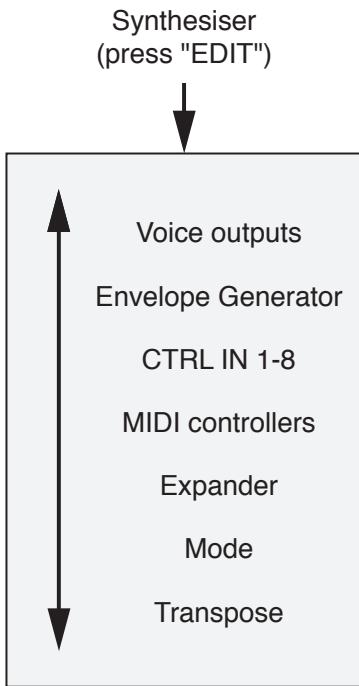
The RS370 offers forty-six patch memories, of which forty-three are populated by factory sounds. (The original RS370 had twenty-three factory sounds.) You can overwrite any memory. The instructions for doing so - plus options for all the other memory-related functions - are given in menu 5.

Menu 1 allows you to select any stored patch and load this into the edit buffer\*. When you do so, the patch name is displayed at the top of the screen.

The factory patches are:

- RS370 Organ
- Blues Organ
- Classic organ
- Eminently
- Polyfilla
- Golden Age
- OK Chorale
- Roller Coaster
- Nifty Pulse
- Touch Ensemble
- Expander
- Soft Lead
- Mutator
- Arplatch
- Saturn
- Chillout
- Repeater
- Modwheel Morph
- Morphing
- Hellbound
- Chimes
- Purity
- Won't get fooled
- Mr Solo
- Open Spaces
- Distant images
- StrangeDawnLight
- Metal Ticks
- Atractive Motion
- Metal Rings
- Shimmering light
- AT!Waves
- Glass Gallery
- Bellistica
- Heavy Machinery
- Robocrickets
- Hollow Fantasy
- Dark Void
- Harmonic Choir
- Space Choir
- Metal Junk Yard
- Moving Waves
- Sanctuary

**\* Important note:**  
All operations on a sound are carried out in the edit buffer. This is an area of memory that lies 'on top of' the patch storage system. Any changes made to the current sound are lost if not saved to a patch memory. However, this also means that, if you change a sound in ways that you do not like, you have not damaged the saved sound.



## MENU 2: SYNTHESISER

This menu provides access to the voicing of the synthesiser within the RS370, as well as to many of its control functions.

There are seven sub-menus:

Menu 2.1	Voice outputs
Menu 2.2	Envelope Generator
Menu 2.3	CTRL IN 1-8
Menu 2.4	MIDI Controllers
Menu 2.5	Expander
Menu 2.6	Mode
Menu 2.7	Transpose

### NOTES ABOUT SYNTHESISER CONTROLLERS

Menus 2.3.1 and 2.4.2 offer access to the internal destinations that you can modulate using external CVs and MIDI controllers. Most of these are self-explanatory, but be aware of the following:

- **Mixing controllers**

In short, you can't. If the value of a destination is subject to a CV CTRL IN, a MIDI controller or an LFO, you can't assign it as the destination of a second controller and mix the effect of the two. The second will always replace the first.

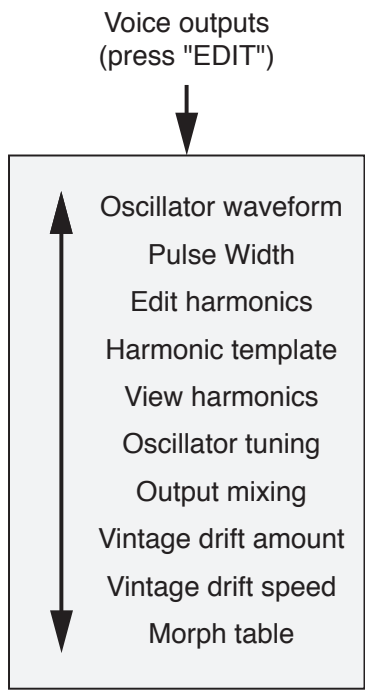
*Note: Controlled destinations are shown by a "!" preceding the destination name in the Controls lists.*

- **Fine Pitch 1 & 2 / Harm Wave Morph 1 & 2**

To overcome the above, the RS370 provides two Fine Pitch destinations that allow you to use two controllers to affect the pitch, and two Harm Wave Morph destinations to control the position in the wavetable. In each case, the operation of the two is identical.

- **Harmonic Wave Morph**

On the original RS370, this allowed you to sweep the synthesised waveform from a sine wave to a square wave and back again in an endless 'morphing' cycle. On the enhanced RS370, this facility has been expanded into true wavetable synthesis, allowing you to morph through sixteen complex wavetables, each containing 256 waveform variations, with full control over position plus the speed and depth of movement through the table.



### MENU 2.1: VOICE OUTPUTS

There are up to ten sub-menus accessed from menu 2.1. These are:

- Menu 2.1.1 Oscillators waveform
- Menu 2.1.2 Pulse Width
- Menu 2.1.3 Edit Harmonics
- Menu 2.1.4 Harmonic templates
- Menu 2.1.5 View harmonics
- Menu 2.1.6 Oscillator tuning
- Menu 2.1.7 Output mixing
- Menu 2.1.8 Vintage drift amount
- Menu 2.1.9 Vintage drift speed
- Menu 2.1.10 Morph table

The menu selection that appears is determined primarily by the MODE selected in menu 2.6, the waveform selected in menu 2.1.1, and the status of the RS375 Expander Control parameter in menu 2.5.1.

*Note: In v3.7 and above, the selection will also be modified by the selection of "Harm wave morph" as a modulation destination in the LFO control section, as a destination in the MIDI controllers section, or as a destination in the Synthesiser CTRL IN section.*

The options are:

- **MODE = Polyphonic MIDI or Polyphonic analogue**

- Menu 2.1.1 Oscillators waveform
- Menu 2.1.2 Pulse width (*Waveform = square*)
- Menu 2.1.3 Edit harmonics (*Waveform = synthesised*)
- Menu 2.1.4 Harmonic template (*Waveform = synthesised*)
- Menu 2.1.5 View harmonics (*LFO controls = Harm wave morph*)
- Menu 2.1.6 Oscillator tuning
- Menu 2.1.7 Output mixing
- Menu 2.1.8 Vintage drift amount
- Menu 2.1.9 Vintage drift speed
- Menu 2.1.10 Morph table

- **MODE = MIDI real-time or Analogue real-time**

- Menu 2.1.3 Edit harmonics (*Expander/Controls ≠ Harmonic levels*)
- Menu 2.1.4 Harmonic template (*Expander/Controls ≠ Harmonic levels*)
- Menu 2.1.5 View harmonics (*Expander/Controls = Harmonic levels*)
- Menu 2.1.6 Oscillator tuning
- Menu 2.1.7 Output mixing
- Menu 2.1.8 Vintage drift amount
- Menu 2.1.9 Vintage drift speed
- Menu 2.1.10 Morph table





**2.1.1 Oscillator waveform**

Select from four conventional synthesiser waveforms:

- sine wave
- triangle wave
- sawtooth wave
- square wave

The fifth option - "synthesised" - provides access to the additive synthesis engine, and makes menus 2.1.3 and 2.1.4 visible.

*Note: With "square" selected, the pulse width menu appears, and you are able to obtain pulse width modulation (PWM).*

**2.1.2 Pulse Width**

With the square wave selected in 2.1.1 you can determine the pulse width in the range 0 to 127.

A pulse width of 64 produces a square wave.

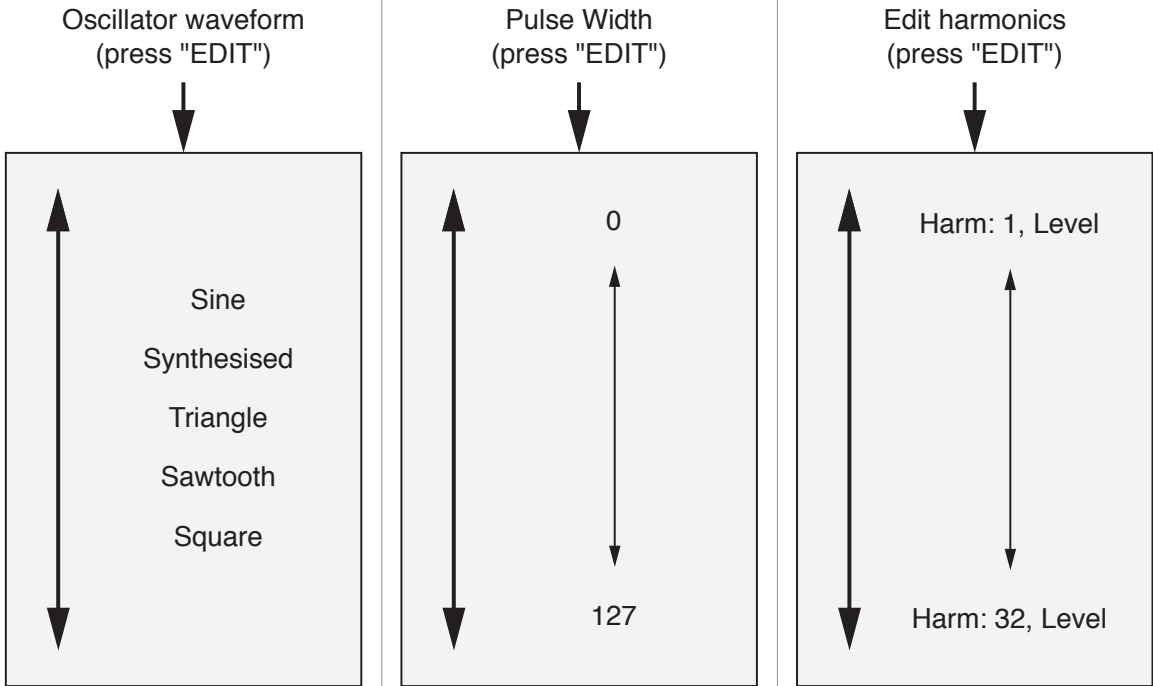
**2.1.3 Edit harmonics**

Use this to create new waveforms by selecting harmonics and assigning amplitudes to each.

• **Harmonic number**  
You may select harmonics in the range 1 to 32.

• **Amplitude**  
You may select amplitudes in the range -127 to +127. A negative amplitude denotes an harmonic with inverted phase (i.e. 180° out of phase with respect to an harmonic that has a positive amplitude).

As you create a new sound, the harmonic spectrum is displayed on the left of the screen, and the waveform is displayed on the right of the screen.

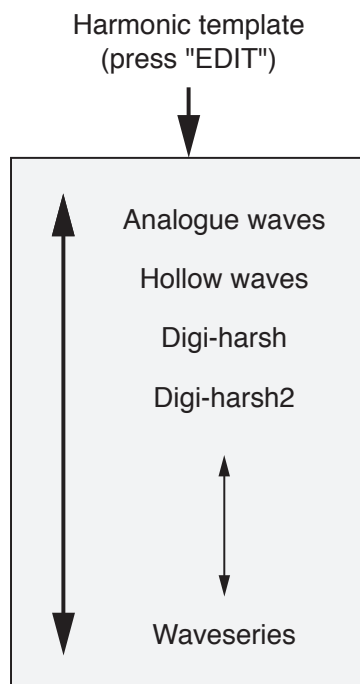


### 2.1.4 Harmonic template

Sixteen harmonic templates (wavetables) are provided. Each of these contains 256 variations.

The templates are:

- Analogue waves
- Hollow waves
- Digi-harsh
- Digi-harsh2
- Digitana
- Highpass waves
- Glass waves
- New waves
- Vocaloid
- Disharmonix
- Disharmonix 2
- ORGANoid
- ORGANoid2
- Xtremeharms
- Hollow waves 2
- Waveseries



Selecting any of the templates displays the harmonic content and the waveform of wave #1. You may now select one of 256 variations by rotating the EDIT knob to step forward and backward through the wavetable.

The wavetables are:

#### Analogue waves

- a selection of waveforms (sine, triangle, sawtooth and square) usually found at the outputs of analogue oscillators, and 'morphing' stages that lie between them.

#### Hollow waves 1 and 2

- waves with primarily low harmonic content. Good for synthesising 'darker' sounds, flutey sounds and sounds that use modified pulse waves

#### Digi-harsh 1 and 2

- the name speaks for itself; digital sounding waves with lots of harmonics for bright, buzzing sounds of all kinds.

#### Digitana

- even more nasty than the digi-harsh waves; appropriate for 'cutting' sounds.

#### Highpass waves

- waves with little low-harmonic content. As the wavetable progresses, some low end eventually appears.

