ARIES MUSIC 77

ARIES MUSIC
INCORPORATED

An Aries Modular Synthesizer system consists of a number of AR-300 series modules. These modules provide a complete set of basic synthesizer component functions: signal sources; controllers and modifiers, and a growing number of more exotic functions. The 300 series is fully modular, allowing maximum system flexibility. We assume some previous experience with synthesizers on the part of our customers, but are happy to give advice and assistance to those who are getting into electronic music for the first time.

It's More Than Another Keyboard

A synthesizer is a group of relatively simple circuits, each performing a relatively simple task. The way in which these circuits are connected to one another (patched) determines the nature of the "instrument": the range of sounds and the kinds of controls involved. While this is true for all synthesizers, some synthesizers, especially the smaller ones, are preassembled by the factory — the range of "instruments" available has been defined and limited, along with the range of musical expression possible.

It's been declared a trade off, that by giving up the enormous range of choices and controls for a few (deemed useful by someone else), you get increased "performability". "You just can't make changes fast enough with a modular patch cord system to play on stage." — so goes the argument. Five or six years ago that may have been the case, but it's not true today — Aries "normalled" patching capability makes it as comfortable to use on stage as it is in the studio. The real trade-off, we feel, is one of instant gratification versus long-term satisfaction. It doesn't take as much effort to learn to play a small pre-set system as it does a modular one — but someone else has done all the exploring for you, left you with the sounds he liked, and you haven't had a chance of learning what making music with electronic circuits is really all about. If your interest is in learning to play a completely new instrument, an Aries Modular electronic musical instrument will be a satisfying and economical choice.

Aries In The Classroom

The Aries Modular System is uniquely situated to use in the classroom for several reasons:

- We offer several cabinet sizes, each student can be assigned only the modules he or she needs for a given lab exercise.
- being modular, the system can grow as class room and composition needs grow.
- It's a patchcord system first, giving the beginning student an easy grasp of the relationship between instrument configuration (patch set up), the sound produced, and its control parameters.

HERE WE ARE:

BOX 3065 SALEM, MA. 01970 (617) 744-2400

Patching & Connectors

No distinction is made between "control signals" and "audio signals". This means that any signal from the system can be patched anywhere else in the system without damage, optimizing overall flexibility. The standard connector is the NTT 311 miniature stereo jack (equivalent to a Switchcraft 42A miniature phone jack). Patch cords are supplied (10 free per thousand dollars of kits ordered) and are completely reliable. Much has been argued over the years about the reliability of miniature jacks -- some manufacturers believe they are not. The fact of the matter is that there doesn't exist the industry-wide standardization of mini's as there is with 1/4" phone jacks -- which means that you've got to have the right patch-cords: either NTT or Switchcraft. The space saving advantages of mini jacks is obvious when you compare panel space requirements of a Moog or Eu modular system to that of an Aries or other type using miniature jacks. All patch cords are shielded to prevent noise or crosstalk.

Input Structure

Most input impedances are 50K ohms minimum, allowing outputs to drive numerous inputs without significant loading. Most module inputs are summing nodes, which allows easy modification to accommodate additional inputs. Signals at control inputs are summed algebraically.

Output Structure

Most output impedances are 1K nominally, allowing output mixing simply by shorting outputs together at a multiple. This kind of mixing does not sum signals but gives the average voltage of signals mixed.

Power Supply

All modules require ±15 volt power supplies. For current requirements, consult specific module specifications.

Building Kits

"Can I build my synthesizer from your kits?" is a familiar question. Our answer is -- probably -- but this answer depends less on your skill and experience than it does on your ability to work slowly with care and patience. People with no experience whatsoever have completed kits successfully, while people who have done other electronic kits have had problems because they've been careless or hasty. It is helpful to have someone demonstrate soldering to you if you've never tried it.

Warranty

Assembled units are fully warranteed to be free of defects of material or workmanship for 1 year from date of shipment. Just return the defective module to the factory and we'll repair and return it.

Modules purchased as kits will also be repaired at the factory, but there is a $15.00 service charge for kit repairs. A bit of quick addition will show that even if nothing works, the kit with full repairs will save you some over an assembled unit.

We have once in a while actually replaced kits which were so badly assembled that they were beyond repair, all for $15.00. Virtually the only thing you can do to void your warranty is to use acid core solder or acid flux (plumbing-type solder). Rosin core solder, 60/40 lead-to-tin ratio is best.

