

# MOOG 1971

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CATALOG '71

# In the beginning...

In two decades, electronic music has matured from an awkward and shy intruder in the realm of music to a dynamic and significant medium of musical expression, whose influence is to be felt equally in experimental avant-garde circles and in the more popular elements of today's musical culture. The increased accessibility of electronic music synthesizers for composition and live performance has been made possible by advances in technology and growing experience in the design of electronic instruments built specifically to meet the needs of musicians. Instrumental in bringing electronic music into the mainstream of contemporary listening has been the modular, voltage-controlled synthesizer concept as developed by R. A. Moog, Inc. This allows the musician control over many parameters of sound with an ease undreamed of in the early days of experimental tape studios.

The development of techniques for composing with electronically generated sounds began with the introduction of the tape recorder, which provided for the first time a means by which individual sounds could be physically manipulated and arranged. Early electronic music studios, such as the Columbia-Princeton Center in New York, were equipped with a number of tape recorders and a collection of electronic instruments—adaptations of standard laboratory, audio, and communications gear—that were capable of producing and modifying sound material. It was in these early studios that, through the ingenuity and insight of a number of pioneering tape composers, new types of musical material and new compositional methods were developed and explored.

The 1960s saw the emergence of a number of relatively small and easy to operate sound-generating and modifying systems, offering a convenient alternative to the use of expensive and musically inefficient laboratory equipment. The Moog synthesizer has become the most widely known and discussed of the present generation of synthesizers, and has proven its indispensability through its widespread acceptance. Today, Moog synthesizers are in use in hundreds of studios maintained by universities, recording companies, and private composers throughout the world. Dozens of successful recordings, film scores, and concert pieces have been realized on Moog synthesizers. Moog instruments have been as indispensable for university contemporary arts curricula as they have been for commercial work in radio and television.

## Synthesizer basics

A Moog synthesizer is an integrated system of modular instruments, each of which performs a single function in the generating, modifying, and shaping of the resultant musical tone or sound. The sounds thus produced are synthesized—they are whole entities assembled from their parts. Only a small percentage of these sounds suggest or simulate traditional musical instruments, for the

Moog synthesizer is really a new instrument, enabling the creative musician to generate and control new types of sound material difficult, if not impossible, to produce by traditional means.

The synthesizer consists of a number of separate, replaceable units called modules. Moog modules are compact (solid state circuitry on printed circuit cards), stable (high quality components), and easily serviced (any module may be removed for inspection in a fraction of a minute simply by removing the screws and unplugging the wiring connector). The use of patchcords (with standard phone plugs) to route audio, control, and timing signals between modules makes the most complicated network of signals instantly 'readable'. The variety of modular instruments on the synthesizer offers the composer the same flexibility as a classical studio, while the consistency of modular design allows him to think in terms of meaningful acoustic and musical operations without being encumbered by technical details.

Moog synthesizers are much more than 'packaged classical studios', however, for an integrating principle underlies the design of the modular instruments. Both programmed control and live performance are made practical realities on the Moog through voltage control—the use of electrical voltage variations to determine the operating characteristics of the signal-generating and signal-modifying instruments. Voltage control was first employed systematically in electronic music synthesizer design in 1964 by R. A. Moog. A voltage-controlled instrument has one or more control inputs which allow the instrument's operating point to be varied in step with an externally applied control voltage. Rapid and precise voltage variations may be produced by a variety of means, each with its own characteristics and advantages.

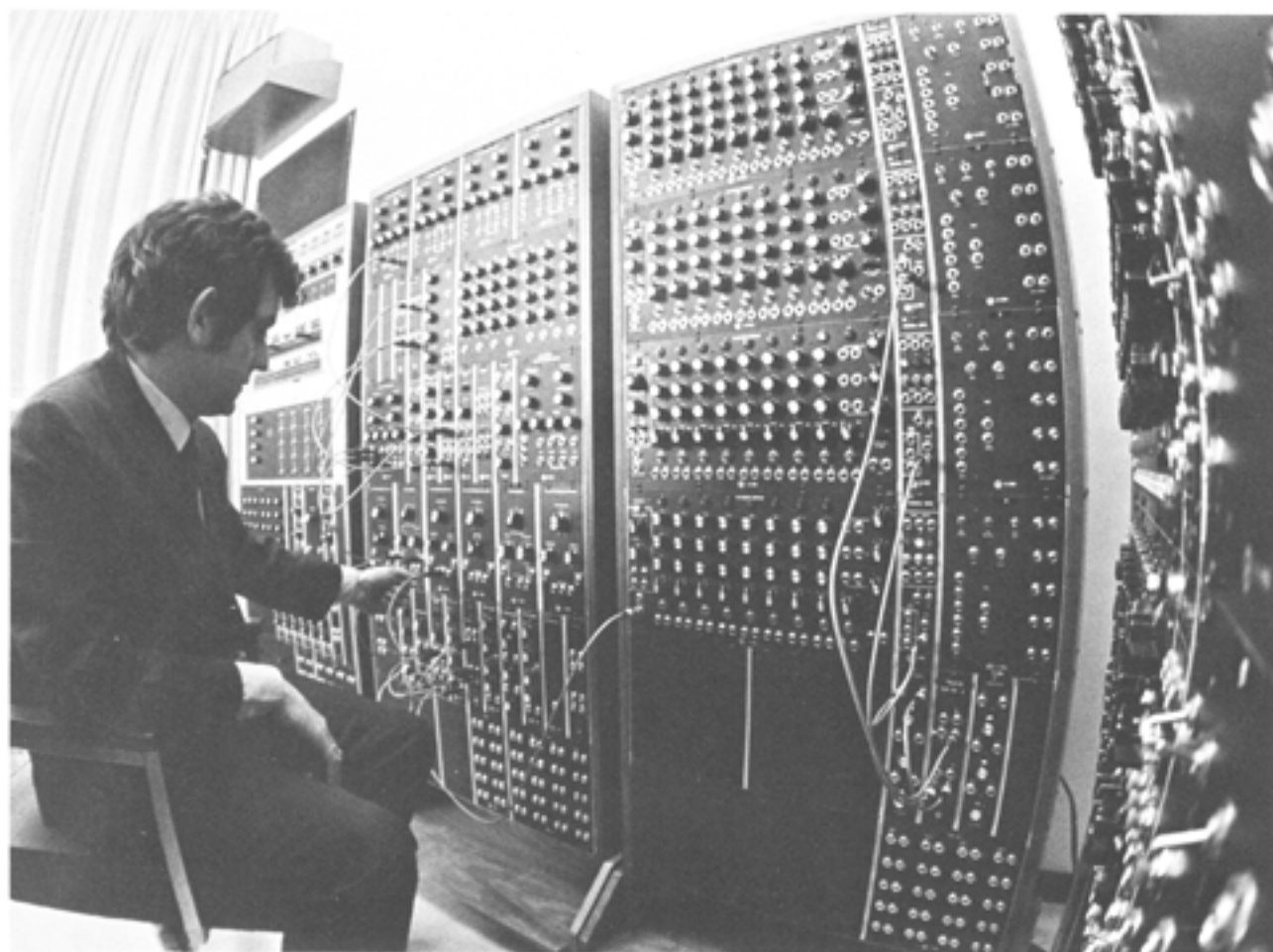
Accurate, wide-range voltage-controlled oscillators, amplifiers, mixers, and filters are the Moog synthesizer's basic signal-generating and modifying devices. Externally applied control voltages as well as panel controls are used to vary the operating points of these instruments. Control voltages are produced by the oscillators, envelope generators, and several types of manual and programmed devices. Manual controllers available from R. A. Moog include keyboard, ribbon, two-dimensional, and foot pedal controllers. The sequential controller, a programming module available either as a synthesizer component or in a separate sequencer complement, generates three independent patterns of discrete voltage change, providing a control voltage of considerable complexity. Non-voltage-controlled signal modifiers in Moog synthesizers include fixed filter banks, reverberation units, and four-channel mixers. A random signal generator (white and pink noise source) may be used either as a signal generator or as a control voltage to the voltage-controlled instruments.

