

PAIA

ELECTRONICS, INC.

DIGITAL CONTROL COMES TO ELECTRONIC MUSIC

P-4700/J (see page 3)



8700 Computer/Controller
(see page 11)

3750 Programmable Drums
(see page 19)

PAIA SYNTHESIZER SYSTEMS...

From the analog basics to



4700/S



2720/R

... for the beginner, a package configuration devised by experienced users removes a lot of the guess work. As you grow, your system can grow because every PAIA module from the simplest to the most complex, those you buy today and the ones that we're developing for tomorrow, are compatible. Not by accident, by design.

Because these packaged systems are standard products, they are easier to manufacture, process and ship. These savings are passed along as lower prices.

2720/A BASIC KEYBOARD SYNTHESIZER KIT

Everything you need to begin synthesizing sounds ranging from flutes, snare drums and the sound of the wind to conjuring sounds from your own imagination. Shown above, the 2720/A is the ideal place to start for the semi-professional or serious amateur with applications in the small recording studio or radio station and is excellent for grade school through university level music labs. Package includes one each of the following 2720 series modules: VCA, Function (Envelope) Generator, Band-pass and Low-pass filters, Control Oscillator/Noise Source, VCO, Power Supply and Keyboard/Case. Includes Step-by-Step instructions, User's manual and materials for 6 audio patch cords and 12 control voltage patch cords.

No. 2720/A BASIC KEYBOARD SYNTHESIZER KIT \$230.00 *24 lbs.

2720/R SYNTHESIZER KIT

If you already know something about electronic music the 2720/R expands your capabilities. You can even process external signals from guitar, microphone, etc. Module complement includes everything that's in the 2720/A plus 2720-11 Envelope Follower Trigger, 2720-12 Inverter/Buffer and 2720-14 Sine Converter/Pulse Width Modulator.

No. 2720/R Synthesizer Kit \$269.00 *26 lbs.

4700/S

When you combine all of the modules that are part of this package and then throw in a keyboard, 12 event sequencer and a four input stereo mixer, it's almost like having two synthesizers in a single package. Wrap them all in sturdy road cases and you have an instrument that goes anywhere and does any job. Module complement includes: Road keyboard with glide, two road module cases, two balanced modulator/VCA's, stereo mixer, reverb, three 4720 VCO's, 4730 VCF, two envelope generators, three watt blocks, control oscillator/noise source and 12 event sequencer.

No. 4700/S synthesizer kit \$525.00
(shipped freight collect)

... COST EFFECTIVE DESIGNS

computer controlled digital systems



4700/C



4700/J

4700/C

The ideal monophonic starter system. Can be used without a computer/processor as a conventional electronic music synthesizer. But, by simply unplugging the synthesizer head from the keyboard, a computer can be put into the loop to provide power and versatility never before possible for synthesizers of any cost. The 4700/C module complement includes the 8782 Encoded Keyboard, Digital to Analog Converter, 2720-5 Control Oscillator/Noise source, 4710 Balanced Modulator/VCA, Reverb, 4720 VCO, 4730 VCF, Envelope Generator, two Watt Block power supplies and a 4761 Wing Cabinet, complete step-by-step assembly instructions and using manual.

No. 4700/C Synthesizer Kit

\$325.00

(shipped freight collect)

4700/J

By anyone's standards this is a BIG synthesizer, as you can see by reviewing the module complement. Like our other packages, it may be used without a computer as a normal monophonic synthesizer. With a computer in the loop, you are ready to do polyphonic instruments, multi-track recording work, and innumerable composer and performer assisting functions that are only possible with a computer/synthesizer combination. The 4700/J module complement consists of: the 8782 Encoded Keyboard, Digital to Analog Converter, QuASH, two 4710 Balanced Modulator/VCA's, three 4720 VCO's, 2720-5 Control Oscillator/Noise Source, 4730 Filter, 4711 Stereo Mixer, two Envelope Generators, Reverb, three Watt Block power supplies and two Road Module Cabinets. Included are step-by-step assembly instructions and using manual.

No. 4700/J Synthesizer Kit

\$549.00

(shipped freight collect)

P-4700/C & P-4700/J

These P-4700 series packages pull it all together: synthesizer, computer and software ready to load from any cassette recorder and begin playing. Each package includes all of the synthesizer modules listed above as well as an 8700 Computer/Controller fully loaded with RAM, CS-87 cassette interface, power supply and all required hardware and connectors. Each represents a significant savings when purchased in this package configuration.

Music software and firmware provided with the P-4700/J includes both the MUS-1 PROM and PMUS cassette. The P-4700/C package includes the SEQUE 1.0 sequencer operating system.

P-4700/C Synthesizer with Computer Controller \$499.00
(shipped freight collect)

P-4700/J Synthesizer with Computer Controller \$749.00
(shipped freight collect)



keyboard with computer/controller
as featured in P-4700 packages.
(Cassette recorder not included.)

DIGITAL INTERFACE MODULES



EQUALLY TEMPERED DIGITAL TO ANALOG CONVERTER

Unlike more conventional R-2R ladder type digital to analog converters, the PAIA 8780 kit is based on a multiplying principle that allows the module to generate the exact exponential stair-step function required to make even the simplest linear response oscillators and filters produce equally tempered musical intervals. The 8780 uses only 6 bits of data to generate over five octaves of control voltage. In an 8 bit system, the remaining two bits are ordinarily reserved for trigger flags, but may be used to provide micro-tonal tunings.

The module is physically and electrically compatible with the complete line of PAIA music synthesizer modules and is easily interfaced to any micro-processor.

8780 Digital to Analog Converter \$34.95 wt. 1 lb.

QuASH (Quad Addressable Sample and Hold)

The least expensive way to provide multiple control voltage channels in a computer based synthesizer system is to multiplex the output of the D/A using multiple, computer addressable, sample and hold circuits. The QuASH provides four of these outputs in a single module. Other features of the module include: adjustable glide rate for each channel with the glide selected or de-selected under computer control, individual trigger "gate" signal associated with each output channel and an individual modulation input for each channel that is non-interactive with other channels. On-board address decoding allows up to four QuASH to be bussed together in a single system without external logic and Bank Select input allows external logic expansion beyond this point. **NOTE: THE QuASH MUST BE OPERATED UNDER COMPUTER/PROCESSOR CONTROL.**

8781 Quad Addressable Sample & Hold Kit \$34.95 wt. 1 lb.

DIGITALLY ENCODED KEYBOARD

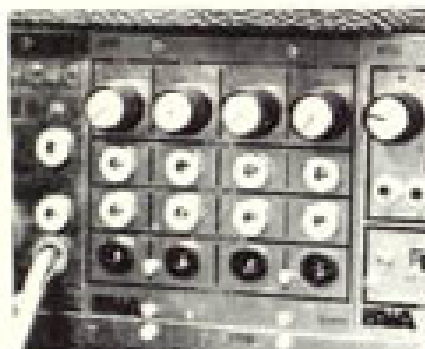
A scanning, matrix encoder tied to a 37 note AGO keyboard provides 6 bits of data and both STROBE and STROBE control outputs. Input control lines to the encoder include SCAN (starts and stops the encoder clock), RESET, START and RANDOM making the keyboard universally applicable to all computer/processors from the very largest to the very smallest. Housed in a trim and sturdy vinyl covered road case, the kit consists of all parts including keyboard, power supply and detailed assembly instructions; software overview for computer applications and detailed instructions for digital sample and hold.

8782 ENCODED KEYBOARD KIT \$119.95
(shipped freight collect)

KEYBOARD ENCODER CIRCUIT

Convert PAIA or other keyboards to the new digital format.

details on page 23



**** WANT TO KNOW MORE? ****

PAIA's FRIENDLY STORIES ABOUT COMPUTERS/SYNTHESIZERS

Making a computer with an electronic music synthesizer presents almost unlimited possibilities for performer and composer alike, and true polyphonic synthesis is only the beginning. Let us tell you the whole story with this package of off-prints from Polyphony, using manuals and more, telling how it works and what it does.

