

BUILD THIS

Percu Synt Ac

James J. Barbarello

LAST MONTH WE COVERED THE CONSTRUCTION of the PerSyn percussion synthesizer and "striking blocks" used to trigger the three percussion-tone generators. Now we are going to show you how to build and use three accessory devices that will greatly improve the versatility of the PerSyn. The accessory pulse generator can be used to trigger the PerSyn and produce a variety of sound effects. You can use the balanced modulator for special effects such as gongs and chimes, as well as the sound of bells and all the various types of drums. A special interface module will permit triggering the PerSyn from the amplitude envelope of an electrified instrument such as a guitar.

The pulse generator

The circuit shown in Fig. 10 produces a positive-going pulse that, when connected to a trigger input, will automatically trigger that generator in the PerSyn. The pulse rate is adjustable from about 1 to 500 hertz. The circuit is simply an oscillator designed around a 555 timer IC. To use, connect J1 (PWR) to TAP on the PerSyn and J2 (TRIG) to the appropriate trigger (TRIG) jack on the synthesizer. Some interesting effects that can be created include "Flying Saucer" (rotate the generator frequency control slowly clockwise) and "Talkbox" (set pulse generator frequency for a continuous output sound, rotate the generator frequency control between minimum and maximum). The PC board pattern is in Fig. 11; parts placement is in Fig. 12.

Balanced modulator

The circuit shown in Fig. 13 is essentially a voltage-controlled amplifier (VCA) whose control signal is provided by an internal oscillator. A generator output signal is connected to the modula-

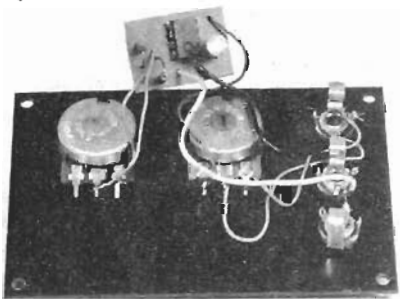
ssion hesizer cessories



If you built the PerSyn percussion generator described last month you'll want to try the three accessories described here to stimulate gongs, chimes, bells and all the various types of drums.



THE PULSE GENERATOR is designed to trigger the PerSyn generator at 1 to 500 Hz.



INSIDE THE PULSE GENERATOR. Components are on the tiny PC board.

tor's input. The modulator's output is, in turn, connected to a mixer input on PerSyn. Power is obtained by connecting power input jack J3 to J16 (TAP) on PerSyn. (Construction details are in Figs. 14 and 15.)

Before using, adjust R2 so that no output is heard when no input is provided, the modulator's LEVEL is at maximum and the modulator's FREQ is near maximum. By adjusting the GEN FREQ and ENVELOPE controls, and the modulator's FREQ and LEVEL controls, such effects as a chime, gong or other metallic sounds can be generated.

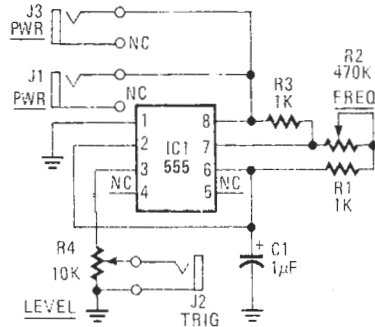


FIG. 10—SCHEMATIC DIAGRAM of the pulse generator. Timer IC is the main component.

PARTS LIST FOR PULSE GENERATOR (Fig. 10)

- R1, R3—1000 ohms, ¼ watt, 5%
- R2—470,000 ohms, miniature potentiometer, log taper
- R4—10,000 ohms, miniature potentiometer, linear taper
- C1—1 μ F, 10 volts or higher
- IC1—555 timer
- J1—J3—phone jack

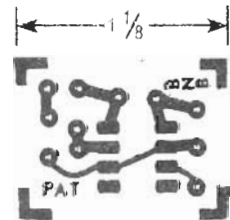


FIG. 11—FULL-SIZE foil pattern of PC board in the pulse generator.

