

2/6/39
The MARTIN STRING-CONTROLLED SYNTHESIZER is in effect three musical instruments in one. The first one is a complete, extremely well built electric guitar which includes among it's features a finely crafted neck and a heavy-duty body strut combination. This design, conceived and realized by Jon Lundberg of Berkeley, California, includes an adjustable bridge and Bigsby, a 22 fret finger board, and two string pickups.

The second instrument consists of a complete, self-contained electronic synthesizer; a device capable of modifying and generating arbitrary musical waveforms, timbre, and envelopes. In addition to being able to process the guitar signal, the synthesizer contains internal signal sources such as oscillators and noise generators. It also contains signal modifiers and processors such as electronically variable filters, envelope generators, envelope followers, string followers and selectors, mixers, and voltage-controlled amplifiers. These circuits provide the ability to perform frequency modulation, amplitude modulation, ring modulation, and timbre modulation. All functions of the synthesizer are electronically controlled, a feature which allows any arbitrary operational mode to be set up simply by moving the slide controllers located on the front surface of the guitar.

The third instrument consists of the generation of an output signal which is a mixture of the guitar signal and the synthesizer signal. The ratio of this mixture, as well as the overall level, of it, is adjustable. The synthesizer is "string-controlled" in that setting the strings in motion in one way or another will initiate events programmed into the synthesizer by front-surface controls. The performer always has the option to change at any time from guitar-synthesizer to either pure

guitar or pure synthesizer. The synthesizer's various functions are easily selected or programmed by means of the slide potentiometers located on the front face of the guitar. These controls are arranged in logical functional groupings such as oscillator controls, envelope generator controls, mixers, etc. In order to make use of the extreme versatility inherent to the instrument, an internal patching network was developed which allows the maximum number of parameter controls to be brought out to the control surface.

The body of the prototype is made of plastic for purposes of demonstration and serviceability. The ~~design~~ design of the production model ^{will be} is restricted only by the space needed for the various electronic components. The synthesizer itself is constructed ^{USING} with integrated circuits, ~~which~~. Since these devices are the "state of the art" of present day semi-conductor electronics, they provide the best available reliability as well as the more obvious benefit of miniaturization. The circuit design of the synthesizer is such that the guitar may be played through any well-designed or commercially available amplifying system.

^{FUNCTIONAL}
The overall capabilities of the MARTIN STRING-CONTROLLED SYNTHESIZER compares favorably with existing larger synthesizer installations in that it has nearly all the functional capabilities of the larger instruments. It surpasses them in that it is the first completely functional instrument available for use in live performance, since its design entails ^{NEW} circuit developments which the other synthesizer manufacturers have not been able to construct.