#### Glass waves

- waves of a rather calmer nature. Good for crystal-type and vibe-like sounds.

#### New waves

- primarily waves reminiscent of electric pianos.

#### Vocaloid

- waves with a vocal quality; good for synthetic choirs and formant-based sounds.

#### Disharmonix 1 and 2

- wavetables containing waves whose fundamental pitch is not clear. Great for effects, digital crystals, telephone tones, and so on.

#### Organoid 1 and 2

- organ waves suitable for all kinds of church, pipe, electric and vintage organs.

#### Xtremeharms

- waves containing lone harmonics with high volumes. Use for harsh wavetable sounds.

#### Wave series

- harmonically rich waves; good for use with analogue filters.

*Selecting any of these inserts the waveform into the harmonic editor, whereupon you can modify it using menu 2.1.3.*

### 2.1.5 View harmonics

This is a visual aid to programming, particularly useful when creating new sounds using an RS375 Expander (if connected) to control the amplitudes of the harmonics. It provides a visual display in three parts:

- **Harmonic display**

The amplitudes of the first sixteen harmonics

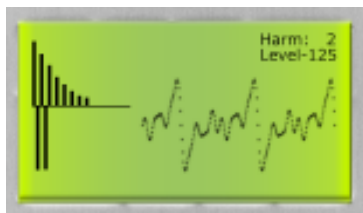
- **Waveform display**

The waveform generated by the first sixteen harmonics

- **Programming display**

The Harmonic number and Level of the harmonic most recently edited using the knobs on the RS375 Expander

*Note: This display is particularly useful for inspecting the changes introduced by Harm Wave Morph and other spectral modulations.*



### 2.1.6 Oscillator tuning

Every voice can comprise up to four oscillators. These all have the same waveform, but can be detuned with respect to one another to create lush textures.

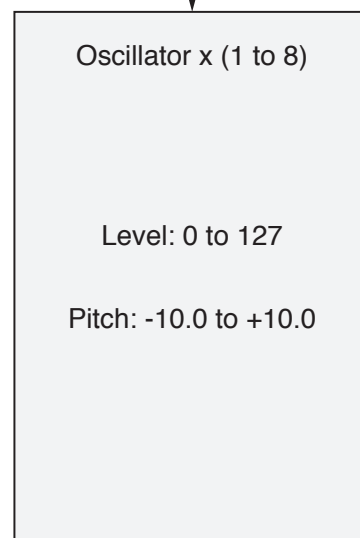
- **Level**

Each oscillator may have a level ranging from 0 (silence) to 127 (maximum)

- **Pitch**

Each oscillator can be detuned sharp or flat by approximately 10% (roughly a semitone in either direction).

Oscillator tuning  
(press "EDIT")



### 2.1.7 Output mixing

The RS370 provides six front panel outputs annotated as VOICE 1, VOICE 2 ... VOICE 6.

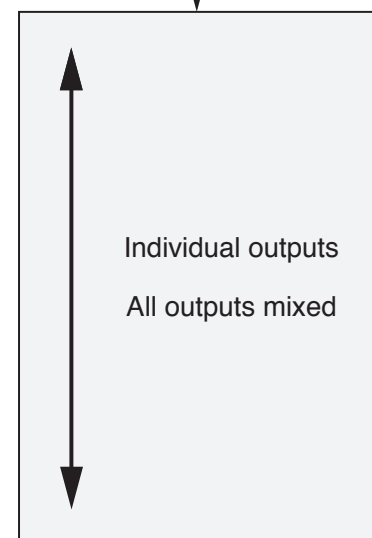
- **All outputs mixed**

To use the RS370 conventionally, with all voices accessible simultaneously from a single output, select "All outputs mixed". The full polyphony is then available from all six physical outputs.

- **Individual outputs**

There are occasions when it is useful to obtain individual voices from separate outputs, perhaps so that you can treat each of them differently using external effects units. To do so, select "Individual outputs", whereupon voice 1 will be available from the VOICE 1 output, voice 2 from the VOICE 2 output, and so on.

Output mixing  
(press "EDIT")



### 2.1.8 Vintage drift amount

If you wish the RS370 to emulate the oscillator drift of an analogue synthesiser, increase this parameter (which sets the maximum amount of drift) to taste.

*Note: This parameter does not cause the frequency of the note played to drift, but modifies the amount of detune of each oscillator around the 'correct' pitch. This thickens the sound and introduces analogue-style variations in the sound without causing notes to sound out-of-tune.*

Use the Vintage drift amount in conjunction with 2.1.9: Vintage drift speed.

### 2.1.9 Vintage drift speed

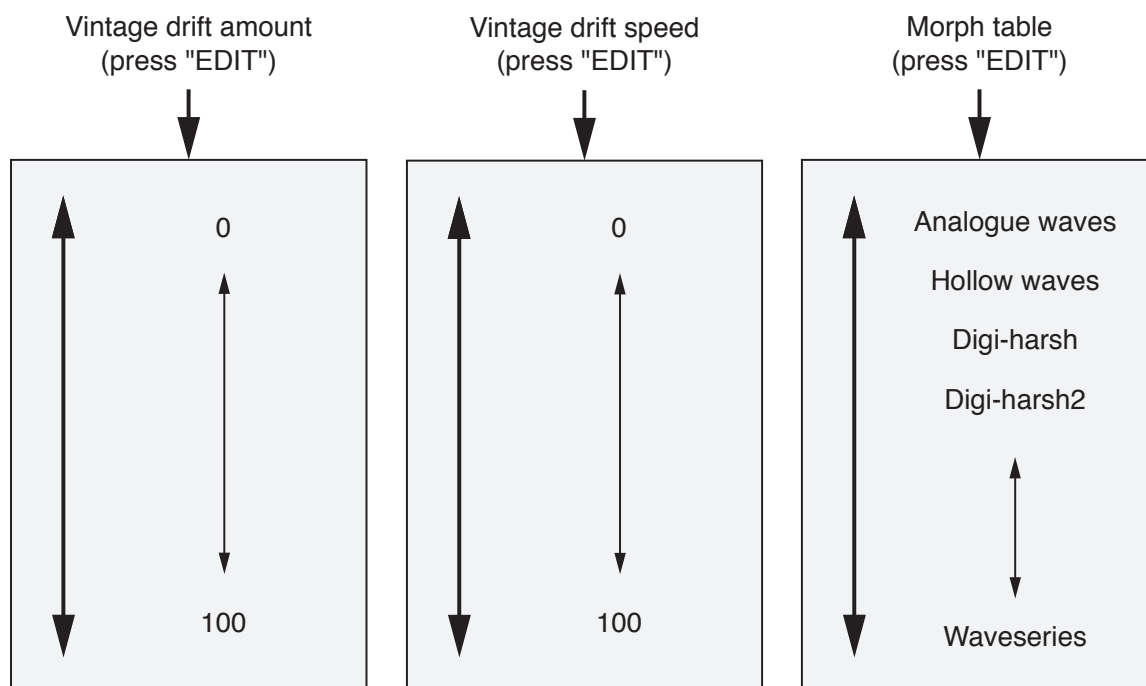
If you wish the RS370 to emulate the oscillator drift of an analogue synthesiser, increase this parameter (which sets the rate of drift) to taste.

Use the Vintage drift speed in conjunction with 2.1.8: Vintage drift amount.

### 2.1.10 Morph table

If any of (i) the LFOs, (ii) the MIDI controllers and/or (iii) the analogue CTRL inputs are set to "Harm wave morph", you can use these dynamically to change your position in the selected wavetable (Harmonic template).

For example, using an envelope to sweep the position within a wavetable produces many of the classic sounds of the PPG and its successors, while placing the position under the control of, say, a modulation wheel, allows you to control the timbre manually in ways that are not possible using more conventional methods of synthesis.



## MORE ON MORPHING:

If wavetable synthesis is new to you, the following examples should help:

### Modwheel Morph

This example demonstrates how you can use an external control (the modulation wheel) to change the sound by moving through the selected wavetable.

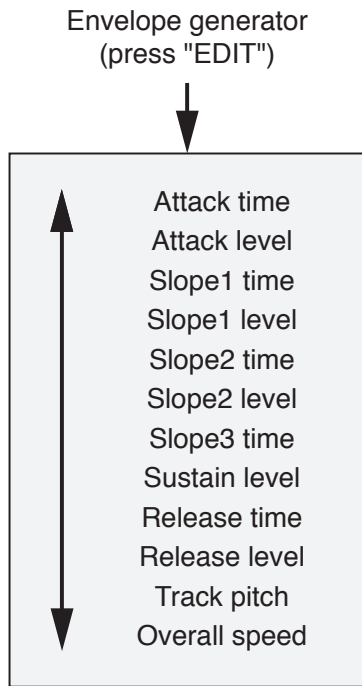
At the topmost menu level, select **Copy from memory**, press Edit, and then scroll down to patch #18, Modwheel Morph. Press Edit to select this. If you are controlling the RS370 using a MIDI controller keyboard of some sort, you will now be able to use its modulation wheel to move forward and backward through the table on which this sound is based. If you now select **Synthesiser** followed by **Voice outputs** and then **Morph table**, you will find that the "Analogue waves" table is selected. Moving the modulation wheel, you will find that, when fully toward you, the output sounds much like a sine wave, and when turned fully away from you, it is discernably a square wave. You can verify what is happening by selecting menu 2.1.5 "View harmonics" and observing the change in the waveform display as you move the modulation wheel.

### Morphing

This patch replaces human control (i.e. you, moving the mod wheel) with an LFO to sweep the waveform forward and backward through the table.

Return to the **Copy from memory** menu, and select patch #19, Morphing. If you investigate the menus, you will now find that LFO1 is assigned to the position in the wavetable, and that the modulation wheel is controlling the depth of LFO modulation within it. Hold a note and push the mod wheel fully away from yourself... the sound will exhibit a slow timbral sweep that would be quite impossible to obtain using a single waveform and conventional filtering. If you now navigate to the LFO section and the **LFO1 gain** menu, you can change the amount of gain (i.e. the range of the sweep) from zero to 127, and in **LFO1 speed** its rate from 0.05Hz to 12.80Hz. Experiment with these to learn how the LFO can be used to affect the nature of the wavetable "morph".

Once you have mastered these examples, you should consider other ways to position the sound in the wavetable and morph through it. Appropriate methods include using the output from an RS200 sequencer applied to an analogue CV input, applying the envelopes (internal and external), and applying all manner of MIDI controllers.



## MENU 2.2: ENVELOPE GENERATOR

Unlike analogue envelope generators, which are usually limited to four steps, the RS370's six, digitally generated envelope generators each offer six steps.

Each of the five Levels and each of the five Times can assume values in the range 0 to 127. What's more, there is no restriction that states that the Attack level must be the highest level, or that the Slope 2 level must be lower than the Slope 1 level... and so on. This means that the RS370 envelope generators are far more flexible than conventional ADSRs.

Two further parameters - *Track pitch* and *Overall speed* - affect the overall response of the contour determined by the other envelope parameters.

**The Envelope parameters**

- Attack time
- Attack level
  
- Slope 1 time
- Slope 1 level
  
- Slope 2 time
- Slope 2 level
  
- Slope 3 time
- Sustain level
  
- Release time
- Release level

All envelope parameters have a range of 0 to 127.

**• Track pitch - YES/NO**

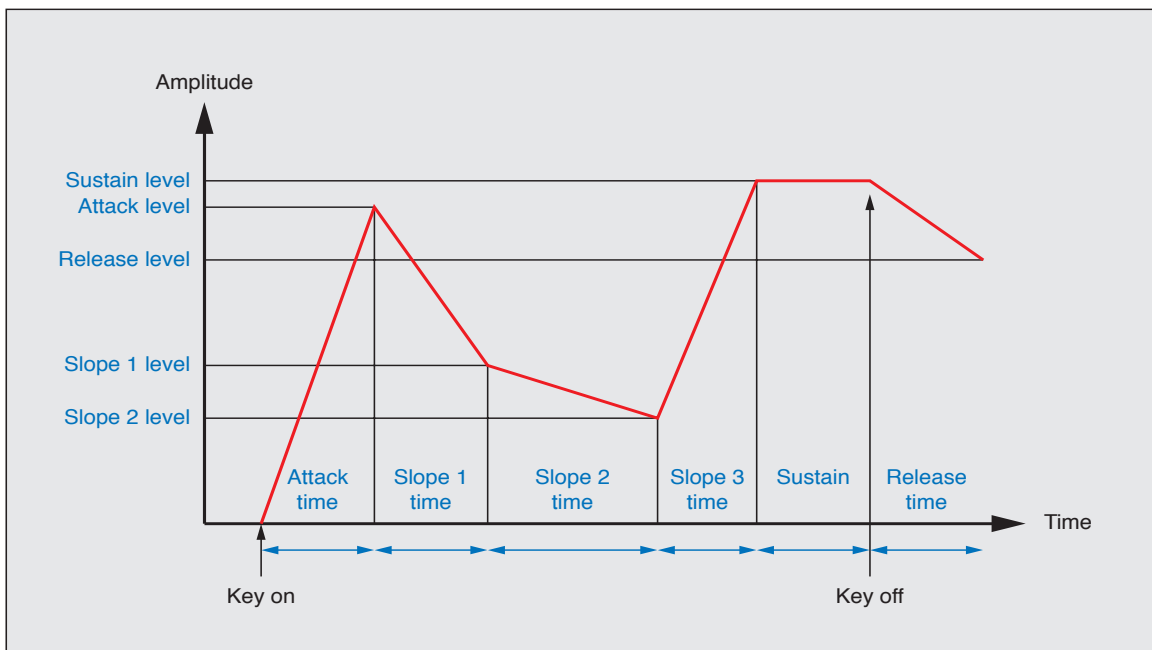
When set to "YES" this will cause the speed of the contour to increase by a factor of two (i.e. to double) for each octave that you play up the keyboard. This imitates the responses of acoustic instruments.