PROGRAMS

PAIA 8700 SOFTWARE

PAIA software is written to produce a system that is as easy to use as possible. In all cases, program features are controlled directly from the 8700 keyboard (for example, with DRUMSYS the RUN key plays the stored score; TAPE loads scores from tape, etc.) Each package consists of tape and full documentation including program listings and interfacing details where required.

PMUS

Polyphonic synthesizer (with sequencing and software transient generators) multi-track recording/playback, compositional programs, supports up to 16 voices. This cassette is FREE with MUS-1 PROM. (MUS-1 required for operation)

POLY

Polyphonic synthesizer program including software transient generators. Supports up to 16 output channels.

DRUMSYS

An 8700/EK-2 Computer Drums operating system that produces the most advanced automatic percussion unit ever offered. Provides all of the features of a 3750 Programmable Drum Set plus dumps and loads drum scores to tape, computer control of drum dynamics, extensive editing of scores, special effects that make drums almost a lead instrument and unique tempo setting control that requires only the tap of a finger.

SEQUE 1.0

The ultimate sequencer. Store sequences from the keyboard AS YOU PLAY THEM. Use the **sequence** as a voice as you transpose it from the keyboard. Easily controlled retrograde and inversion capabilities make 12 tone row compositions a snap. Save and load sequences using easily managed cassette tapes. No tempo indicator to watch—just play, then speed up or slow down as required. AND THESE ARE ONLY THE START.

Each of the above software and documentation packages includes tape, documented listings and interfacing details. Each is priced at \$4.95 plus \$1.00 postage and handling. Documentation, less tape is available for \$2.00 postpaid.

MUS-1 FIRMWARE

To optimize a system for music applications some commonly used programs are best stored in Programmable Read Only Memory. This is the PROM. MUS-1 contains keyboard reading routine, 16 channels of QuASH drivers, polytonic algorithm and software transient generator subroutines.

MUS-1 PROM

\$22.00 plus postage - (\$1.00)

** ATTENTION KIM FANS **

We're sort of KIM fans too (though, as you might expect, we feel that our own 8700 is more price effective in many cases — and in some ways easier to use). In addition to our exceptional PVI-KM video display (page 12), we have this software for the KIM.

CASS'S CODE

Cass Lewart has published over 50 technical articles within the past few years and here are some things he's done for the KIM. This double tape for the KIM/PVI system features a mini-disassembler which recognizes, organizes and displays OP-CODES and operands for one, two or three byte instructions. Displays in hex. The second program on the tape is a morse code teacher which generates random 5 character words and sends them in morse code. To check your accuracy, the word sent may be displayed on request. (requires speaker and driver as in KIM owners manual)

Cass's Code / CLP-1

\$4.95 plus postage

KIM MUSIC PACKAGE

The KIM also makes an excellent control system for PAIA synthesizers and this package provides interfacing details and documentation of programs for polyphonic synthesizers and sequencers, compositional programs and others.

KIM MUSIC PACKAGE / KMUS

\$4.95 plus postage

4700 Series Synthesizer Modules

BALANCED MODULATOR

Balanced modulators (also known as "ring" modulators) allow the synthesist to construct sounds with non-harmonic frequency components. Signals applied to the carrier and modulation inputs of the module are suppressed and in their place appears a new output signal containing only the sum and difference frequencies of the original inputs. Essential for realistically producing the sounds of large gongs, railroad type chime horns and many other natural and purely electronic effects. Can also be used as VCA or frequency doubler. Light Emitting Diode warns of signal overload when processing piano, guitar or other electrified instruments. Requires +18, \pm 9v. supply.

No. 4710 *Balanced Modulator Kit* \$22.50 1 lb.

STEREO MIXER

As the synthesist's talents progress beyond "waa-waa's" and bleep-bleeps" a good mixer becomes essential to realize the subtle, almost natural sounds that express today's music. Op-amp circuitry is significantly better than passive mixers. Individual level controls for each input; pan pots allow each signal source to be placed left, right or in between. Master gain controls for left and right outputs. 10K impedance is compatible with common sound sources, 100 ohm output impedance will drive most loads. 6 db. max. gain; 20 Hz - 20 kHz. frequency response. Requires \pm 9v supply.

No. 4711 *Stereo Mixer Kit* \$29.88 3 lbs.

REVERB "CONCERT HALL" ACOUSTICS WITH MAXIMUM FLEXIBILITY.

A reverberation unit is a natural addition to any Synthesizer system since it provides an electro-mechanical equivalent to the delays and echos that define the acoustics of a large auditorium. The 4712 optimizes control flexibility by allowing for the mixing of two separate input signals as well as post-mixing of the input signals with the processed reverb signal. Front panel switch allows for instantaneous, pop-free termination of reverb effects without affecting normal signal flow through the module.

Consists of two units, control head electronics and reverb spring assembly. Control head occupies single module space in standard PAIA equipment and reverb spring assembly fastens to rear of cabinet (mounting hole drilling required).

No. 4712 *Reverb Module Kit* \$26.95 wt. 4 lbs.

WIDE RANGE VCO

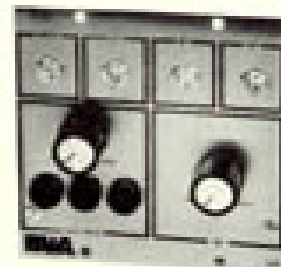
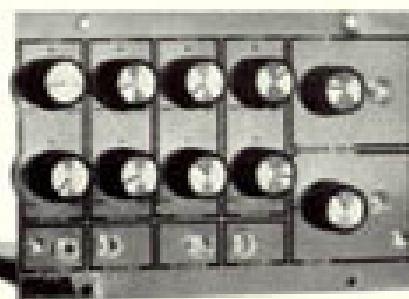
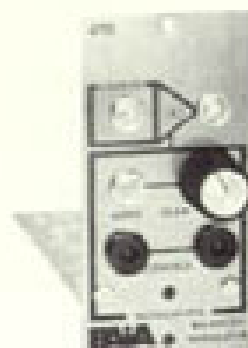
If you're particular about specifications, this is the oscillator for you. Features 16 Hz. to 16 kHz. guaranteed minimum frequency range, simultaneous ramp, triangle, sine and voltage modulated variable duration pulse outputs. Front panel initial pitch control allows multiple oscillators to be chromatically offset from one another while tracking a keyboard.

No. 4720 VCO \$34.95 1 lb.

MULTI-MODAL VCF

A filter for the purist, the 4730 multi-filter features simultaneous lowpass, high pass and band pass outputs with Q adjustable from 5 to over 150. Guaranteed corner frequency range from 16 Hz. to 16kHz. Linear control voltage/frequency characteristics provide keyboard tracking and front panel initial frequency control allows multiple filters to be chromatically offset. Requires \pm 9, +18 volt supplies.

6 No. 4730 VCF \$37.95 1 lb.



for added capabilities



ENVELOPE GENERATOR

ADSR - Attack/Decay/Sustain/Release. Voltage step or manual push-button causes output voltage to rise at a rate set by attack control, then fall at decay control rate to constant level set by sustain control. Releasing push-button or terminating trigger causes output to fall to 0v, at a rate set by release control. Level control varies output. Light Emitting Diodes indicate module status. Times variable from 2 ms. to 2 seconds, 5v. peak output level. Requires +18v. supply.

No. 4740 Envelope Generator Kit \$25.95 2 lbs.



ROAD CABINETS

Anyone who doesn't have their equipment nailed down needs the protection that these sturdy vinyl covered cases provide. The 4761 road cabinets have space for 13 single width modules and include power buss, interface panel (for power distribution) and all hardware. Buy two and we throw in hinges, latch and carrying handle for a fold-up portable package.

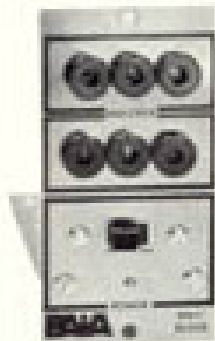
No. 4761 Road Module Cabinet \$19.95/each 8 lbs.