Replacement parts are available from us -- write for prices.

User's Manual

A comprehensive User's Manual is available, written for Aries by Keri L. Perrin of the Boston School of Electronic Music. The Manual covers synthesizer theory in general, and Aries synthesizer operation in particular, in ninety six thorough pages. We recommend that anyone planning to purchase over $800 worth of kits or assembled first purchase and peruse this book. The price of the Manual ($9.50) is refundable with the placement of an order of $1000 or more. It is also a useful classroom tool or curriculum guide, coming from one letty a good deal of experience in electronic music education.

Documentation

Documentation kits, which include schematic, wiring diagram, and assembly instructions, on any Aries module are available for $5.00. This amount will be credited towards the purchase of that module.

Authorized Dealers

Prices are the same whether ordering from a dealer or direct from the factory, but delivery schedules may vary, as we ship to the dealer unless otherwise directed. All of these dealers are qualified to do custom work, repairs, and modifications to electronic music instruments.

Ron Rivera
48 Brighton Avenue, #11
Allston, MA. 02134
(617) 782-6684

Dana McCarty
164 West 83rd Street
New York, New York
10024
(212) 787-1330

The Boston School of
Electronic Music
137 Kilsyth Road
Brighton, MA. 02135
(617) 734-4660

Carl Frawd
Gentle Electric
140 Oxford Way
Santa Cruz, CA. 95060
(408) 423-1561

ADSR ENVELOPE GENERATOR

The AR-312 provides the classic four-stage envelope control source with Gate and Trigger logic.

Output: A positive D.C. voltage, variable according to:
Attack time — governs initial voltage rise to +10v.
Decay time — governs change from +10v. to Sustain level voltage.
Sustain Level — voltage at which signal remains until Gate is removed.
Release time — governs voltage change from Sustain level to 0v.

Inputs: Gate — positive-going edge initiates Attack, Decay and Sustain functions as designated; negative-going edge initiates Release. A steadily rising and falling voltage of at least 2v. peak is required, such as square wave or keyboard Gate.
Trigger — initiates new Attack if Gate is still present. This permits legato keyboard playing where each key initiates a new envelope before the first has finished.

The ADSR output may be used to control any v.c. parameter in the synthesizer, and is most commonly associated with VCA and VCF control. In that manner, the ADSR provides four significant controls over dynamics of sound. This is important, as recognition of sounds by the human ear depends more on the timbral envelope, or dynamics of the harmonic spectrum, than on the harmonic content (static waveshape) of a tone.

Attack time: 2mS. to 4sec.
Decay time: 2mS. to 2sec.
Sustain level: 0v. to +10v.
Release time: 2mS. to 2sec.
Gate Input Impedance: 100K ohms
Trigger Input Impedance: 30K ohms
Output Impedance: 1K ohms
Power Consumption: +15v. D.C. @4mA.
-15v. D.C. @2mA.

SAMPLE & HOLD, CLOCK and NOISE SOURCE

The AR-316 is a sophisticated multi-function module. Its three basic elements function independently, allowing more flexible use of sampling and clocking circuitry. Classic Sample & Hold operation (where a new sample of the voltage source appears at the output with the receipt of each trigger) uses the Trig input; "Track and Hold" operation uses the Gate input, where the output tracks the voltage source precisely, until the gate is removed, then remains at the last voltage level tracked, until a new gate appears. The Clock may function as an independent low-freq. oscillator, whose pulse output is normalled to the Trig input of the S&H circuit (toggle switch selectable). The Noise Generator includes two forms of filtered noise, Pink and Random (sub-audio) as well as full-spectrum White Noise.

Inputs:	Level	Impedance
S&H Gate	2v.-10v.	100K ohms
S&H Trig	2v.-10v.	40K ohms
Clk Sync	2v.-10v.	50K ohms
Clk FM	±10v.	100K ohms
S&H In	±10v.	200K ohms

TRIG. and Sync inc. positive-going edge
FM = 1v./octave
Gain = 1.0
Outputs:

S&H Out	±10v.	1K ohms
Drift: 1mv./sec. max.		
Clock: Square	0-+10v.	1K ohms
Sawtooth	0-+10v.	1K ohms
Trigger	0-+10v.	1K ohms
Clock Frequency Range: .3-30Hz		
White Noise	1V RMS	1K ohms
equal energy/cycle, 10Hz-18KHz		
Pink Noise	4V RMS	1K ohms
equal energy/octave, 10Hz-18KHz		
Random Noise	4V RMS	1K ohms
equal energy/cycle, 0.4Hz-7Hz		

Sampling Time: 10 microseconds
Power Consumption: +15V. D.C. @ 44mA.
-15V. D.C. @ 34mA.