All synthesizer modules are designed for as general application as possible. Voltage levels are adjusted so that, wherever possible, logical interconnections between instruments may be set up with a minimum of patchcords, and without level adjustments. Many voltages serve either signal or control functions, a feature made possible by the careful design and wide operating range of modular instruments.

Moog synthesizers are completely compatible with standard professional audio equipment, and can be installed in an existing studio with no modification. It is not necessary, however, to assemble an extensive studio. In addition to the synthesizer, a patch panel, a studio mixer, two or three tape recorders, and a monitor-amplifier and speakers are all that a working composition studio requires. The compatibility of Moog synthesizers with conventional audio equipment facilitates the processing of external signals (live instruments, voices, natural sounds, for instance) by the synthesizer, yet another example of the synthesizer's adaptability for live performance as well as tape composition.

R. A. Moog engineers are collaborating with musicians in the design of special synthesizers for studio composition, live performance, and educational applications. The Mini Moog is the first in a projected line of small but versatile performance synthesizers, which will place many of the basic resources of electronic music literally at the fingertips of the performing musician. In the planning stages are a number of highly sophisticated instruments, to be used in combination with small computers, which will offer sound material far beyond the capabilities of any standard equipment now in use. Finally, a series of classroom synthesizer components will bring instruction in the techniques of electronic music production into the curricula of schools everywhere, using equipment within their budgetary means. It is an exciting time for engineers as well as musicians, and we at R. A. Moog, Inc. invite you to participate with us in a dialogue of art and technology.

## A look at the future



CEMS (Coordinated Electronic Music Studio) at the State University of New York at Albany.

Designed and built by R. A. Moog, Inc. in collaboration with composer Joel Chadabe, this studio incorporates a balanced group of standard Moog modular instruments with a series of specially engineered interface modules. A four-digit wide-range digital clock plus eight 960 Sequential Controllers provide a complex sequence of timing and control signals. A voltage-controlled mixer coordinates the audio signals. This sophisticated studio system is an example of R. A. Moog capabilities in designing and building equipment to meet the specific needs of individual composers.



# Introducing... the Mini Moog



Model D Mini Moog

Newest in the expanding line of Moog products is the Mini Moog, a compact, moderately priced miniature synthesizer designed and built especially for live performance. The Mini Moog incorporates the basic synthesizer features to be found on our large modular systems in a lightweight, portable package designed to be easily set up and played. Front panel controls and switches eliminate the need for patchcords. The Mini Moog can be used to process any audio signal, live or recorded. Its audio output may be fed into any sound system or put directly on tape, while its auxiliary power output will power foot pedals or other accessory controllers. Detailed specifications are available on request.

## Basic Features

### SOUND SOURCES

- 3 Voltage-Controlled Oscillators, each offering a selection of six different waveforms
- Noise Source, generating white or pink noise
- Microphone/Accessory Preamp for introducing external audio signals for processing by the Mini Moog

**MIXER** with switches and volume controls for the five sound sources

### SOUND MODIFIERS

- Voltage-Controlled Lowpass Filter with contour generator and emphasis controls
- Voltage-Controlled Amplifier with contour generator controls

### CONTROLLERS

- Keyboard (full-size 3 $\frac{1}{2}$ -octave) for controlling pitch, and secondarily, filter
- Pitch Bender for expressive "bending" of notes
- Glide control for injecting portamento between notes
- Tune control for tuning entire Mini Moog
- 3 External Control Input jacks for external control of pitch, volume, and filter
- Trigger Input socket for external trigger

A-440 reference tone, a highly stable oscillator for use in tuning the Mini Moog and other instruments to Standard Pitch

### OUTPUTS

- Main Signal Output (phone jack) with volume control
- Headphone Output (phone jack) with volume control
- Auxiliary Power output (2 DC power sockets)

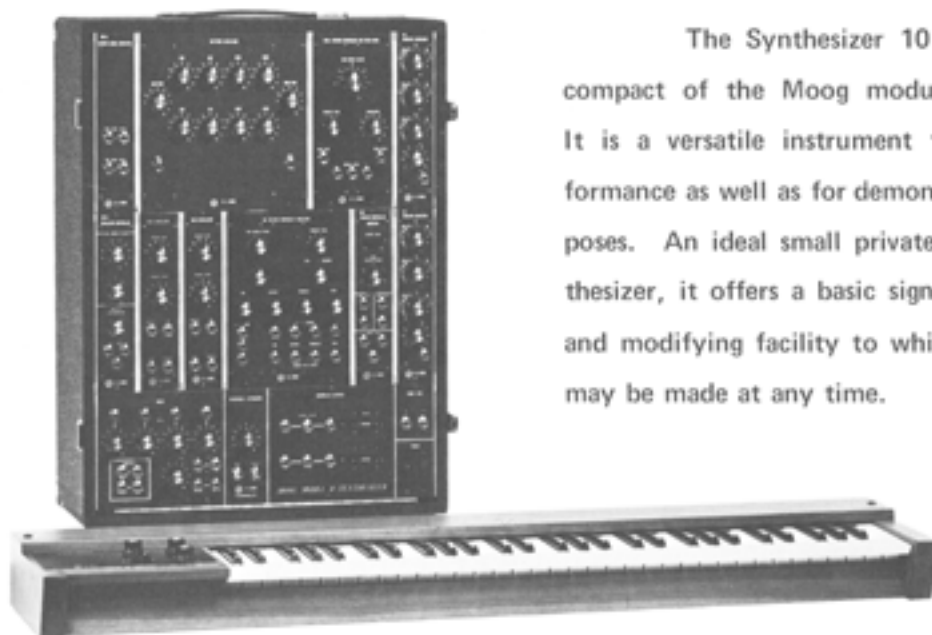
## Power Requirements

100-135 VAC, 50-60 Hz, 10 watts maximum  
A 2-wire AC power cord is provided.

## Dimensions & Weight

The front panel is hinged, and folds down flush with the case for easy carrying.  
Overall Size (with front panel down): 28 $\frac{1}{4}$ " wide, 16" deep, 5 $\frac{1}{2}$ " high  
Net Weight: 28 lbs.  
Shipping Weight: 45 lbs.