**• Overall speed - 0 to 127**

Once you have defined an envelope, you can affect its overall execution speed. Higher values increase the contour rate; lower values decrease it.

This parameter only has effect if Track pitch = NO.

*Note: The relationship between the Overall speed value and the contour rate is approximately a doubling of the rate for an increase of 10 in the parameter value. This means that the total range is a little under "two to the power of thirteen", which is approximately a factor of 8,000.*



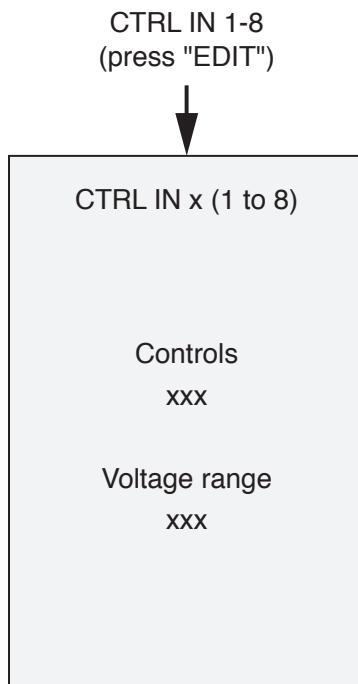
## MENU 2.3: CTRL IN X

The RS370 offers four CV controllers that you can route to a variety of destinations.

CTRL IN 1 is a knob, whereas CTRL IN 2, 3 and 4 are sockets.

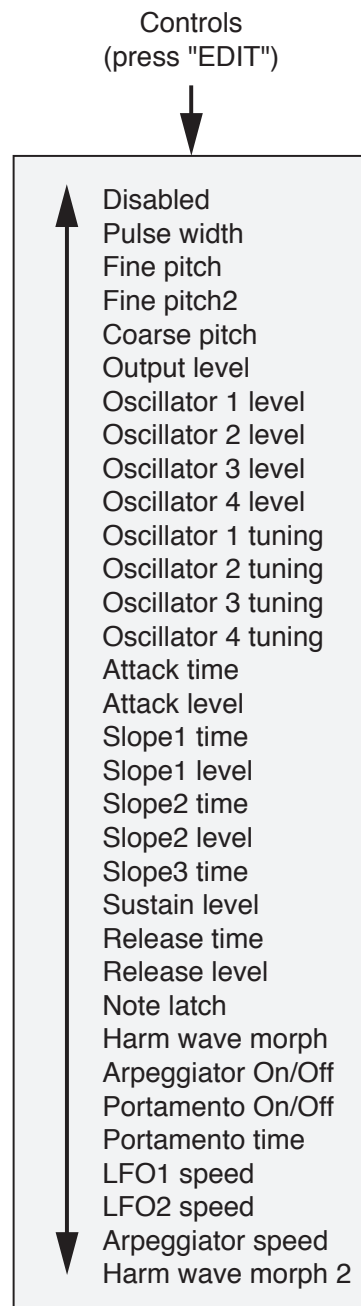
Menu 2.3 allows you to assign the destination controlled by the knob and the inputs. It also allows you individually to select the voltage range expected by each of CTRL IN 2, 3 and 4.

*Note: A further four CV input sockets - CTRL IN 5 to 8 - are provided by the RS375 and RS376 Expanders.*



### 2.3.1 Controls

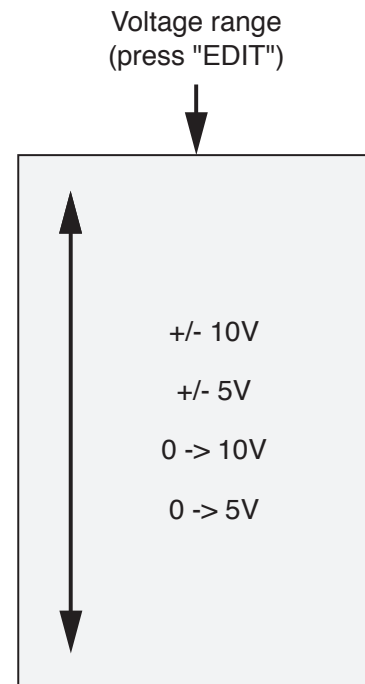
There are thirty-two destinations, and each CV controller can affect one at a time. Use the "Controls" menu to determine the destination for each.



### 2.3.2 Voltage range

Select the appropriate range individually for each CV input. The options are:

- -10V to +10V
- -5V to +5V
- 0V to +10V
- 0V to +5V



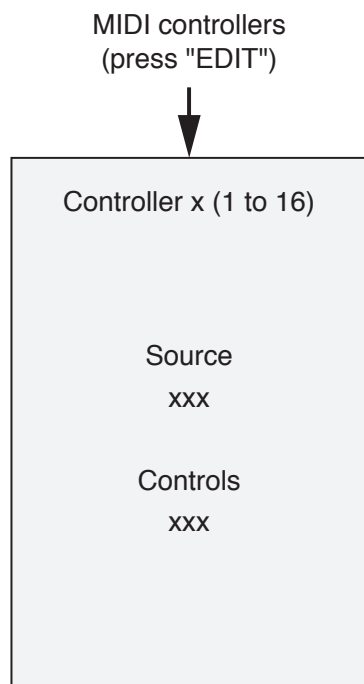


## MENU 2.4: CONTROLLER X

You can further control the RS370 using up to sixteen simultaneous MIDI controllers.

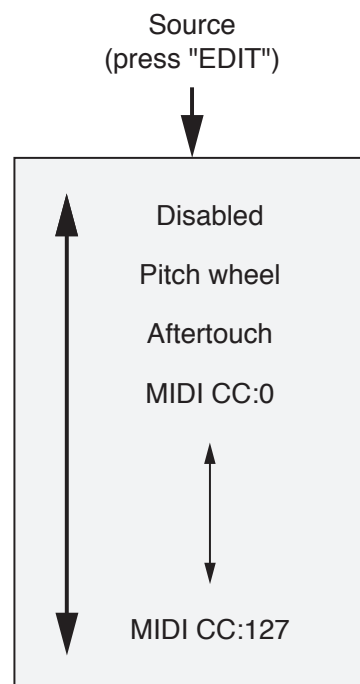
Menu 2.4 allows you to assign the source of each controller, and the destination controlled by each.

*Note: If you use multiple sources, each destination must be unique.*



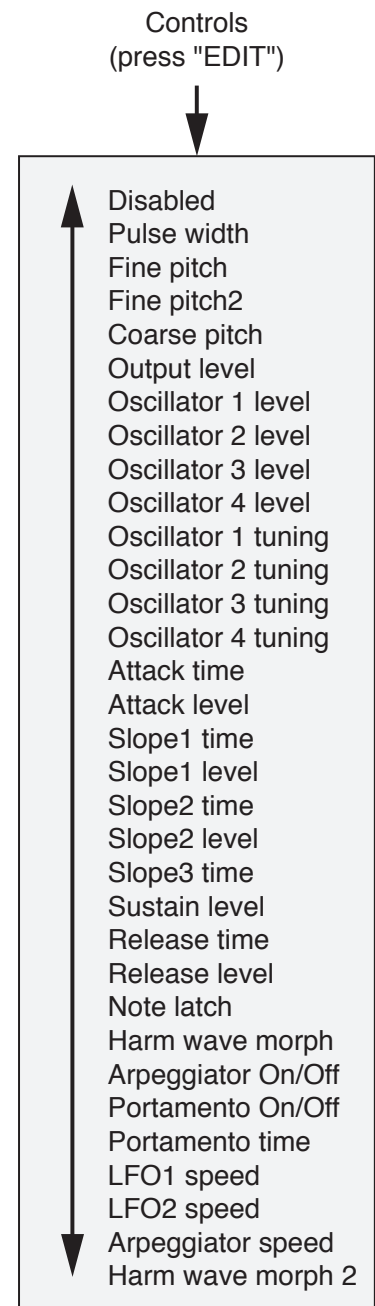
### 2.4.1 Source

There are 130 MIDI control sources. Select one for each controller that you wish to use.

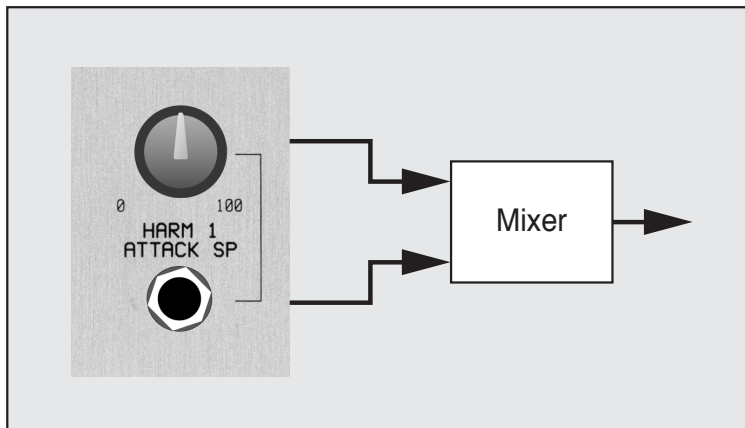


### 2.4.2 Controls

There are thirty internal destinations. Select one for each controller that you wish to use.



## THE RS375 HARMONIC GENERATOR EXPANDER



The RS375 Harmonic Generator Expander adds sixteen control knobs, twenty CV inputs, and four CV outputs to the RS370.

Four of the CV inputs - those marked CTRL IN 5 to CTRL IN 8 - are not affected by menu 2.5, so we will not discuss them here. Likewise, the four outputs - marked CTRL 5 to CTRL 8 - are not affected by menu 2.5, and are covered elsewhere.

The sixteen knobs and sixteen CV inputs controlled by menu 2.5 are arranged in pairs called HARM 1, HARM 2... up to HARM 16As you can see from the diagram above, each knob/input combination is linked by a CV mixer unique to that pair. Each knob produces a CV in the range  $\pm 10V$ , and this is mixed (summed) with any CV applied to the associated CV input.

This combination of manual and remote control is very flexible. If menu 2.5 is set to "Envelope Generator", you can set up each stage of the EG using the first ten knobs, and then modulate every time and level using external CV sources. Alternatively, if menu 2.5 is set to "Harmonic levels" (an option that is only available in MIDI real-time and Analogue real-time modes) you can set the amplitudes of the first sixteen harmonics using the knobs, and then modulate each amplitude using external CVs. This degree of control is unique to the RS370/RS375 combination, and offers myriad possibilities such as modulating each component in the harmonic spectrum using LFOs, EGs, sequencers and manual controllers such as joysticks.

## MENU 2.5: EXPANDER

Select the sub-menus to determine what is controlled by the Expander's knobs and inputs, and what voltage range is used.

### 2.5.1 Controls

The sixteen knobs and their associated CV inputs can control two sets of parameters:

- **Envelope Generator**

Knobs 1 to 10 control the ten contour shape parameters in the Envelope Generator. (See menu 2.2.) You can modulate these parameters by applying CVs to the ten associated CV inputs.

- **Harmonic Levels (real-time modes only)**

Knobs 1 to 16 control the first sixteen harmonics. (See menu 2.1.3.) You can modulate these parameters by applying CVs to the ten associated CV inputs.

- **Nothing**

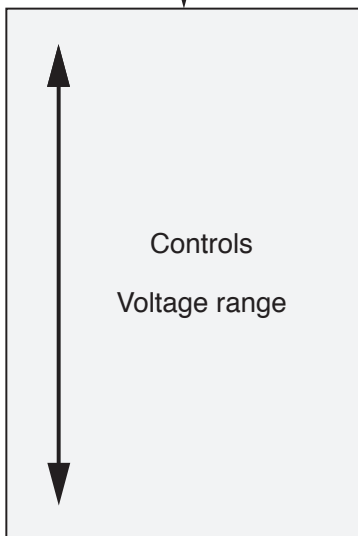
The knobs and CV inputs are defeated, and have no effect on the RS370.