VOLTAGE CONTROLLED AMPLIFIER

The AR-310 is a two-quadrant multiplier, allowing dynamic control of the amplitude of a signal, both from the synthesizer and from an external source. The four audio signal inputs are summed together, and two of these have independent level controls. The same applies to control inputs, where only one input has a level control. The control signals are again summed with the Initial Gain voltage level. The audio signals are then multiplied by the control voltages, in either linear or exponential fashion. In ordinary usage, sub-audio or D.C. control voltages, such as those from the AD68R, are used to control signal amplitude. Some interesting musical effects may be obtained by using audio-frequency voltages at the control inputs for high-frequency amplitude modulation.

Maximum Signal Input: ±10v, p-p.
Maximum Control Input: ±10v.
Gain: 0db to -100 db
Frequency Response: D.C. to 20 KHz (-3db)
Linear Control: Gain = control voltage/10
Exponential Control:

v = control voltage

$$\text{Gain} = \frac{10v-10}{3} = 10^{(v-10)/3}\ \text{db}$$

Input Impedance: 50K ohms min.
Output Impedance: 1K ohms
Controls: Signal level 1, Signal level 2; Initial Gain Control level 1, Mode Switch (linear or exponential)
Connectors: 4 Signal Inputs
4 Control Inputs
2 Outputs
Power Consumption: +15v D.C. 85mA
-15v D.C. 85mA

BALANCED MODULATOR

The AR-310 is a four-quadrant voltage multiplier. The voltage present at input X is multiplied by the voltage at input Y. If both inputs are in the audio frequency range, the resultant output is a signal whose frequency spectrum consists of the sum and difference frequencies of the fundamentals and harmonics of the input signal. These are commonly used to produce bell and gong-like tones.

The module is D.C. coupled; when a control signal is applied to one input, and an audio signal to the other, the AR-310 can function as a VCA.

Both X and Y inputs have associated attenuators. Two floating attenuators are provided in this module -- these are not electrically associated with the Balanced Modulator, and may be used anywhere in a patch where extra attenuation is needed. Also within this panel is another 4-jack "patch" or multiple.

Frequency Response: D.C. to 20 KHz (-3db)
Maximum Input Level: ±10v, peak-to-peak
Signal-to-Noise Ratio: 80db
Signal Feedthrough: less than 1%, X and Y inputs
Input Impedance: 20K ohms, X and Y inputs
Output Impedance: 1K ohms

HEX ATTENUATOR

The AR-321 consists of six floating attenuators. Input to attenuator 1 can be normalled to 2 or more attenuator inputs to allow multiple use of a single control signal with independent attenuation for each output. This module does not require a back frame or p.c. card assembly, as all necessary circuitry is contained on the panel. (No edge connector, no power consumption — look, ma! no hands!)

DUAL MIXER

The AR-322 may be used both as an audio mixer and as a control voltage processor. Each mixer has 4 inputs, two of which have level controls and polarity reversers. This allows both addition and subtraction of waveforms, envelopes or other signals, as well as variable gain inversion. Each mixer has an independent output. In addition, there are sum (A+B) and difference (A−B) outputs, which allows use of the module as a single 8-input mixer. Mono/stereo effects may be obtained by applying the sum and difference outputs to left and right channels respectively.

Inputs: 4 inputs to Mixer A; 4 inputs to Mixer B
Input Level: ±10v.
Outputs: 1 — Mixer A; 1 — Mixer B; 1 — A+B; 1 — A−B
Frequency Response: D.C. to 50K Hz (−3db)
Input Impedance: 100K ohms
Output Impedance: 1K ohms
Controls: Gain controls 1 & 2, each mixer
Polarity switch (+ or −) 1 & 2, each mixer
Connectors: A inputs 1, 2, 3, 4;
B inputs 1, 2, 3, 4.
Outputs A; B; A + B; A − B
Power Consumption: +15v. D.C. @12mA.
−15v. D.C. @12mA.