# the Synthesizer 10



The Synthesizer 10 is the most compact of the Moog modular systems. It is a versatile instrument for live performance as well as for demonstration purposes. An ideal small private studio synthesizer, it offers a basic signal-generating and modifying facility to which additions may be made at any time.

## Instrument Complement

- 1 901 Voltage-Controlled Oscillator
- 1 901A Oscillator Controller
- 2 901B Oscillators
- 1 902 Voltage-Controlled Amplifier
- 1 903A Random Signal Generator
- 1 904A Voltage-Controlled Lowpass Filter
- 1 907 Fixed Filter Bank
- 1 910 Power Supply
- 2 911 Envelope Generators
- 1 951 Keyboard Controller
- 1 Console Panel No. 11 including
  - 4-Input Mixer with + and - outputs
  - Jack Multiples
  - Reversible Attenuator
  - 2 Control Voltage and Trigger Outputs
  - 2 Trunklines
  - Power Switch

## Optional Equipment

- \* Add'l 951 or 950 Keyboard Controller
- \* 956 Ribbon Controller
- \* 958 Foot Pedal Controller
- \* 959 X-Y Controller
- \* Add'l Portable Case with your choice of modular instruments
- \* Portable Sequencer Complement A or B
- \* Step-Down Power Transformer for 50-60 Hz, 220-240 VAC operation

## Patchcord Complement

- 10 1-ft. cords
- 8 2-ft. cords
- 1 1-ft. switch trigger cord
- 1 18" switch trigger cord
- 1 switch trigger Y-cord

## Power Requirements

110-125 VAC, 50-60 Hz, 130 watts  
A standard 3-wire AC power cable is included.

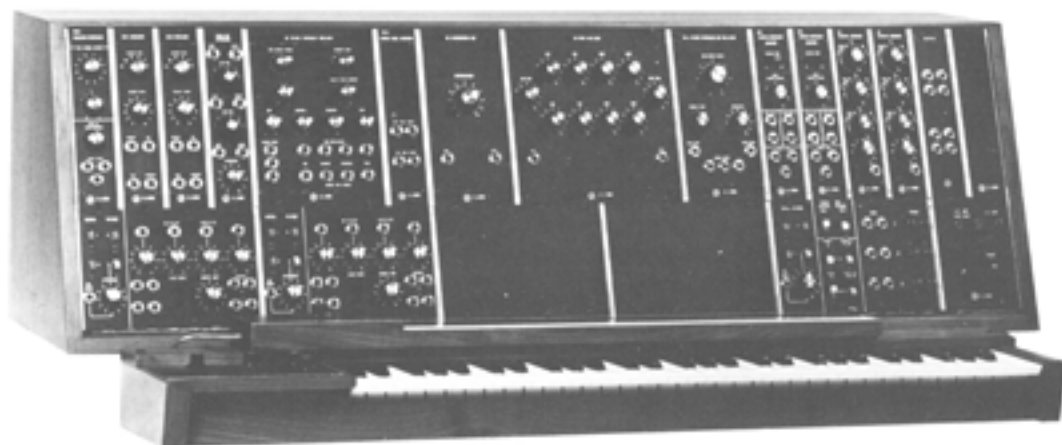
## Descriptive Material

A complete set of Schematics (circuit diagrams), Specification Sheets for important modules, and an Instruction Manual are included.

## Dimensions & Shipping Weight

Modular instruments are housed in a Portable Case measuring  
18" wide, 25" high, 9 1/2" deep  
Keyboard dimensions:  
43" wide, 4" high, 9 1/2" deep  
Shipping Weight: 78 lbs.

# the Synthesizer Ic



The Synthesizer Ic is an instrument of limited complexity, designed to satisfy the requirements of independent composers. It is particularly suitable for use in the teaching of electronic composition, and is an appropriate starting point in establishing an institutional studio.

## Instrument Complement

- 1 901 Voltage-Controlled Oscillator
- 1 901A Oscillator Controller
- 2 901B Oscillators
- 2 902 Voltage-Controlled Amplifiers
- 1 903A Random Signal Generator
- 1 904A Voltage-Controlled Lowpass Filter
- 1 905 Reverberation Unit
- 1 907 Fixed Filter Bank
- 1 910 Power Supply
- 2 911 Envelope Generators
- 1 950 Keyboard Controller
- 1 956 Ribbon Controller
- 1 991 Filter-Attenuator Panel
- 1 994 Jack Multiples Panel
- Blank Panel with power-supply wiring and space for one single-unit module
- 2 Console Panel No. 3, each including
  - 4-Input Mixer with + and - outputs
  - 2 Trunklines
  - Control Voltage Switches
  - Attenuator

- 1 Console Panel No. 4 including
  - Control Voltage Switches
  - Attenuator
  - Trigger- and Envelope-Routing Switches
  - 3 Control Voltage & Trigger Outputs
- 1 Console Panel No. 8 including
  - Power Switch

## Optional Equipment

- Add'l 950 or 951 Keyboard Controller
- 950B Scale Programmer
- 958 Foot Pedal Controller
- 959 X-Y Controller
- Upper Console Cabinet with your choice of modular instruments (Cabinets come in 12- and 22-unit sizes)
- Console Sequencer Complement A or B
- Step-Down Power Transformer for 50-60 Hz, 220-240 VAC operation

## Descriptive Material

A complete set of schematics (circuit diagrams, specification sheets for important modules, and an instruction manual are included.

## Patchcord Complement

- 8 1-ft. cords
- 6 2-ft. cords
- 4 3-ft. cords
- 4 4-ft. cords
- 2 5-ft. cords
- 2 3-ft. switch trigger cords

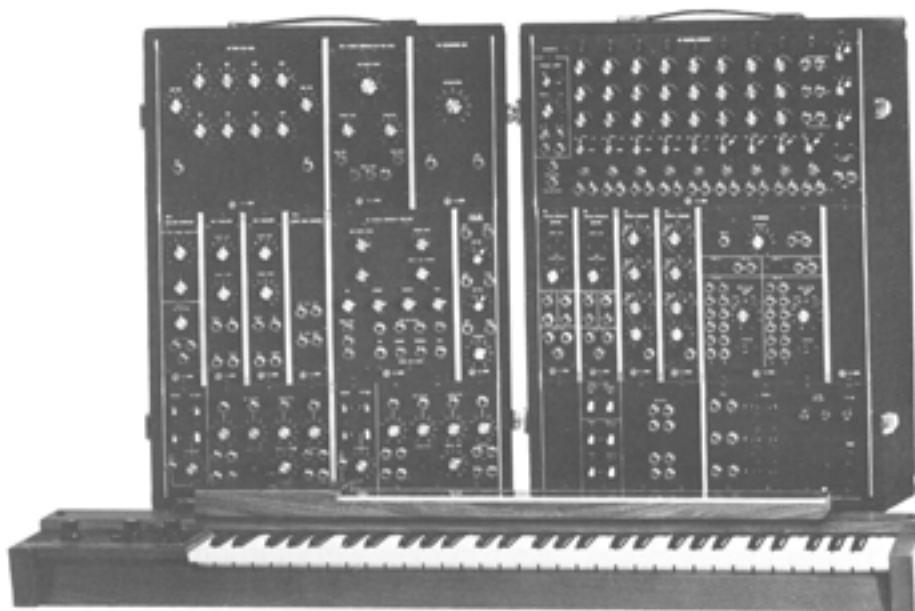
## Power Requirements

110-125 VAC, 50-60 Hz, 180 watts  
A standard 3-wire AC power cable is included.

