DON BUCHLA

Buchla 100 Series (Audio synthesizer), 1964

WE HAD TWO ENCOUNTERS with Buchla's instruments before we met the man. The first incident took place at Subotnick's NYU music studio on Bleecker street, right above Rogosin's Bleeker Street Cinema. There was a clandestine operation in progress: Subotnick's students were selling their alloted time on the "Buchla" to the public. They even advertised in The Village Voice. We picked up Bob Mason's ad and moved some video gear in there one evening. There was a mysterious man living in the room behind the studio. We were introduced later. His name was Serge Tcherepnin.

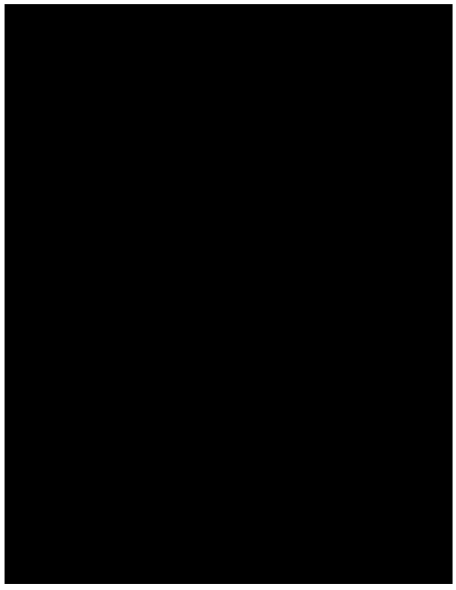
We started experimenting right away and of course it worked. Those machines were eager to copulate. We modulated the picture by the raw voltages and generated some sounds from the video. Then we got a bit of good luck. A student by the name of Rhys Chatham was eager to experiment free of charge. The next year he was to become the first music director of The Kitchen.

There was also a Buchla instrument at the National Center for Experiments in Television in San Francisco. We made a few interesting patches from which two videotapes "Sound Prints" and "Spaces II" survive. Steve Beck arranged for us to meet Buchla at his factory. Don was quite shy and there were a lot of exotic people and exotic smoke in his loft. It was years before we became friends. Now we get a preview of all his new instruments, we even buy them and like them very much indeed. We even adopted his Toyota Landcruiser which he parks in our backyard for his annual trips to the Indian Country. —W.V.

DONALD BUCHLA WAS BORN "somewhere in California." Educated in physics, physiology, and music, his multi-faceted creativity has been applied to fields as diverse as space biophysics research, musical instrument design, and multi-media composition. Much of his work has involved the refinement and utilization of communications channels between man and machine, notably the invention of mobility aids for the visually handicapped, the development of instrumentation for biofeedback and physiological telemetry, and the design of high level music composition languages. His innovative concepts in studio design and the originality and versatility of his musical instruments have led to his international recognition as one of the most progressive inventors on the music circuit.

"I WOULD SAY that philosophically the prime difference in my approach from that of Robert Moog was that I separated sound and structure and he didn't. Control voltages were interchangeable with audio. The advantage of that is that he required only one kind of connector and that modules could serve more than one purpose. There were several drawbacks to that kind of general approach, one of them being that a module designed to work in the structural domain at the same time as the audio domain has to make compromises. DC offset doesn't make any difference in the sound domain but it makes a big difference in the structural domain, whereas harmonic distortion makes very little difference in the control area but it can be very significant in the audio areas. You also have a matter of just being able to discern what's happening in a system by looking at it. If you have a very complex patch, it's nice to be able to tell what aspect of the patch is the structural part of the music versus what is the signal path and so on. There's a big difference in whether you deal with linear versus exponential functions at the control level and that was a very inhibiting factor in Moog's general approach.

Uncertainty is the basis for a lot of my work. One always operates somewhere between the totally predictable and the totaly unpredictable and to me, "source of uncertainty," as we called it, was a way of aiding the composer. The predictabilities could be highly defined or you could have a sequence of totally random numbers. We had voltage control of the randomness and of the rate of change. In this way you could make patterns that were of more interest than patterns that are totally random." —D.B.