ROAD KEYBOARD

The traveling musician needs equipment that is brawny enough to survive the ordeals of the road — and that's what this keyboard unit is all about. Internal electronics are identical to the time-tested 2720-8, but in a trim and sturdy vinyl covered case. Features slip hinges on the keyboard cover and fully hinged top for tuning access. Includes separate power supply for sample and hold electronics.

No. 4782 Road Keyboard \$134.95 wt. 20 lbs.



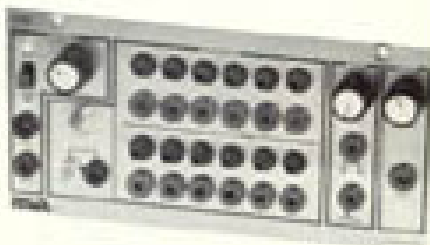
WATT BLOCK

300 ma. power supplies may be wired to provide either +18v, or $\pm 9v$. Power requirements vary from module to module but on the average 300 ma. is sufficient for 30 of the 2720 series or 20 of the 4700 series modules. Light Emitting Diode power indicator. Multiple jack panel consisting of 3 pin jacks and 3 phone jacks aid in complex patches.

No. 4770 Watt Block Kit \$12.95 3 lbs.

Since Watt-Block will often be used in groups of 3, line cords for above are sold separately.

No. LC-6 6 ft. line cord \$1.00 postpaid



SEQUENCER

Use for automatic bass lines, super speed arpeggios, any repeating or non-repeating sequence up to 12 events long. "Synch" and "run" inputs to internal clock allow for remote control and series or parallel chaining of multiple sequencers. Built in glide, Clock rate pulse or variable duration step triggers as well as trigger output jacks at each stage. Light Emitting Diodes (not shown in this photo) indicate position in sequence, clock rate and step trigger duration. Includes manual operation pushbuttons. Requires +18, $\pm 9v$ supply.

No. 4780 Sequencer Kit \$65.00 wt. 3 lbs.



A Joy Stick is the missing control element on most American synthesizers. A Joy Stick gives you total, infinitely variable control of two parameters simultaneously. Our Joystick controller works in either of two modes: As a Control Voltage Source with your exponential front-end equipment, or as a Controllable Multiplier for linear response elements. A touch activated "gate" trigger activates with the slightest touch of the Joy Stick's metal shaft. No buttons to search for. The kit comes complete with all parts, step-by-step instructions and its own completely finished case.

4783 JOY STICK CONTROLLER KIT \$39.95 wt. 2 lbs.

2720 Series Synthesizer Modules ...

VOLTAGE CONTROLLED AMPLIFIER (VCA)

The VCA will most often be used in conjunction with the function generator to give synthesized sounds the desired attack and decay characteristics. The differential input and I.C. op-amp output stages of this module guarantee pop-free performance no matter how fast the control voltage changes. Nominal gain is 0 db. (unity) at full control voltage with minimum 60 db. isolation at 0 control voltage.

No. 2720-1 Voltage Controlled Amplifier \$14.95 plus postage

VOLTAGE CONTROLLED OSCILLATOR

The VCO serves as the heart of any synthesizer by providing the other processing elements with a signal of the proper pitch and harmonic content. Features of the 2720-2 include ramp, triangle and variable duration pulse outputs with a frequency range of 20Hz. to 5 kHz. Individual, on board voltage regulators and op-amp control voltage summation assure reliable, drift free operation.

No. 2720-2A Voltage Controlled Oscillator \$27.95 plus postage

FUNCTION GENERATOR

Accepts a trigger pulse from the controller and generates a 0 to 5v. output waveform with independently adjustable rise (attack) and fall (decay) times. Attack is variable from .002 to 1 second and decay is variable from .005 to 1 second, with sustain level maintained as long as input trigger is present. Both variable and fixed amplitude outputs are available. This module may be triggered from the control oscillator to produce an endless variety of repeating waveform shapes.

No. 2720-4 Function Generator \$21.95 plus postage

VOLTAGE CONTROLLED FILTERS

VCF's are key processing elements in synthesized music because they allow you to precisely control the harmonic content of the sound you're working with. Voltage control allows you to place the filters under the automatic control of a function generator or to have the filter follow the controller voltage. Nominal band-pass center frequency range is from 350 to 1200 Hz. with front panel adjustable "Q" control. Low pass filter roll off rate is 12 db/octave adjustable by summation of the control voltages.

No. 2720-3B Band Pass Filter \$14.95 plus postage

No. 2720-3L Low Pass Filter \$11.95 plus postage

CONTROL OSCILLATOR/NOISE SOURCE

Typical applications of the control oscillator are as a source of tremolo and vibrato or a means of cyclicly sweeping filters. Frequency range of the oscillator is 1 to 25 Hz. in three ranges and both fixed 5v. peak to peak and variable amplitude outputs are available.

The noise source provides un pitched sound used in wind/surf sounds, cymbals, snare drums, steam and many other special effects.

No. 2720-5 Control Oscillator/Noise Source \$21.95 plus postage

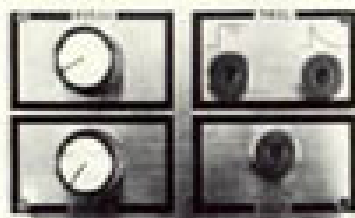
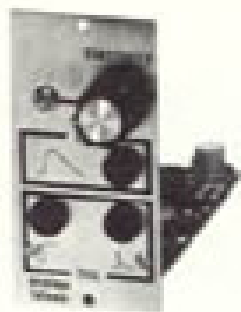
POWER SUPPLY

Provides the three voltages required by modules at currents up to 100 ma., sufficient for up to 20 modules. Two variable bias sources of 0 to 5v. and -5 to +5 volts allow the setting of constant parameters for filters, oscillators, amplifiers. Isolated potentiometer can serve as master volume control or attenuator. Patch panel allows more than one module to be driven from the same control source or patching between audio and control lines.

No. 2720-7 Power Supply \$24.00 2 lbs.



basics to begin or expand your custom system



ENVELOPE FOLLOWER/TRIGGER

The Envelope Follower/Trigger module allows any electrified musical instrument (including microphones) to serve as signal, control voltage and trigger source for the 2720 series modules. The low level output of the instrument is converted to a DC voltage by a precision full wave rectifier built around two operational amplifiers. A Schmitt trigger circuit provides step and pulse outputs whenever the output level of the instrument exceeds a pre-set level.

No. 2720-11 Envelope Follower/Trigger Kit \$12.95

INVERTER/BUFFER

The 2720-12 can be used as an audio inverter, high input impedance/low output impedance buffer, inverting summer or level shifter. Also useful with filter modules to produce "super Q" band-pass filter as well as notch and high-pass responses. Module provides for summation of audio signal and two control voltages with both direct and AC coupled outputs. Front panel switch selects output offsets of either 0 or 5v.

No. 2720-12 Inverter/Buffer Kit \$12.95 plus postage

SINE CONVERTER/PULSE WIDTH MODULATOR

The Sine Converter/PWM accepts as an input the triangle output of the VCO and produces at its outputs a sine wave and voltage controlled variable duration pulse. Both of the new waveforms are the same frequency as the triangle input. Pulse duration is variable from less than 5% at 0 control voltage to greater than 50% when the sum of the control voltages equals 5 volts. Negative control voltages turn off the pulse completely. Amplitude of the sine and pulse outputs is .5v peak to peak.

No. 2720-14 Sine Converter/PWM Kit \$19.95 plus postage

2720-8 Keyboard/Case

The keyboard provides 3 octaves of control voltage (C through C) in a standard 37 note AGO configuration. Pitch knob allows range of keyboard to be raised and lowered a full octave while maintaining the chromatic relationship of semi-tones. Sample/hold circuit provides a minimum of 30 seconds control voltage holding time after keys are released. Pressing any key generates pulse trigger function and voltage step trigger is present while any key is held down. Case measures 31 X 12 X 11 and provides space for 15 single width modules.

Keyboard action manufactured by Pratt, Read & Co. to PMA Specifications featuring self-wiping gold switch contacts for long, trouble free life. Semi-tone intervals tuned with individual P.C. mounted trimmer potentiometers accessible from the bottom of the case.

No. 2720-8 Keyboard/Case \$128.00 wt. 15 lbs.