PRE-AMP/ENVELOPE FOLLOWER

See Figures 1a & 1b, page 12

The AR-331 features a preassembled, tested subassembly which provides the Pre-Amp and Envelope Follower circuitry. Assembly involves a dozen additional components and wiring front panel controls and jacks.

The AR-331 is a multi-function module incorporating a 40db pre-amp for tape recorded, microphone, and electric instrument signals, a linear envelope follower and inverter, and a comparator or threshold detector circuit which produces a gate output as long as the input is above the threshold level. Pre-amp output is "normally" connected to Envelope Follower input; Envelope Follower output "normally" connected to Inverter and Threshold Detector. These connections are defeated by a jack inserted in the appropriate plug.

Pre-Amp Inputs: Miniature connectors: 1/4" phone, RCA (phono) and mini (1/8") phone for easy interfacing to external sources. Capacitively (AC) coupled.

Controls: Input Level Attenuator
Output: +40db (×100) above input signal
Envelope Follower:
- Inputs: 1 w/Attenuator; 1v (p-p) input produces 10v DC output; Direct Coupled
- Outputs: Full-wave Rectifier Output; Linear Envelope Output

Inverter: Unity Gain (max.) w/ Input Attenuator
Threshold Detector (Comparator):
- Input: 0-+10v (positive comparison only)
- "ON" Threshold Level: variable from +.3v to +10v.
- Threshold Hysteresis: .3v
- Signals below on-off set level do not produce gate.
- Signals above threshold level produce a gate.

Input Impedance: 50K min., except threshold signal input > 10K
Output Impedance: 1K ohms, except Gate Out: 330 ohms, and Trig Out: 3.3K ohms
Power Consumption: +15v @15mA, -15v @12mA

PITCH and ENVELOPE FOLLOWER

The Gentle Electric Model 101 is represented by Aries, and will be available in standard module form later this year. It is designed to accurately track an input from instrument or microphone source to produce a 1v/octave control voltage for synthesizers over a range of 25Hz to 10KHz. It also includes:

Linear and Logarithmic envelope followers.

Infinite compression — a signal output that remains at a constant, synthesizer-compatible amplitude, regardless of input amplitude.

Low-noise mic preamp, which can be used independently and accepts microphones or instrument pickups.

Track and Hold operation on the pitch follower, controlled by a footswitch, synthesizer, or panel switch.

A Pulse wave output at the fundamental input frequency. Pulsewidth is controlled by input waveform.

The GE 101 is an ideal alternative to keyboard control for those musicians who play other instruments or who wish to experiment with combinations of synthetic and acoustic music.

Specified Input Level (SIL): 0db (note 1) into LINE IN or -40db into MIC IN w/Line Level control set for 0db atten.
Overload (onset of clipping): 10db above SIL.
Overload Indication: 5db above SIL.
Pre-Amp Gain: 40db
Compressor Out: 10v p-p (trimmable)
Threshold of Compression: 40db below SIL
Gate Threshold - on: 30db below SIL; off: 35db below SIL (5db hysteresis)
Gate Output: 0v (off) when sig. is below gate threshold; 15v (on) when sig. is above gate threshold
Trigger Output: 2mS pulse to 15v when either Gate output goes on OR when sig. amplitude increases at a rate exceeding that which is set up by the RETRIGGER control.
Linear Env. Output proportional to full-wave peak amplitude (5v nom. for SIL)
Log Env. Output: 1v change for 10x change in amplitude (10v nom. for SIL)
Pitch: 1v/OCT Output: When signal is above gate threshold, this follows extracted fundamental pitch at 1v/OCT (nominal). When signal is below threshold (or when HOLD function is activated) it holds the last pitch obtained.
HOLD Drift (at Pitch: 1v/OCT output) less than 20mV (1.5%) per minute.

VOLTAGE CONTROLLED OSCILLATOR

The AR-311 generates all the basic synthesizer waveforms simultaneously: sawtooth, triangle, variable width pulse (square) and sine. An exceptionally well-engineered sine converter [illegible] a pure, low-distortion sine wave [illegible] very clean balanced modulation. The AR-311 uses exponential frequency control providing 1 v/octave control of frequency over the entire audio range. Control voltage inputs are summed; each positive volt doubles the frequency, and each negative volt halves it. Over an extremely wide range (negative control voltages may be used to drive down as low as .002Hz, positive as high as 50KHz).

Frequency Range: (Manual Control)
0.03Hz – 20Hz low range
15Hz – 15KHz high range

Control Input Level: ±10v. max.