## Dimensions & Shipping Weight

Modular instruments are housed in a walnut Console Cabinet measuring 48 1/2" wide, 15" high, 14" deep  
Keyboard Controller dimensions: 43" long, 4" high, 9 1/2" deep  
Shipping Weight: 117 lbs.

# the Synthesizer Ip



Synthesizer Ip with optional 960 and 961

The Synthesizer Ip is the portable version of the Ic. It has space for an optional sequential controller and sequencer interface.

## Instrument Complement

- 1 901 Voltage-Controlled Oscillator
- 1 901A Oscillator Controller
- 2 901B Oscillators
- 2 902 Voltage-Controlled Amplifiers
- 1 903A Random Signal Generator
- 1 904A Voltage-Controlled Lowpass Filter
- 1 905 Reverberation Unit
- 1 907 Fixed Filter Bank
- 1 910 Power Supply
- 2 911 Envelope Generators
- 1 950 Keyboard Controller
- 1 956 Ribbon Controller
- 1 991 Filter-Attenuator Panel
- \* Blank panels with power-supply wiring for optional 960 Sequential Controller and 961 Interface or other modules
- 2 Console Panel No. 3, each including
  - 4-Input Mixer with + and - outputs
  - 2 Trunklines
  - Control Voltage Switches
  - Attenuator

- 1 Console Panel No. 7 including Trigger- & Envelope-Routing Switches Jack Multiples
- 1 Console Panel No. 5 including 3 Control Voltage & Trigger Outputs Power Switch

## Optional Equipment

- \* Add'l 950 or 951 Keyboard Controller
- \* 950B Scale Programmer
- \* 958 Foot Pedal Controller
- \* 959 X-Y Controller
- \* Add'l Portable Case with your choice of modular instruments
- \* Portable Sequencer Complement A or B
- \* Step-Down Power Transformer for 50-60 Hz, 220-240 VAC operation

## Descriptive Material

A complete set of schematics (circuit diagrams), specification sheets for important modules, and an instruction manual are included.

## Patchcord Complement

- 8 1-ft. cords
- 6 2-ft. cords
- 4 3-ft. cords
- 4 4-ft. cords
- 2 5-ft. cords
- 2 3-ft. switch-trigger cords

## Power Requirements

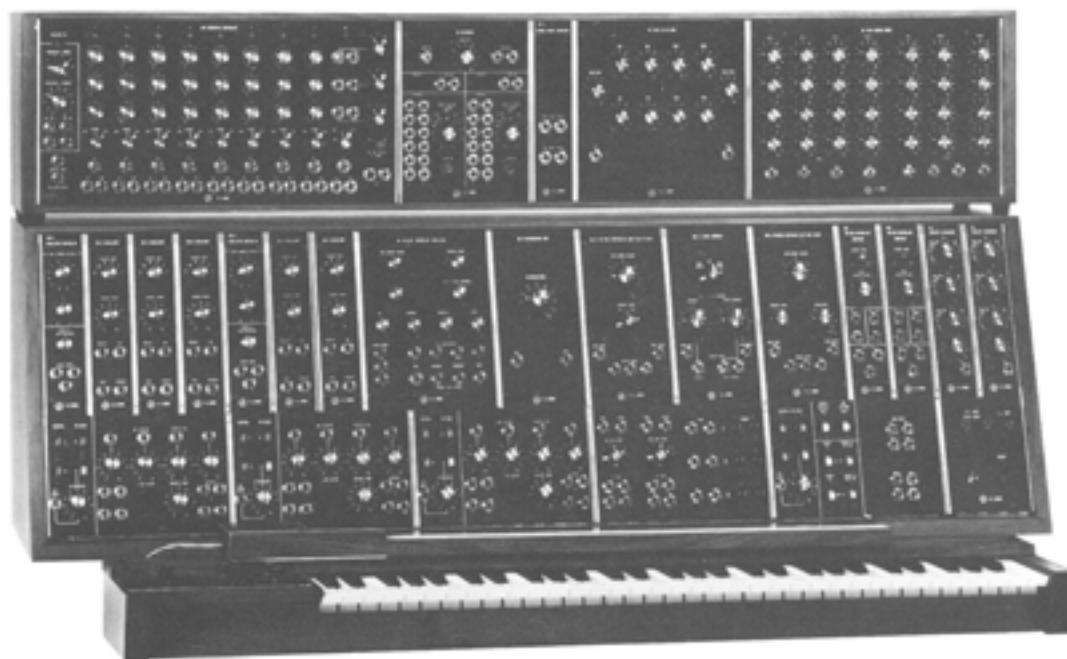
110-125 VAC, 50-60 Hz, 180 watts  
Standard 3-wire AC power cable and one inner connecting cable included

## Dimensions & Shipping Weight

Modular instruments are housed in 2 Portable Cases each measuring 18" wide, 25" high, 9 1/2" deep  
Keyboard Controller measures 43" long, 4" high, 9 1/2" deep  
Shipping Weight: 118 lbs.



# the Synthesizer IIc



Synthesizer IIc with optional 960 and 961

The Synthesizer IIc is a moderately priced middle synthesizer. It is suitable for use in an extensive course in electronic music composition techniques, or as a generating and processing facility in independent or moderate-sized institutional studios.

## Instrument Complement

- 1 901 Voltage-Controlled Oscillator
- 2 901A Oscillator Controllers
- 5 901B Oscillators
- 2 902 Voltage-Controlled Amplifiers
- 1 903A Random Signal Generator
- 1 904A Voltage-Controlled Lowpass Filter
- 1 904B Voltage-Controlled Highpass Filter
- 1 904C Filter Coupler
- 1 905 Reverberation Unit
- 1 907 Fixed Filter Bank
- 1 910 Power Supply
- 2 911 Envelope Generators
- 1 950 Keyboard Controller
- 1 956 Ribbon Controller
- 1 984 Four Channel Mixer
- \* Blank panels with power-supply wiring for optional 960 Sequential Controller and 961 Interface or other modules
- 3 Console Panel No. 3, each including
  - 4-Input Mixer with + and - outputs
  - 2 Trunklines
  - Control Voltage Switches
  - Attenuator
- 1 Console Panel No. 2 including Lowpass & Highpass Filters

## Jack Multiples

- 3 Control Voltage & Trigger Outputs
- 1 Console Panel No. 6 including
  - Control Voltage Switches
  - Attenuator
  - Trigger- and Envelope-Routing Switches
  - Jack Multiples
- 1 Console Panel No. 8 including Power Switch

## Optional Equipment

- \* Add'l 950 or 951 Keyboard Controller
- \* 950B Scale Programmer
- \* 958 Foot Pedal Controller
- \* 959 X-Y Controller
- \* Add'l Upper Console Cabinet with your choice of modular instruments (cabinets come in 12- and 22-unit sizes)
- \* Console Sequencer Complement A or B
- \* Step-Down Power Transformer for 50-60 Hz, 220-240 VAC operation

## Descriptive Material

A complete set of schematics (circuit diagrams), specification sheets for important modules, and an instruction manual are included.