Don Buchla

Buchla 100 Series

FRAME 090 step through next 5 frames

STEP BACK

STEP FORWARD

BUCHLA 100 SERIES

Model 100 Cabinet
Specially designed walnut cabinet accommodates power supply and 15 panel units. (Most modules are 4 1/4" x 7" and occupy one panel unit, but some are 8 1/2" or 17" wide and occupy two or four panel units.) Overall dimensions are 23" x 23" x 8".

Model 106 Mixer
Two 3-channel mixers with both separate and common outputs and level controls for each input.

Model 107 Voltage Controlled Mixer
Two 5-channel mixers with both separate and common outputs. Input levels are controlled by externally applied control voltages usually derived from a Model 114 touch controlled voltage source.

Model 110 Dual Voltage Controlled Gate
Two voltage controlled amplifiers generally used in conjunction with a Model 180 attack generator to control the envelope of applied signals.

Model 111 Dual Ring Modulator
Two independent ring modulators. Each output consists of the sums and differences between frequency components of two input signals. Original signals are suppressed about 55 db.

Model 112 Touch Controlled Voltage Source
Touch activated keys produce one of twelve preselected voltages at each of two outputs. A third output voltage is proportional to finger pressure, and a fourth output is a pulse generated whenever a key is activated. Generally used to initiate notes and control their pitches.

Model 114 Touch Controlled Voltage Source
Ten independent, touch activated keys, each with a corresponding control voltage output and pulse output. The voltage outputs are particularly useful for controlling gates (110) or mixers (107), and the pulse outputs for initiating attack waveforms (180) or other events.

Model 115 Power Supply
Regulated supply for powering a cabinetful of modules plus one or two keyboards. Installed in Model 100 cabinet, unit occupies no panel space.

Model 117 Dual Proximity Detector
Two capacitance-actuated control voltage sources for enabling spatial control of sound parameters. Theremin-style antennas may be remotely located.

Model 123 Sequential Voltage Source
Produces a sequence of two to eight programmed voltages at each of three outputs. Switching is accomplished by applying a pulse, usually from a Model 140 pulse generator. Indicator lamps show which of the 24 potentiometers are in control. Eight pulse outputs are energized as corresponding segments are switched. Unit may be used to simultaneously program pitch, amplitude, and duration of single or repetitive sequences of notes.

Model 124 Patchboard
Consists of 24 miniature audio jacks mounted on a panel. Used in studio installations to facilitate connection to tape recorders, monitors, and other auxiliary equipment.

Model 130 Dual Envelope Detector
Produces a control voltage proportional to the instantaneous amplitude of an applied signal. Detector time constant is variable from .01 to 1 second.

Model 144 Dual Square Wave Oscillator
Two independent oscillators in one unit. Frequencies are continuously variable from 5 cps to 20 kc and may be controlled internally or with externally applied voltages. There is provision for wide band amplitude and frequency modulation.

Model 146 Sequential Voltage Source
Produces a sequence of two to sixteen programmed voltages at each of three outputs. Otherwise identical to Model 123.

Model 148 Harmonic Generator
Generates a fundamental and its first nine harmonics (harmonic numbers 1 - 10). Fundamental frequency is continuously variable from 5 cps to 5 kc and may be controlled internally or with an externally applied voltage. There is provision for wideband frequency modulation. The 148 is frequently used in conjunction with mixers (106, 107), gates (110), and attack generators (180) to enable precise programmed envelope control of individual overtones.

Model 150 Frequency Counter
Four digit counter measures frequencies to 100 kc with a precision of 10 cps. Frequencies below 10 kc are measured with a precision of 1 cps.