Sync Mode: [illegible] wave of [illegible] to reset

Sync Input Level: 2v min. – 10v. max.

Pulse Width: variable 0 to 100% of duty cycle (50% = square wave)

Pulse Width Modulation: 10% per volt at input, Max. input ±10v.

Input Impedance: 50K ohms min.

Output Impedance: all outputs, 1K ohms

Controls: Coarse Frequency, Fine Frequency (±1/2 octave)
Control Input Level 1, Pulse Width

Connectors: 4 control inputs (1 w/attenuator) Sync. Input, Pulse Width Modulation Input
Four Waveform Outputs

Power Consumption: +15V. D.C. @30mA.
-15v. D.C. @30mA.

See Figure 3, page 12

DUAL SAWTOOTH/PULSE VCO

The AR-332 features two [illegible] and [illegible] voltage controlled sawtooth generators. This [illegible] the [illegible] for [illegible].

The AR-332 is two fully independent sawtooth/pulse VCO's. These waveforms have the highest harmonic content of all the basic synthesizer signals, and though the AR-332 lacks the triangle and sine wave outputs, it is in all other respects like two AR-311's [illegible] a savings in [illegible] and space [illegible]. One oscillator of the AR-332 is "normally" synced to the other — this is defeated by the insertion of a dummy plug into the sync input jack.

See Figure 3, page 12.

All specs like AR-311 except:

Controls: Coarse [illegible] to all controls
Each oscillator has coarse and fine freq. control
Control signal input attenuator and pulse width setting
High or Low Range switch

Output Levels: -5v. to +10v., both sawtooth and pulse

Power Consumption: +15v. @[illegible]mA.
-15v. @[illegible]mA.

DUAL LFO, LAG, and INVERTER

The AR-334 is a multi-function module providing control voltage signal sources and signal processors. The two low-frequency oscillators have independent manual frequency controls, provide three simultaneous waveform outputs each and are syncable. The LAG circuit is a [illegible] low-pass filter, with a variable very low cut-off frequency. The LAG is used to limit the rate of change of a control signal, like the portamento circuit in the AR-313 Keyboard Control, or to "round off" the edges of a low frequency pulse to produce a [illegible] envelope.

LFO's:

Frequency range: 0.04Hz to 20Hz

Output Waveforms: Sawtooth: 0v.–+15v.
Square: 0v.–+15v.
Triangle: [illegible]

Sync Input: positive-going edge rec. 3v. min. to 15v. max.

Sync Input Impedance: 47K ohms

LAG

Gain: 1.0

Lag Time: variable 1mS to 1 sec.

Input Impedance: 1K ohms at min. Lag
1M ohms at max. Lag

Input Level: ±15v. max.

INVERTER

Gain: variable 0 to -1.0

Input Level: ±10v. max.

Input Impedance: 50K min.

Output Impedance: 1K ohms, all outputs

Controls: LFO-1 frequency
LFO-2 frequency
LAG time
INVERTER gain

Connectors: LFO-1: Sync In, Sawtooth Out, Square Out, Triangle Out
LFO-2: same as LFO-1
LAG In, LAG Out
INVERTER In, INVERTER Out

Power Consumption: +15v. D.C. @[illegible]mA.
-15v. D.C. @[illegible]mA.

MULTIMODE VC FILTER

The AR-[illegible] is a voltage controlled, state-variable filter with simultaneous HIGHPASS, LOWPASS, BANDPASS, and switch-selectable NOTCH or PEAK outputs. It also features [illegible]

Frequency Response: 10Hz - 20KHz
Signal-to-Noise Ratio: [illegible]
Distortion: less than [illegible] typically
Q (Gain at Cut-Off Freq.): 0.5 to [illegible]
Signal Levels: [illegible]

Input Impedance: [illegible] ohms
Output Impedance: 1K ohms [illegible]
Controls: Initial (Cut-Off) Freq., Resonance, Audio 1 Input Attenuator, Freq. Control 1 Input Attenuator, NOTCH/PEAK switch [illegible]
Connectors: 3 Audio Signal Inputs
2 Freq. Control Inputs
2 Q Control Inputs
1 NOTCH or PEAK output
1 LOWPASS output
1 HIGHPASS output
1 BAND PASS output
Power Consumption: +15v. D.C. @ [illegible] mA., -15v. D.C. @ [illegible] mA.