## Patchcord Complement

- 10 1-ft. cords
- 6 2-ft. cords
- 4 3-ft. cords
- 4 4-ft. cords
- 2 5-ft. cords
- 2 1-ft. switch-trigger cords
- 2 3-ft. switch-trigger cords

## Power Requirements

110-125 VAC, 50-60 Hz, 200 watts  
A standard 3-wire AC power cable is included.

## Dimensions & Shipping Weight

Modular instruments are housed in two walnut console cabinets.  
Main Console Cabinet measures 48 1/2" wide, 15 1/2" high, 14" deep  
Upper Console Cabinet (22-unit) is 48 1/2" wide, 10" high, 8 1/2" deep  
Keyboard measures 43" long, 4" high, 9 1/2" deep  
Shipping Weight: 165 lbs.



# the Synthesizer IIp



The Synthesizer IIp is the portable version of the IIc. Its moderately complex facilities and convenient portability make it a flexible performance or studio system.

## Instrument Complement

- 2 901A Oscillator Controllers
- 5 901B Oscillators
- 3 902 Voltage-Controlled Amplifiers
- 1 903A Random Signal Generator
- 1 904A Voltage-Controlled Lowpass Filter
- 1 904B Voltage-Controlled Highpass Filter
- 1 904C Filter Coupler
- 1 905 Reverberation Unit
- 1 907 Fixed Filter Bank
- 1 910 Power Supply
- 2 911 Envelope Generators
- 1 950 Keyboard Controller
- 1 956 Ribbon Controller
- 1 984 Four Channel Mixer
- 1 991 Filter-Attenuator Panel
- 2 Console Panel No. 3, each including
  - 4-Input Mixer with + and - outputs
  - 2 Trunklines
  - Control Voltage Switches
  - Attenuator
- 1 Console Panel No. 4 including
  - Control Voltage Switches
  - Attenuator

Trigger- & Envelope-Routing Switches  
3 Control Voltage & Trigger Outputs

- 1 Console Panel No. 9 including
  - Power Switch

## Optional Equipment

- \* Add'l 950 or 951 Keyboard Controller
- \* 950B Scale Programmer
- \* 958 Foot Pedal Controller
- \* 959 X-Y Controller
- \* Add'l Portable Case with your choice of modular instruments
- \* Portable Sequencer Complement A or B
- \* Step-Down Power Transformer for 50-60 Hz, 220-240 VAC operation

## Descriptive Material

A complete set of schematics (circuit diagrams), specification sheets for important modules, and an instruction manual are included.

## Patchcord Complement

- 10 1-ft. cords
- 6 2-ft. cords
- 4 3-ft. cords
- 4 4-ft. cords
- 2 5-ft. cords
- 2 1-ft. switch-trigger cords
- 2 3-ft. switch-trigger cords

## Power Requirements

110-125 VAC, 50-60 Hz, 220 watts  
Standard 3-wire AC power cable and one inner connecting cable included

## Dimensions & Shipping Weight

Modular instruments are housed in 2 Portable Cases each measuring 18" wide, 25" high, 9 1/4" deep

Keyboard dimensions:  
43" long, 4" high, 9 1/4" deep

Shipping Weight: 170 lbs.

# the Synthesizer IIIc



The Synthesizer IIIc is the largest and most versatile of the Moog studio model synthesizers. Many Synthesizer III's have been installed as the basic signal generating and processing facilities in large institutional and commercial electronic music studios.

## Instrument Complement

- 1 901 Voltage-Controlled Oscillator
- 3 901A Oscillator Controllers
- 9 901B Oscillators
- 3 902 Voltage-Controlled Amplifiers
- 1 903A Random Signal Generator
- 1 904A Voltage-Controlled Lowpass Filter
- 1 904B Voltage-Controlled Highpass Filter
- 1 904C Filter Coupler
- 1 905 Reverberation Unit
- 1 910 Power Supply
- 3 911 Envelope Generators
- 1 911A Dual Trigger Delay
- 1 912 Envelope Follower
- 1 914 Extended Range Fixed Filter Bank
- 1 950 Keyboard Controller
- 1 956 Ribbon Controller
- 1 984 Four Channel Mixer
- 1 992 Control Voltages/Attenuator Panel
- 1 993 Trigger & Envelope Voltages Panel
- 4 Console Panel No. 3, each including
  - 4-Input Mixer with + and - outputs
  - 2 Trunklines
  - Control Voltage Switches
  - Attenuator

- 1 Console Panel No. 2 including
  - Lowpass & Highpass Filters
  - Jack Multiples
  - 3 Control Voltage & Trigger Outputs
- 1 Console Panel No. 8 including
  - Power Switch

## Optional Equipment

- \* Add'l 950 or 951 Keyboard Controller
- \* 950B Scale Programmer
- \* 958 Foot Pedal Controller
- \* 959 X-Y Controller
- \* Add'l Upper Console Cabinet with your choice of modular instruments (12- and 22-unit sizes available)
- \* Console Sequencer Complement A or B
- \* Step-Down Power Transformer for 50-60 Hz, 220-240 VAC operation

## Descriptive Material

A complete set of schematics (circuit diagrams), specification sheets for important modules, and an instruction manual are included.

## Patchcord Complement

- 14 1-ft. cords
- 8 2-ft. cords
- 6 3-ft. cords
- 6 4-ft. cords
- 4 5-ft. cords
- 2 1-ft. switch-trigger cords
- 3 3-ft. switch-trigger cords

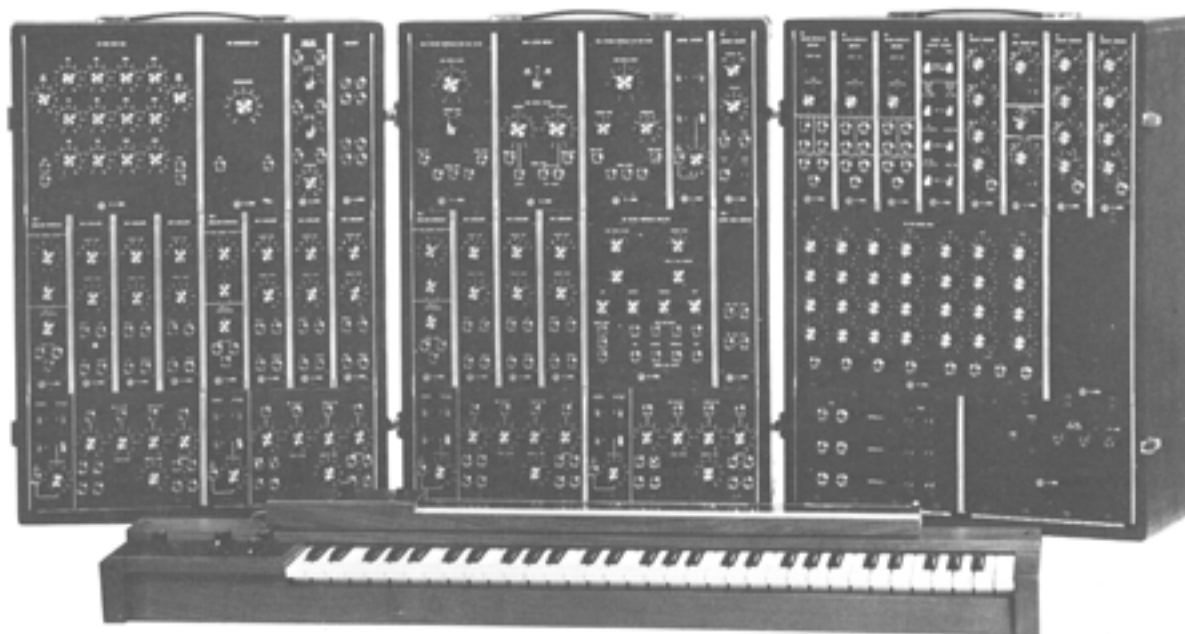
## Power Requirements

110-125 VAC, 50-60 Hz, 250 watts  
A standard 3-wire AC power cable is included.

