

## ARIES AR-317 VOLTAGE-CONTROLLED OSCILLATOR MODULE

The Aries 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 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 or control voltage source) 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; i.e., 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.

### FEATURES:

- Wide Range: Less than 1 Cycle / Minute to over 50,000Hz in 2 Ranges
- Extremely Accurate: Oscillators Track together in tune over entire hearing range
- No Drift: Fully temperature stable
- Very Pure Sine Wave, plus Sawtooth / Triangle / Variable Width Pulse (Square) Waves, simultaneously available
- Phase Synchronizing (Sync) Input
- Pulse Width Modulation Input gives phasing and chorus effects
- 4 Controls Inputs (1 Octave / Volt)
- 1 Control Input Attenuator
- Coarse and Fine Frequency Control
- Pulse Width Control (0 to 100%)

### Specifications

- Frequency Range
  - Manual Control (2 ranges): 0.03 Hz to 30Hz / 16Hz to 16kHz
  - May be driven by voltage control from 1 cycle every 10 minutes (0.002 Hz) to 50kHz typically
- Control Inputs 0 to 1V/Octave
- 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 = +/- 10V
- Sine Wave incorporates a significant advance in waveform converter circuitry which provides a very clean, low distortion, pure sounding sine wave
- All Input Impedances 50K ohms min
- All Output Impedance 1K ohms

#### Controls

- Coarse Frequency
- Fine Frequency (+/- 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 (Triangle / Sawtooth / Pulse / Sine)

