

Aries inc.



**ARIES SYSTEM 300 ELECTRONIC
MUSIC SYNTHESIZER**

THE PEOPLE BEHIND THE ARIES SYSTEM 300 ELECTRONIC MUSIC SYNTHESIZER

Frank Fink: Frank is president of Aries, Inc. and co-owner of B and F Enterprises. He has a bachelors degree in Physics from Brooklyn Polytechnic Institute, and worked as a consulting engineer from 1965 to 1970. He has authored articles in Electronics Magazine, Electronic Design Magazine, etc., and has many diversified interests, including music and its relationship to electronics now and in the future.

Dennis Colin: Dennis is a consultant to Aries on the Music Synthesizer. He has a bachelor's degree in EE from Lowell Tech, has worked in the field of music technology for many years, and is a musician by avocation. To his credit are a patent for a single bus keyboard (issued in 1974), and two patents on related products, still pending. He is a member of the AES and authored one of the earliest articles on voltage control filters, published in June of 1971.

Arthur Pennell: Arthur is the Chief Engineer at Aries, Inc. He has a Bachelor of Science degree from Drexel University, and is a member of both the IEEE and NEOSA. He has worked in the fields of Electronics and Optics for twenty years, in engineering as well as personnel and management.

Dennis Graham: Dennis G. is project co-ordinator for the synthesizer, and an enigma to all of us. Never having written anything on the synthesizer, he has read everything that has been written, and is ready, willing, and able to apply his knowledge and creativity to our project. He joined our staff through an ad in a highly specialized publication, and has worked at everything from package to circuit design with amazing skill and versatility.

James Bastable: Jim is our Production Co-ordinator. Both schooled and skilled in such diverse fields as purchasing, quality control, technical drawing, PC Layout, and photography, his energy and enthusiasm have helped make a dream come true for Aries, in the development of our Music Synthesizer.

ARIES SYSTEM 300 ELECTRONIC MUSIC SYNTHESIZER

ARIES Inc. takes great pride in introducing its System 300 Electronic Music Synthesizer. Combining the latest in technology with tried and proven techniques in the field of Electronic Analog Signal Processing, ARIES Inc. has created a truly professional studio instrument, priced within the reach of the serious musician or audiophile.

The accuracy, stability and versatility this synthesizer offers, match and surpass the most expensive synthesizers on the market today. Using a standard 1 Volt/Octave scale factor, the System 300 is fully compatible with other manufacturers' products. The highest quality electronic components, reliable shielded patchcord interconnections and rugged mechanical construction guarantee unsurpassed reliability and durability.

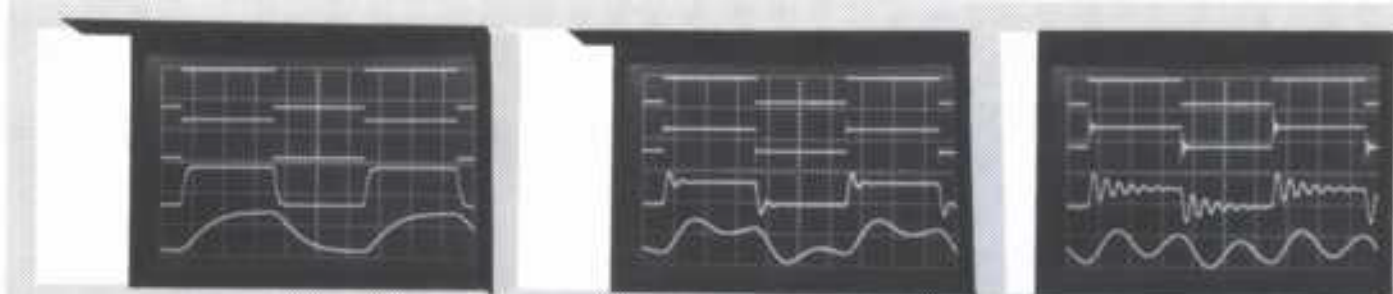
The beauty of a synthesizer is its ability to modify, process and control musical properties of sound. The ARIES 300 Synthesizer with its 1 Volt per octave control and its linear keyboard output allows any number of oscillators, filters, etc. to be controlled from the keyboard, while tracking together at any constant musical interval. Any external tuning control will change the oscillator pitch by the same amount, regardless of keyboard position.

The ARIES 300 Synthesizer's abilities to create high quality, pleasing and unique musical articulations as well as original and exclusive sound effects make it capable of the most demanding studio or live performance entreaties.

This catalog combines the latest and most complete information concerning the construction and operation possibilities of synthesizers on today's market. The detailed description of each individual module will allow you to discover for yourself the unlimited possibilities the ARIES 300 Musical Synthesizer holds in store.

Available as a kit or wired, the ARIES 300 can offer both a challenge and a better understanding of the instrument's potentials when assembled by yourself.

**ARIES INC. • 119 FOSTER STREET •
PEABODY, MA. 01960
617-532-0450**



Top waveform in all 3 pictures displays 100 Hz Square wave input. Next wave is VCF output at 16 KHz Cutoff. Next wave is VCF output at 1KHz cutoff. Bottom wave is VCF output at 250 Hz cutoff. Picture at left Q = 0.5, Center Q = 2, Right Q = 5

Voltage Control Filter • AR-314

- **Wide Range: 16Hz to 16,000Hz. Cutoff Frequency (entire Range of Hearing)**
- **Extremely Accurate, Stable, Uniform 1 Octave per Volt Control Characteristic Over Entire Range**
- **Variable Resonance or Peaking Control Allows Flexible Mixing of Synthesizer Sources and External Sounds, such as Electrical Guitars.**
- **4 Audio Inputs, and 4 Control Inputs Allow Flexible Mixing of Synthesizer Sources and External Sounds, such as Electrical Guitars.**
- **Variable Resonance Control Generates Boost for Timbre Control, as well as wah-wah and other effects**

The AR-314 VCF allows dynamic control over the tone quality of synthesizer sounds, as well as external instruments such as electrical guitars. The VCF will accurately track with the oscillators when controlled from the Keyboard Voice, over the entire hearing range. Used with the Envelope Generator it can generate the dynamics of horns, violins, guitars, and other instruments. In addition, the Resonance Control can add swooping wah-wah effects and howling wind like sounds, due to its sharp frequency peaking ability.

