

RS330

KEYBOARD CONTROLLER



INTRODUCTION

The Sorcerer is a hugely powerful and flexible *keyboard* modular analogue synthesiser. Supplied complete with an RS220 X-Y Controller (joystick) and an RS330 Keyboard Controller, it is perhaps the first synthesiser of its kind.

At the heart of this lies the RS330. Supplied complete with the Sorcerer's integrated MIDI connection system (see below) this allows you to play the Sorcerer from external MIDI instruments and/or sequencers, and makes it possible for you to use the Sorcerer's keyboard as a monophonic controller for external MIDI instruments and devices. You can even use the modules installed in your Sorcerer to create complex and dynamic MIDI pitch controllers via the RS330. And, of course, there's nothing stopping you from using the RS330 (whether driven by an incoming MIDI signal or by the Sorcerer's own keyboard) to control other analogue synthesisers that offer appropriate CV and trigger/gate inputs.

THE SORCEROR KEYBOARD

The Sorcerer incorporates a 4-octave (49 note) monophonic, low-note priority keyboard that produces neither velocity nor aftertouch (pressure) information. It generates pitch CVs (via the RS330) that conform to the 1V/Octave standard. Existing versions are not compatible with synthesisers that use the less common Hz/V system.

IN USE - AS A KEYBOARD CONTROLLER

In this section we will ignore the RS330's MIDI capabilities, and discuss its analogue facilities.

Inputs and Outputs

CV-OUT (x5)

When you play the Sorcerer's keyboard, the RS330 produces a pitch CV determined by the note played (and the CV-IN - see below) at each of its five CV OUT sockets. The lowest note on the keyboard produces an output of -1V, 0V, or +1V, depending upon the position of the TRANSPOSE switch.

Note: Multiple outputs allow you to direct the pitch CV simultaneously to oscillators, filters, envelope generators, VCAs, and so on, without needing a RS230 CV Buffer or RS170 Multiple. You can also control up to five external 1V/Oct synthesisers using these outputs.

CV-IN

This receives a CV input in the range $\pm 5V$, scales it to 20% of its former amplitude to lie in the range $\pm 1V$, and adds it to the CV produced by the keyboard. The precise action of this input is determined by the KBD TRIGGER switch:

- **KBD TRIGGER - SINGLE**
The voltage presented to CV-IN is added to the keyboard CV at all times.
- **KBD TRIGGER - MULTIPLE**
The voltage presented to CV-IN is added to the keyboard CV only when a key is pressed. If you are using a varying input CV, the final voltage is "held" (much like a Sample & Hold module) when you release the key. The held voltage will be dropped and the varying input will again be applied when you press the next key.

GATE OUT (x2)

While a key is depressed, these produce Gate pulses of amplitude +12V.

TRIGGER OUT (x2)

These produce trigger pulses of amplitude +12V. The precise action of these outputs is determined by the KBD TRIGGER switch:

- **KBD TRIGGER - SINGLE**
A new trigger is produced only when all previous notes have been released.
- **KBD TRIGGER - MULTIPLE**
A trigger is produced every time that you press a lower note, whether or not previously held higher notes have been released. Furthermore, a trigger is produced every time that you release a lower note, provided that a previously held higher note is still depressed.

S-TRIG OUT

A number of vintage synthesisers (the most famous of which is the Minimoog) use an alternative triggering system called "S-Trig". This system - which is, strictly speaking, a Gate - uses an inverted pulse with a positive voltage representing "OFF", and 0V determining a note "ON".

The S-TRIG output on the RS330 provides this alternative, thus allowing you to use the Sorcerer as a controller for a Minimoog, or any other synthesiser fitted with CV and S-Trig inputs.

When all keys are "OFF" the S-TRIG output produces a voltage of +12V. When you press a key, the output drops to 0V.

Other Controls

TRANSPOSE

The transpose switch has three positions marked STD, +1 Octave, and -1 Octave. To be precise, this adds 1V to the keyboard CV (when in the +1 Octave position) or subtracts 1V from the keyboard CV (when in the -1 Octave position). It has no affect when set to STD.

PORTAMENTO

This slews the output CVs generated by the keyboard. The circuit used produces a 'linear' slew modelled on the Minimoog, and it responds in such a way that, for example, a glide across two octaves takes twice as long as a glide across one octave.

The rate of slew is controlled by the PORTAMENTO TIME control, with its fastest rate (minimum slew) in the fully anticlockwise position, and its slowest rate (maximum slew) when in the fully clockwise position.

The portamento switch offers three options:

- **OFF**
No slew is applied
- **ON**
Slew is applied to all keyboard transitions

- **S-SHOT (Single shot)**
This is a non-latching performance control that allows you to add slew when required. Slew is applied only when you press the switch to its S-SHOT position. When you release the switch, it will return to its OFF position, and slew will no longer be applied.

MIDI

The Sorcerer offers three standard MIDI connectors on its rear panel, together with a rotary switch that allows you to select the MIDI channel to which the RS330 will respond.