### 2.5.2 Voltage Range

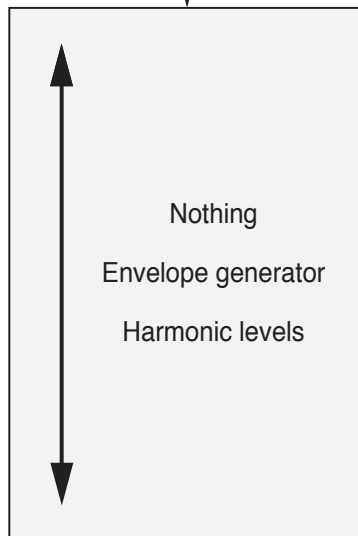
This sets the range of voltages accepted by the upper sixteen input sockets on the RS375. The options are:

- -10V to +10V
- -5V to +5V
- 0V to +10V
- 0V to +5V

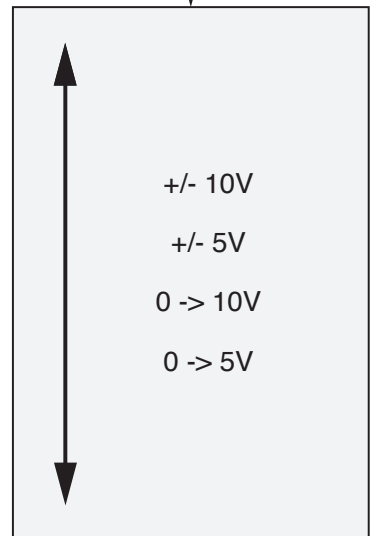
Expander  
(press "EDIT")

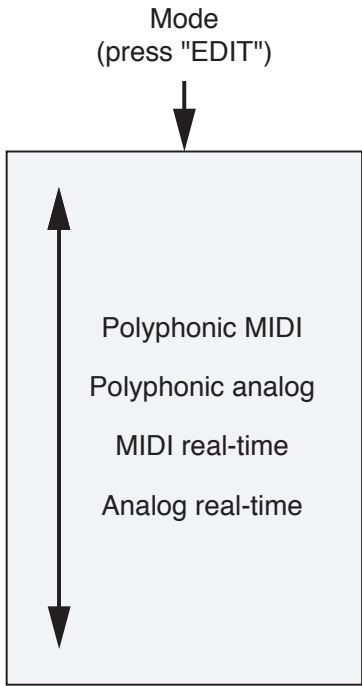


Controls  
(press "EDIT")



Voltage range  
(press "EDIT")





**MENU 2.6: MODE**

The RS370 offers four modes of operation as follows.

• **Polyphonic MIDI**

**Polyphonic:** The RS370 acts as a 6-voice polyphonic sound generator.  
**MIDI:** The RS370 also acts as a 6-channel MIDI/CV converter (see menu 6). The sockets marked CV1 to CV6 and TRIGGER1 to TRIGGER6 become MIDI/CV outputs.

• **Polyphonic analogue**

**Polyphonic:** The RS370 acts as a 6-voice polyphonic sound generator.  
**Analogue:** The sockets marked CV1 to CV6 and TRIGGER1 to TRIGGER6 become analogue inputs.

• **MIDI real-time**

**Real-time:** The RS370 acts as a monophonic harmonic synthesiser with one voice comprising four oscillators. You can modulate the harmonic levels of a sound in real-time, immediately hearing the effect on the sound.  
**MIDI:** The RS370 also acts as a 6-channel MIDI/CV converter (see menu 6). The sockets marked CV1 to CV6 and TRIGGER1 to TRIGGER6 become MIDI/CV outputs.

*Note:* This mode is useful only when used in conjunction with the RS375 Expander.

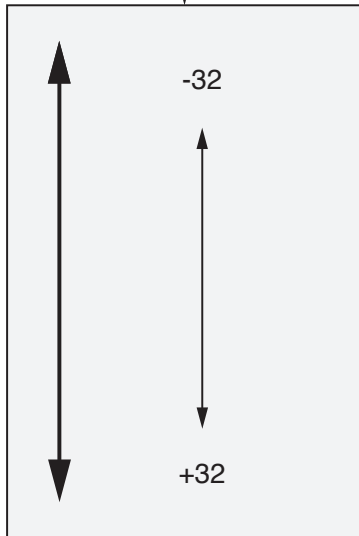
• **Analogue real-time**

**Real-time:** The RS370 acts as a monophonic harmonic synthesiser with one voice comprising four oscillators. You can adjust the harmonic levels of a sound in real-time, immediately hearing the effect on the sound.  
**Analogue:** The CV 1 socket becomes a dedicated 1V/Oct pitch control input.

*Note:* This mode is useful only when used in conjunction with the RS375 Expander.

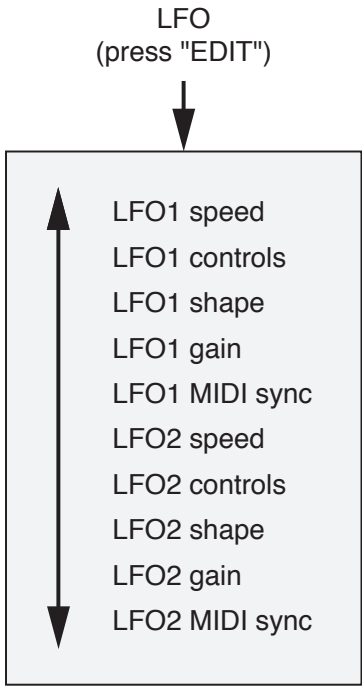


Transpose  
(press "EDIT")



## MENU 2.7: TRANSPOSE

You may transpose the output of the RS370 by  $\pm 32$  semitones.

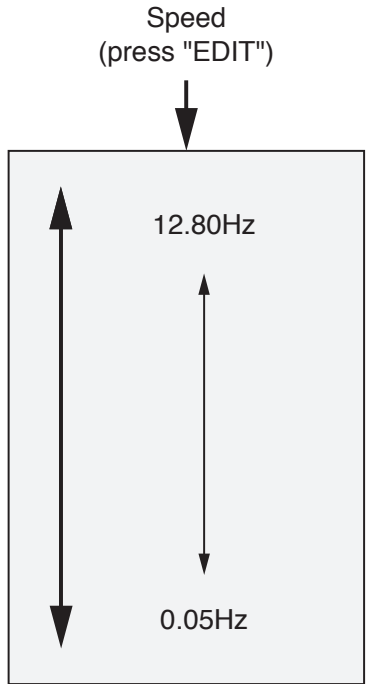


**MENU 3: LFO**

The LFO menu provides access to the shape, rate, amplitude, destination and MIDI sync (if any) of the two LFOs provided within the RS370.

**MENU 3.1: SPEED**

Adjust the LFO speed from 0.05Hz (one cycle every twenty seconds) to 12.80Hz.

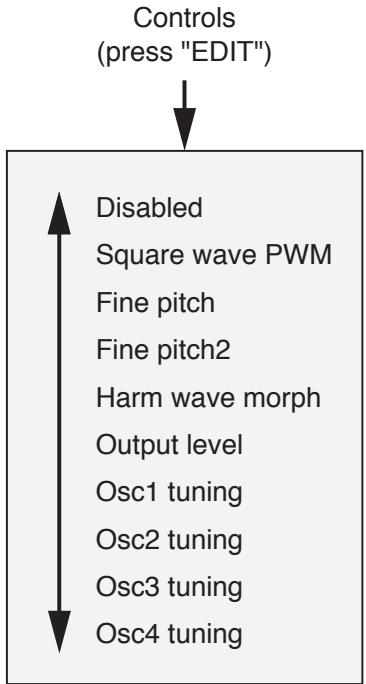


**MENU 3.2: CONTROLS**

Select from nine destinations (i.e. the parameter that will be modulated by the LFO) or "off". The destinations are:

- **Square wave PWM**  
This recreates the classic PWM sound of analogue synthesisers.
  
- Note: The square wave must be selected in menu 2.1.1.*
  
- **Fine pitch & fine pitch2**  
Adjusts the pitch by up to ±4 semitones (a major 3rd).
  
- **Harm wave morph**  
Sweep the output wave position in a wavetable to create PPG-type sounds.

**Osc 'n' tuning**  
Independently modulate the pitch of an oscillator.

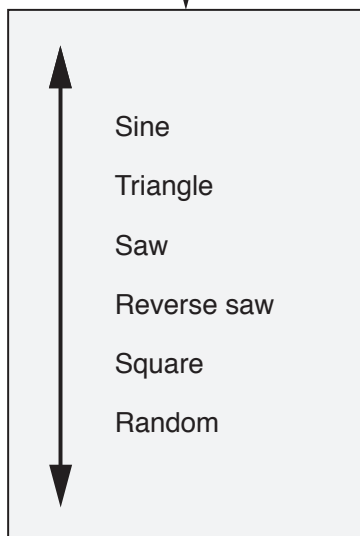


### MENU 3.3: SHAPE

Select from six LFO waveshapes:

- Sine wave
- Triangle wave
- Sawtooth wave
- Reverse saw (ramp) wave
- Square wave
- Random

Shape  
(press "EDIT")



### MENU 3.4: GAIN

You may control the LFO amplitude dynamically using the mod wheel or aftertouch, or set it to a fixed value.

- **Mod Wheel**

Control the LFO amplitude using the modulation wheel of a MIDI keyboard. (Requires appropriate settings in menu 7.)

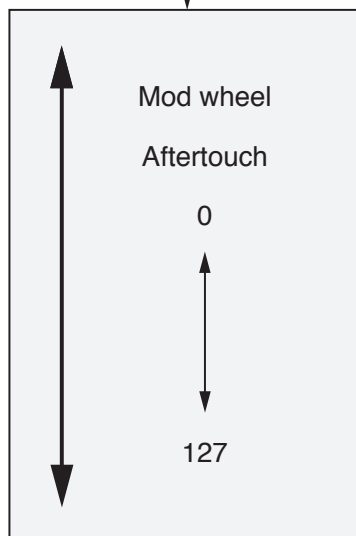
- **Aftertouch**

Control the LFO amplitude using MIDI aftertouch. (Requires appropriate settings in menu 7.)

- **0 to 127**

Set the LFO amplitude to a fixed value in the range 0 to 127.

Gain  
(press "EDIT")

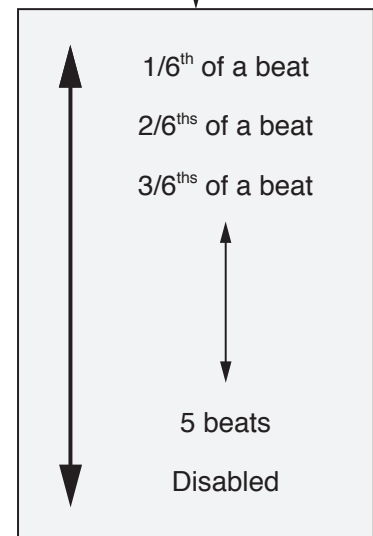


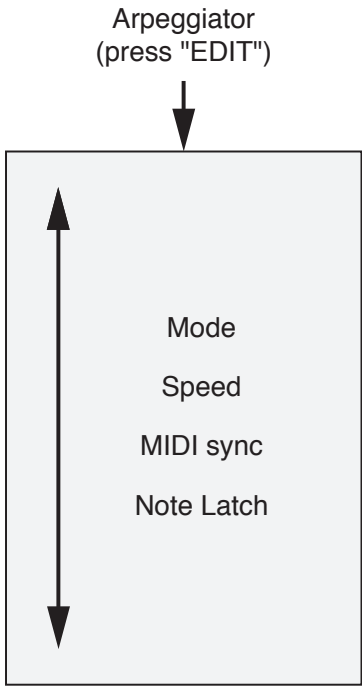
### MENU 3.5: MIDI SYNC

You can synchronise the LFO to MIDI clock, with thirty options ranging from one LFO cycle every 1/6 of a beat, to one LFO cycle every five beats.

When not using MIDI sync, set this parameter to "Disabled". If you do not do so, the LFO will fail to operate when no MIDI clock is detected.

MIDI Sync  
(press "EDIT")





**MENU 4: ARPEGGIATOR**

The RS370 provides a simple monophonic arpeggiator with multiple modes, MIDI sync, and Hold functions.