Audio Signals are fed into any of its four input jacks (one has a level control) and mixed. These sounds are filtered and appear at the two output jacks.

The VCF passes tones up to a certain pitch (cutoff frequency). Frequencies above this are attenuated (cut down in level).

Now, this cutoff point is manually adjustable by a knob. At 16 Hz (the left end) almost no signals within the range of hearing will get through. At 16KHz (the right end), however, almost all such signals pass through unaffected. The filter is then "wide open". In between these extremes, the filter will modify the sounds of a waveform such as a pulse or sawtooth, or white or pink noise, because these have high frequencies called overtones or harmonics. Filtering these out makes the tone "duller". Of course, the Sine wave has no harmonics, so the filter cannot change its sound; it can only lower its level (amplitude).

The cutoff frequency can also be voltage controlled. Any positive voltage such as an envelope Generator Output, applied to any of the four VCF Control inputs, will raise the cutoff above the manual setting. Conversely, a negative voltage will lower it. (One of the Control inputs has a level control.)



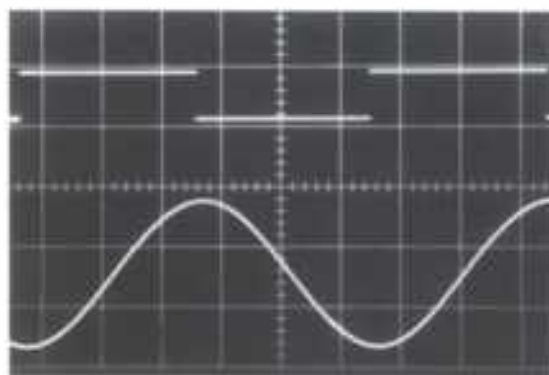
Top waveform is 100Hz Sawtooth input. Bottom is VCF output at 1KHz Cutoff Q=5



Top waveform displays same as above photo except pulse input.



Resonant Spiral Crossplot demonstrates relation between VCF input and output



Top waveform is 100 Hz Square input. Bottom Sine wave shows filtering of fundamental due to 100 Hz cutoff, Q=5.

Voltage Control Specifications

Response Type:
12 octave sweep with adjustable peak (Q)

Cutoff Frequency:
16 Hz to 16 K Hz

Q (Gain at Cutoff Freq.)
0.5 to 50

Maximum Signal Level:
± 70V peak

Signal to Noise Ratio:
at least 20 db.

Control Input:
0 to 1 octave increase in Cutoff or Peak Frequency per Volt of Control Input

Signal Input Impedance:
50 K ohm max

Control Input Impedance:
50 K ohm max

Output Impedance:
1 K ohm

Tracking:
When Control Input is Connected to the Keyboard, the Freq. of Cutoff or Highest Resonance will track the VCO's to within a small Fraction of a Semitone over the Full 5 Octave Range

Controls:
Initial Freq., Resonance (Q), Signal Input, Control Input

Connections:
4 Signal Inputs (1 with attenuation)
4 Control Inputs (1 with attenuation)
2 Outputs

Power:
+ 15.0V D.C. @ 20mA
- 15.0V D.C. @ 20mA



Voltage Control Amplifier

AR-316 Specifications

Maximum Signal Input
± 10 V peak

Maximum Control Input
± 10 V

Gain
0 db to 120 db

Frequency Response
D.C. to 30 KHz (-3db)

Linear Control
Gain = Control Voltage

Exponential Control
Gain = $10^{\frac{Control Voltage}{10}}$ (20 db/10 V)

Signal Input Impedance
20 K ohms min

Control Input Impedance
50 K ohms min

Output Impedance
7 K ohms

Controls
Signal Level 1, Signal Level 2, Initial Gain, Control Level 1, Mode Switch, R.N. 1, Exp. 1

Connections
4 Signal Inputs (2 with attenuators)
4 Control Inputs (2 with attenuators)
2 Outputs

Power
+ 15.0 V D.C. @ 100 mA
- 15.0 V D.C. @ 100 mA

AR-316

- **Wide Range — Over 100 db of Accurate Gain Control**
- **Linear or Exponential Mode Switch**
- **4 Audio Inputs, (2 With Level Controls)**
- **4 Control Inputs, (2 With Level Controls)**
- **Frequency Response DC to 30 KHz**

The AR-316 Voltage Controlled Amplifier (VCA) allows dynamic control of the loudness of a sound, both from the synthesizer and from external instruments.

When controlled from the AR-312 Envelope Generator, the VCA contours the attack, decay, sustain, and release properties of a note. In addition, the VCA can produce tremolo and other types of amplitude modulation when driven from an oscillator (AR-317) waveform. The linear mode results in a gain directly proportional to the control voltage. In the exponential mode, the number of decibels of gain changes in proportion to the control voltage.



Top waveform shows Sawtooth Control input, Linear Mode. Center shows Signal input. Bottom is VCA output.



Same waveform as the picture to left except Exponential Control Mode.