PHASE/FLANGE

The AR-[illegible] is a voltage controlled phaser. [illegible]

[illegible]

Input Impedance: [illegible] ohms
Output Impedance: 1K ohms
Power Consumption: +15v. D.C. @ [illegible] mA., -15v. D.C. @ [illegible] mA.

See Figure [illegible], page 12.

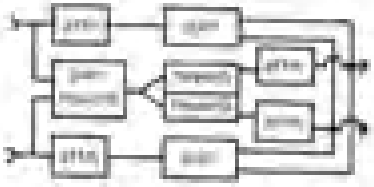
VOLTAGE-CONTROLLED LP FILTER

The AR-[illegible] is a [illegible] low pass filter with voltage controllable cutoff frequency and variable resonance (Q). This filter modifies the harmonic content, or spectrum, of an incoming signal by attenuating all frequency components of the waveform above a certain cutoff point. The resonance control boosts the amplitude of the frequencies or harmonics of the incoming wave closest to the cut-off frequency by a variable amount depending on the manual setting. The control input varies the cut-off frequency at 1 octave per volt of input signal: positive voltage will raise the cut-off and negative voltage will lower it.

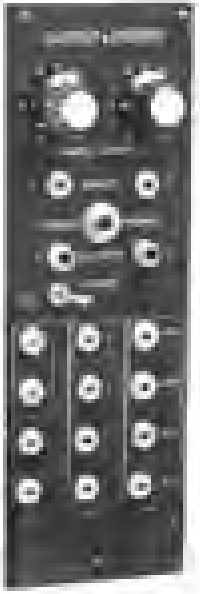
Frequency Response: 10Hz to 20KHz
Q (Gain at Cut-off Freq.): 0.5 to [illegible]
Maximum Signal Level: +10v. peak
Signal to Noise Ratio: [illegible] min.
Control Input: [illegible]
Signal Input Impedance: [illegible] ohms min.
Control Input Impedance: [illegible] ohms min.
Output Impedance: [illegible] ohms
Controls: Initial Freq., Resonance (Q), Signal 1 Input Attenuator, Control 1 Input Attenuator
Connectors: 4 Signal Inputs
4 Control Inputs
2 Outputs
Power Consumption: +15v. D.C. @ [illegible] mA., -15v. D.C. @ [illegible] mA.

POWER SUPPLY

STEREO REVERB & OUTPUT



OUTPUT & POWER



KEYBOARD GROUP

The Keyboard Group consists of three pa-
rents: the AR-2 I-F for Dream Keyboard,
AR-2PC Keyboard Electronics, and AR-2B5
Keyboard Cabinet.

The Keyboard is also the most inexpensive
solid synthesizer construction offering inter-
face, precise control of any CV generator.

Controls:

Kbd — the is the most essential voltage (vol-
ts) - proceeding 0 V. - voltage proportionate to
the lowest key being held down. With the
Tuning Control at center position, the lowest
key (C2 semitone 1Hz) will produce 0 V. and
1 Vlt., an that 1 octave = 1 volt. (A guide)

Aux. Voltage provides the necessary control
for 2 notes (semitone) - a D.C. voltage propor-
tional to the interval between the lowest and
highest keys being held down. Which output is
the Voltage present at the Key, control (each of
a VCO), where positive V.CO returns with the
Vlt/oct system, the V.CO will have adjustable
interval of keys is viewed. (2 gates)

Gate — provides a (+5v.) signal as long as the
pressed.

Trigger — provides a +5v., 1mS, duties when
new a key is depressed.

Controls:

Tuning — Add or subtract voltage from the
main Kybd section (key or effect at or near
its center position). This may be used as a
"pitchbend" control, altering notes sharp or
flat. Range: 1.3 volts.

Portamento — Glides a glide, or lag time, be-
tween notes by shaping the voltage from one
level to the next according to the amount set
by the control pot. The portamento shape
switch selects Normal (exponential or
Linear response). In the Normal mode the
same amount of lag is resulted in glide over-
shoot (overshoot as large from pot, in Linear, the
glide takes longer for long intervals and is
more uniform glide. The On/Off switch allows
the glides to collect or remove fluctuations at
any time. (Portamento lag time: 0 to 0.8 sec.)

Mounting:

The Keyboard electronics section rides mount-
ed on and has Velcro. Press on the key-
bed circuit board to 3 and 6 screw locations.
(Tabs should not normally be loaded, but if
necessary can be adjusted in the sample slots).