Connections

- **MIDI IN**
Connect this to the MIDI OUT of the keyboard, sequencer or other device with which you wish to control the RS330.
- **MIDI OUT**
Connect this to the MIDI IN of any MIDI device (or chain of devices) you wish to control from the RS330 and/or the Sorcerer.
- **MIDI THRU**
Any MIDI data received at the Sorcerer's MIDI IN socket will be echoed by the MIDI THRU socket, thus allowing you to connect the Sorcerer in a 'daisy chain' of MIDI devices.

MIDI Channel Selector

The MIDI channel selector offers sixteen positions marked in hexadecimal fashion from '0' to 'F'. Use a small tool such as a precision screwdriver to choose the MIDI channel on which the Sorcerer receives and transmits over MIDI, according to the following table:

Arrow points towards	MIDI Channel selected
0	1
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9
9	10
A	11
B	12
C	13
D	14
E	15
F	16

IN USE - AS A MIDI TO CV UNIT

The RS330 generates pitch CVs, Triggers, Gates and controller CVs from incoming MIDI data received at the Sorcerer's MIDI IN.

Pitch CVs

These conform to the 1V/ Oct standard, with MIDI Note #36 producing 0V. The pitch CVs are produced at each of the five CV-OUT sockets.

Note: Pitch CVs generated internally by the Sorcerer's keyboard take priority over MIDI-generated CVs. This means that, when you press a note on the keyboard, MIDI Note ON and OFF data received at the MIDI IN are ignored.

Gates

Gates are generated in conventional fashion with the Gate output "high" (and the S-Trig "low") whenever a MIDI Note ON is received at the MIDI IN socket, and until the corresponding Note OFF is received. The Gate is output from each of the GATE OUT sockets.

Triggers

Triggers are generated from Note ON messages contained within the incoming MIDI data, as determined by the KBD TRIGGER switch:

- **KBD TRIGGER - SINGLE**
A trigger is produced by a MIDI Note ON only when all previous notes have been released. (All MIDI Note ONs have been followed by appropriate Note OFFs.)
- **KBD TRIGGER - MULTIPLE**
A trigger is produced every time that a MIDI Note ON is received.

Triggers are output from both the TRIGGER OUT sockets.

Controllers

In addition to pitchbend (which is automatically handled) the RS330 generates five further analogue controller CVs from the incoming MIDI data. These are determined by the MIDI Controllers:

Velocity
Aftertouch
Mod Wheel (MIDI CC#1)
Expression (MIDI CC#11)
Effect 1 (MIDI CC#12)

The CVs derived from each of these are output from the appropriate socket on the RS330's panel.

- **Bipolar Controllers**

MIDI CC#11 and CC#12 are treated as 'bipolar' controllers - i.e. they can produce both +ve and -ve voltages. The output CVs lie in the range $\pm 5V$, as follows:

MIDI value = 0	Voltage = -5V
MIDI value = 63	Voltage = 0V
MIDI value = 127	Voltage = +5V

- **Unidirectional controllers**

Since there is no such thing as a 'negative key velocity' or 'negative aftertouch', these controllers - plus MIDI CC#1 (Modulation) - are handled in a different fashion, and produce CVs as follows:

MIDI value = 0	Voltage = 0V
MIDI value = 127	Voltage = +10V

Note: Some early Sorcerers treated MIDI Velocity, Aftertouch and Modulation as bipolar controllers. Like CC#11 and CC#12, these then produced voltages in the range $\pm 5V$. Other early revisions treated Velocity, Aftertouch and Modulation as unidirectional controllers with a range of 0V to +5V. If you would like to discuss these matters, please contact Analogue Systems for advice.

All other controllers and MIDI CCs are ignored.

IN USE - AS A KEYBOARD MIDI CONTROLLER

The RS330 generates monophonic MIDI Note ON and MIDI Note OFF data determined by the keys played on the Sorcerer's keyboard.

Priority

The Sorcerer acts as a lowest-note priority controller keyboard.

Pitch

With the TRANSPOSE switch set to STD, the lowest note on the Sorcerer keyboard generates MIDI Note #36.

Note: Early Sorcerers generated MIDI Note #24 on the lowest key. For more information, please contact Analogue Systems.

Velocity

To ensure that you hear the full range of sound that your external MIDI sources can generate, the fixed MIDI Velocity is set to 127.

Note: The first Sorcerers generated MIDI Velocity = 63, in line with the early MIDI specification. For more information, please contact Analogue Systems.

CV-IN

You can patch a control voltage into the CV-IN socket to generate pitch changes in the MIDI output. Voltages in the range $\pm 5V$ are accepted and acted upon, and these generate MIDI pitchbend messages in the range 0 to 127.

Note: You will not damage the RS330 if you present voltages higher than +5V or lower than -5V to this input, provided that they are produced within the Sorcerer, and lie within Analogue Systems' maximum voltage range of $\pm 12V$. However, we advise that you try to stay within the CV-IN specification whenever possible.