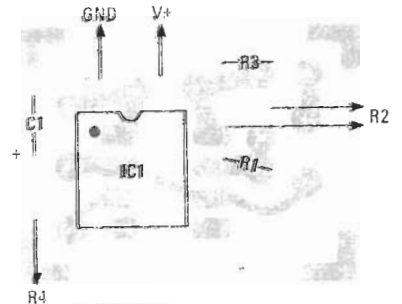


FIG. 12—COMPONENT PLACEMENT and connections to parts and points not on the board.

The modulator can also be used to create controlled distortion, that can add "crispness" to a bongo or such. Simply set the VOLUME control on PerSyn until distortion is heard and then back off the control just enough to remove the distortion.

Trigger interface

The circuit in Fig. 16 produces a positive going pulse each time the level of the

PARTS LIST FOR BALANCED MODULATOR (Fig. 13)

Resistors 1/4 watt, 5% unless otherwise noted

- R1, R5, R6—4700 ohms
- R2—100,000 ohms, miniature PC mount trimmer potentiometer
- R3—47,000 ohms
- R4—100 ohms
- R7, R10—22,000 ohms
- R8—100,000 ohms
- R9—10,000 ohms
- R11, R13—10,000 ohms, potentiometer
- R12—470 ohms
- C1, C2—1.0 μ F tantalum
- IC1—CA3080 transconductance op-amp (RCA)
- IC2—5558, LM1458 or MC1458 op-amp
- J3, J4—phono jacks

Note: Complete kits (including all required components, predrilled and marked enclosures) are available from BNB Kits, R.D. #1, Box 241H, Tennent Road., Englishtown, NJ 07726: Pulse Generator (PPG-1) at \$14.75; Balanced Modulator (PMA-1) \$19.95 and Trigger Interface (PTI-1) \$14.95. The PC boards alone (PPG-PC, PMA-PC and PTI-PC) are \$5.50 each.

The above prices include U.S. postage and handling. Canadian orders please add \$1.50. New Jersey residents add 5% sales tax. No C.O.D. orders. Please allow 4 to 6 weeks for delivery.

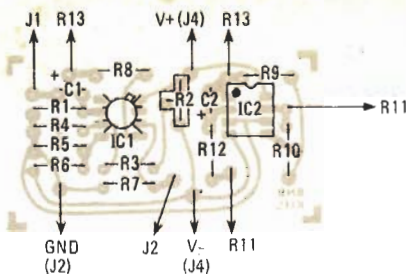


FIG. 15—THE TWO IC'S and other components are positioned on the PC board as shown.

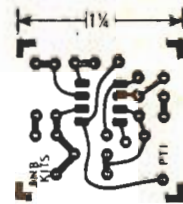


FIG. 17—THE INTERFACE FOIL PATTERN is shown full-size.

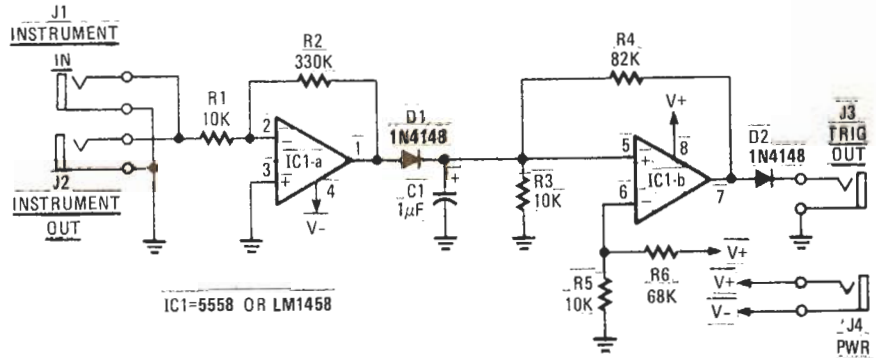


FIG. 16—THE TRIGGER INTERFACE produces a positive-going pulse when the amplitude of the input signal exceeds a preset level.

input signal goes above a preset level. In operation, your instrument is connected to J1 and J2 is connected to an amplifier. Jack J3 (TRIG OUT) is connected to an appropriate TRIG jack on PerSyn. The trigger interface is assembled on the PC

PARTS LIST FOR TRIGGER INTERFACE (Fig. 16)

Resistors 1/4 watt, 5% unless otherwise noted.