Control Interfaces:

Gate and Trigger — (+5v. Active High &
Low) — (5 wires).

Power Connections: +15v. D.C. 40 mA &
-15v. D.C. @ 10mA.

On Synthesizer Controllers

The fundamental fact that (in synthesizer pa-
rlance) from the old standard electronic
music control is voltage control — voltage con-
trolled oscillators, filters, amplifiers, proc-
essors, envelope shapers, and so on. Voltage
control means that any voltage source can vary
any (i.e. developing) knob. Control (machine)
synthesizers usually don't have much above
the voltage control level, a multiswitch, a key-
board, a simple sequencer (in also trans-
ducer) — monophonic, pseudo-polyphonic
electronic — everything — as long as the voltage s
sensitivity of control and specification is range.
(1-1 V) and the 1 volt/octave (1 V./ O.C.)
for example 1 key than 1 Vlt.

The keyboard is the most common type of
controller because it offers precise, and easy
to memorize mapped voltages and timing
signals. The sensitive, many-switch control
found in the AR-2330 is another common-
and relatively inexpensive controller. More
frequently found controlling (pseudo-control
voltages), the keyboard can also be used to cre-
ate arbitrarily long repeating sequences by
sampling previous waveforms, and these can
come over the master sequencer and gated sequ by
sending back a bit of the CV control to the
CPU input oscillator, or by using the time
feature on the CPU chips and the switch
producing the sampled signal.

Sequencers are another instrument useful con-
troller for producing predictable patterns.
There are usually step of two types: the
shorter (8 event to 16 event) pattern repe-
ater or the sequencer/recorder memory, and
the longer (24 to 256 event) regular memory
type.

A [illegible] combining an integrated
synthesizer controller suite around a 6 voice
Polyphonic Digital Keyboard and including
two banks of sequencing, a programmable
rhythmic pattern accompanist and pre-patch
storage.

CABINETS

All three cabinets are hand-made of high-grade,
Grade I laminated 3/4" plywood. Kits are
designed with an eye to help the first assem-
bled soldering are included with construction
manuals. All cabinets have mounting hard-
ware for modular mounting and 50-pin edge
connectors for (i.e. heavily laboratory (panel
hardwearing or "normalized" patch connections
to be made).

AR-2H/C — holds 11 4-rack (Dimensions/mo-
dule panel holes) designs. (Dim.
AR-2130 — holds 14 4-rack 300 series modules
and power supply, keyboard and keyboard
electronics. Weight: 50 lbs.
AR-2B5 — holds 7 4-rack 300 series modules
and power supply. Weight: 14 lbs.
AR-2CB — holds the power supply and
keyboard electronics.

All cabinets are produced with our Optional
Economy kit (the kind you pay).

SAMPLE SYSTEMS

SYSTEM 6

AR-206, AR-220, AR-310, AR-311, AR-312, AR-214, AR-216, AR-218, AR-313, AR-224, AR-228, AR-229, AR-230, AR-314, AR-315 113 Pedalboard

SYSTEM 10

AR-216, AR-220, AR-228, AR-312 (2), AR-214, AR-218 (2), AR-219, AR-311 (3), AR-104, AR-220, AR-224, AR-221 (2), AR-226, AR-206, AR-101, AR-230 Keyboard Divider

GLOSSARY

ATTENUATE — reduce amplitude of signal [illegible]

AUDIO SIGNAL — within the frequency range of human hearing (approx. 20Hz – 20KHz).

CONTROL VOLTAGE — any signal used as a control input [illegible]

[illegible] — change [illegible]

D.C. — Direct Current, or a voltage with no [illegible] changing component.

ENVELOPE — contour of [illegible] of changing amplitude or harmonic structure for the duration of the event.

ENVELOPE FOLLOWER — a device which produces a D.C. voltage directly proportional to the amplitude [illegible]

FORMANT — a characteristic resonance in an instrument or voice, regardless of frequency.

FREQUENCY — cycles per second [illegible]

GATE — signal used to 'gate' — that is, to hold ON or OPEN [illegible]

HARMONIC — frequency component of a signal that is above the fundamental or lowest frequency. Usually a signal contains several harmonics in a particular order, or series.