GLIDE RETRO-FIT

Directly replaces standard control panel on the 2720-8 Keyboard/Case to provide variable rate glissando from one note to the next. Requires $\pm 9v$ supply.

No. 2720-9 Glide Retro-fit Kit \$12.95 plus postage

WING CABINET

Space for 7 single width modules in beautifully finished mahogany case. Designed so that two cabinets fit side-by-side on top of 2720 series case; or stack as "wings" to the main synthesizer case. Includes all hardware, rubber feet and power distribution buss parts. Wood parts fully assembled. Removable back plate.

Modules shown for illustration only.

No. 4760 Wing Cabinet \$15.00 3 lbs.

EXPANSION PACKAGES, PARTS & LITERATURE

4700/B EXPANDER PAC

In most cases PAIA equipment is compatible with equipment supplied by ARP, MOOG, Etc. and presents a low cost alternative means of expanding the systems from these manufacturers. Current trends in electronic music are towards subtler, more natural sounds that in many cases aren't possible without multiple processing modules. Package contains: one 4760 Wing cabinet, one 4740 ADSR Envelope Generator, one 4710 Balanced Modulator, one 2720-11 Envelope Follower, and 2720-12 Inverter/Buffer and two 4770 Watt Blocks. (Note: while 2720 and 4700 series are electronically and mechanically compatible, there is a marked appearance difference caused by the heavier, matte finish of the 4700 series panels.)



4700/B Expander Pac Kit

\$99.99

14 lbs.

4700/A SEQUENCER PACKAGE

This package forms a completely self-contained sequencer compatible with either PAIA equipment or units from other manufacturers. Package contains: one 4780 Sequencer, two 4770 power supplies, one 4760 Wing Cabinet, and one single width blank panel.

4700/A Sequencer Package

\$99.95 w/ 10 lbs.

4700/II MIXER PAC

Whether your interest is electronic music synthesis, stage work, production of film presentations or any of the other areas where precision audio eases the task or enhances the product, you always seem to run out of mixers before the job is done. PAIA mixer pacs are an economical solution to this problem. The package contains one 4760 Wing Cabinet, one 4770 Watt Block, and two 4711 Mixer modules and provides an 8 in/ 4 out capability for under \$80.00.

4700/II 8 in/4 out MIXER PAC

\$79.95 w/ 12 lbs.

PATCH CORD SETS

... Something you never seem to have enough of. Set consists of 16 audio and 24 control voltage connectors with 15 ft. of cord.

PTCH

\$9.95

BLANK PANELS

When configuring a custom system and fitting it into cases you sometimes end up with unsightly gaps. Blank panels are available in single, double or triple module widths to close the space until you decide to expand further. Specify 2720 or 4700 series material.

BP-1 SINGLE WIDTH BLANK PANEL

\$2.50

BP-2 DOUBLE WIDTH BLANK PANEL

\$3.00

BP-3 TRIPLE WIDTH BLANK PANEL

\$3.50

DEMONSTRATION CASSETTE

If you'd like to hear for yourself the capabilities of the synthesizer equipment listed in this catalog a demo cassette offers both information and inspiration. Includes examples of a variety of applications from free form sound effects, compositions and live performance pieces using 2720, 4700 and 6700 series modules, in addition to demonstrations of selected special effects kits. Included with the tape is an explanatory manual with patch charts telling you how to achieve all of the effects used on the tape. The next best thing to a hands on demonstration in our studio.

DEMO CASSETTE

\$3.50 postpaid

THE CRAIG ANDERTON MUSIC TAPE

You may recognize the name from his monthly columns in *Guitar Player* and *Contemporary Keyboard* or from his prolific contributions to other magazines or his book "Electronic Projects for Musicians". Now you can see a side of Craig that few have seen before, the composer/ performing artist.

This recording is a collection of ten original works ranging from the semi-classical "Dog Dreams 1/ 11" to the totally bizarre "Roy Herful". Using a lot of our equipment as well as many devices of his own design, Craig composed, performed and recorded the tape singlehandedly in his home studio. An explanatory booklet is included with the tape including lyrics and details on how the effects were accomplished. We're not promoting this as a demo tape but rather as thoroughly enjoyable listening. We think you'll like it.

CAMT The Craig Anderton Music Tape

\$5.95

(plus 50c postage & handling)

PAIA 8700 COMPUTER/CONTROLLER



8700 Processor: 6503 MPU, Wear free "Active Keyboard", Micro-Diagnostic, Extensive documentation, Fully Socketed.

Piebug Monitor: User Subroutines, Relative address calculator, Pointer High-low, Back-step key.

Cassette Interface: Load & Dump by file #, Positive indication of operation, Tape motion control.

The Answer For... Student, Hobbyist, Manufacturer.

An exceptional price on an applications oriented 6503 based microprocessor system featuring: 1K bytes RAM locations (512 bytes supplied), 1K bytes ROM locations (256 byte monitor included), two 8 bit input ports, two 8 bit output ports, one latched and one buffered.

A 24 key touch operated keypad is used by the monitor to allow entry and execution of user programs as well as controlling features not normally found on low-cost single board computers: including a relative address calculator that completely eliminates this normally tedious hexadecimal calculation and back-space key that eases entry and editing of programs. Pointer High and Pointer Low keys allow the 8700's twin seven segment displays to serve the multiple functions of indicating both address location and data.

The 8700 fits in a space reserved in the 8782 encoded keyboard's case. PAIA software support available for Electronic Music Synthesizer interface.

8700 COMPUTER/CONTROLLER KIT \$149.95

wt. 4 lbs.

CASSETTE INTERFACE OPTION

This is one of the most reliable and easy to use cassette systems that we've seen. A single LED indicates proper cassette volume control setting and provides a positive indication of data flow. We've even made software and hardware provision for tape motion control (relays must be added). The CS-87 option fits entirely on the 8700 circuit board and consists of the POT-SHOT PROM and a handful of additional components.

CS-87 Cassette Interface Option

\$22.50 plus postage

POWER SUPPLY

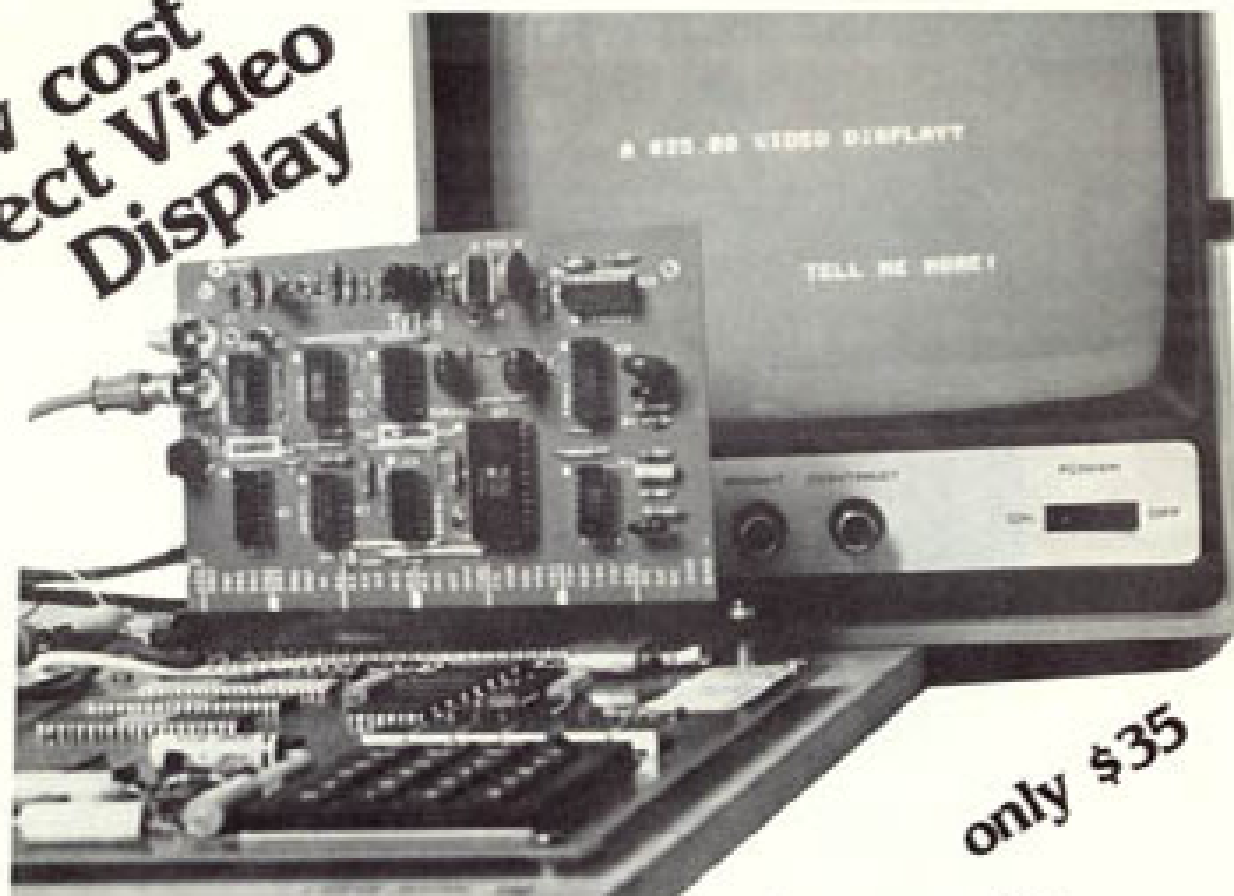
The logical choice to power the 8700. Fully regulated 5v. at 1 amp, -9 volts @ 300 ma. Also provides a 60 Hz. output for real-time clock applications.

