Jim Scott Accessories Commentary 17 Sept 2023

This should be preceded by a statement commenting that this document was created in the 1970's and refers to the state of the art some 50 years ago. This was a decade before MIDI and other more recent digital interfaces. Nowadays a large number of sequencer and programming devices exist. So, what I stated is back in the day is true, as far as it goes, but does not address the modern accessories market. It needs to be made clear that this is an historical record relating to control voltages such as for affecting pitch, and to gates/triggers to initiate articulation.

Triggers in historical Moog parlance refers to what in modern practice are referred to as gates. They do the same thing but are electrically incompatible. You cannot connect a trigger output to a gate input and expect it to function correctly. A trigger output is a switch closure to ground in the active mode and an open circuit equivalent in the inactive mode. A gate is a voltage signal. It is active when the voltage is high, often plus 5 volts or higher. It is inactive when voltage is low, usually zero volts. When a trigger or gate goes active, it is a signal for an event to occur, for example to initiate a contour generator to articulate a note. When this note was written, Moog Inc. equipment was still using triggers, as instituted by Bob Moog in 1964. I think maybe in the 1970's era some Moog terminology may have begun using the words "trigger" and "gate" interchangeably, which introduced a confounding factor.

Page 4, paragraph 2: I do not recall the "slide potentimeter" mentioned in conjunction with the ribbon.

Description of Accesories

I was briefly the ~~Chief~~ Chief Engineer after we moved to Cheektowaga. I was given the position. I did not want it in recognition of the Peter Principle and returned to being a project leader, in short order. That is where my skills were strong. Management was not my forte'

Jim Scott

5 May 2019

SYNTHESIZER ACCESSORIES

By James L. Scott
Chief Engineer
Moog Music, Inc.

SYNTHESIZER ACCESSORIES

WHAT'S AN ACCESSORY?

What are accessories for, you may ask? First of all accessories do not produce sound--synthesizers do that. Accessories are add-on units that plug into your synthesizer to expand its usefulness. They do this by providing additional control over the sounds your synthesizer makes. They fall into two categories: automatic accessories and playing accessories.

Automatic accessories such as Sequencers and Sample and Hold units run all by themselves to play a synthesizer or to create textures. The musician programs these devices, so to speak, to cause the synthesizer to generate patterns. For example, a sequencer is commonly used to generate complex rhythms or to generate controls so that the synthesizer will play a repeating melodic line.

Playing accessories on the other hand are directly operated by the performer to shape the sound of a synthesizer. They translate the movements of the musician's body into musical expressiveness. Moog manufactures Drums, Ribbons, Footpedals, and Footswitches for this purpose. With each of these the musician shapes pitch, or loudness, or timbre, or other effects. With the Drum or Ribbon the player also may articulate notes--that is, turn notes on and off.

Electronic music synthesizers are capable of a vast array of beautiful effects. All that nice sound is in there waiting for you to use it. Every synthesizer

comes with a keyboard as the primary playing control for pitch and articulation. However, a keyboard alone does not allow you to get the full potential out of your instrument. Playing accessories let you get your hands and feet into the guts of your axe. With these you twist and bend the sound for the expressiveness and nuance that constitutes true music making. Even a small machine like the Micromoog requires the use of all four limbs to get the most it can deliver.

OPEN SYSTEMS AND SYSTEMS INTERFACING

Interfacing is a bit of technical jargon that refers to interconnecting two or more systems so that they work together properly. For the purposes of this article, systems translated as synthesizers and their accessories. Moog synthesizers are open systems. That is, all Moog synthesizers allow introduction of controls from the "outside world" to vary important elements of sound. Some Moog synthesizers, especially the newer designs, can also send out controls to manipulate other synthesizers. Therefore, we may speak of synthesizer-to-synthesizer interfacing and accessory-to-synthesizer interfacing.

This writer is not particularly happy about having to impose terms like "systems interfacing" on you musicians in the first place. It happens, however, that the term has come into use in the electronics music world in the last year or two and so we have to deal with it here. All you need to do is keep in mind that an "open system" synthesizer possesses the flexibility to be interconnected with accessories and other synthesizers. With "open systems" or "systems interfacing" you can expand the music making power of your machine.

Since we've touched on the subject, we should spend a little time discussing synthesizer-to synthesizer interfacing even if it is somewhat outside the scope of this article. Using patchcords and cables one may interface two synthesizers

so that the first will control the second. For example, you can slave a Micromoog so that it will play in unison with the topmost note of the Polymoog. You can do this because both the Poly and the Micro are "open systems."

One may interface audio signals between synthesizers also. The audio output of any synthesizer may be routed through another to modify the sound. For example, you may pass the output of the Micromoog through the 907A Fixed Filter Bank in the System 15 Synthesizer to put a formant (series of resonances) on the sound. You must emply formant filtering if you wish to accurately simulate certain orchestral instruments.

Triggers turn notes on and off. Usually a synthesizer will be silent in the absence of a trigger. Most often the trigger comes from the keyboard. In a monophonic instrument the trigger starts when a key is depressed, stays on as long as a key remains held down and ceases when all keys are released. Triggers activate the contour generators which produce the attacks and decays of notes. The triggers that come from accessories are identical to the triggers that come from the keyboard. They come on for a time, then go off for a time. They determine the time between notes and the time each note stays on (i.e. tempo and duration).