#### Power Consumption

- 36mA at +15V
- 36mA at -15V

# VCO

FREQUENCY





256 1K 4K  
64 16 16K  
COARSE

x1  
x0.3 x1.6  
FINE

4 5 6  
3 7  
2 8  
1 9  
0 10  
CONTROL 1

50%  
5% 95%  
PULSE WIDTH

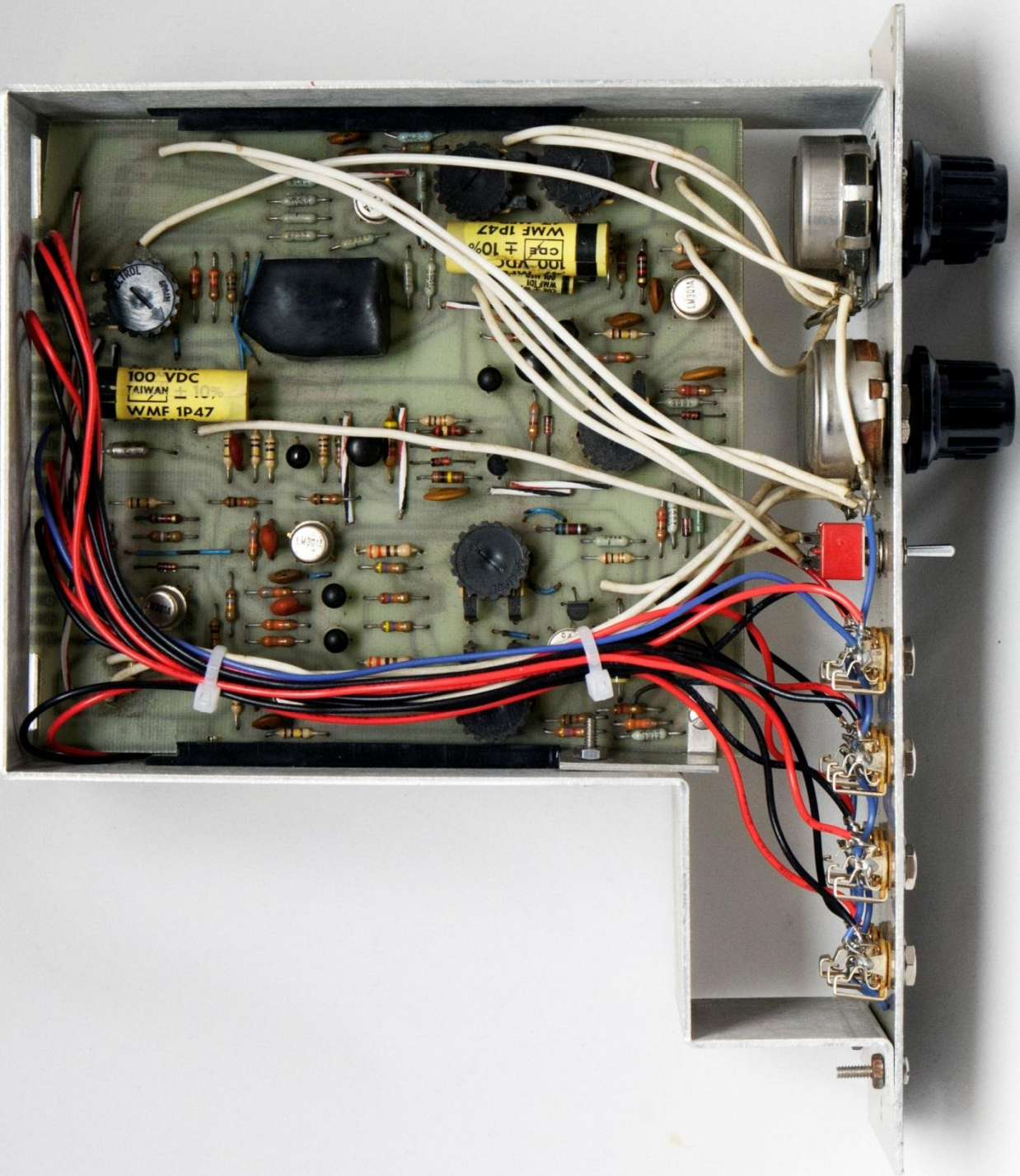
x.002 x1  
RANGE

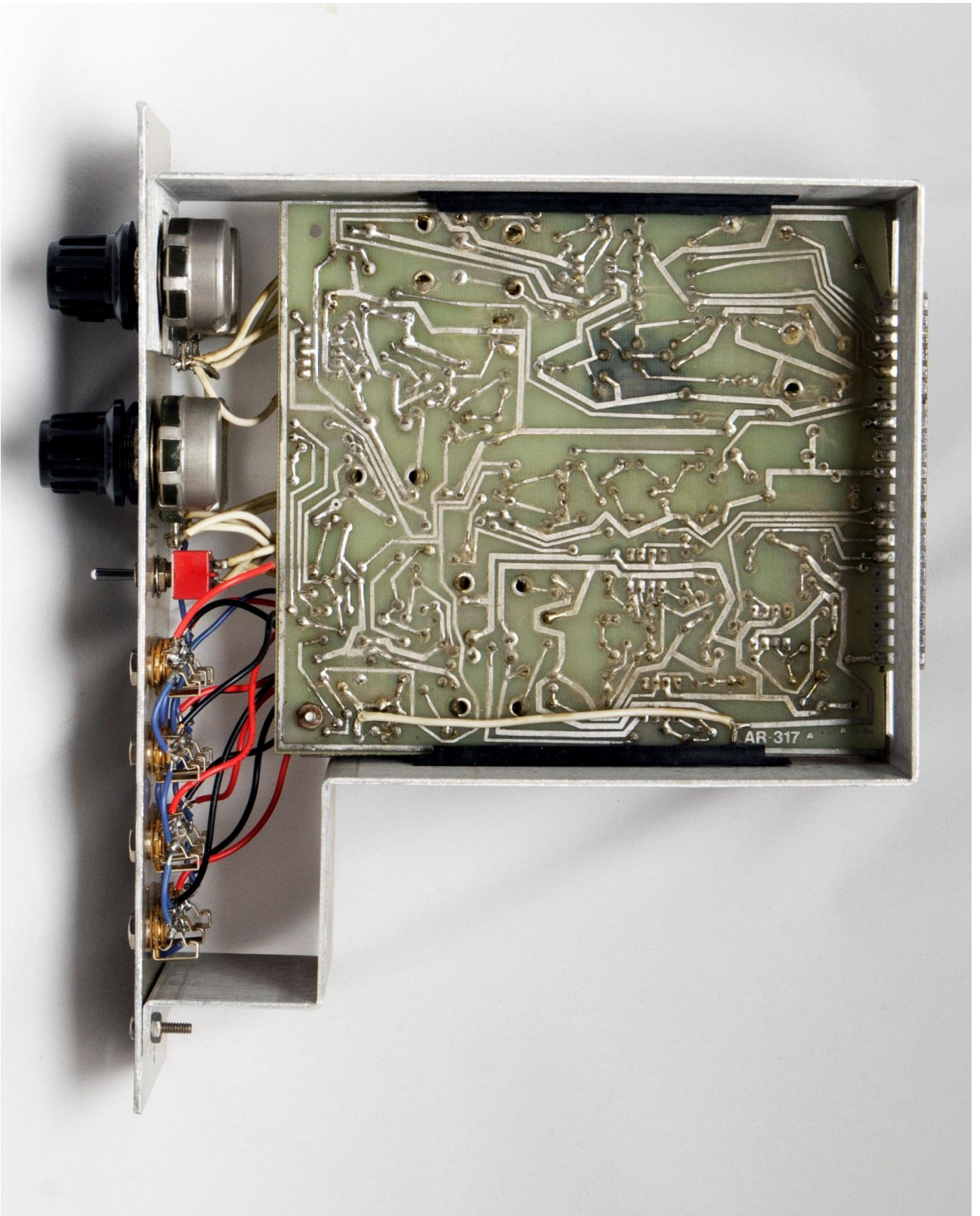
1	SYNC	
2	PWM	
3		
4		

CONTROLS

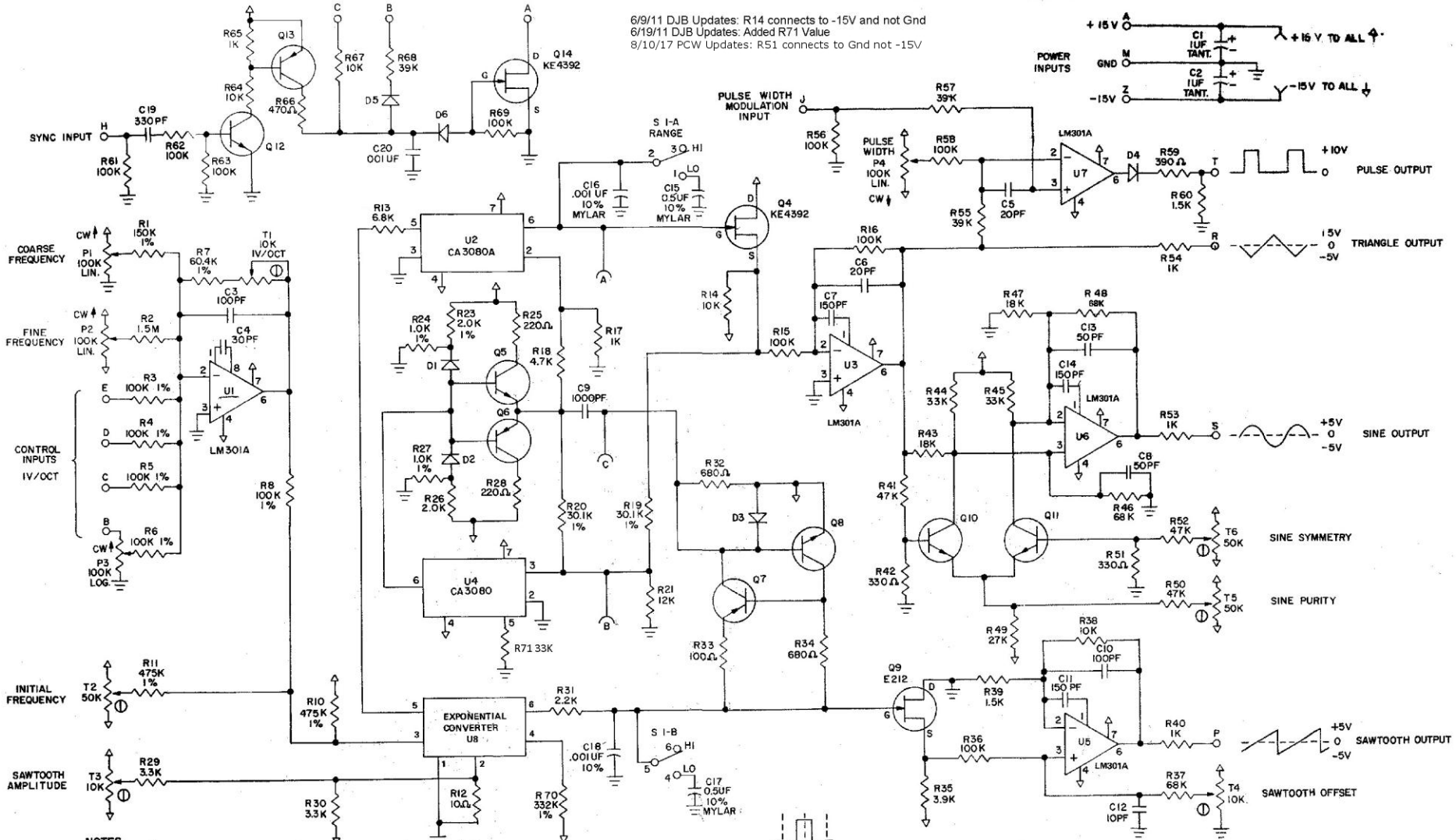
OUTPUTS

AR-317





6/9/11 DJB Updates: R14 connects to -15V and not Gnd  
 6/19/11 DJB Updates: Added R71 Value  
 8/10/17 PCW Updates: R51 connects to Gnd not -15V

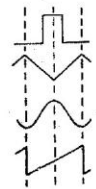


- NOTES:
1. ALL RESISTORS 10% CARBON, UNLESS OTHERWISE NOTED.
  2. ALL CAPACITORS CERAMIC DISC, UNLESS OTHERWISE NOTED.
  3. ALL NPN TRANSISTORS ARE TYPE 2N3904 OR EQUIV.
  4. ALL PNP TRANSISTORS ARE TYPE 2N3906 OR EQUIV.