PS-87 Power Supply Kit

\$24.95

wt. 3 lbs.

**Low cost
Direct Video
Display**



Don Lancaster's ingenious design provides software controllable options including:

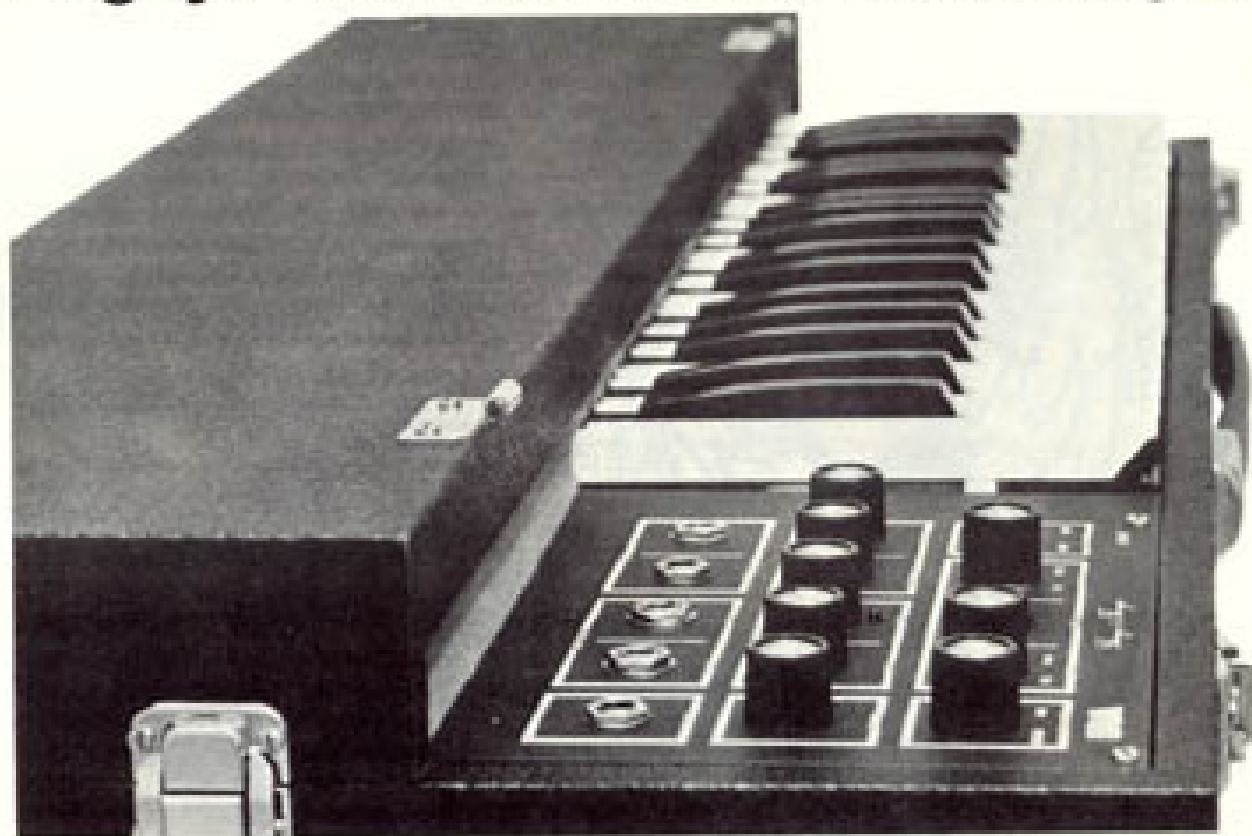
- **Scrolling**
- **Over 2K on-screen characters with only 3MHz bandwidth**
- **Full performance cursor**
- **Variety of line/character formats including 16/32, 16/64 even 32/64**
- **User selectable line lengths**

You'll want to see the operational details on this first. The PVI-1K is not the universal answer to every video display requirement. In applications where its minor limitations present insurmountable obstacles to a design, more expensive techniques should be used. If you are in doubt, the PVI is completely described in the July and August, 1977 issues of Popular Electronics. Reprints of these articles are the instruction set for this kit and are available separately for \$2.00 postpaid refundable upon purchase of the PVI kit.

Complete kit includes circuit board, all parts and instructions and is available in either of two forms.

PVI-KM Ready to go with KIM's	\$34.95	wt. 1 lb.
PVI-MT For other processors (requires PROM coding)	\$34.95	wt. 1 lb.

String Synthesizers Can Be: Just strings...



.... **OR** they can have: violins/cello/piano, separate mixable piano output, synthesizer interface, variable chorusing, variable sustain controls, jacks for foot controls, keyboard split, dual violin/cello mixers, stereo string option, even a modestly priced computer interface option. **You're gonna love it!**

Stringz 'n' Thingz just \$295 from **PIA**

We can't possibly cover all of the features and options of Stringz 'n' Thingz in this limited space but even in this small space we can say that the 1550 is the most advanced and versatile string ensemble available **AT ANY PRICE, FROM ANYBODY**. Computer interface will be announced when available.

If you'd like more detailed operational information before purchasing this kit we recommend the Stringz 'n' Thingz documentation set, an eighty-four page assembly and user's manual priced at \$5.00 refundable upon purchase of the kit.