- R1, R3, R5—10,000 ohms
- R2—330,000 ohms
- R4—82,000 ohms
- IC1—5558, LM1458, CA1458 or equal
- D1, D2—1N4148
- C1—1 μ F, 10 volts or higher
- J1—J4—phone jacks, 1/8 inch

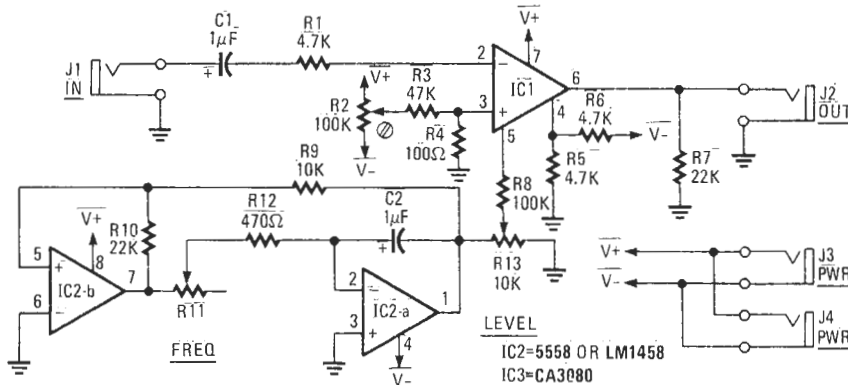


FIG. 13—THE BALANCED MODULATOR schematic diagram. Circuit is basically a voltage-controlled oscillator controlled by an internal source. Output feeds a mixer input on the PerSyn.

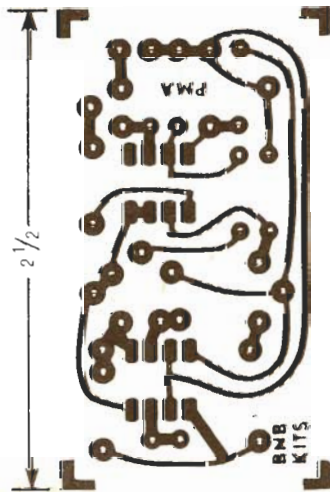


FIG. 14—BALANCED MODULATOR foil pattern is reproduced here at full-size. There is ample room for the few components used.

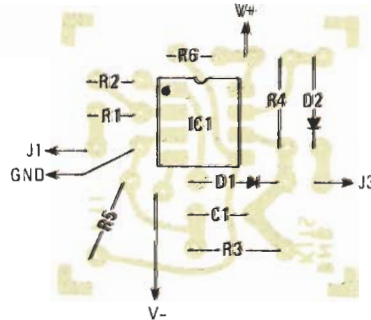


FIG. 18—HOW PARTS ARE GROUPED around the IC on the interface PC board.

board in Fig. 17. Assembly details are in Fig. 18.

As with the other options, power is obtained by connection to the TAP jack on PerSyn. Set your instrument's volume control to minimum. Slowly increase the instrument volume while striking a note

as hard as you will when you wish to trigger PerSyn, until an output is heard from PerSyn. You have just set the threshold level. Now any time your instrument is played at that same volume, PerSyn will be triggered. If you set your instrument's volume too high, you may hear a number of outputs from PerSyn each time you strike a note. To eliminate this multiple triggering effect, simply lower the volume slightly on your instrument until proper operation is obtained.

PerSyn has been designed to be nearly "goof-proof" in operation, so do not hesitate to experiment with all controls, interconnections and any special circuits you may think of. The more you experiment, the more you will realize the possibilities for new and different sounds.

In a follow-up article in an early issue, we will describe two additional accessories: the Snare/Cymbal and the Sequencer. The former allows synthesis of Snare Drum, Cymbal and special effects. This makes it possible to synthesize all conventional percussion sounds. The Sequencer produces three distinct programmable 8-bit serial trigger pulse patterns and can be used to automatically trigger the PerSyn and the Snare/Cymbal accessory. The PerSyn system can now double as a fully programmable complex rhythm unit. **R-E**