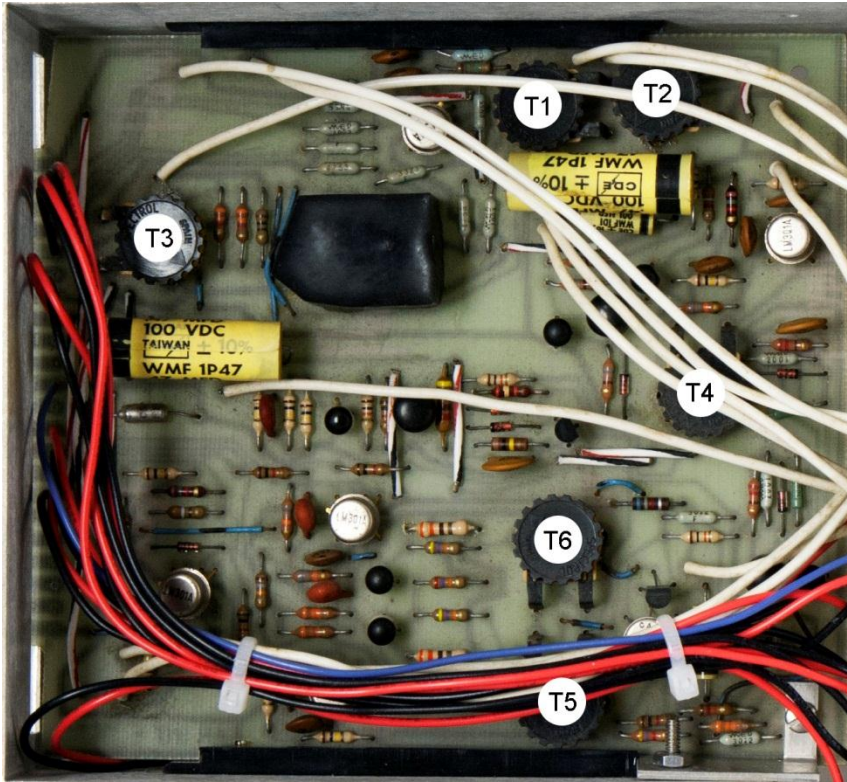
HIGHEST REFERENCE DESIGNATION:

C20	P4	S1
D6	Q14	T6
	R70	U7

WAVEFORM TIMING

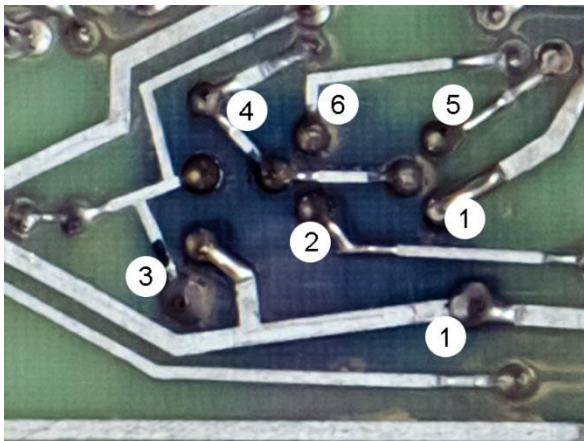


AR-317  
 PRECISION WIDE RANGE  
 MULTI-WAVEFORM  
 VOLTAGE CONTROLLED OSCILLATOR

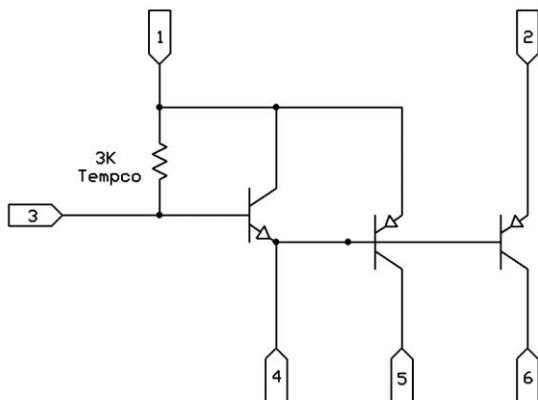


AR-317 Trimmers

- T1: 1V/Oct
- T2: Initial Frequency
- T3: Sawtooth Amplitude
- T4: Sawtooth Offset
- T5: Sine Purity
- T6: Sine Symmetry



The exponential converter potted module U8 contains three transistors and a 3K Tempco resistor. U8 is drawn on the schematics as a 6 pin module but you can see the 11 individual pins on the solder side of the PCB. The numbers correspond to the pin numbers shown on the schematic.



This is the internal schematic of the exponential converter potted module U8.