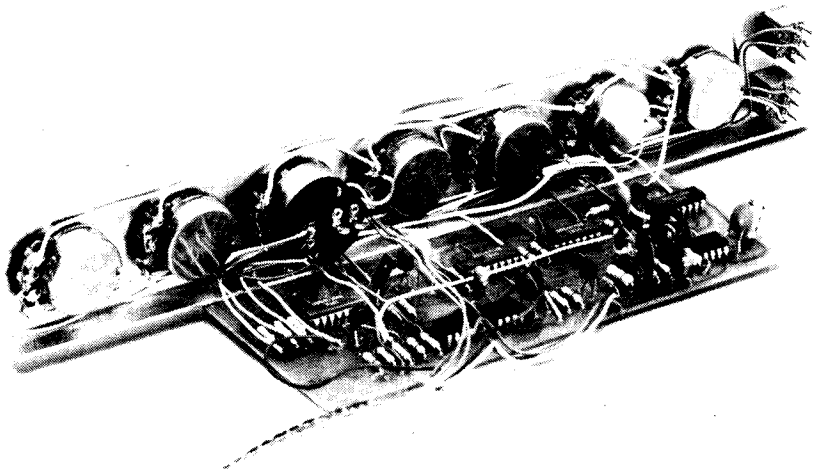


TRANSIENT Generator 2 module provides an almost infinite variety of output shapes.

It may for example be used to modify the keyboard output voltage. Such a keyboard output would, when applied to an oscillator for example, cause it to commence the note in tune, raise to say one octave higher, hold the note for a preset period and then drop the note to one octave lower than the basic frequency.

The number of semitones or octaves, shifted up or down, is uniform over the entire keyboard range. The maximum design range of control is of the order of plus or minus two octaves.

Usually this module will be used to control a Voltage Controlled Filter (VCF), in the bandpass mode, being fed from a complex waveform (considerable harmonic content). Upon pressing a keyboard key the Transient 2 waveform could for example, cause the filter to commence at the timbre as selected the VCF "TUNE" control, sweep up to the higher overtones and finish on the lower fundamentals.

CONSTRUCTION

With the aid of the component overlay (Fig. 2), assemble components to the printed circuit board paying particular attention to the orientation of integrated circuits, transistors, diodes and electrolytic capacitors.

It is recommended that sockets be used — for the CMOS ICs at least. These CMOS ICs should also be the last components to be fitted to the board.

The mechanical assembly is similar to

PARTS LIST

Transient Generator 2

R1, 19, 23	Resistor	100k	¼W	5%
R2, 14, 18	"	10k	"	"
R3	"	15k	"	"
R4	"	680 ohms		
R5	"	470 ohms		
R6	"	8.2k		
R7, 9, 11	"	1M		
R8, 12, 15, 16, 17	"	1.2k		
R10	"	1.8k		
R13	"	39k		
R20	"	5.6k		
R21	"	470k		
RV1, 4		2M log rotary		
RV2, 3		22k trim potentiometer		
RV7, 8, 9		25k lin rotary		
RV5		2M log rotary switched		
C1	Capacitor	4.7µF 25 V tag tantalum		
C2, 4	"	33pF ceramic		
C3, 5	"	0.0033µF polyester		
C6, 10	"	10 µF 25 V tag tantalum		
C8, 9	"	100pF ceramic		
C11, 7	"	2.2 µF tag tantalum		

IC1, 2, 3	Integrated circuit	LM301A
IC4, 5	" "	SCL4016AE*
IC6, 7	" "	SCL4011AE**

* the prefix and suffix of CMOS varies from manufacturer to manufacturer.
** should be Solid State Scientific only (CEMA)

Q1	Transistor	PN3638 or similar
Q2, 3, 4	"	PN3643 or similar
D1, 2,	Diode	IN914 or similar
SW1, 3	Switch	SPDT miniature toggle CNK7201 or similar
SW2	"	Part of RV5
PC Board	ETI 601g	

Metal bracket to Fig 4.

Recommended extras

8 pin socket Utilux type M2139-8 off
Utilux type M2138 pin 8 off
14 pin IC socket 4 off.