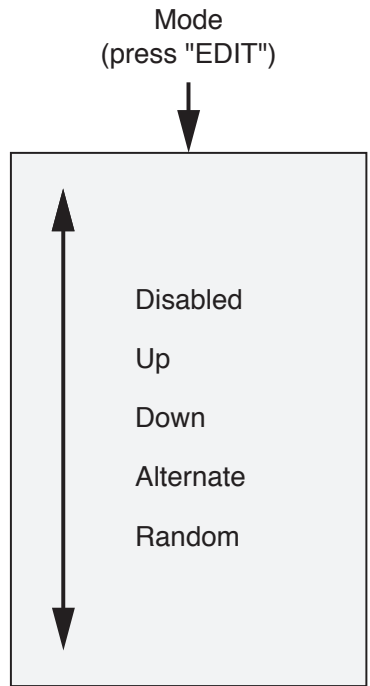
The arpeggiator uses the notes played by the MIDI controller keyboard, and does not extend the sequence over multiple octaves.

**MENU 4.1: MODE**

Select from one of four arpeggiator modes, or "off":

- Up
- Down
- Alternate
- Random

If you do not wish to arpeggiate your sounds, select "Disabled" in this menu.





#### MENU 4.2: SPEED

The arpeggiator will run at rates from 2.825Hz (a little under three notes per second) to 10.101Hz (a little over ten notes per second).

#### MENU 4.3: MIDI SYNC

You can synchronise the arpeggiator to MIDI clock, with thirty options ranging from one note every 1/6 of a beat, to one note every five beats.

When not using MIDI sync, set this parameter to "Disabled". If you do not do so, the arpeggiator will fail to operate when no MIDI clock is detected.

#### MENU 4.4: LATCH

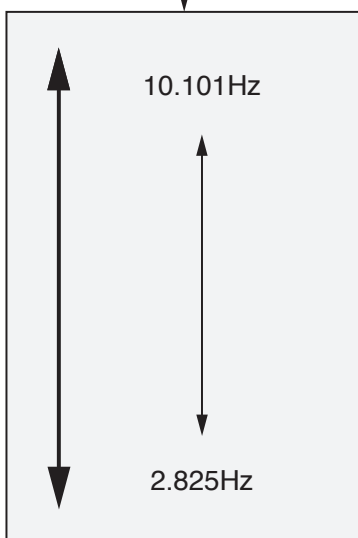
Any notes being played and arpeggiated will be held when you select "Note latch".

You may also select Note latch before you have played any notes. The RS370 will then wait for you to play some notes, and will hold these until the latch is cancelled.

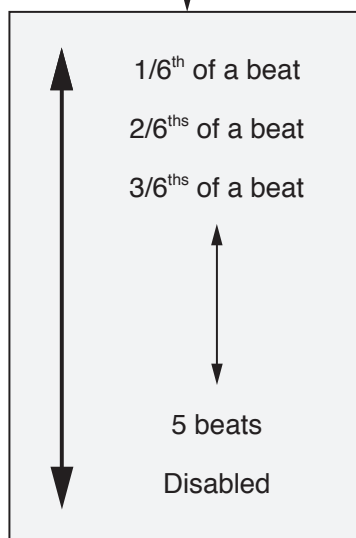
To release the latch but remain in the Note latch menu, press the EDIT knob. A further press of the EDIT knob will then latch the notes again.

To release the latch and to leave this sub-menu, press CANCEL.

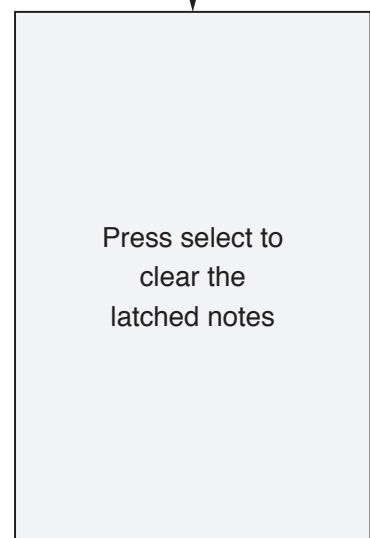
Speed  
(press "EDIT")

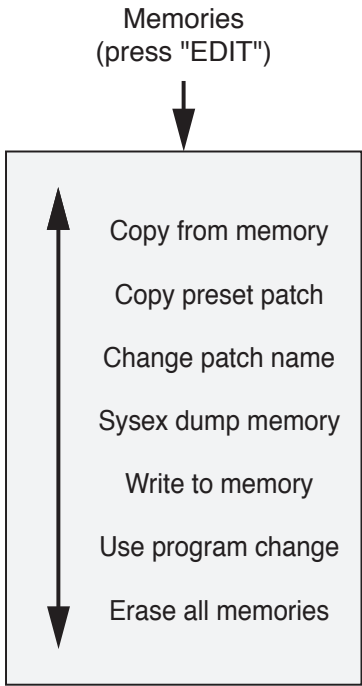


MIDI Sync  
(press "EDIT")



Note latch  
(press "EDIT")





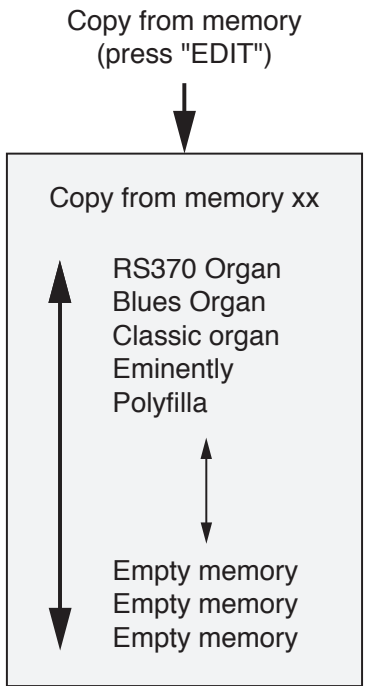
**MENU 5: MEMORIES**

Menu 5 provides access to all the commands needed to organise and manage the forty-six patch memories within the RS370.

**MENU 5.1: COPY FROM MEMORY**

The RS370 offers forty-six patch memories, of which forty-three are initially populated by factory sounds.

This menu - which is identical to Menu 1 - allows you to select any one of the stored patches and load this into the edit buffer. When you do so, the patch name is displayed at the top of the screen.





**MENU 5.2:  
COPY PRESET PATCH**

This allows you to select any of the forty-three factory preset patches and load this into the edit buffer. When you do so, the patch name is displayed at the top of the top level screen.

*Note: The factory sounds are held in ROM and can always be recalled, even when you have overwritten them in the main area of memory.*

**MENU 5.3:  
CHG PATCH NAME**

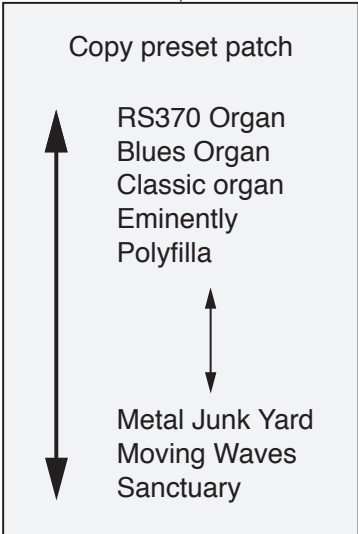
Change the name of the patch in the edit buffer.

Navigate left/right using the EDIT knob, then press the knob to permit changes to the highlighted character.

**MENU 5.4:  
SYSEX DUMP MEMORY**

Press the EDIT knob to dump the patch in the edit buffer to a waiting SysEx recorder.

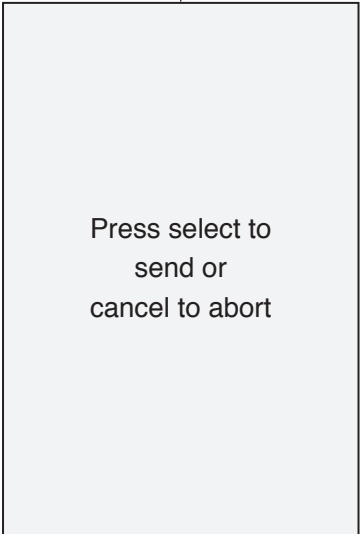
Copy preset patch  
(press "EDIT")



Change patch name  
(press "EDIT")



Sysex dump memory  
(press "EDIT")



### MENU 5.5: WRITE TO MEMORY

You can save the sound in the edit buffer to any of the forty-six patch locations.

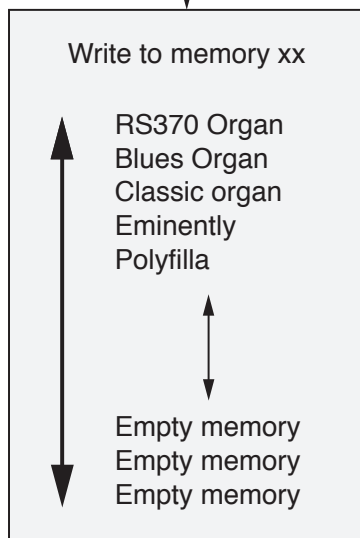
Select the memory to which you wish to save the sound. The RS370 will ask:

Are you sure? NO  
Are you sure? YES

To save, select YES and press the EDIT button.

To abort the operation, press NO or CANCEL.

Write to memory  
(press "EDIT")

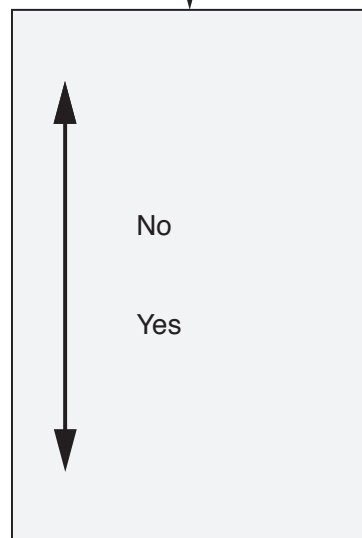


### MENU 5.6: USE PROGRAM CHG

Set this option to "Yes" to permit patch selection using the MIDI Program Change command.

Set it to "No" to disable MIDI Program Changes.

Use program change  
(press "EDIT")



### MENU 5.7: ERASE ALL MEMORIES

Erases all patch memories. If you select this, the RS370 will ask:

Are you sure? NO  
Are you sure? YES

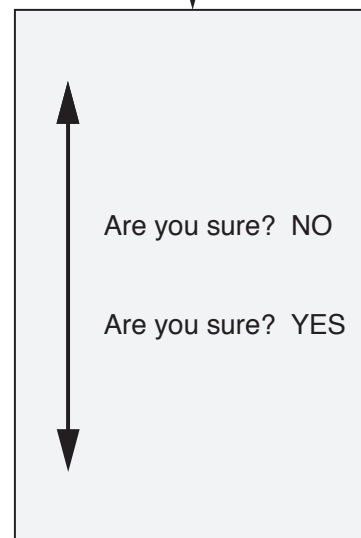
To erase all memories, select YES and press the EDIT button.

To abort the operation, press NO or CANCEL.

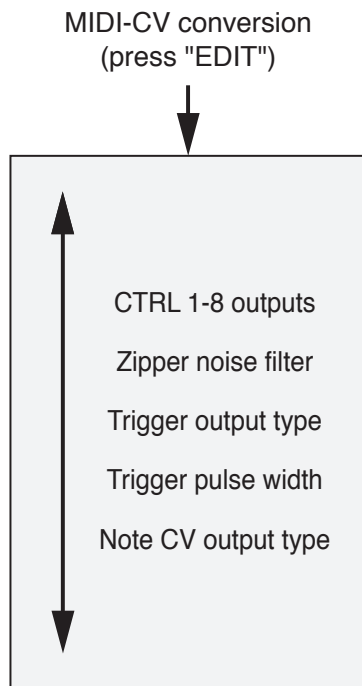
#### **Warning:**

Use this operation with great care. While you can reload the factory sounds (see menu 5.2 and menu 8) you cannot rescue your own sounds unless you have saved them via SysEx (menu 5.4).