VCA output, Linear Mode, with low frequency Sawtooth control and high frequency Sawtooth input.



Balanced Modulator & Attenuators AR-315

AR-315 Specifications

Frequency Response:
D.C. to 20 KHz (-3db)

Maximum Input Level
± 10 V peak at Y and X inputs

Signal to Noise Ratio:
80db

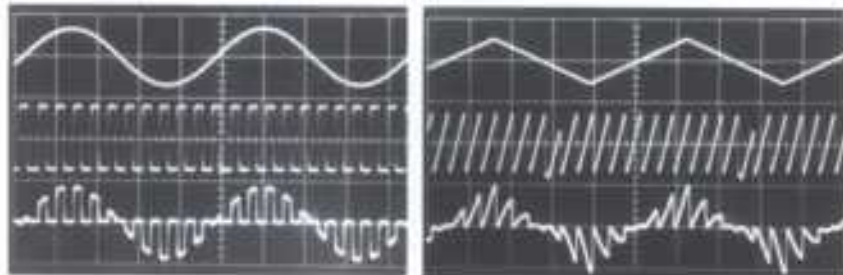
Signal Feed Through:
Less than 1% Y and X inputs

Input Impedance:
20 K ohms, Y and X inputs

Output Impedance:
7 K ohms

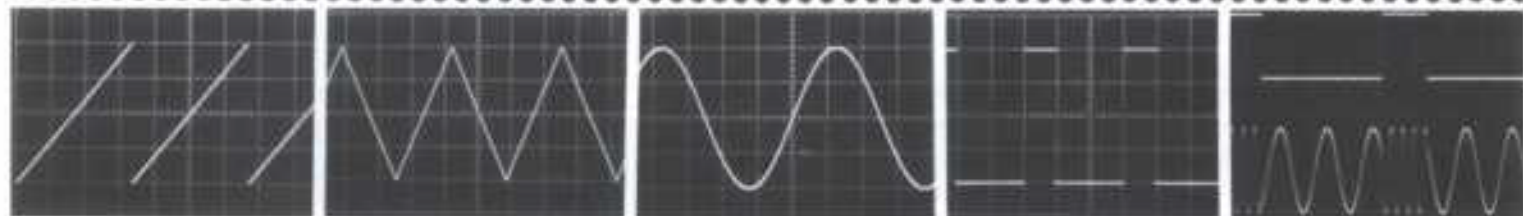
- **Generates Inharmonic Tones Resembling Bells, Gongs, and an Assortment of Exotic Space Sounds**
- **Balanced (ring modulator) Operation Allows Electrical Musical Instruments to be Plugged In**
- **Level Control On Each Input**
- **Wide Range — D.C. to 30 KHz.**
- **May Also be Used as a VCA**
- **Module Has Two Independent Attenuators (Level Controls) with Own Input and Output Jacks**

The AR-315 Balanced Modulator is a device which multiplies two input voltages together, producing a complex tone at the output. The Modulator can be used for a wide variety of sound generation, and amplitude modulation effects. It can be used as a VCA by connecting one input to an audio signal and the other input to a control signal. Complex envelopes may be generated by modulating an Envelope Generator (AR-312) output with an oscillator waveform (AR-317) or with another envelope signal.



Top waveforms show X input. Center waveforms show Y input. Bottom waveforms Balanced Modulator output.

Aries Voltage Control Oscillator • AR-317



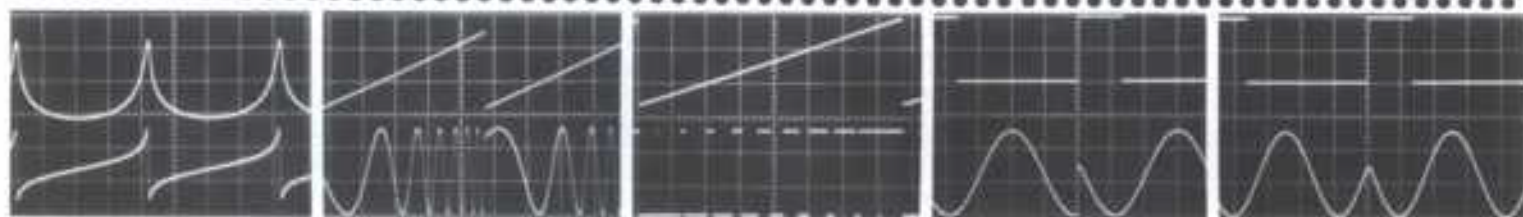
Sawtooth wave

Triangle Wave

Sine Wave

Pulse Wave

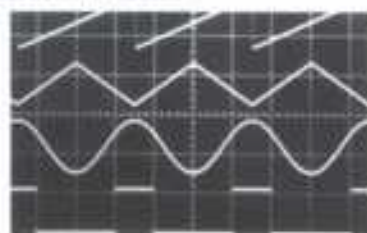
FM of Sine wave by Pulse



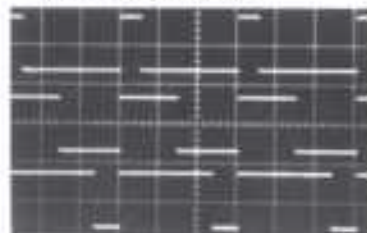
Self frequency modulation (IFM). Upper waveform Sine Output. Lower waveform Sawtooth output. FM: Upper waveform Sawtooth. Lower waveform Sine wave. Controlled by Sawtooth. Pulse with modulation (lower waveform) by Sawtooth (upper waveform). Synchronizing of Sine wave (lower waveform) by Pulse wave (upper). Same characteristics as picture to left except for change in Sine wave frequency.