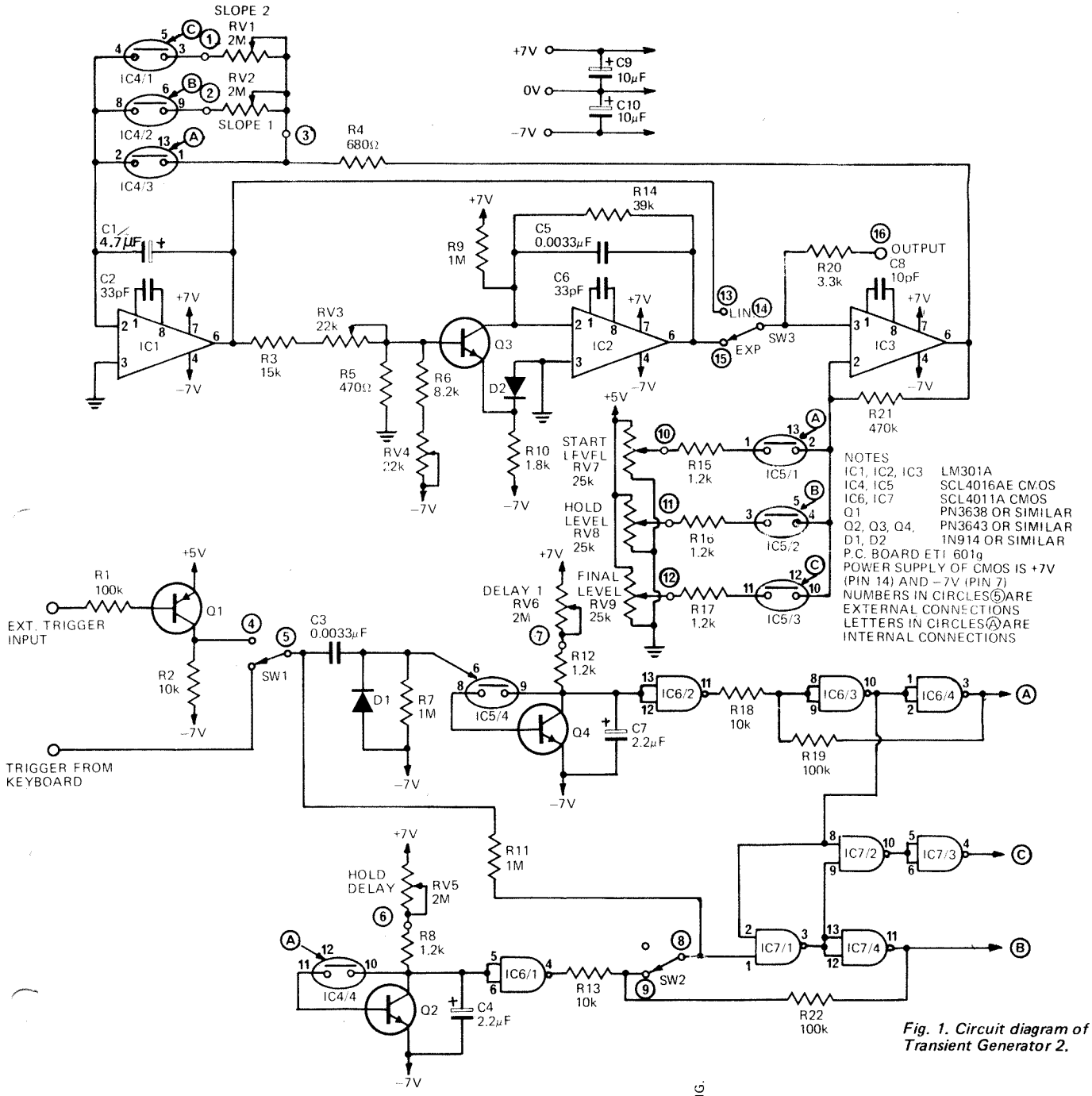


Fig. 1. Circuit diagram of Transient Generator 2.

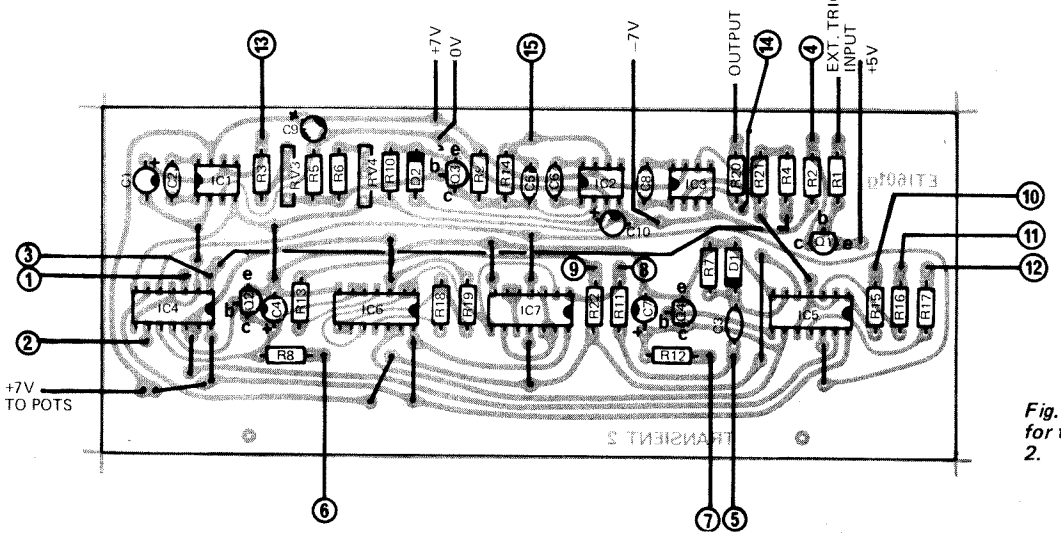


Fig. 2. Component overlay for the Transient Generator 2.