Erase all memories  
(press "EDIT")



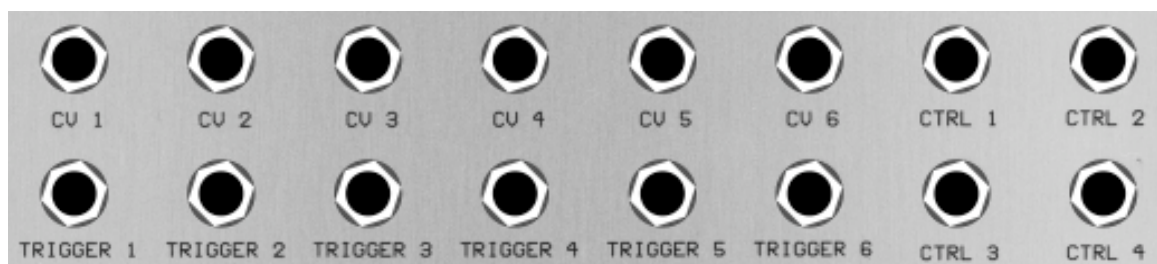
## MENU 6: MIDI TO CV CONVERSION

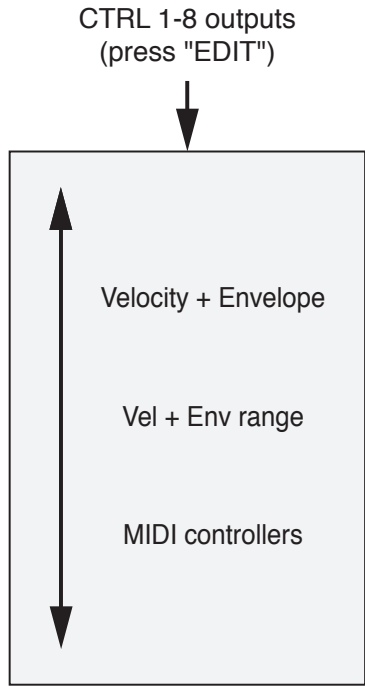


The RS370 is a powerful single-channel, 6-note MIDI/CV converter that you can use independent of, or in conjunction with its internal synthesiser. It offers six pitch CVs (V/Oct and Hz/V standards), multiple note allocation modes, plus Triggers, Gates, and S-Triggers, with variable voltage ranges for each.

The RS370 provides four MIDI Controller outputs (CTRL1 to CTRL4) that you can allocate freely to more than 130 MIDI performance controllers and CCs. With the RS375 or RS376 Expanders attached, you have access to a further four programmable outputs (CTRL5 to CTRL8).

In addition, you can direct the RS370's internal envelopes to the MIDI CTRL outputs. This means that, in addition to the voltages determined from the MIDI data, you can tap the envelopes triggered by the MIDI Note ONs, directing them back into the RS370 itself in novel ways, or sending them to external modules and/or synthesisers. This is a very powerful feature that allows you to use MIDI/CV triggering in ways that are not possible on any other single module.





**MENU 6.1:  
CTRL 1-8 OUTPUTS**

Determines how the MIDI/CV converter operates, and what controllers are available at the CTRLx outputs.

**6.1.1 Velocity + Envelope**

This determines whether the CTRL1 to CTRL"n" outputs carry voltages proportional to MIDI velocity or the signals generated by the RS370's internal envelopes.

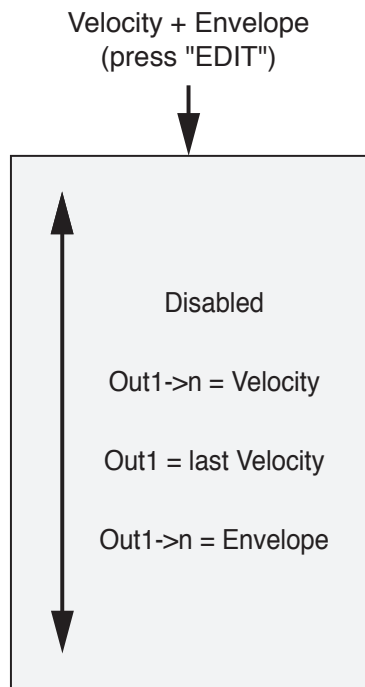
• **What is "n"?**

The number "n", which can take values from 1 to 6, is the number of voices selected in menu 7.4. Depending upon the value of "n", menu 6.1.1 determines the signals carried by:

- n=1: CTRL output 1 alone
- n=2: CTRL1 & 2
- n=3: CTRL1, 2 & 3
- n=4: CTRL1, 2, 3 & 4
- n=5: CTRL1, 2, 3, 4 & 5
- n=6: CTRL1, 2, 3, 4, 5 & 6

There are four options:

- **Disabled**  
No signals are output
- **Out1->n = Velocity**  
The CTRL 1-n outputs carry the MIDI velocities for the MIDI Note ONs currently being played, up to the maximum number of notes being accepted by the RS370. (See menu 7.4.)
- **Out1 = last Velocity**  
CTRL 1 carries the MIDI velocity of the note most recently played. Use this option when using the RS370 to drive a monophonic synthesiser.
- **Out1->n = Envelope**  
The CTRL 1-n outputs carry the internal envelopes as triggered by the most recent MIDI Note ONs. The maximum number of envelopes produced is determined by the maximum number of voices being generated by the RS370. (See menu 7.4.)





**6.1.2 Vel + Env range**

Determines the output voltage range for the MIDI velocities or envelopes selected in menu 6.1.1. The options are:

- -10V to +10V
- -5V to +5V
- 0V to +10V
- 0V to +5V

**6.1.3 MIDI Controllers**

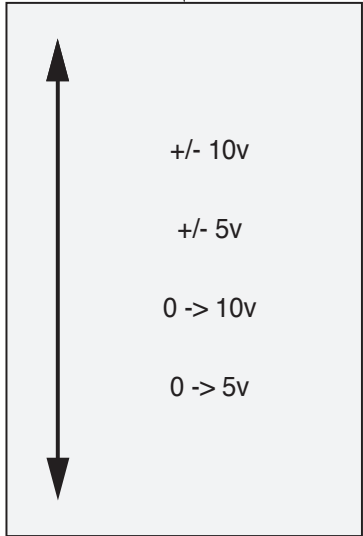
Determines the signals carried by any CTRL outputs not occupied by the MIDI Velocity and Envelope settings in menus 6.1.1 and 6.1.2.

- **Source**  
There are 131 MIDI controller sources. Select one for each CTRL output that you wish to use.
- **Voltage range**  
Select the voltage range generated by each of the used CTRL outputs.

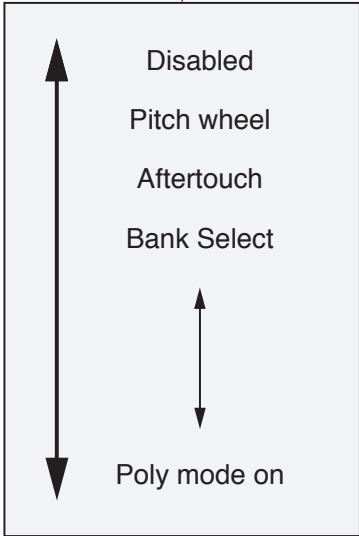
MIDI controllers  
(press "EDIT")



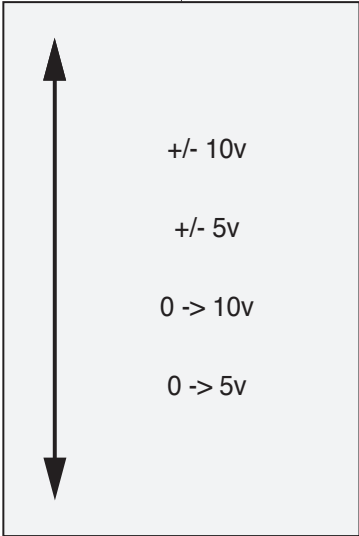
Vel + Env range  
(press "EDIT")



Source  
(press "EDIT")



Voltage range  
(press "EDIT")

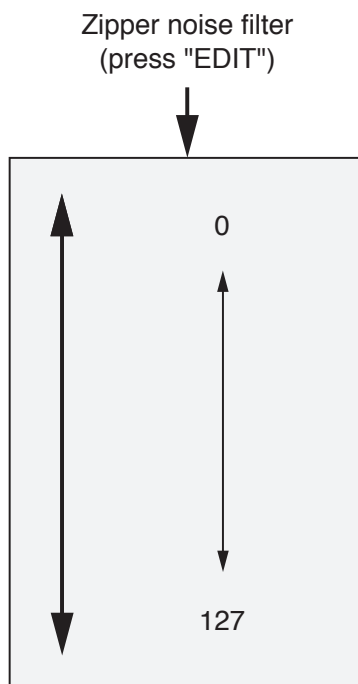


## MENU 6.2 ZIPPER NOISE FILTER

There is a low-pass filter (a slew generator) placed between the MIDI/CV converter and the outputs. This smooths the analogue CVs produced, and eliminates "zipper noise" caused by the quantisation of MIDI control values.

Select a value that eliminates the 'zipper noise' artefact without unduly slowing the response that you require.

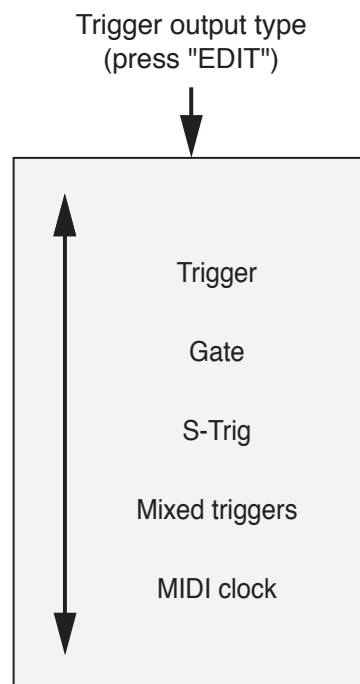
- zero = no filtering
- 127 = maximum filtering



## MENU 6.3 TRIG OUTPUT TYPE

Select between the conventional trigger and gate types, and obtain these from the RS370's six trigger outputs.

- **Trigger**  
Each MIDI Note On produces a Trigger pulse (defined by menu 6.4) of approximately +5V at the appropriate output.
- **Gate**  
Each MIDI Note On produces a Gate of approximately +5V at the appropriate output. The Gate is maintained while the key remains depressed.



- **S-Trig**  
Each MIDI Note On produces an S-Trig (an inverted Gate) of approximately 5V->0V at the appropriate output.

- **Mixed triggers**

Every Trigger or Gate generated by a MIDI Note On is directed to all six of the Trigger outputs simultaneously.

### Notes about Mixed Triggers:

*In the late 1970s and early 1980s, there were a handful of polyphonic synthesizers manufactured that offered just a single filter and filter envelope for the whole keyboard, no matter how many notes were pressed.*

*In this limited architecture, there were two ways to make the filter envelope respond to someone's playing. Firstly, the filter envelope could react (i.e. enter the Attack stage) when the first note was played, and only enter its Release stage when the last note was released. Alternatively, every new note could reinitialise the envelope. This made it possible to "chop" up your playing, causing every note to retrigger each time that you played a new note.*

*The RS370's "Mixed triggers" option - which is perhaps unique on an instrument in the modern era - recreates the latter response.*



- MIDI Clock



With MIDI Clock selected, the trigger and clock outputs (the first six outputs on the lowest row of the RS370) are reassigned to respond to MIDI Start/Stop/Continue messages as shown in the table at the bottom of this page. To summarise:

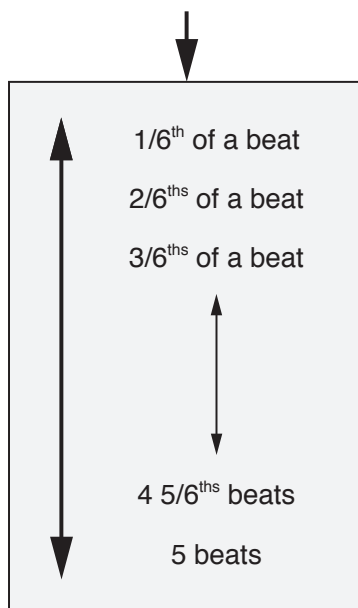
- When a MIDI Start is received for the first time, a trigger is produced at the Start, Start/Stop and Reset outputs, the Run output goes High, and a clock is output from the Clock socket. The clock rate is controlled by MIDI Clock and the selected tempo. (See menu 6.4: 'Output Clock Rate'.)
- If a second MIDI Start is received before a MIDI Stop is received, there is no further output from any of the trigger sockets, but the clock continues to be produced.
- When a MIDI Stop is received after a MIDI Start, triggers are produced at the Start and Start/Stop outputs, the Run output goes Low, and the clock is halted with the output Low.
- If a second MIDI Stop is received before a MIDI Start is received, there is no output from any of the sockets.
- If a MIDI Continue is received after a MIDI Stop, triggers are produced at the Start and Start/Stop outputs, Run goes High, and a clock is again produced.
- If a second MIDI Continue is received before a MIDI Stop or first MIDI Continue is received after a MIDI Start, no triggers are produced but the clock continues to be produced.

	Output					
Command	Start	Stop	St/stop	Run	Reset	Clock
Start	trig	-	trig	hi	trig	clk
Start	-	-	-	-	-	clk
Stop	-	trig	trig	lo	-	lo
Stop	-	-	-	-	-	lo
Continue	trig	-	trig	hi	-	clk
Continue	-	-	-	-	-	clk

### MENU 6.4 OUTPUT CLOCK RATE

You can synchronise the analogue clock to MIDI clock, with thirty options ranging from one clock pulse every 1/6 of a MIDI beat, to one pulse for every five MIDI beats.