- **Wide Range: Less Than 1 Cycle per Minute to Over 50,000Hz (Cycles per second) in Two Ranges**
- **Extremely Accurate: Oscillators Track Together in Tune Over Entire Hearing Range**
- **No Drift: Fully Temperature Stable**
- **Very Pure Sine Wave Plus Sawtooth, Triangle, and Variable Width Pulse (square) Waves Simultaneously Available**

- **Phase Synchronizing (sync) Input**
- **Pulse Width Modulation Input Gives Phasing and Chorus Effects**
- **4 Control Inputs (1 Octave per Volt)**
- **1 Control Input Attenuator**
- **Coarse and Fine Frequency Control**
- **Pulse Width Control (0 to 100%)**



Displays 3 different VCO pulse widths. 20%, 50%, 80%.



Displays VCO phase relationship.

The AR-317 Voltage Controlled Oscillator (VCO) is an extremely versatile package which represents a major improvement over other oscillators. It generates all the basic synthesizer waveforms simultaneously: sawtooth, triangle, variable width pulse (square) and sine. An engineering breakthrough in sine converters provides a pure, low distortion sine wave, which allows really clean balanced modulation.

Contrary to synthesizer kits which use linear oscillator control, the AR-317 VCO, along with the AR-314 VCF, uses accurate full range exponential control. Only this type provides 1 octave per volt (1/12 V per semitone) control of frequency over the entire range of hearing. Only exponential control (with a linear keyboard, such as the AR-313) allows unlimited flexibility in controlling any number of oscillators from any number of sources.

The AR-317 VCO has 4 control inputs, 1 of which has a level control. Its 1 octave per volt characteristic means that signals may be summed, and each positive volt doubles the frequency, and each negative volt halves it, over an extremely wide range.

A Sync input allows any external square or pulse wave to drive the VCO at exactly the same frequency, or any multiple (harmonic) of the external source. This can generate all sorts of unique speech-like tones. In addition, the width, or duty-cycle of the pulse wave may be voltage controlled (modulated) from an external source.

The AR-317 VCO also has many uses in the electronic lab: ie: as a function generator, audio sweep oscillator, frequency response tester, transient generator.

The low frequency range, together with the Sync feature, can be used to create unique envelope signals and vibrato type modulation waveforms.



Voltage Control Oscillator Specifications

Frequency Range:
Manual Control, two ranges 0.03 Hz to 30 Hz, 16 Hz to 16 KHz
May be driven by voltage control from 1 cycle every 10 minutes (0.002 Hz) to 50 KHz typically

Control Inputs:
0 to 1 octave per volt

Control Input Level:
 ± 10 V max.

Sync Input:
Positive going edge triggers all waveforms to reset. Requires at least 2V. Max Level = 10V.

Pulse Width:
Variable 0 to 100% duty cycle.
50% = Square Wave

Pulse Width Modulation:
10% per Volt, Maximum Input = ± 10 V

Sine Wave:
Many Synthesizers only provide a roughly shaped approximation to a sine wave. The ARIES VCO incorporates a significant advance in waveform-converter circuitry which provides a very clean, low distortion, pure sounding sine wave.

Frequency Accuracy and Tracking:
The oscillators will track one another, and follow the keyboard scale in tune over the whole audible range of 16 Hz to 16 KHz to within a small fraction of a semitone.

All Input Impedances:
50 K ohms min.

Output Impedance:
All outputs, 1 K ohm

Control:
Coarse Frequency, Fine Frequency $\pm 1/2$ octave,
Control Input 1, Pulse Width

Connections:
4 Control Inputs (1 with Attenuator)
Sync Input,
Pulse Width Modulation (PWM) Input
4 waveform outputs

Power:
 $+15.0$ V D.C. @ 20 mA
 -15.0 V D.C. @ 36 mA

SAMPLE/HOLD, CLOCK, NOISE GENERATOR • AR-318

- **High Speed, Low Drift Sample and Hold Allows Generation of Wide Variety of Note Patterns, Sequences and Scales**
- **Built-in Clock Oscillator with Voltage Control and Sync. Input Generates Many Rhythms**
- **External Triggering and/or Gating Allows Operation from Keyboard**
- **Trigger, Gate and Sawtooth Output Allow Automatic Control of Envelope Generators**
- **Sample and Hold May be Held on (Track and Hold) with External Gate**
- **Noise Generator Has Simultaneous White and Pink Noise, Plus Slow Random Control Voltage Outputs**



The AR-318 module contains a precision Sample and Hold circuit, a voltage controlled clock oscillator, and a noise generator with 3 simultaneous outputs.

The Sample and Hold may be thought of as an electronic strobe. It takes an input signal, which may be noise or a musical waveform, and converts it to a stepped output or sequences of voltages. The output changes only when a short trigger pulse is applied to the trigger input. At this time, the output immediately jumps to the level of the signal input, and then "freezes" at this level until the next trigger. Thus, staircase waves and all sorts of patterns may be generated, which can create melodies when connected to an oscillator.

The Sample and Hold also has a gate input; which will hold the circuit on continuously. Then the output follows the input. This is called Track and Hold operation.

A manual trigger push button will also trigger the Sample and Hold. A switch selects operation from either an external source, or the internal clock.

The Clock is a voltage controlled low-frequency oscillator with 3 outputs: sawtooth, square and narrow pulse. The last two can function as a gate and trigger to simultaneously operate an Envelope Generator (AR-312) and the Sample and Hold. Because it can be synchronized and/or voltage controlled, a wide variety of melody patterns with rhythmic control may be created.