PLAYING ACCESSORIES

The 1121 Foot Switch generates neither control voltages or triggers; it is designed for use with the Minimoog as a switch. Normally it may act as a sustain pedal or to turn keyboard glide on and off. (It may be modified to turn the Micromoog modulation on and off by moving one wire from the normally closed contact to the normally open contact).

The 1120 Pedal Control Source is a source of a continuously variable voltage that may be used to control the synthesizer. The 1120 produces no triggers, and is usually used with a trigger-producing device such as the keyboard. The pedal is used to bend pitch, control tone color, produce wah-wah, or to act as a volume expression pedal.

The 1150 Ribbon Controller is a fretless fingerboard that produces a continuously variable control voltage. The voltage is determined by the point depressed on the surface of a taut metallic ribbon. A slide potentiometer provides a second continuously variable control voltage. Triggers are produced by touching etched traces on the fingerboard. The 1150 contains a "memory" that retains after release the control voltage corresponding to the last portion of the ribbon element to be touched. Like the pedal, the ribbon may be used for pitch, tone color, wah-wah, and volume. Since the only moving part is your finger, it responds very quickly and readily yields, trills, vibrato, and glissando. One may play the ribbon like a one-string bass, articulating notes by tapping the trigger groove.

The 1130 Drum Controller is a drum which is modified with extensive electronic circuitry. It produces triggers and discrete control voltage changes each time the head is struck either with drumsticks or the hands. One way of using it with a synthesizer will give a sharp "snare drum" when struck sharply and a nice round "bass drum" when struck gently.

AUTOMATIC ACCESSORIES

A fair amount of confusion exists as to the distinction between a Sample and Hold (S & H) and a Sequencer. Furthermore, two types of Sequencers have come

into the marketplace: Analog Sequencers and Digital Sequencers which only adds to the confusion. Both Sequencers and Sample and Hold units make repetitive patterns that the user must in some fashion preset (program) into it. And often one can produce a very similar sounding effect on either machine. So what's the difference?

We can get a good idea of the contrast between a S & H and a Sequencer by comparing what each can and cannot do in a specific application--the production of a repeating melodic line. In both instances described below, we use the accessory to produce a stepped control voltage with a trigger synchronous with step transitions. (For the S & H assume that a sawtooth, i.e. non-random, waveform is being sampled).

The Sequencer has a precisely preset program. The user individually sets the pitch and duration of each note. The Sequencer may play either an equally-tempered scale or it may play any arbitrary interval between successive notes. It may play at a constant tempo or can generate complex rhythms. Individual notes can be edited (changed in pitch and duration) without affecting the pitch or time value of any other note. It is often impractical to change the program while the Sequencer is actually being performed. Typically one programs the Sequencer in advance and manipulates tempo (speed of playing) or transposes the key of the entire melodic line during use.

A S & H plays at a constant tempo only. One may vary playing speed but all notes are the same length. The pitch intervals are of an adjustable arbitrary step size with all steps the same size. Not only that, but the pitches will ascend (or descend) uniformly for a given length of time and then start over again at the bottom (or top). One cannot normally get true musical scales out of the thing.

One cannot tune an individual note without affecting all the rest. Unlike the Sequencer, the S & H can be widely and continuously varied during performance. It's a device that you can program "on the fly" instead of having to carefully program in advance and leave alone in the heat of battle.

Okay, now that we've shed some light on Sequencers and S & H units, what's this about analog and digital Sequencers? In olden times (7 years ago) analog Sequencers made their appearance on the scene. Analog Sequencers are manually programmed. One establishes pitches and times by presetting knobs. You need one knob for the pitch and another for the duration for each note. One-hundred notes takes two-hundred knobs, etc., which obviously means long sequences (non-repetitive) are not practical.

Enter the digital Sequencer a couple of years ago. The musician programs this little beast by playing into it from a keyboard. It contains a computer-style (digital) memory that retains the pitch and duration of each note played into it. When played back, the digital Sequencer causes the synthesizer to repeat exactly the same passage that the performer just read into it. The playback of course can be speeded up, slowed down, or transposed in key. The digital Sequencer is more easily reprogrammed in performance due to this "instant replay" feature. Also, since we don't have to contend with two knobs per note, we can make programming quite long sequences of notes practical. Digital Sequencers have one major drawback. Editing of individual notes becomes a much more clumsy process than with Analog Sequencers.

Moog manufactures the 1125 Sample and Hold and it manufactures the Complement A and Complement B Sequential Control Systems. At present Moog does not manufacture a digital Sequencer.

The 1125 Sample and Hold Accessory is capable of generating a series of stepped control voltage changes and synchronous triggers. A control voltage change and trigger may be initiated by playing the SAMPLE button, or a continuous string of voltage changes may be produced automatically, creating repeating metronomic patterns of sound when used to control the synthesizer. The string of control voltage changes may be repetitive, random, or a mixture of the two.

The Sequential Control Systems are a part of our Modular (i.e. Studio or Professional) line of equipment. Originally they were designed to assist avante garde composers realize their music in electronic music studio work. Now they have found a new place assisting gigging musicians performing live before an audience. We haven't the space here to go into all the things Moog Sequencers can do--that would take a short book. So let's just mention a few. They can control three separate pitches (chording), or they can simultaneously control up to 3 parameters of a series of single notes such as pitch, loudness, and tone color. They produce triggers synchronous with control voltage changes for contouring (articulating) notes. And their speed of operation (tempo) can be electronically varied over a wide range.

Well, I guess this brings me to the end of this short dissertation. What else is there to say, at this point about accessories but: "Try 'em; you'll like 'em." Your listeners will like 'em too.