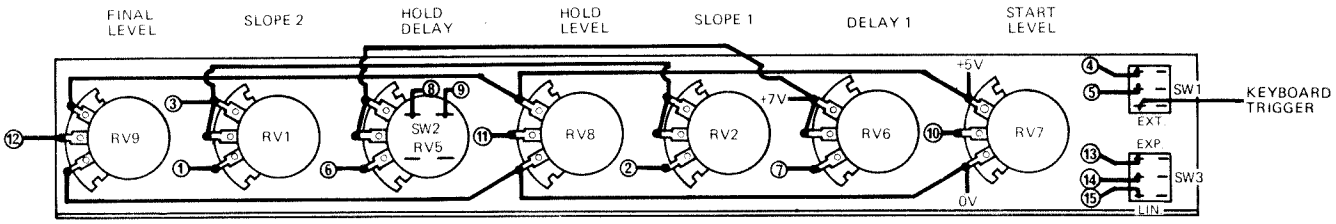


Fig. 3. Wiring diagram to switches and potentiometers on the mounting bracket.

INTERNATIONAL MUSIC SYNTHESIZERS

that for Transient 1 (described last month). All rotary potentiometers and switches are mounted onto the bracket, drilling details for which are shown in Fig. 4. The bracket, in turn, is mounted onto the component side of the printed circuit board.

Wiring between the potentiometers and switches, and the connection points to the printed board is illustrated in Fig. 3.

CALIBRATION

As with Transient Generator 1, the exponential converter section has to be calibrated. Begin by setting SW3 to the LINEAR position and SLOPE 2 to maximum rate.

Measure the output voltage and check that it is variable between '0' volts and +5 volts by means of the FINAL LEVEL control.

Adjust the output to '0' volts by means of the LEVEL CONTROL and adjust RV4 so that the output of IC2 is exactly zero.

Adjust the output to +5 volts with the level control and then adjust RV3 for +5 volts at the output of IC2.

Repeat the previous two adjustments until the settings remain correct when the level control is varied from one end to the other.

Switch to EXPONENTIAL and check that the output of IC1 does not go negative at any setting.

HOW IT WORKS

Transient Generator 2

This module is very similar to the Transient 1 generator described last month. It consists of two main sections.

1) The wave shaping circuitry (analogue).

2) The control circuitry (digital).

The analogue section is almost identical to that of Transient 1, described last month, and reference should be made to that article. The main exception is the omission of the reset-transistor across the integrator IC. Additionally the three inputs to the comparator are all adjustable, the 'ATTACK' potentiometer has been deleted and the 'attack time' is thus always at its maximum rate.

Last month's "How it works", in conjunction with both circuit diagrams should readily explain the operation of this section.

The digital section of the two modules is different. That for Transient 2 works as follows:–

When a trigger pulse is presented to gate IC5/4, it turns on for about 3 millisecs. This discharges C7 via Q4. The resulting low level at the input of IC6/2 gives 'high' output at (A) (IC6/4). Whilst (A) is high C4 will remain discharged.

The digital ICs used in this module are 2-input NAND gates (four per package), the truth table for which is shown below:–

INPUT 1	INPUT 2	OUTPUT
0	0	1
0	1	1
1	0	1
1	1	0

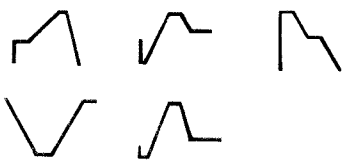
Note that for the ±7 volt supplies as used, '0' means less than –1 V and '1' means greater than +1 V at the inputs. In the case of outputs, '0' means close to –7 V and '1' means close to +7 V.

A high output at (A) will select the maximum slope rate and the START LEVEL potentiometer RV7. The output will go rapidly (within 5m-secs) to the level set by RV7.

After the initial 3 m-sec period C7 begins to charge at a rate selected by 'DELAY 1' control, RV6. When C7 charges to approximately 0V the output at (A) will go low allowing output (B) to go high selecting 'SLOPE 1' and the HOLD LEVEL as set by RV8. The output will now charge towards this new level at the SLOPE 1 selected rate. At the same time capacitor C4 is also released and begins to charge. When about half charged (around 0V) the output (B) will go low and output (C) high. Thus 'SLOPE 2' is selected and the 'FINAL LEVEL' set by RV9. The output cycle is thus complete and the final level will be maintained until the unit is retriggered.

Note that the slopes can be in either direction depending only on the settings of the level potentiometers.

Below are examples of output waveforms available.



If the 'HOLD DELAY' potentiometer (RV5) is switched off, the key hold time replaces the hold delay, and, if the key hold time is less than DELAY 1, then at the completion of DELAY 1, SLOPE 2 and FINAL LEVEL will be selected – thus eliminating SLOPE 1 AND HOLD LEVEL.

Fig. 4. Mounting bracket for Transient Generator 2.