The Noise Generator has three outputs: white noise, pink noise and random noise. White noise sounds like air hissing out of a valve. Controlled by an Envelope Generator and VCA or VCF, it can create drum-like sounds. Used to modulate an oscillator, many complex tones can be created. White noise is a useful audio test signal, since it has equal energy per cycle over the whole audio range. Pink noise is like white noise but filtered to have equal energy per octave. It sounds deeper, like wind, and can create thunder-like sounds. Random noise is a control signal which can, for example, modulate an oscillator and cause a random vibrato effect, similar to a performer's natural vibrato on a musical instrument.

AR-318 SPECIFICATIONS

Output Impedances: Square = 1 K ohm, Sawtooth = 1 K ohm, Trigger = 2K ohm

NOISE GENERATOR

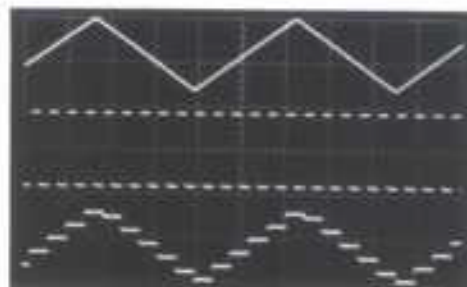
Connections:	Sample Hold - Signal Input, Output, Trigger Input, Gate Input Clock - Square Output, Sawtooth Output, FM Input, Trigger Output Noise Generator: White Output, Pink Output, Random Output	White Noise	2 V RMS, equal energy per cycle between 10 Hz and 10 KHz
Power:	+ 15.0 V D.C. @ 42 mA - 15.0 V D.C. @ 24 mA	Pink Noise	4 V RMS, equal energy per octave between 10 Hz and 10 KHz
		Random	4 V RMS, equal energy per cycle between 0.4 Hz and 2 Hz
		Output Impedances:	1 K ohm all outputs
		Control:	Sample/Hold Output Level, Clock Frequency, Sample/Hold Trigger Source (External or Clock), Manual Trigger Button

SAMPLE/HOLD

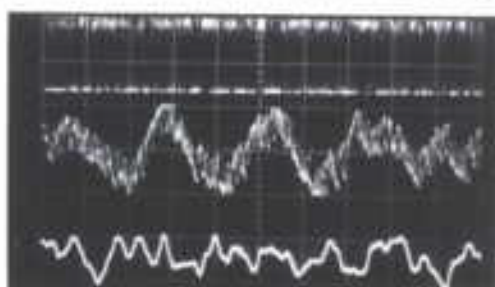
Maximum Signal Level:	± 10V	Sampling Time:	10 microseconds
Gain:	1.0	Gate Input Level:	10 V max. requires 2 V
Trigger Input Level:	10 V rms, requires at least 2 V	Gate Signal:	Any positive voltage between 2 V and 10 V causes output to follow signal input exactly. When gate is removed output holds its voltage.
Trigger Signal:	Requires a positive-going edge, such as a square wave, of between 2 and 10 V, and a rise time of 0.2 nS or less. Trigger causes the output to suddenly acquire the level of the input signal, and hold it until the next trigger.	Output Drift:	Less than 10 mV per sec.
		Input Impedances:	Signal Input = 200 K ohms, Gate Input = 1 K ohms, Trigger Input = 40 K ohms

VOLTAGE CONTROLLED CLOCK

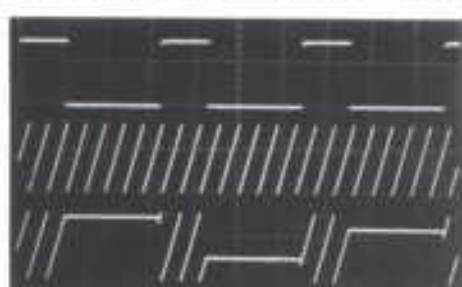
Frequency Range:	0.3 to 30 Hz	Sync Input:	Positive going edge, between 2 and 10 V, causes square and sawtooth to reset, and also causes trigger to appear
Output Waveforms:	Square, Sawtooth, and narrow trigger pulse	FM Control Input:	External voltage (± 10 V Max.) causes clock frequency to change by approximately 1 octave per volt.
Output Amplitude:	0 to 10 V, all waveforms	Input Impedances:	Sync Input = 50 K ohms, FM Input = 100 K ohms



Noise Generator/Outputs: white noise, pink noise and slow random control signal.



Sample Hold: Signal Input, Trigger Input and Sample Hold Output.



Sample Hold Gate Mode: Gate input, Signal input, Sample Hold output.

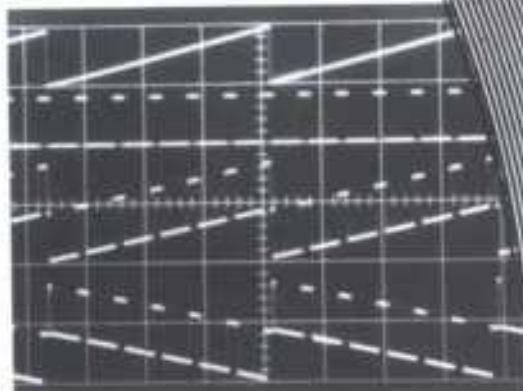
Dual Mixer • AR-323

- 2 Separate Mixers with 4 Inputs Each
- Sum Output (A + B) Allows Use as a Single 8 Input Mixer
- Input Polarity Switches Allow Signal Addition and Subtraction
- Wide Range — D.C. to 30 KHz, Allows Processing of Control Signals and Audio Mixing Simultaneously
- Low Noise and Distortion — May be Used for External Sound Sources
- Difference Output (A - B) Used with sum Output Creates Stereo Matrix Effect