1550 STRINGZ 'N' THINGZ KIT

\$295.00

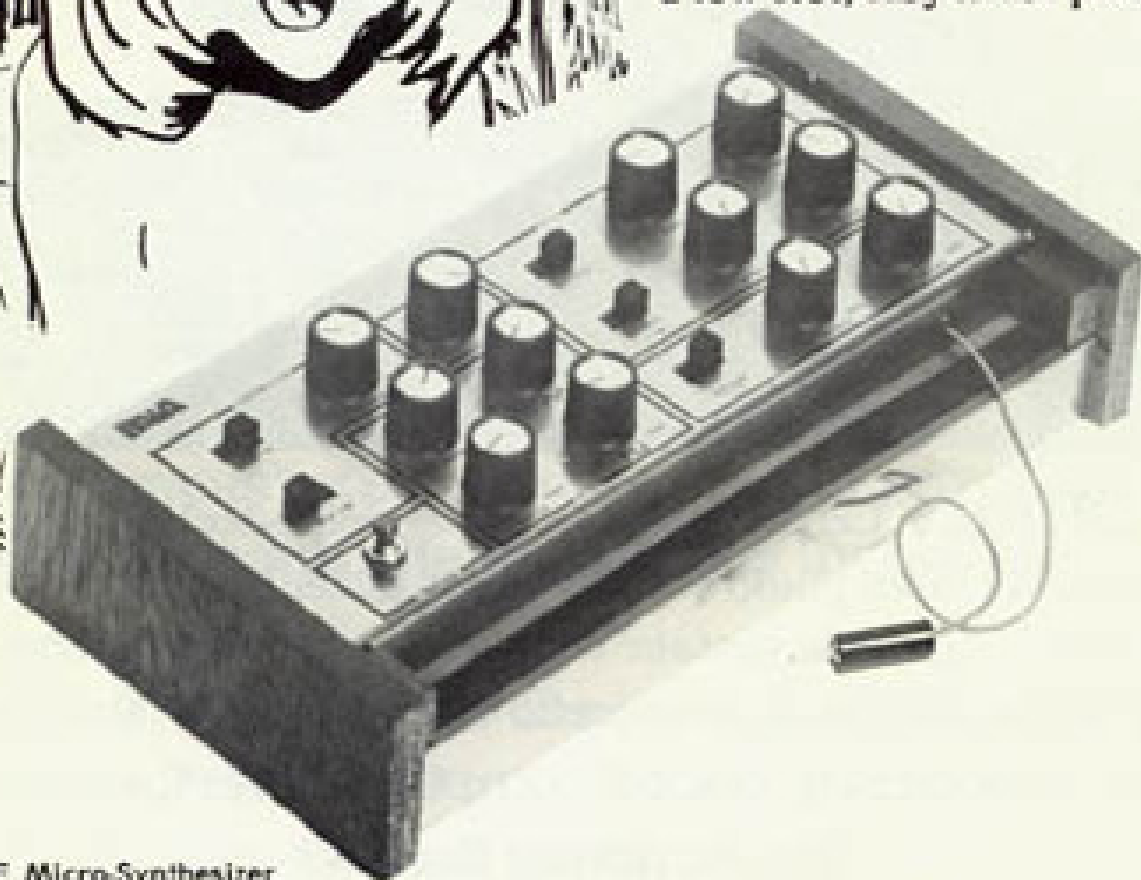
wt. 30 lbs.



GNOME

the original
micro-synthesizer

John Simonton's time-proven design provides two envelope generators VCA, VCO & VCF in a low cost, easy to use package.



GNOME Micro-Synthesizer

Every day more people discover that the GNOME is the most versatile, cost effective special effects device on the market today.

The Gnome has two function generators (one with repeat for cyclic effects), VCA, VCF and VCO. Use alone with its built in ribbon controller or modify to interface to guitar, electronic piano, polytonic keyboards, etc.

With the Gnome's normalized controls you'll soon be able to produce those far out electronic sounds even if you've never been near a synthesizer before. The Gnome can make outer space sounds for rock musicians, demonstrate principles of music and acoustics for educators, provide rhythmic pulses for modern dance groups and sound effects for theatre companies and is one of the neatest toys in the world for the audiophile.

Complete kit and well illustrated step-by-step instructions and using manual make the GNOME the perfect introduction to electronic music synthesis.

3740 GNOME Micro-Synthesizer Kit

\$49.95

shipping wt. 4 lbs.



Mini-Organ

**A Battery powered
polytonic pitch source
complete with
speaker & amplifier**



Oz Mini-Organ

Oz is polytonic with over 6-1/2 octaves total range from its specially manufactured 1-1/2 octave keyboard. A built in speaker and amplifier makes Oz a truly self-contained instrument. Large Scale Integration and CMOS technology allow battery powered portability. Oz has a single tuning knob (no internal adjustments) and a mixing input that allows other instruments to play through the amplifier. Output jack and switch selectable step or multiple pulse trigger provides simple synthesizer interface. LED's indicate: Power on, octave setting and trigger status. A unique pressure-sensitive pitch bender chromatically transposes single notes or whole chords by up to a full octave. The entire package closes into an extremely portable, rugged 13 x 11 x 4 inch vinyl covered wood case.

Complete kit includes all parts, circuit board, completely finished case and front panel, specially manufactured keyboard and our step-by-step, loaded with pictures instruction manual.

No. 3760 OZ Mini-Organ Kit

\$89.95

shipping wt. 12 lbs.

Interface OZ with the GNOME for a completely portable, polytonic synthesizer-like instrument complete with speaker and amplifier for less than you'd expect to pay for a guitar.

As Larry Fast of Synergy puts it, "When I don't want to pack up my big 'poly-machine', my OZ processed through a smaller synthesizer makes a good substitute."

ELECTRONIC MUSIC ACCESSORIES

○ ○ ○ Ping Pong ○ ○ ○

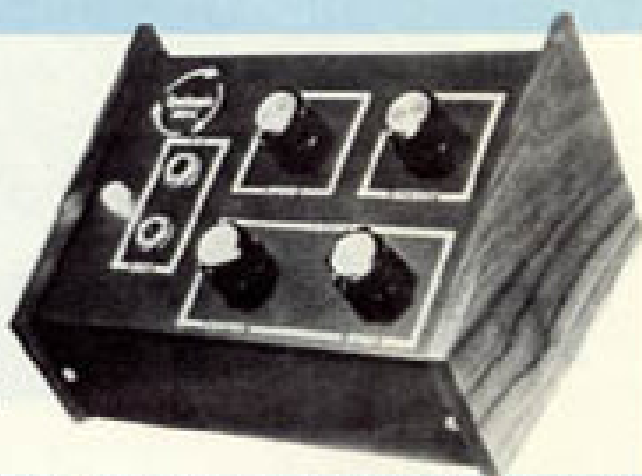
An outa site effect for live performances. The Ping-Pong accepts an input from any electronic musical instrument and alternately routes it to two separate amplifiers. Independent left and right depth controls allow for a gentle undulation of the sound back and forth or a fantastic stroboscopic jump from one end of the stage to the other. Front panel switch allows the sound to be routed to one or both of the amps then the unit is switched out. Effect can be initiated or terminated with either front panel switch or optional foot switch plugged into the rear panel jack. Powered by a single 9v. transistor battery. Complete kit includes case with hardwood end panels, circuit board, all parts and hardware, step-by-step instructions. Battery not included.



No. 3721 PING-PONG KIT \$29.95 wt. 3 lbs.

SYNTHESPIN MK-II ROTATING SPEAKER SIMULATOR

- ★ Integrated Circuit Design
- ★ Voltage Control Operation
- ★ Wide Rotating Speed Range (.2 to 15Hz.)



For years electronic organs have used mechanical rotating speakers to produce a tremolo effect. Recently these speakers have gained added popularity with musicians because the sound they produce is totally unlike electronic forms of tremolo. However, mechanical speakers are too bulky and heavy to be conveniently carried from one date to the next and their cost puts them beyond the means of many amateur and semi-professional musicians. The synthespin was designed as a low cost, portable electronic simulator of the rotating speaker effect.

The Synthespin MK-II is an updated and improved version of a similar unit sold by PAIA for several years. In addition to the rotating speaker effect the MK-II also produces numerous effects ranging from very slow phasing type sounds to a bubbling pseudo-reverb. Electrical inputs on the rear of the case provide for optional foot pedal control of the rotating effect as well as allowing for instantaneous foot switch cancellation and bypass functions.

Complete kit includes: circuit board, all parts, wire & hardware, pre-finished case and step-by-step instructions.

No. 1702K

Synthespin MK-II Kit

\$24.95

3 lbs.

PHLANGER

- ★ Delay Time .5 ms. to 10 ms.
- ★ Wide Range of Effects
- ★ Remote Voltage Control Capability



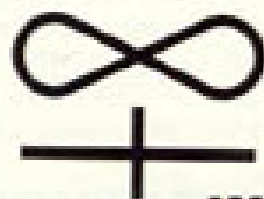
PHLANGER

Phil Spector's original "Big Hurt" sound, which can only be approximated by using frequency dependent phase shifters, is exactly duplicated using our new constant time delay PHLANGER. This unit features a 1024 stage Charge Coupled Device analog shift register that exactly duplicates the effect of two tape recorders running slightly out of synchronization. Multiple user controls allow effects ranging from chorusing, voice doubling and reverb to full "jet plane" effects. Optional foot pedals provide hands free control of internal oscillator sweep speed or manual spectrum sweeping.