## Dimensions & Shipping Weight

Modular instruments are housed in two walnut console cabinets.  
Main Console Cabinet measures 48 1/2" wide, 15 1/2" high, 14" deep  
Upper Console Cabinet (22-unit) is 48 1/2" wide, 10" high, 8 1/2" deep  
Keyboard Controller measures 43" long, 4" high, 9 1/2" deep  
Shipping Weight: 175 lbs.

# the Synthesizer IIIp



The Synthesizer IIIp is the portable version of the IIIc. It is capable of meeting the most stringent live-performance requirements, and is equally at home in a large studio.

## Instrument Complement

- 1 901 Voltage-Controlled Oscillator
- 3 901A Oscillator Controllers
- 9 901B Oscillators
- 3 902 Voltage-Controlled Amplifiers
- 1 903A Random Signal Generators
- 1 904A Voltage-Controlled Lowpass Filter
- 1 904B Voltage-Controlled Highpass Filter
- 1 904C Filter Coupler
- 1 905 Reverberation Unit
- 1 910 Power Supply
- 3 911 Envelope Generators
- 1 911A Dual Trigger Delay
- 1 912 Envelope Follower
- 1 914 Extended Range Fixed Filter Bank
- 1 950 Keyboard Controller
- 1 956 Ribbon Controller
- 1 984 Four Channel Mixer
- 1 991 Filter/Attenuator Panel
- 1 992 Control Voltages/Attenuator Panel
- 1 993 Trigger & Envelope Voltages Panel
- 1 994 Jack Multiples Panel
- \* Blank panel with power-supply wiring & space for two single-unit modules

- 4 Console Panel No. 3, each including
  - 4-Input Mixer with + and - outputs
  - 2 Trunklines
  - Control Voltage Switches
  - Attenuator
- 1 Console Panel No. 1 including
  - 3 Control Voltage & Trigger Outputs
- 1 Console Panel No. 9 including
  - Power Switch

## Optional Equipment

- \* Add'l 950 or 951 Keyboard Controller
- \* 950B Scale Programmer
- \* 958 Foot Pedal Controller
- \* 959 X-Y Controller
- \* Add'l Portable Case with your choice of modular instruments
- \* Portable Sequencer Complement A or B
- \* Step-Down Power Transformer for 50-60 Hz, 220-240 VAC operation

## Descriptive Material

A complete set of schematics (circuit diagrams), specification sheets for important modules, and an instruction manual are included.

## Patchcord Complement

- 14 1-ft. cords
- 8 2-ft. cords
- 6 3-ft. cords
- 6 4-ft. cords
- 4 5-ft. cords
- 2 1-ft. switch-trigger cords
- 3 3-ft. switch-trigger cords

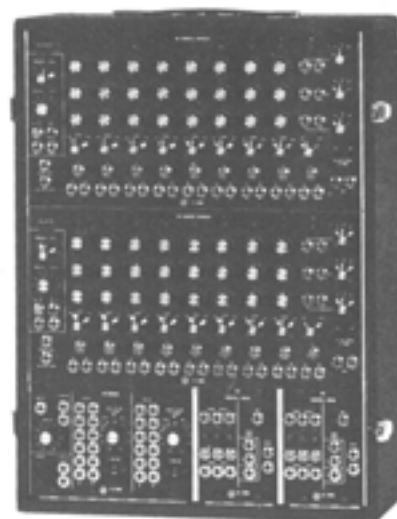
## Power Requirements

110-125 VAC, 50-60 Hz, 250 watts  
Standard 3-wire AC power cable and two inner connecting cables included

## Dimensions & Shipping Weight

Modular instruments are housed in 2 Portable Cases each measuring 18" wide, 25" high, 9 1/2" deep  
Keyboard dimensions: 43" long, 4" high, 9 1/2" deep  
Shipping Weight: 172 lbs.

# Sequencer Complement A & B



Complement B portable

The 960 Sequential Controller, 961 Interface, and 962 Sequential Switch are modular instruments. Available separately or as synthesizer options, they may also be purchased assembled into systems called sequencer complements. A Moog sequencer complement is a logical primary addition to the basic synthesizer, providing a complete programmed control facility which greatly increases the synthesizer's creative potential. Both Complement A and B are available in either portable case or console cabinet. All units include a built-in power supply for powering additional instruments. The Complement A is wired to permit expansion to a Complement B by the addition of a second 960 and 962.

## Instrument Complement

A	B	
1	2	960 Sequential Controller
1	1	961 Interface
1	2	962 Sequential Switch
*		Blank panels with space and power-supply wiring for conversion to Complement B
1	1	994 Jack Multiples Panel (console models only)
1	1	910 Power Supply (mounted inside on console models, on top of case on portable models)

## Patchcord Complement

4	8	2-ft. cords
2	4	4-ft. cords
2	3	1-ft. switch trigger cords
2	3	3-ft. switch trigger cords
1	2	special voltage trigger to switch trigger cord

## Descriptive Material

Schematics, module specification sheets, and a sequencer operating manual are included.

## Power Requirements

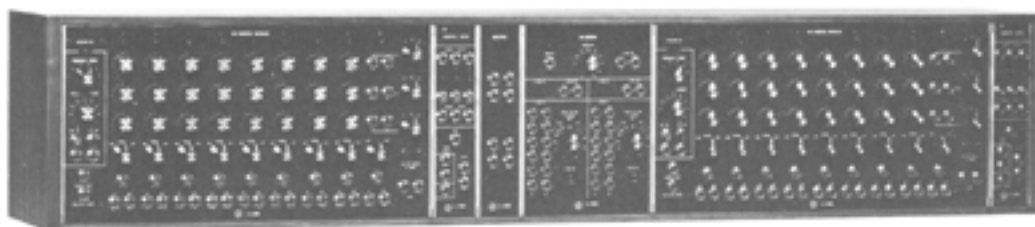
110-125 VAC, 50-60 Hz  
Standard 3-wire AC power cable included

## Dimensions & Shipping Weight

Instruments are housed either in a Portable Case  
18" wide, 25" high, 9 1/2" deep  
or in a walnut Upper Console Cabinet  
48 1/2" wide, 15" high, 14" deep

### Shipping Weight:

portable A 42 lbs. console A 45 lbs.  
portable B 49 lbs. console B 51 lbs.



