



# EMS

## Putney, Model VCS 3 (Audio Synthesizer) 1968

**BEFORE THERE WERE ANY video synthesizers, there were many kinds of oscillators. J.P. Boyer talked about the process of heterodyne where two known frequencies create the famous interference pattern as the basic synthetic principle. That's what the audio synthesizers had in their guts: a bunch of oscillators.**

**Mr. Mayer and his son seemed to peddle them from loft to loft in NYC, all five story walk-ups. I recall sending him from my five stories up to Ernie Gusella, five stories up at Forsyth Street.**

**Clearly, in comparison to audio, the video synthesizers have failed to proliferate. In most cases, they were only one of a kind. They came still born, or half blind with learning disabilities. They meant more by their concept and ideology than by their visual product. But as Paik predicted, they had to come nevertheless.**

**The Putney was a mortal blow to my ambitions in film. This was the first time where the big God's studio of the "Outside" just fit into a small wooden box from England. —W.V.**

### SPECIFICATIONS PUTNEY (MODEL VCS 3)

Power Supply: 220-240, or 105-115VAC, 50 or 60 cps. (battery operation is also possible—details on request).

Input Sensitivities: High Gain Inputs: 2 X 5mV AC into 600 ohms.

Low Gain Inputs: 2 X -2.5—0 plus or minus 2.5VDC into 47 K-ohms.

(Although the studio is self-generating and no input is required to produce a very large range of sounds, high gain AC inputs are provided so that microphones and other audio signals can be fed into the studio, and high impedance DC inputs so that external control voltages may be applied).

Output: 2 X 10V into 50 ohms (without panning facility—normally for driving amplifiers, tape recorders, etc.).

Line Level Outputs: 2 X 2V into 600 ohms (with panning facility—normally a headphones output).

DC Output: A control voltage can be brought out and applied to another device.

Every sound device has level controls for each output. There are three voltage controlled oscillators with various waveforms. Two of them are primarily designed for audio signals, while the third has a frequency range extending far below the audio

spectrum, and is intended principally for control. But all three can be used for either purpose, and oscillatory waveforms are available elsewhere as well. A combination of highly stable design and a stabilized power supply ensures a virtually drift-free performance from all three oscillators.

Oscillator 1. This has sine and ramp waveforms, and covers the large range of 1Hz to 20 KHz in one range, without switching. The two separate outputs can be mixed if so desired to provide a large range of timbres. Frequency control (as well as that of Oscillators 2 and 3) is by slow motion dial.

Oscillator 2. This generator has the same frequency range as Oscillator 1, and also has two outputs, but in this case the alternatives are square and ramp, and a shape control enables the waveform to be varied from asymmetrical (short pulse and sawtooth) through a symmetrical (square and triangle) to a mirror image asymmetrical with polarities opposite to those of the first position.

Oscillator 3. This has exactly the same waveform control arrangements as Oscillator 2, but has a specially low frequency range, extending from approximately 1 cycle every 20 seconds (.05 Hz) to 500 Hz. Thus very slow transitions of voltage control can be made.



INFO Frame 21367 to 24259



## TREATMENTS

**Envelope Generator (Attack/Decay).** This device has four time controls—attack-time, on-time, decay-time (which can also be voltage controlled), and off-time. The off-time control can be set so that repetition is automatic at a wide range of speeds, or so that a button or external switch must be pressed to activate each cycle. As mentioned above (Source No. 6) the repetition frequency of this generator is also available as a control trapezoid waveform.

**Reverberation.** A spring reverberation unit has a reverberation/direct signal ratio which can be either manually or voltage controlled, as well as an output level control.

**Trapezoid Output from Envelope Generator.** This output is available whether or not the attack/delay facility is being used. Normally a low frequency, it provides another shape of control waveform.

**Noise Generator.** This has amplitude and coloration controls, so that various bandwidths of noise can be obtained at any level.

**Ring Modulator.** This very advanced I.C. modulator has a high carrier rejection and low distortion. The only control needed is output level.

**External Sources.** Up to two simultaneous external sources (for example, a microphone and an external oscillator, or a second VCS 3 and a prepared tape) can be fed into the studio, where they can be processed with internally generated sources.

**Filtering.** A bandpass filter with manually controlled "Q" and manually or voltage controlled center frequency. When the "Q" is sharpened beyond a certain point the circuit becomes an oscillator (Source No. 5).

**Filter Used as Oscillator.** When the filter (see below) is adjusted so that it is self-oscillatory, it produces a very pure sine and wave output. Both filter and oscillator functions cannot, however, be used at the same time.

## MONITORING AND PATCHING

A meter is provided which can be plugged to read any required parameter. It can be used to log AC levels accurately, or as a center-zero DC meter to monitor subsonic waveforms which cannot be checked by ear. (If other indicating devices, such as an oscilloscope or a frequency meter, are available,



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it is a simple matter to connect them to the VCS 3). The patching is by a 16 x 16 way pin-panel matrix, completely eliminating unreliable and untidy cord patching. As well as being clearly labelled in words, the matrix carries a letter and number code which is repeated on the panel near the appropriate control. Each of the 256 locations in the matrix board can therefore be designated by simple map reference (B12, G4 for example). In addition, perforated templates can be marked with selected locations and placed in position over the matrix board, making pin plugging literally child's play.

## MANUAL CONTROL

As well as the attack/decay button mentioned above (Treatment No. 1), the studio is provided with a joystick which enables any two control parameters to be varied simultaneously with one hand, and the joystick is so placed that it and the button can both be operated by the right hand, leaving the other free for altering knobs or matrix plugging. In addition EMS will shortly announce a range of peripheral equipment, including a keyboard which it will be possible to add to an existing VCS 3 by simply plugging it in, a special DIN socket having been provided for this purpose.

## INPUT AND OUTPUT AMPLIFIERS

The input amplifiers (see general specification above) each have a level control on the panel. The two output amplifiers not only have tone controls as well as level controls, but can also be voltage controlled, so that amplitude modulation and automatic fades and crossfades can be applied. Pan controls, which cross one channel to the other, are available on the line outputs.