MIDI Sync  
(press "EDIT")

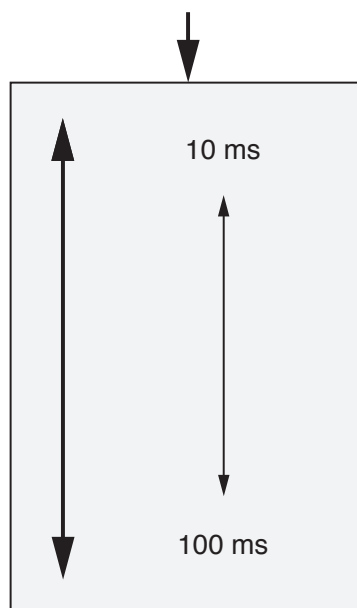


### MENU 6.5 TRIG PULSE WIDTH

With the Trigger option selected in menu 6.3, this allows you to determine the duration of the trigger pulse.

For correct operation, this should be set to the shortest duration that triggers the destination.

Trigger pulse width  
(press "EDIT")



### MENU 6.6 NOTE CV OUT TYPE

The RS370 will control analogue synthesisers that conform to both of the common pitch/voltage standards:

- **1V/Oct**

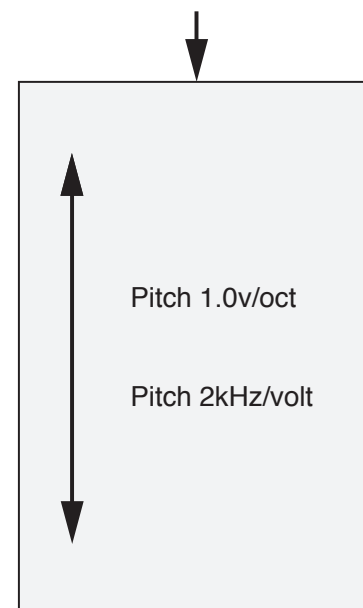
Use this option to control the pitch on synthesisers from manufacturers such as Moog, ARP, Sequential Circuits, Roland and Analogue Systems.

- **2kHz/Volt**

Use this option to control the pitch on some of the vintage synthesisers produced by Korg and Yamaha.

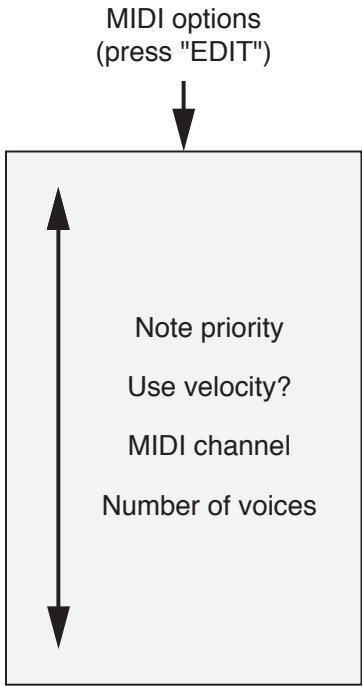
*If you are unsure of the appropriate option to use, please consult the documentation for the destination system.*

Note CV output type  
(press "EDIT")





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**MENU 7.1:  
NOTE PRIORITY**

If you play more notes than the RS370 is able to reproduce simultaneously, you must choose how the unit responds to the next note received. This is particularly relevant when using the RS370 as a monophonic synthesiser.

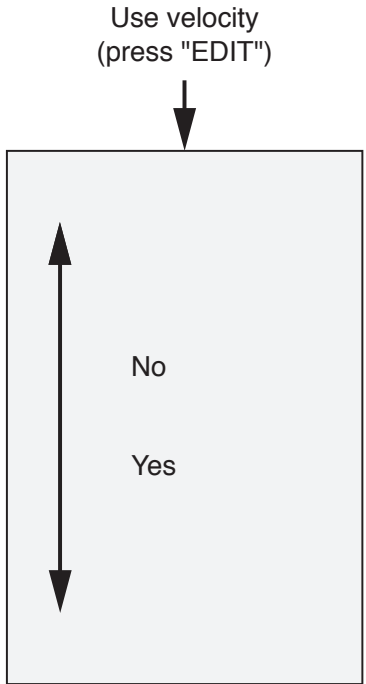
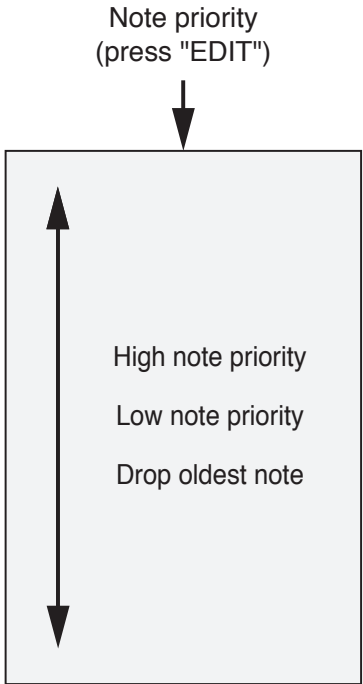
- High note priority  
High notes are given priority, and lower ones are 'stolen' so that high ones can be produced.
- Low note priority  
Low notes are given priority, and higher ones are 'stolen' so that low ones can be produced.
- Drop oldest note  
Recent notes are given priority, and older ones are 'stolen' so that current ones can be produced.

**MENU 7.2  
USE VELOCITY**

Switches On and Off the RS370's response to MIDI Velocity

**MENU 7:  
MIDI OPTIONS**

This menu allows you to set up global parameters that determine how the RS370 responds to incoming MIDI data.

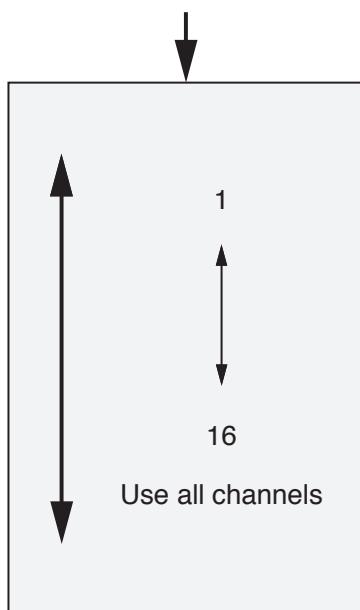


### MENU 7.3 MIDI CHANNEL

- **1 - 16**  
Select the MIDI channel received.

- **Use all channels**  
The RS370 responds to all incoming MIDI data (OMNI mode).

MIDI channel  
(press "EDIT")



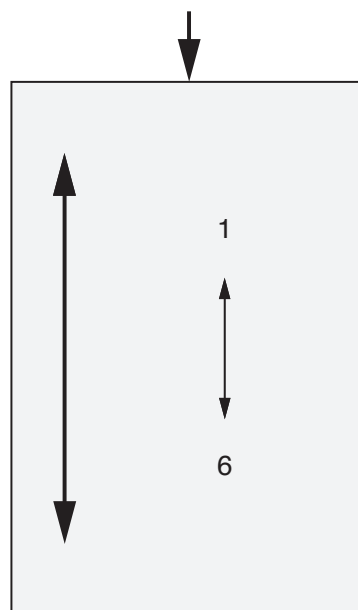
### MENU 7.4 NUMBER OF VOICES

This performs two functions simultaneously:

- **Synthesiser voices**  
Determines the number of voices produced by the RS370's internal synthesiser.

- **MIDI/CV voices**  
Determines the number of voices handled by the MIDI/CV converter, whether used to drive the internal synthesiser, or to drive external devices.

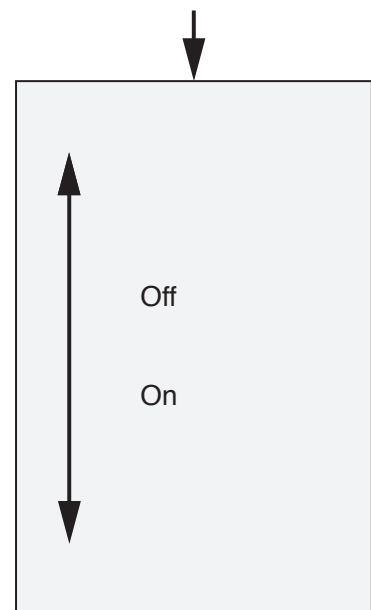
Number of voices  
(press "EDIT")



### MENU 7.5 MIDI CHAIN

Allows you to chain two RS370s together to create a 12-voice synthesiser, or a 6-voice synthesiser with layering.

MIDI chain  
(press "EDIT")





Special options  
(press "EDIT")



- ↑
- Show analogue inputs
- Show expander inputs
- Show voices
- Show incoming MIDI
- Factory defaults
- Show version
- Calibration
- ↓
- Update firmware

### MENU 8: SPECIAL OPTIONS

These options provide all the "housekeeping" functions for the RS370. They allow you to observe the operation of the RS370 (and, if connected) the RS375 Expander, to calibrate them, update their operating system, and restore the factory defaults.

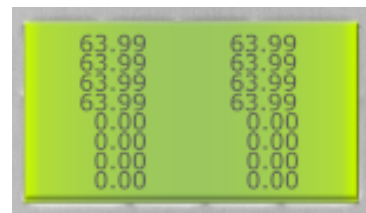
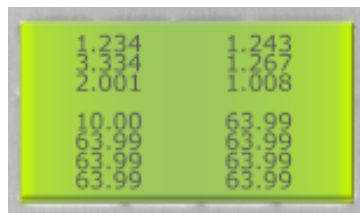
### MENU 8.1 SHOW ANALOGUE IN

This page shows fourteen values.

- **CV inputs/outputs**  
The block of six values shows the voltages present at the CV1 to CV6 sockets, whether used as inputs or outputs.
- **CTRL inputs**  
The block of eight values shows the input voltages at CTRL IN 1 to CTRL IN 8.

### MENU 8.2 SHOW EXPANDER IN

This page shows the voltages produced by the sixteen knob/input pairs (denoted as HARM 1 to HARM 16) on the RS375 Expander.



### MENU 8.3 SHOW VOICES

This page shows the status of the internal voices.

The values shown are:

- MIDI note number
- Current envelope stage

The symbol "\_" denotes that this voice is currently unused or inactive.

The bar to the right of the screen shows the summed output amplitude of all voices being played.



### MENU 8.4 SHOW MIDI

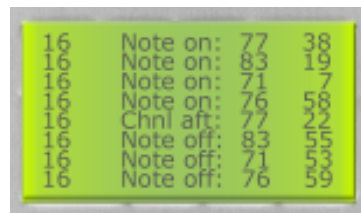
Shows the eight most recent MIDI messages received by the RS370. The first two values shown are:

- The MIDI channel received
- The message type

The next two values depend upon the message type. For example, if the message is a Note On or Note Off, the values will be:

- MIDI Note number
- Note On (or Off) Velocity

*For a full description of MIDI messages and their values, please refer to an appropriate text.*



### MENU 8.5: FACTORY DEFAULTS

The RS370 ROM contains the factory defaults, including the factory sounds. If you wish to restore these, select this menu and press EDIT. The RS370 will ask:

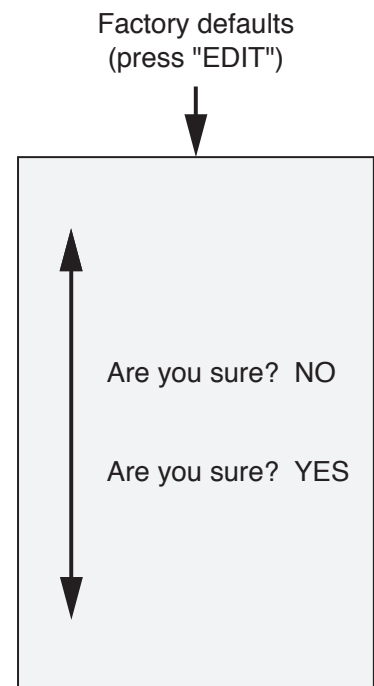
Are you sure? NO  
Are you sure? YES

To restore the defaults, select YES and press EDIT.

To abort the operation, press NO or CANCEL.

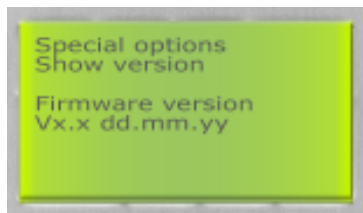
**Warning:**

*Use this operation with great care. You cannot rescue your own sounds and settings after restoring the factory defaults.*



## MENU 8.6 SHOW VERSION

Shows the software version installed, and the date of this version.