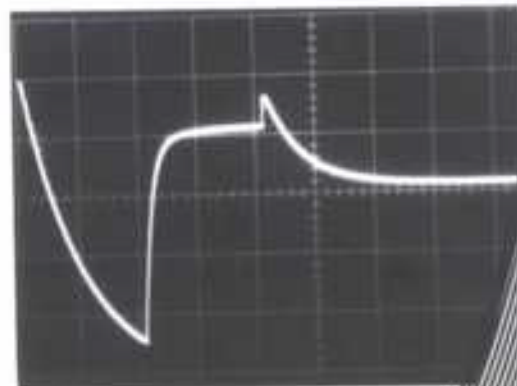
Dual Mixer Specifications

- Inputs:**
Each mixer has 4 inputs, 2 with attenuators and polarity switches. Max. Level = ± 10 V
- Outputs:**
Each mixer has one output. In addition there is a sum (A + B) output, and a difference (A - B) output. This module may be used to add, subtract, attenuate, and mix both audio and control signals.
- Frequency Response:**
D.C. to 50 KHz, ± 0.05 dB
- Input Impedance:**
100 K ohms, all inputs
- Output Impedance:**
1 K ohm, all outputs
- Controls:**
Mixer A — Gain 1, Mixer A — Gain 2, Mixer A Polarity 1 and 2
Mixer B — Gain 1, Mixer B — Gain 2, Mixer B Polarity 1 and 2
- Connections:**
- | | |
|----------|--------------------|
| A Inputs | 1, 2, 3, 4 |
| B Inputs | 1, 2, 3, 4 |
| Outputs | A, B, A + B, A - B |
- Power:**
- 15.0 V D.C. @ 12 mA
- 5.0 V D.C. @ 12 mA



Upper waveform displays Sawtooth input to mixer. Next waveform shows Pulse also applied to Mixer. Next waveform shows Mixer output. Bottom waveform displays Mixer output with Sawtooth input inverted.

Waveform illustrates mixing of 2 Envelope Generator outputs with one inverted.



The AR-323 Dual Mixer is both an audio mixer and a control signal processor. Each mixer has 4 inputs, two of which have level controls and polarity switches. This allows both addition and subtraction of waveforms, envelopes, or other signals, and variable gain inversion or voltage following. Each mixer has its own separate output. In addition, there are sum (A + B) and difference (A - B) outputs. These allow use as a single 8 input mixer, and can provide matrix stereo effects by using the sum as the left output and the difference as the right one.

Some of the AR-323 uses are: Oscillator waveform mixing; Envelope Generator mixing for complex envelopes; Patching in of external instruments or sources; general voltage processing.

DUAL LFO, LAG, INVERTER AR-324

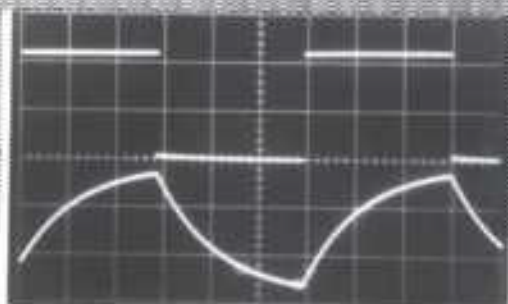


- 2 Separate Low Frequency Oscillators with Sawtooth, Square, and Triangle Outputs
- Phase Synchronizing (sync) Inputs on Each LFO
- LFO's can be Used for Vibrato, Tremolo, and Modulation Effects
- Square Wave Output Triggers Envelope Generator (AR-312) and Sample and Hold (AR-318)
- Variable Lag Circuit Acts as a Low Pass Filter, to Slow Down Control Signals, Generate Portamento, etc.
- Inverter Has Variable Gain

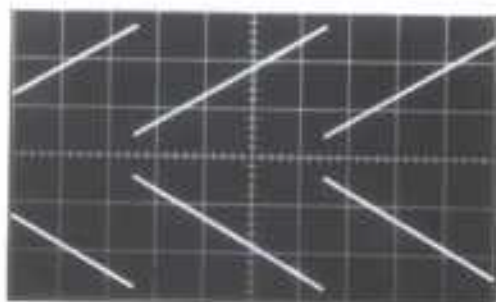
The AR-324 is a versatile control signal package. Its 2 oscillators cover the range from 0.3 Hz (1 cycle every 3 seconds) to 30 Hz. The simultaneously available sawtooth, square, and triangle waves may be synchronized to an external trigger or square wave. The triangle wave provides a natural vibrato signal to control a VCO, while all 3 outputs generate interesting modulations of oscillators and filters. In addition, the square wave outputs can trigger both the Envelope Generator and Sample and Hold, thus creating a wide variety of melodic and rhythmic control possibilities.

The Lag circuit provides a variable delay or slowing effect on a control signal. For example, the keyboard (AR-313) voice can be patched through the lag into one VCO, but connected directly into a second VCO. This will allow portamento (gliding from one note to another) on one tone, but not the other; which creates a nice pleasing effect of two instruments playing together.

The inverter has variable gain. It allows one to reverse the effect of a control signal. Negative envelope signals are one example, and so is reversing the keyboard action by inverting the voice output. Its wide frequency response also allows inversion of audio waveforms.



Top waves shows Square wave input to Lag. Bottom waveform Lag output.



Top waveform displays Sawtooth input to inverter and Bottom waveform shows Inverter output.