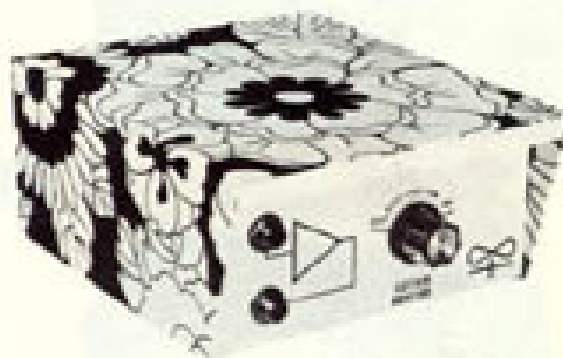
No. 1500 Phlanger Kit

\$59.95

wt. 4 lbs.



INFINITY PLUS LOW DISTORTION SUSTAIN



"Infinity Plus" may seem like an ambitious name to call a sustain but once you hear this one you'll have to agree—it fits. Sustain duration control lets you pull out notes or chords as long as you like without changing over-all volume. Maximum sustain allows controlled feed back guitar techniques that hold a note until you decide to let it go. Rear panel jack for optional foot switch allows the sustain to be switched in or out at the touch of a toe.

The Infinity Plus is a low distortion sustain that adds little coloration and no fuzz to the original sound. The use of two low noise Integrated Circuit operational amplifiers plus fully imprinted circuit board and "modular" design add up to a trouble free unit that is easy to build and a gas to use.

Complete kit includes circuit board, pre-finished case, instructions, wire, all parts.

Kit Name
Infinity Plus

Stock No.
No. 9711

Price
\$22.95

Shipping Wt.
4 lbs.

pygmy Portable Amplifier Take it anywhere!

Battery powered portable amps are the slickest things to come along in a while. They're tiny, light weight, and LOUD. Use them for practicing on the road, headphone listening while others sleep, distortion boosters at full volume, stage monitors, spontaneous open air concerts — you name it. Eight penlight batteries are good for about a month's use and drive the PYGMY's 5 inch acoustic suspension speaker to a room filling 1.2 watts RMS (up to 8 watts peak). The speaker's hefty magnet assures that what goes in as signal comes out as sound. Internal 3 position switch selects speaker/headphones/line level outputs. Road worthy 1/2 inch ply case is supplied to you pre-covered with heavy black vinyl and all hardware (corners, hinges, strap pegs, latch and speaker bezel) is provided. The Pygmy's integrated circuit design and step-by-step instructions make assembly a snap — figure about 3 hours tops. Batteries and strap not included.

No. 1750 PYGMY AMP KIT \$39.95 wt. 6 lbs.



USE YOUR PYGMY AMP TO GET "TALKING GUITAR" EFFECTS

Convert your Pygmy Amp to produce the new "Talking Guitar" effects. Modification kit includes a replacement speaker bezel which concentrates the sound from the speaker and emits this higher pressure signal from a small hole. The sound pressure is then fed through a 6 ft. length of tubing to your mouth for formant processing.

ELECTRO/LARYNX RETRO-FIT \$5.00 postpaid



PAIA/DeArmond FOOT SWITCH

A positive action, push on, push off switch housed in a ruggedly constructed stamped steel frame with scuff-proof cover of moulded neoprene. The switch can be activated from any position and its circular serrated top gives you non-slip contact. Switch comes complete with 8 foot connecting cable and standard phone plug.

No. 1650 PAIA/ DeArmond Foot Switch \$12.95



PAIA/DeArmond Pedal Volume Control

We've made special arrangements with Rowe/DeArmond to sell their model 1600 as a PAIA/DeArmond foot pedal. If you're familiar with this pedal you know that it's one of the toughest made and is an industry standard. We've made it available in a volume control expression pedal configuration for use with synthesizers, guitars, or whatever you've got. Included with the pedal are two interesting and informative articles from POLYPHONY. The first, by Marvin Jones describes a multitude of ways to use foot pedals with synthesizers as well as simple modifications that provide foot operated control voltage sources. The second, "Build a Wa/Anti-Wa Pedal" by Craig Anderton describes a unique special effects unit that can be housed in the pedal. DeArmond's recommended list price is \$54.00 but we sell them for \$34.95.



1600 PAIA/ DeARMOND FOOT CONTROL \$34.95 wt. 4 lbs.

**DIFFERENT
DRUMMERS**

PROGRAMMABLE DRUM SET

**256 BYTE MEMORY
TOUGH SENSITIVE
ELECTRONIC CONTROLS**

**TAILOR TIME SIGNATURE, DRUM
SOUND & INDEPENDENT BRIDGE
RHYTHM TO EACH APPLICATION**



While most electronic rhythm units offer only a limited choice of pre-determined rhythm patterns, the PAIA Programmable Drum Set allows you to select percussion sounds — Heavy Bass, Light Bass, Snare Drum, Rom-Tom, Conga, Wood Block or Clave — and structure pattern and time signature in any conceivable combination.

Touch sensitive switches allow scores to be entered in seconds, and **NO PROGRAMMING KNOWLEDGE IS REQUIRED.**

Without question the Programmable Drum Set advances the state of the art in automatic percussion units with features and abilities far too extensive to cover completely, including: Score editing, Bridges and Intros, external synch to sequencers — foot controls, memory save switch and many more.

High Fidelity Magazine describes the 3750 as "an easy project . . . fun to do and yields delightful results. . . . an excellent educational tool and a versatile aid to the musician who can't afford a live rhythm section."

3750 PROGRAMMABLE DRUM SET KIT \$84.95

wt. 5 lbs.

**GET AN ALMOST UNLIMITED VARIETY OF
SWITCH SELECTABLE RHYTHMS**

With the

**Drummer
Boy**



Eleven Rhythms: Waltz, Vienna Waltz, Jazz Waltz, Polka, Fox Trot, Samba, Boss Nova, Funk, Cha-Cha, Rhumba, Tango. Rhythms are switch selected and can be combined two or more at a time for an almost unlimited range of effects. Drum sounds include Bass, Snare, Conga, Clave, and wood block. Rocker switches allow individual drum sounds to be interchanged within the framework of a rhythm pattern. Down-Beat emphasis is switch selectable. Plugs into any guitar, organ or hi-fi amplifier. Case is pre-punched sturdy gauge aluminum with oiled hardwood end panels. * Magazine article re-print instructions

No. 7701K

Drummer Boy Kit

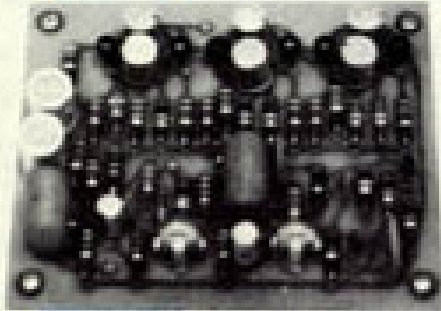
\$59.00

6 lbs.

DON'T MISS COMPUTER DRUMS see page 23

ENVIRONMENTAL SOUND

surf synthesizer



The roar of the ocean is one of the most relaxing sounds imaginable. Now you can have the sound of the surf electronically synthesized and played through your hi-fi. Complete in this low cost package is a special purpose synthesizer consisting of a pink noise source, random voltage generator, voltage controlled attenuator, and voltage controlled low pass filter. Use as a background sound generator, mood setter. An unbeatable conversation piece. Powered by two 2U5 type batteries (not supplied). Complete kit includes: circuit board, all parts, battery connectors and clips, miniature type phone output jack and plug, detailed instructions.