Complement B console



# Moog module functions

## 901 VOLTAGE-CONTROLLED OSCILLATOR

Generates periodic sine, triangular, rectangular (pulse), and sawtooth waveforms at fixed and manually variable amplitude levels. The frequencies of these waveforms are variable within a range of from .1 Hz to 15 KHz, according to the sum of manually set and external control voltages. The width of the pulse waveform is manually variable.

## 901A OSCILLATOR CONTROLLER

Applies the sum of manually varied and external control voltages to the 901B Oscillators permanently connected to it. As frequencies of a band of 901Bs are varied by a 901A, the harmonic intervals formed by those frequencies remain the same. The function of a 901A and a 901B together is similar to that of a 901, except that on the 901A and 901Bs, amplitude levels are not variable. The widths of the 901B pulse waveforms may be set manually on the 901A.

## 901B OSCILLATOR

Generates periodic sine, triangular, pulse, and sawtooth waveforms. The frequencies of these waveforms may be controlled manually on the 901B, but control of their entire potential range depends on the control voltage supplied by the 901A to which it is permanently connected.

## 902 VOLTAGE-CONTROLLED AMPLIFIER

Processes the amplitude of one or two signals according to the sum of manually set and external control voltages. The relationship between the control voltage sum and the gain may be either linear or exponential. The 902 may also be used to invert a signal.

## 903A RANDOM SIGNAL GENERATOR

Generates two kinds of random voltage waveforms (white and pink noise) simultaneously.

## 904A VOLTAGE-CONTROLLED LOWPASS FILTER

Allows the lower portion of a signal's harmonic spectrum to pass, while varying the upper harmonic cutoff point, according to the sum of manually set and external control voltages, within a range of from 20 Hz to 30 KHz. In addition, a manual regeneration control varies the amplitude of a resonant peak at the cutoff frequency.

## 904B VOLTAGE-CONTROLLED HIGHPASS FILTER

Allows the upper portion of a signal's harmonic spectrum to pass, while varying the low frequency cutoff point, according to the sum of manually set and external control voltages, within a range of from 20 Hz to 30 KHz.

## 904C FILTER COUPLER

Permanently connected to the 904A and 904B, the 904C combines their functions into a single function which is manually invertible. In its bandpass mode, the signal paths of the 904A and 904B are placed in series (passing a variable center-frequency band), while in the bandreject mode they are placed in parallel (resulting in a void between high- and low-frequency cutoff points). The width and/or center frequency of the band or void is determined by the sum of manually set and external control voltages.

## 905 REVERBERATION UNIT

Adds mechanically produced (spring) reverberation to a signal, the amount of which is manually controlled.

## 907 FIXED FILTER BANK and 914 EXTENDED RANGE FIXED FILTER BANK

Passes selected portions of a signal's harmonic spectrum according to a number of manual controls on its panel, each of which varies the amplitude of a particular range of the spectrum.

## 910 POWER SUPPLY

Provides -6 and +12 volts regulated DC at 1.0 amperes for powering most of the 900 series modules. A -10 volt unregulated bias is also provided. Front panel features include a power on/off switch, fuse holders, and pilot light. Three power outlet sockets (Jones -303) are included at the rear for powering accessories.

## 911 ENVELOPE GENERATOR

Generates a voltage/time contour (DC voltage) which must be triggered. Time aspects of the curve's shape (initial rise, decay, sustain level, final decay) are preset manually. The 911 can be used to control transient variations in amplitude, timbre, or pitch. Connected to a 902, for example, it will determine the loudness/time contour of each voltage event (that is, each note).

## 911A DUAL TRIGGER DELAY

Allows manually variable delay of the initiation of each of two switch triggers. The two delays may also be coupled in series (tandem) or in parallel.

## 912 ENVELOPE FOLLOWER

Produces a voltage/time contour (DC voltage) which is proportional to the envelope of an AC input (command) voltage. The time that the DC circuitry takes to respond to changes in the magnitude of the command voltage is manually variable. The 912 also produces a switch trigger whenever the DC voltage rises above a manually variable threshold.

#### 950 and 951 KEYBOARD CONTROLLER

Produces a switch trigger and one of sixty-one discrete voltage levels when a key is depressed on its conventional five-octave organ keyboard. The intervals between successive levels are equally tempered, but the magnitude of the common interval can be varied manually, as can the range of the entire scale. A manual control varies the time of continuous glide between levels (portamento). The 950 includes wiring and connectors for the addition of a 950B; the 951 does not have this feature.

#### 950B SCALE PROGRAMMER

Designed to be connected to the 950 Keyboard Controller, the 950B bypasses the 950's equal-tempered interval control, thus allowing for the individual tuning of each note on the keyboard. The 950B consists of sixty independent manual controls, each of which varies the magnitude of an interval between two successive voltage levels on the 950. Tuning is continuously variable from 0 to 2 semitones.

#### 956 RIBBON CONTROLLER

Generates a switch trigger and a voltage of continuously variable or discrete magnitudes, according to the position of a pressure point applied to a taut metal band stretched across a resistance ribbon. The total range is manually variable.

#### 958 FOOT PEDAL CONTROLLER

Generates a continuously variable voltage level, the magnitude of which is controlled by the position of the foot pedal.

#### 959 X-Y CONTROLLER

Generates two continuously variable voltage levels, the magnitudes of which are manually variable by means of a control rod moved along the X and/or Y axis. The 959 can thus be used to control two different parameters of a sound at once.

#### 960 SEQUENTIAL CONTROLLER

Generates three control voltage contours separately and simultaneously. Each contour is composed of a maximum of eight manually preset discrete levels. Each level may be triggered separately, or by the 960's pulse wave oscillator as part of a repeating sequence. A voltage trigger is produced each time a level is triggered. When the levels are triggered in automatic sequence, the rhythm and tempo of the sequence is determined by the sum of manually set and external control voltages. Selected levels may be eliminated from the sequence.

#### 961 INTERFACE

A conversion module, the 961 converts voltage triggers (required by most modules) to switch triggers (required by the 911 and 911A), and vice versa. It also converts AC (audio) signals to voltage triggers, with manually variable sensitivity. The duration of switch triggers generated from voltage triggers is manually variable.

#### 962 SEQUENTIAL SWITCH

A three-position electronic switch which allows various modes of selecting one of three input signals. Signals may be selected manually or triggered by externally applied voltages. The 962 will also shift automatically in a repeated sequence from one input to the next, either between the first two or among all three, according to a rise in voltage applied to the shift input. Trigger outputs corresponding to the trigger of each input are produced. Connected to the 960, the 962 increases the maximum number of discrete levels in a sequence from 8 to 24.

#### 984 FOUR CHANNEL MIXER

Combines four input signals, cross-coupling them to any of four output channels by a matrix of sixteen input level controls. Each of the four output channels has bass and treble controls, as well as its own output level control.

### BODE INSTRUMENTS

R. A. Moog manufactures and distributes ring modulators and frequency shifters designed by Harald Bode. These instruments are fully solid state and conform to professional audio equipment standards. They are widely used in important studios, and can be used in conjunction with Moog synthesizers and other systems. Built for standard relay rack mounting, with front panels 19" wide, 3 1/2" high.