## MENU 8.7 CALIBRATION

You may calibrate the CV outputs on your RS370 (and, if connected, the CV/control inputs on your RS375).

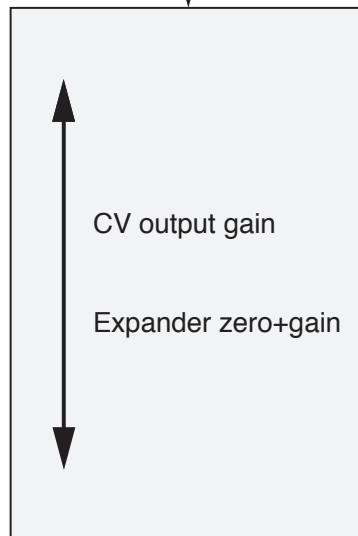
There are two options:

- Calibrate the RS370 CV output gains
- Calibrate the RS375 Expander zero and gain

### **Warning:**

*If you are unsure about calibrating your units, please leave this for qualified personnel at Analogue Systems, or at the company's appointed dealers and service agents.*

Calibration  
(press "EDIT")



### 8.7.1 Calibrating RS370 CVs

To calibrate the RS370's CV outputs, select "CV output gain".

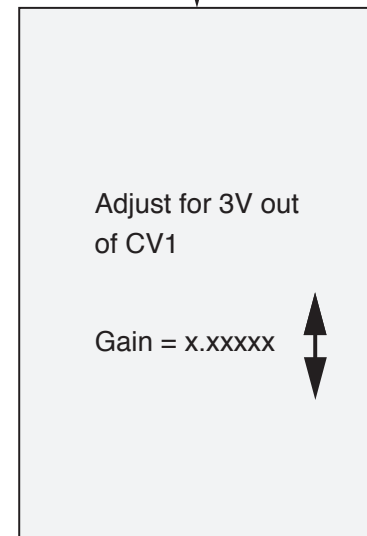
Measure the voltage produced by the CV1 socket using a high accuracy voltmeter. Use the EDIT knob to adjust the Gain shown on the RS370 screen until the output voltage is precisely 3V.

Now press EDIT.

The unit will display the message "Please wait" for a moment while it performs internal calibration of the CVs.

**Do not touch any of the controls while this is happening.**

CV output gain  
(press "EDIT")





### 8.7.2 Expander zero + gain

To calibrate the RS375's CV outputs, select "Expander zero+gain".

Remove all MIDI connections from the RS370. Connect the correctly calibrated CV1 output on the RS370 to the HARM1 input on the RS375, and use the HARM1 knob to obtain a value as close to zero as possible.

Now press EDIT.

The unit will now calibrate for 0V and calibrate the internal CV gain.

**Do not touch any of the controls while this is happening.**

### Warning:

If the RS375 fails to calibrate, and/or you obtain the message, "Unable to calibrate expander input gain" ensure that the patch cable has good continuity and try the operation again. If calibration still fails, contact Analogue Systems for advice.

***Under no circumstances must you attempt to fault-find as:***

- *it can be dangerous to you*
- *it may harm the unit*
- *it will void your warranty*

### MENU 8.8 UPDATE FIRMWARE

You may update the RS370 firmware (i.e. the operating system) via MIDI.

To update, select YES and press the EDIT button. The RS370 will then wait for the data. If you are unable to send the OS file or a fault occurs, the RS370 will continue to wait. You cannot CANCEL this, and if you remain unable to send the upgrade, power cycle the unit (i. e. switch Off and then switch On again). This will not harm the RS370, which will remain unaffected by the aborted upgrade.

If you decide not to upgrade, select NO or press CANCEL.

Expander zero + gain  
(press "EDIT")



Connect CV1 to  
expander harm1 input.  
Adjust the harm1 pot  
until this value is  
within +/-100 then  
press Edit.

xxxxx



Update firmware  
(press "EDIT")



Are you sure?

No

Yes



## ANALOGUE SYSTEMS RS370 FACTORY SOUNDS: V3.8

The following pages list all forty-three factory sounds for the RS370.

To obtain the best results, many of the polyphonic patches are programmed so that you can connect the VOICE1 output to the AUDIO IN of an RS100 low-pass filter (or equivalent), and the CTRL OUT1 CV output patched to the CV-IN VARY of the filter, whereupon MIDI CC#11 (Expression) will control the filter's cut-off frequency.

Some monophonic patches such as #9, #12, #22 and #24 do not send CVs derived from MIDI messages, but the internal envelope generated by the RS370. This can then be used to shape the filter response in the traditional fashion.

### Common MIDI controllers used in the RS370 factory sounds:

The MIDI controllers used throughout the factory sounds (although not all necessarily used in every patch) are:

- Aftertouch
- Velocity
- CC#01 Modwheel (mostly vibrato effects, but the attack portion of the envelope and oscillator tuning are controlled in some patches)
- CC#02 Breath Controller (the release time of the envelope)
- CC#05 Portamento time
- CC#07 Volume
- CC#11 Expression (control of the external filter cut-off frequency)
- CC#65 Portamento on/off
- CC#69 Hold (programmed to toggle the internal arpeggiator on/off)

### Hints:


The CTRL IN1 knob is usually programmed to adjust the volume of the sound or the arpeggiator speed (where appropriate), or to latch the notes of arpeggiated sounds.

Some patches (such as #11: Expander and #42: Moving Waves) benefit from applying external LFOs to CTRL IN2 and CTRL IN3, either to modulate the RS370's oscillators or to control Morph Sources 1&2, which modulate the sound's position within its wavetable.

A handful of patches (such as #37: Hollow Fantasy) send the RS370's internal envelopes from CTRL OUT1 and CTRL OUT2, and these can be carried by patch cords to CTRL IN2 and CTRL IN3 for special effects.

- |    |                 |   |
|----|-----------------|---|
| 1  | RS370 Organ     | Standard organ sound. The modwheel introduces vibrato.  |
| 2  | Blues Organ     | Blues-type organ. The modwheel introduces vibrato.  |
| 3  | Classic Organ   | Based on the classic 888000000 drawbar setting. The modwheel introduces vibrato.  |
| 4  | Eminently       | A string synth emulation. Moving the modwheel will introduce lush chorus effects. Patch a slow sine wave or triangle wave from an RS80 LFO into the 1V/oct input of the RS100 filter to add filter modulation.  |
| 5  | Polyfilla       | A standard pad.   |
| 6  | Golden Age      | This utilises all the MIDI CCs listed above in an attempt to recreate early analogue polysynths. If you select the Mixed Triggers option, the TRIGGER1 output on the RS370 can be patched to the TRIG1 input of an RS290. Then, on the RS290, select Sync To Clock in the Clock Settings menu and select Clock Source = TRIG1 to enable sync'd delay times. |
| 7  | O.K. Chorale    | An analogue vocal sound.  |
| 8  | Roller Coaster  | When played polyphonically, this produces a sequenced effect.   |
| 9  | Nifty Pulse     | A monophonic square wave lead/bass sound. Moving the modwheel forward introduces pulse width modulation. Aftertouch introduces vibrato. CC#02 (Breath Controller) varies the release time of the envelope   |
| 10 | Touch Ensemble  | Another string emulation. The modwheel introduces the chorus effect.  |
| 11 | Expander        | This employs the RS375 expander for real time control of the envelope generators. Patch two independent triangle waves into CTRL IN2 & CTRL IN3 and set the frequencies to obtain rich oscillator detuning effects.   |
| 12 | Soft Lead       | A monophonic lead patch. Direct CV1 from the RS370 to the 1V/oct CV input of the filter for keyboard tracking. Patch the RS370's CTRL OUT1 to the CV VARY IN of the filter to allow the RS370's internal envelope generator to control the filter cut-off frequency.  |
| 13 | Mutator         | A sound effect that uses the modwheel, MIDI volume, CC#2 and MIDI Velocity to vary the type of effect.  |
| 14 | Arp latch       | An arpeggiated sequence. You can press up to six notes and latch them by turning CTRL IN1 beyond the 12 o'clock position. You may then add further notes or replace existing ones by playing the keyboard.  |
| 15 | Saturn          | A dark, mysterious sound with metallic shimmering movement.   |
| 16 | Chillout        | A useful polyphonic pad 'chopped up' by a strong tremolo effect if CC#7 is reduced from value = 127. Moving the modwheel detunes OSC2 using the internal LFO1 to introduce thickness and movement in the sound.   |
| 17 | Repeater        | The repeating effect is introduced by the modwheel.   |
| 18 | Mod Wheel Morph | A standard polysynth sound that morphs from sine wave to square wave by manipulating the modwheel. The View Harmonics menu shows the nature of the effect in real-time as you change the waveform.  |

- 19 Morphing An arpeggiated morphing sound. Use the modwheel to increase the depth of the effect. Use CTRL IN1 to latch the notes (see patch #14).
- 20 Hellbound A polyphonic patch that demonstrates movement in the wavetable using the modwheel (via Wave Morph 2) to move through the table, while it is at the same time being swept by LFO1 (via Wave Morph 1).
- 21 Chimes An FM bell/chime sound. MIDI CC#69 toggles the arpeggiator on/off.
- 22 Purity A monophonic lead synth patch. The modwheel introduces vibrato.
- 23 Wont Get Fooled A famous patch from The Who's "Who's Next" album. MIDI CC#07 controls the depth of the "chopping" effect. MIDI CC#02 will alter the release time. Patch the audio output to an RS500e filter if available. A low frequency sine wave from an LFO should be patched into the 1V/oct input of the filter to create a slow, swept effect.
- 24 Mr Solo Another monophonic lead sound that morphs from sine wave to square wave as you move the modwheel. Aftertouch introduces vibrato and MIDI CC#02 changes the envelope release times. The envelope can be patched from CTRL OUT 1 to the CV-IN VARY of a low pass filter. Additional patching from CV1 to the 1V/oct input of the filter ensures keyboard tracking of the cut-off frequency.
- 25 Open Spaces A pad conjuring up vast areas of space. MIDI CC#11 varies the tone.
- 26 Distant Images A pad with an initial attack phase that has a vocal quality.
- 27 Strange Dawn Light A lighter pad that can be enhanced using a filter.
- 28 Metal Ticks A special effect that comes into play when two or more notes are held. Moving the modwheel changes the sound in a subtle way.
- 29 Attractive Motion A smooth pad with modulation.
- 30 Metal Rings A polyphonic sound reminiscent of FM synthesis.
- 31 Shimmering Light A dreamy pad with a slow attack.
- 32 AT! Waves A heavily modulated pad with a slow attack phase.
- 33 Glass Gallery This demonstrates wavetable morphing. The rate is controlled by the pitch wheel. The modwheel controls the tuning of OSC4.
- 34 Bellistica A pad with an initial attack that fades into a sustained sound. The pitchbend wheel alters the attack time of the envelope, while the modwheel alters the speed of the modulation. Aftertouch increases the level of OSC3.
- 35 Heavy Machinery A special effect patch in which the CTRL IN1 knob controls the level of the sound.
- 36 Robo Crickets An insectoid, chirping effect. Experiment with the pitchbend- and modwheels, plus aftertouch
- 37 Hollow Fantasy This ethereal pad is enhanced by patching CTRL OUT1 to CTRL IN2 and CTRL OUT2 to CTRL IN3 so that the envelope generator sweeps the sound through the wavetable. In this patch the CTRL IN1 knob controls the volume level of the sound.

- 
- |    |                |  |
|----|----------------|--|
| 38 | Dark Void      | Uses wavetable synthesis to conjure an image of foreboding.  |
| 39 | Harmonic Choir | A wavetable synthesis choir emulation. Patch VOICE1 to either an RS360 Vocal Filter or an RS110 Multimode filter and use the band-pass outputs to accentuate the vocal quality. The modwheel moves through the wavetable to change the character of the voice. |
| 40 | Space Choir    | A variation on the Harmonic Choir.   |
| 41 | Metal Junkyard | A wavetable synthesis patch that uses the modwheel to move through the wavetable.  |
| 42 | Moving Waves   | An evolving wavetable patch. Enhance the effect by patching two sine wave LFOs into CTRL IN2 and CTRL IN3 to affect Morph Sources 1 and 2.   |
| 43 | Sanctuary      | A wavetable synthesis church organ that changes in character when you move the modwheel.   |

*Factory sounds were created by:*

Patch 3:	David Goodman, Helpful Music
Patch 18 - 19:	Les Newell, Analogue Systems
Patches 25 - 41:	Bakis Sirros, Parallel Worlds
All others:	Bob Williams, Analogue Systems

With the exception of the analogue waves, all wavetable design by Bakis Sirros of Parallel Worlds.