No. 3711K Surf Synthesizer Kit \$14.95 plus postage

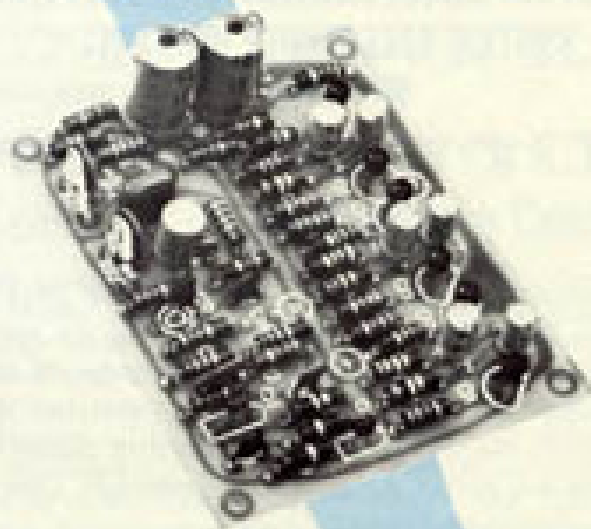
The Wind

Don't be surprised if you feel like running for your coat when you hear the wind, it's so realistic that people who have heard it report they actually feel cooler. Trimmer adjustments provide a range of effects from moderate breeze to full gale. Great for background sound, special effect accessory for organs or other musical instruments, or just as a party starter. May be used with any hi-fi or musical instrument amplifier, powered by two standard transistor batteries (batteries not included). May be housed in the 3711C case shown on facing page.

Complete kit includes: circuit board, all parts, hardware and wire; battery connectors and clips, miniature type phone output jack and matching plug, detailed instructions.

No. 3730 Wind Kit

\$14.95 plus postage



EFFECTS

★ LOW COST

★ BATTERY POWERED

★ USE WITH ANY HI-FI

Wind Chimes



You'll feel like you've been transported to the Mikado's palace for the afternoon tea ceremony as you settle back and relax to the gentle random tinkling of these electronic wind chimes. Internal trimmer adjustments allow you to select either the ring of brass chimes or the percussive resonance of bamboo rods. The wind chimes are completely self contained, battery powered (battery not supplied) and may be used with any hi-fi or musical instrument amplifier. May

be housed in the 3711C case shown on facing page.

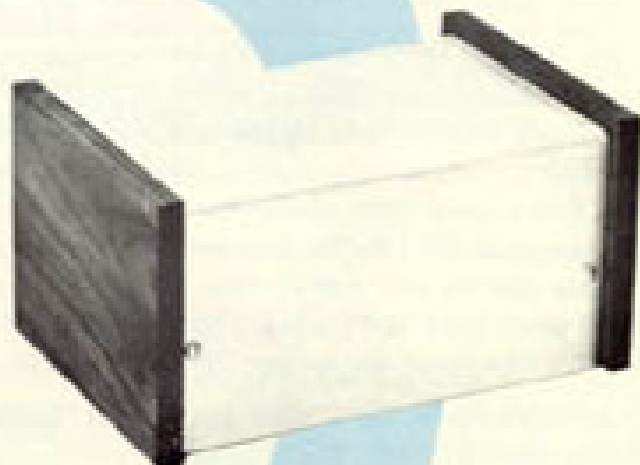
Complete Kit includes circuit boards with parts placement designators, all parts, hardware and wire, power switch, co-ax output lead with RCA type plug, detailed instructions.

No. 3721 Wind Chimes Kit

\$19.95 plus postage

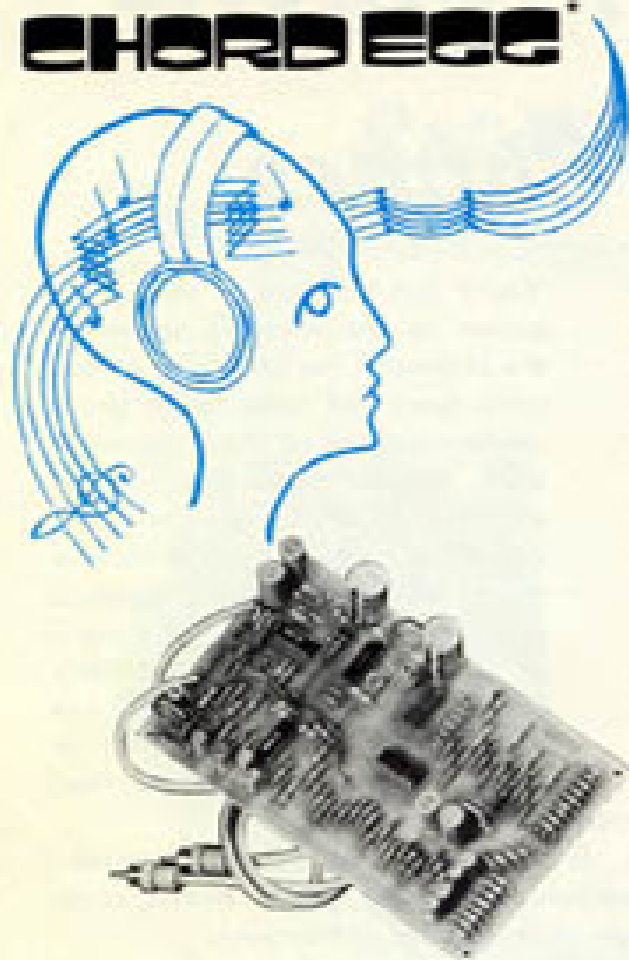
3711 Case

Houses the Surf Synthesizer, The Wind or the Wind Chimes interchangeably. Heavy aluminum body with oiled walnut end pieces blends with contemporary audio and hi-fi equipment. Aluminum top and bottom are completely pre-punched with provision for power switch and output jack on the rear apron of the case. The case is supplied unpainted.



Stock No.	Price	Shipping wt.
3711-C	\$4.50	1lb.

STEREO CHORD EGG*



THE ULTIMATE MEDITATION/ENVIRONMENT MACHINE?

STEREO CHORD EGG

The EGG plugs into any stereo amplifier to create soothing, flowing environmental sound textures — and through headphones it's incredible. The chords and notes exist in your mind, they pan and swell and phase their way through your psyche in unpredictable patterns, never repeating.

The combination of LSI organ technology with synthesizer-type processing and digital randomizing/control elements make the EGG and altogether intriguing package from either technological or metaphysical viewpoints. Kit includes: circuit board, all parts and step-by-step instructions. No case available — requires 8 "AA" penlight batteries.

3790 STEREO CHORD EGG KIT \$34.95 plus postage

*EGG Encephalo-Gratification Generator

CUT OUT NOISE POLLUTION AND KEEP YOUR COOL WITH THE

CHATTER JAMMER

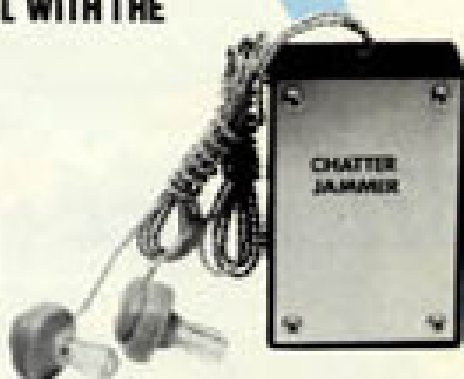
Technically speaking, Pink noise is an equal probability distribution of an all frequencies within a given bandwidth.

If you still have trouble visualizing what it sounds like there are many natural phenomena that come close to being pink noise. The sound of falling rain and the roar of the ocean are two good examples.

Strangely enough, most people find these sounds relaxing.

We make only one claim for the Chatter Jammer; if you must work in a noisy environment the Chatter Jammer will help you to concentrate by blocking out distracting outside sounds and substituting the gentle "rushing" sound of pink noise. Thousands of these units have been bought by students and businessmen. Hundreds have been sold to doctors of various disciplines (MD, DDS, PHD, etc.).

The Chatter Jammer is shirt pocket size, completely self contained and can be assembled in less than an hour. Kit includes circuit board, case, earphones, selected noise diode and instructions. Requires two 9 volt transistor batteries (not supplied).



No. 111 Chatter Jammer Kit

\$7.95 plus postage

PAIA ELECTRONICS
1020 W. WILSHIRE BLVD.
OKLAHOMA CITY, OK 73116



Polyester & cotton T-shirt, specify size:
Small, Medium, Large or Extra Large.
Color T-Shirt \$4.95 postpaid

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