#### 6401 BODE RING MODULATOR

Produces an output signal composed of the sum and difference frequencies of the two input signals (program and carrier). Frequency response is  $\pm 2$  dB from 30 Hz to 20 KHz. Built-in power supply for 110 VAC operation. Front panel features include squelch threshold control and squelch on/off switch for carrier suppression in absence of program signal.

#### 6402 BODE DUAL RING MODULATOR

A dual channel version of the Model 6401. Completely separate channels, each with two signal inputs and one output. Same specifications and features as 6401, aside from duplication of circuitry.

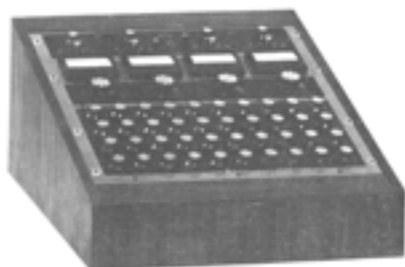
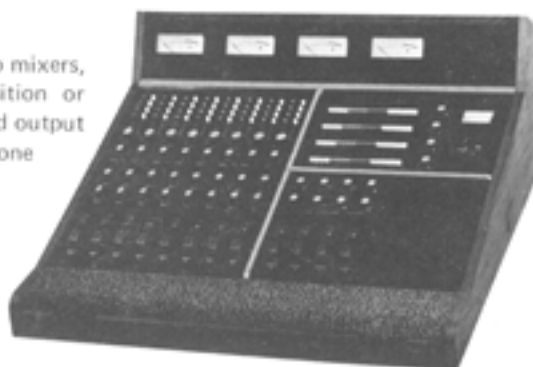
#### 6552 BODE FREQUENCY SHIFTER

Produces an output signal containing the frequencies of the program input, shifted by an amount equal to the frequency of the carrier input. Output can be either sum or difference frequency. Carrier frequency range is 40Hz to 10 KHz. Built-in power supply for 110 VAC. Squelch threshold control and squelch on/off switch provided.

## R. A. MOOG OFFERS THESE ADDITIONAL PRODUCTS:

### 1200 Studio Mixer

The 1200 Studio mixer is an innovation in the field of studio mixers, providing signal-coordinating facilities for an extensive composition or recording studio. It has 8 line level inputs, 4 output channels, a send output channel, and 2 receive inputs, in addition to 2 independent microphone preamp inputs and a 4-channel monitoring system. Bass and treble equalization controls are provided for each of the line inputs. A unique feature is the system of panning and routing switches. Detailed specifications are available.



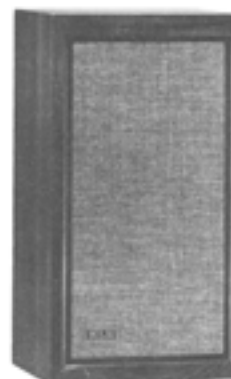
### 1084 Mixer

The 1084 is a signal coordinating center of moderate complexity designed to meet the requirements of modestly scaled electronic studios. It features 8 line level inputs and 2 microphone preamp inputs, with level controls arranged as a matrix, in addition to 4 output channels and 4 independent monitor channels.

### Other Studio Accessories

R. A. Moog manufactures or distributes all of the components that go to make up a basic electronic composition studio. Central to any studio is a Moog custom-built Patch Panel, through which all connections between synthesizer, mixer, tape recorders, monitoring system, and any other units may be made. To complete your studio R. A. Moog offers 2-and 4-track tape recorders by Scully, amplifiers by McIntosh, and speakers by KLH, Bose, and Bozak.

KLH Speaker



959 X-Y Controller

### Synthesizer Extras

A number of additional modules and single-function instruments not included in standard Moog Synthesizers are listed on page 14. In addition to the instruments described, special modules or other instruments can be made to order. Portable Cases, Upper Console Cabinets (12- and 22-unit sizes), and 19" wide RM-1 Eight-Unit Rack Mounts (built to fit standard relay rack) are available to house additional modules.

## DESIGN & INSTALLATION OF COMPLETE STUDIOS

In addition to designing and manufacturing electronic music equipment, R. A. Moog specializes in the design and installation of complete electronic music studios. We have planned and installed a variety of studios and have advised and worked on many more. Synthesizers both standard and custom-built can be integrated with existing or newly acquired studio accessories and audio equipment, computerized programming devices, and recording or live-performance facilities to create a studio suited to your purposes. Installations range from basic teaching studios to highly sophisticated compositional facilities.

## SPECIAL INSTRUMENTS AND SYSTEMS

The Sales Department at R. A. Moog, Inc. welcomes the opportunity to discuss your particular needs. It is always possible to extend the capabilities of a standard synthesizer through the addition of modules, cases, cabinets, and accessory equipment. If you would like to arrange for a custom synthesizer, design charts are available to aid you in choosing and arranging your own selection of modular instruments. In addition to the systems and instruments described in this catalog, R. A. Moog has designed and manufactured systems and instruments to meet specific requirements. These have included:

- special systems assembled from standard instruments
- specially designed manual controllers
- programming devices
- signal-scrambling facilities (vocoders)
- custom mixers and mixing consoles
- frequency-controlled variable speed tape recorders
- special performance equipment
- live signal processing systems
- systems for scientific and educational purposes

## TERMS OF SALE

Terms of sale of Moog synthesizers and standard Moog products are: 50% with order, balance on delivery. Purchases by rated institutions are payable within thirty days from date of invoice. Terms for special instruments can be arranged at the time of sale. Orders are acknowledged promptly, and an estimated delivery date is furnished. Instruments and systems weighing less than 50 lbs. will be shipped by parcel post or United Parcel Service. Larger systems will be shipped by truck or air freight. Shipping and insurance costs will be assumed by the purchaser. Prices are F. O. B. Trumansburg, New York. Further information may be obtained by contacting the Sales Dept.

## CUSTOMER SERVICE

The R. A. Moog Warranty covers all instruments against defects in materials and workmanship for a period of one year. After the one-year period, instruments will be serviced at a nominal cost. Requests for servicing should be sent to the Service Manager, R. A. Moog, Inc. If the servicing problem is confined to one or two individual modules, the instruments believed to be defective may be sent to our factory with transportation charges prepaid, while a temporary loan of replacement modules is sent to the customer by the fastest available method. Defective units are serviced and returned, usually within 48 hours. Field service is available in certain localities for inter-system problems requiring the presence of a field technician.

## ELECTRONIC STUDIO USE

As part of its educational program, R. A. Moog maintains at its Trumansburg headquarters a complete model electronic studio which is open for inspection and extended use by composers, performers, and music educators working in the electronic music medium. The studio may be scheduled for experimental, instructional, or commercial use at rates including the services of a Moog engineer or resident musician. Write to us for studio rate schedules.

## FURTHER INFORMATION

Descriptive literature, demonstration recordings, price lists, and other material will be sent on request. Guided tours of our factory and studio in Trumansburg, ten miles north of Ithaca in the heart of New York's scenic Finger Lakes region, are available by appointment. We welcome the opportunity to acquaint you with Moog equipment, and to participate with you in the development of new concepts in electronic music instrumentation.



**R. A. Moog, Inc.**

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