IMPEDANCE — electrical resistance, measured in OHMS

Hz — Hertz, equal to one cycle per second (frequency)

K — Kilo, or one thousand (as in 1K ohms, or 10KHz)

MULTIPLE — a set of connectors (jacks) wired together so that a signal going in to one connector will appear as an output at all other connectors of the multiple.

POLARITY — positive or negative nature of a voltage or signal. A signal that is inverted changes to the opposite polarity.

PULSE WIDTH — percentage of [illegible] in the duty cycle of a pulse wave.

RESONANCE — an exaggerated or emphasized [illegible]

SAMPLE — to look at the voltage level of a signal at any particular instant [illegible]

SLEW — to slow the rate of change of a signal [illegible] LAG and PORTAMENTO

SPECTRUM — [illegible] the harmonic content of a signal.

TIMBRE — tonal [illegible]

TRACK — to follow and [illegible] a signal without altering it.

TRIGGER — a short, nearly instantaneous signal or pulse [illegible]

FIGURES

FIGURE 1a

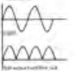


FIGURE 1b

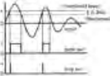


FIGURE 2

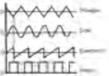


FIGURE 3

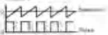
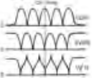


FIGURE 4



ORDERING INFORMATION

Credit — Mastercharge orders accepted. Credit extended only to approved educational institutions (terms — Net 30 days).

C.O.D. — C.O.D. orders must be accompanied by a minimum [illegible] deposit.

International Orders — Prices quoted are in U.S. funds. Outside U.S. and Canada send International Money Order.

Delivery Time — Assembled System: 6 weeks delivery. Kits: Usually sent in two or three shipments, 1 to 2 weeks apart. Consult factory for special delivery requirements.

Discount — Quantity Discount:
Orders over $1000 — take 5% off total price
Orders over $3000 — take 10% off total price

Order Form — Please tear out this form if you wish to retain price list.

Number	Description	Kit price	Wired price	Weight	Quantity	Kit or Wired
AR-330	Basic Cabinet (11 module spaces)	$ 42.00	$168.00	28 lbs.		
AR-330	Integral Cabinet (14 modules & Kbd)	—	$[illegible]	50 lbs.		
AR-340	Microcabinet (7 module spaces)	$ 36.00	$ 75.00	14 lbs.		
AR-317	Five Octave Keyboard	$178.00	—	15 lbs.		
AR-313	Keyboard Interface Electronics	$ 32.50	$375.00	7 lbs.		
AR-330	Keyboard Cabinet	$ 52.00	—	14 lbs.		
AR-312	ADSR Envelope Generator	$ 51.00	$110.00	3 lbs.		
AR-314	Low-pass Voltage Controlled Filter	$111.00	$154.00	3 lbs.		
AR-315	Balanced Modulator	$ 38.00	$127.00	3 lbs.		
AR-316	Voltage Controlled Amplifier	$ 89.00	$121.00	3 lbs.		
AR-317	Dual Waveform V. C. Oscillator	$125.00	$160.00	3 lbs.		
AR-318	Sample & Hold, Noise, V. C. Clock Module	$ 77.00	$121.00	3 lbs.		
AR-320	Pre-Amp & Envelope Follower	$149.00	$215.00	3 lbs.		
AR-321	Four Attenuators	$ 45.00	$ 70.00	3 lbs.		
AR-322	Power Supply	$ 52.00	$132.00	7 lbs.		
AR-323	Dual Mixer	$ 21.00	$121.00	3 lbs.		
AR-324	Dual Low Frequency Oscillator	$ 77.00	$137.00	3 lbs.		
AR-326	[illegible]	$ 57.00	$ 98.00	3 lbs.		
AR-327	Multimode V. C. Filter	$158.00	$248.00	3 lbs.		
AR-328	[illegible]	$158.00	$236.00	3 lbs.		
AR-330	Phase/Flange Module	$158.00	$235.00	3 lbs.		
DR-101	Voice & Envelope Follower	—	$540.00	7 lbs.		
AR-333	Dual Sawtooth/Pulse V. C. Oscillator	$179.00	$295.00	4 lbs.		
	User's Manual		$ 5.00			
	Documentation Files	—	$ 3.00			

All prices F.O.B. Salem, Ma.

[illegible]

Include allowance for UPS shipping, or contact us for details.

NAME ____________ PHONE ____________ TOTAL ______

ADDRESS ____________

ARIES MUSIC

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