AR-324 SPECIFICATIONS

DUAL LOW FREQUENCY OSCILLATOR (LFO)

Frequency Range:	0.3 Hz to 30 Hz
Output Waveforms:	Sawtooth (0 to +10V), Square (0 to +10V), Triangle (-5V to +5V)
Sync Input:	Positive going edge between 2 and 10 V causes all waveforms to reset
Sync Input Impedance:	47 K ohms
Output Impedances:	1 K ohm, all outputs

LAG

Function:	Causes an input waveform to be slowed down or low pass filtered
Gain:	1.00- Accurate enough to process the keyboard voice
Lag Time:	Variable, 1 mS to 1 Sec.
Input Impedance:	1 K ohm at min. lag, 1 M ohm at max. lag
Input Level:	± 10 V max

INVERTER

Gain:	Variable: 0 to -1.0
Input Level:	± 10 V max
Input Impedance:	50 K ohm
Output Impedance:	1 K ohm

Controls: LFO-1 Frequency, LFO-2 Frequency, Lag Time, Inverter Gain

Connections: LFO-1 - Sync In, Sawtooth Out, Square Out, Triangle Out
LFO-2 - Sync In, Sawtooth Out, Square Out, Triangle Out
Lag In, Lag Out, Inverter In, Inverter Out

Power: -15.0 V D.C. @ 48mA
-15.0 V D.C. @ 20mA



POWER SUPPLY AR-322

- *Provides All 3 Outputs Required by ARIES Synthesizers*
- *Well Regulated, Assuring Excellent Stability and Tuning Accuracy of Synthesizer*
- *High Power — Capable of Powering 2 Synthesizers and Keyboards Simultaneously*
- *Ruggedly Constructed to Fit Into AR-310 Synthesizer Cabinet*

Outputs: +15.0 Volts at 1 Amp max.
-15.0 Volts at 1 Amp max.
+5.0 Volts at 1 Amp max.



OUTPUT AND POWER AR-326

- *2 Separate Audio Output Driver Amplifiers*
- *Stereo Headphone Jack*
- *Will Drive High-Impedance (40 ohms or greater) Speakers Directly*
- *Separate Level Controls and Inputs*
- *2 Phone Jacks on Back for Master Output to Stereo Sound System or Musical Instrument Amplifiers*
- *Short-Circuit Proof Outputs*
- *Wide Frequency Response — 16 Hz to 30 KHz*

SYNTHESIZER CABINET AR-310

- *Rugged Cabinet Holds 10 Modules Plus Output/Power Control Module*
- *Modules Easily Replaced or Interchanged*
- *Holds AR-322 Power Supply*
- *Female Connector for Each Module Allows Custom Patch Interconnections to be Wired In, if Desired*
- *Cabinets are Vertically Stackable*

ARIES SYSTEM 300 PRICE LISTING

COMPONENT	UNIT DESCRIPTION	QUAN. per TYPICAL SYSTEM	KIT PRICE	WIRED PRICE
KEYBOARD GROUP				
AR-311	Keyboard	1	\$119.50	\$119.50
AR-313	Keyboard Interface	1	\$ 59.50	\$119.50
AR-320	Keyboard Case	1	\$ 24.50	\$ 49.00
ELECTRONICS MODULE GROUP				
AR-312	Envelope Generator ADSR	2	\$ 49.50	\$ 99.00
AR-314	Voltage Controlled Filter	1	\$ 59.50	\$119.00
AR-315	Balanced Modulator & Attenuator	1	\$ 39.50	\$ 79.00
AR-316	Voltage Controlled Amplifier	1	\$ 39.50	\$ 79.00
AR-317	Voltage Controlled Oscillator	2	\$ 69.50	\$139.00
AR-318	Voltage Controlled Clock, Noise Generator & Sample/Hold	1	\$ 59.50	\$119.00
AR-323	Dual Mixer	1	\$ 39.50	\$ 79.00
AR-326	Output Control Module	1	\$ 39.50	\$ 79.00
CASE AND POWER SUPPLY GROUP				
AR-310	Case & back Plane Connectors	1	\$ 49.50	\$ 99.00
AR-322	Power Supply	1	\$ 79.50	\$159.00
COMPLETE TYPICAL SYSTEM				
	Includes all over the above components. If purchased separately, \$907.00 Group Price		\$895.00	\$1500.00

**ARIES INC. 119 Foster Street
Peabody, Ma. 01960**

PLEASE SEE OTHER SIDE FOR ORDERING FORM

PURCHASE ORDER FORM FOR ARIES SYSTEM 300 SYNTHESIZER

COMPONENT	# OF UNITS	WIRED PRICE	KIT PRICE	AMOUNT ENCLOSED
AR-311		\$119.50	\$119.50	
AR-313		\$119.50	\$ 59.50	
AR-320		\$ 49.00	\$ 24.50	
AR-312		\$ 99.00	\$ 49.50	
AR-314		\$119.00	\$ 59.50	
AR-315		\$ 79.00	\$ 39.50	
AR-316		\$ 79.00	\$ 39.50	
AR-317		\$139.00	\$ 69.50	
AR-318		\$119.00	\$ 59.50	
AR-323		\$ 79.00	\$ 39.50	
AR-326		\$ 79.00	\$ 39.50	
AR-322		\$159.00	\$ 79.50	
AR-310		\$ 99.00	\$ 49.50	
COMPLETE SYSTEM PRICE		\$1500.00	\$895.00	

Shipping Charges Additional. Allow Ample Allowance to Cover Parcel Post and Insurance

Shipping Wt.
Each Module = 2 lbs.
Keyboard & Case = 30 lbs.
Power Supply = 15 lbs.
Entire Synthesizer Kit = 60 lbs.

All orders must be occupied by at least 25% Balance due C.O.D.

Include Sales Tax, if applicable in your State. Allow two to four weeks for delivery.