Model 155 Dual Integrator
Produces continuous control voltage functions when used in conjunction with sources of discrete control voltages (e.g. keyboards, sequencers). Positive and

negative slopes may be individually and continuously varied from 15 volts in .0025 seconds to 15 volts in 10 seconds; either or both slopes may be voltage controlled. Particularly useful for generating complex voltage controlled envelopes, frequency glides, and repetitive control functions.

Model 156 Dual Control Voltage Processor
Serves to mix, compress and invert control voltages. Each channel has two control voltage inputs and an internal voltage source. Particularly useful for obtaining fine pitch control, transposition capability, and range compression of control voltage sources.

Model 157 Control Voltage Inverter
Four channel unit complements control voltages to accomplish a variety of inverted functions.

Model 158 Dual Sine-Sawtooth Oscillator
Two independent oscillators in one unit. Frequencies are continuously variable from 5 cps to 20 kc and may be controlled internally or with externally applied control voltages. Waveshape is continuously adjustable from sine to sawtooth; oscillators may be wideband frequency modulated.

Model 160 White Noise Generator
Produces white noise with a flat frequency distribution from 5 cps to 20 kc and weighted noise with a constant power per octave distribution.

Model 165 Dual Random Voltage Source
Produces two uncorrelated, random output voltages, each of which is changed by applying a trigger pulse. Used to randomize frequency, amplitude, and time.

Model 170 Dual Microphone Preamplifier
Two high-gain mike preamplifiers. Input connectors are 3 pin XLR. Input impedances are selected by a panel mounted switch.

Model 171 Dual Instrument Preamplifier
Two preamplifiers for electric guitars, contact microphones, and other low-level signal sources. Input impedances are 200 k (omega symbol); input connectors are standard phone.

Model 172 Dual Signal Leveler
Two high-gain, constant-output amplifiers. Output signal levels are maintained at 0 db (plus or minus 1 db) for input variations of from -40 db to +10 db. Time constants are variable from .05 to 5 seconds.


INFO Frame 18837 to 21366

Model 175 Dual Equalizer - Line Driver
Used in studio installations to drive 600 (omega symbol) headsets or unbalanced lines at a nominal +4 db (max. +20 db). Unit incorporates bass and treble controls of the variable turnover variety.

Model 176 Dual Hiss Cutter
Reduces tape hiss by restricting bandwidth of signals that would otherwise be masked by high frequency noise. Signals above a certain threshold (including fast transients) are unaffected.

Model 180 Dual Attack Generator
Two independent units produce envelope control voltages initiated by pulses. Attack time is variable from .002 to 1 second; decay time from .002 to 5 seconds; duration from .002 to 5 seconds. Duration may be optionally controlled by trigger pulse length.

Model 185 Frequency Shifter
Shifts frequencies contained in input signal by an amount equal to the applied carrier frequency. Raised and lowered signals are simultaneously available.

Model 190 Dual Reverberation Unit
Two independent spring type reverberators. Degree of reverberation is continuously variable.

Model 191 Sharp Cutoff Filter
Voltage controlled highpass and lowpass filters with 24 db/octave slopes. Cutoff frequencies are variable from 5 cps to 20 kc with no range shifting. Also functions as a bandpass filter with voltage controlled center frequency and bandwidth.

Model 192 Dual Lowpass Filter
Two lowpass filters with cutoff frequencies variable from 200 cps to 20 kc. Slopes have sharp knees and are 12 db/octave.

Model 194 Bandpass Filter
Divides an input signal into four frequency bands. Cross-over frequencies are 200 cps, 900 cps, and 4 kc. Slopes have sharp knees and are 12 db/octave.

Model 195 Octave Format Filter
Divides an input signal into ten frequency bands centered at octave intervals from 31 cps to 16 kc.

Model 196 Phase Shifter
Shifts phase of input signal such that a 90 degree (plus or minus 5 degree) phase relationship between the two outputs is maintained from 5 cps to 20 kc. Used in conjunction with ring modulators for frequency shifting or for exotic visual displays.