Please Advise if Partial Shipment is Acceptable . . . Yes No

TOTAL
TAX (if Appropriate)
SHIPPING CHARGES
TOTAL AMOUNT ENCLOSED

Mastercharge and BankAmericard Accepted.

Charge Card No. _____

Expiration Date _____ Bank No. _____

Signature _____

NAME _____

ADDRESS _____



AR-715 GIANT DIGITAL CLOCK



Six huge glowing numbers give you the time to the second — from 50 feet away! Designed to eliminate "auditorium squint," and intended for commercial and industrial applications. Mounts on shelf or wall.

AR-710 NIXIE DIGITAL CLOCK

**OTHER
ARIES
KITS**



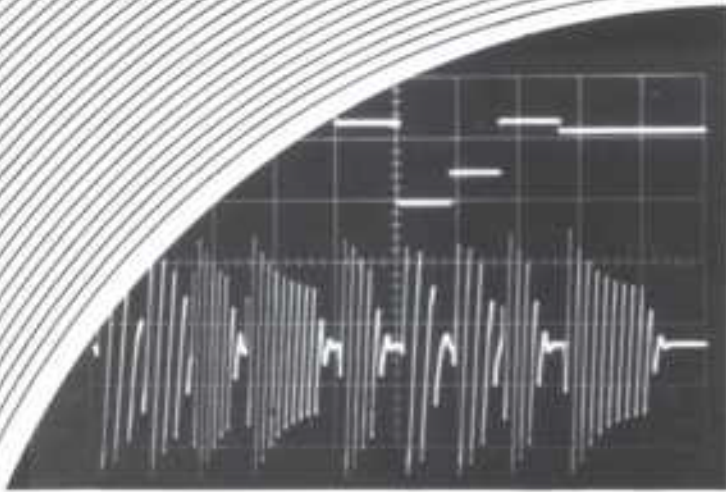
Our original clock — and still very popular. Excellent readability from six neon-colored digits, and quick time setting from front-panel controls.

Individual 7400-series TTL integrated-circuit design means that many useful signals are available internally. For example, continuous semi-decoded BCD digit data outputs are provided, as is a direct clear. You can drive remote displays and comparators for alarm and intervalometer functions.

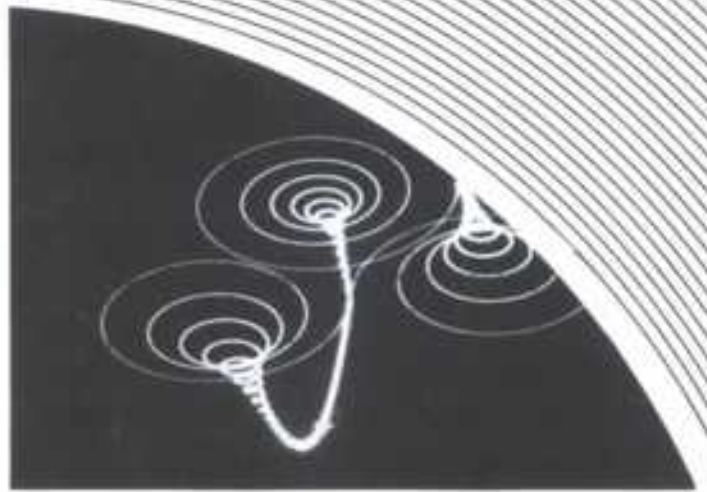
AR-610 FREQUENCY COUNTER



Counts pulses or measures frequencies from DC to 50 MHz. Measures time intervals from 1 microsecond to 1 second. Six digit computer type display reads frequencies below 10 MHz to one Hertz. Time base switching allows display of either the first six digits or the last six digits of higher frequencies. Infinite (count) mode displays the total number of pulses since reset without regard to elapsed time. Time interval measurement enables the determination of linear or angular velocity (using auxiliary transducers).



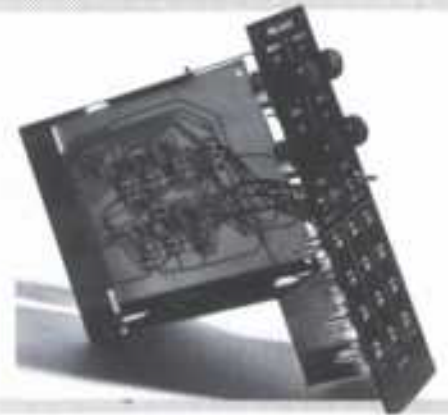
Keyboard Voice output and synthesizer output to "Rockabye Baby".



This "3 Coins in a Fountain" illustration is a logarithmic spiral generated by a VCO, VCF and Mixer.

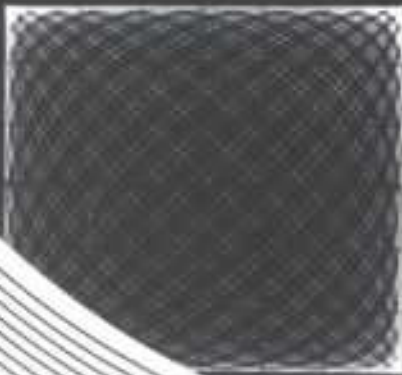
ARIES SYSTEM 300 ELECTRONIC MUSIC SYNTHESIZER

- Available as a Kit or Completely Wired
- Modular Quality Construction
- Economically Priced at a Fraction of Other Units
- Accuracy, Stability & Versatility Equal and Surpass the Most Expensive Synthesizers Available
- 5 Octave, 2 Voice Keyboard Generation and Processing
- Standard 1 Volt/Octave Control for Total Compatibility with Other Systems



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Lissajous pattern from 2 Sine wave Oscillators.



Complex wave generated by mixing, modulating, and synchronizing 2 Oscillators.

