1. General Description

The V3340 is a high precision Voltage Controlled Oscillator, featuring both exponential and linear control scales plus up to 4 buffered output waveforms: triangle, sawtooth, square, and pulse with voltage controllable pulse width. The extremely accurate exponential and linear control inputs are virtual ground summing nodes, allowing multiple control voltages to be mixed within the device itself. Full temperature compensation makes this VCO extremely stable.

Included is provision of hard and soft synchronization of the frequency and an output for easy adjustment of high frequency tracking. A sophisticated circuit design ensures oscillation start-up under any power-on sequence and power supply conditions.

2. V3340 Circuit Block and Connection Diagram
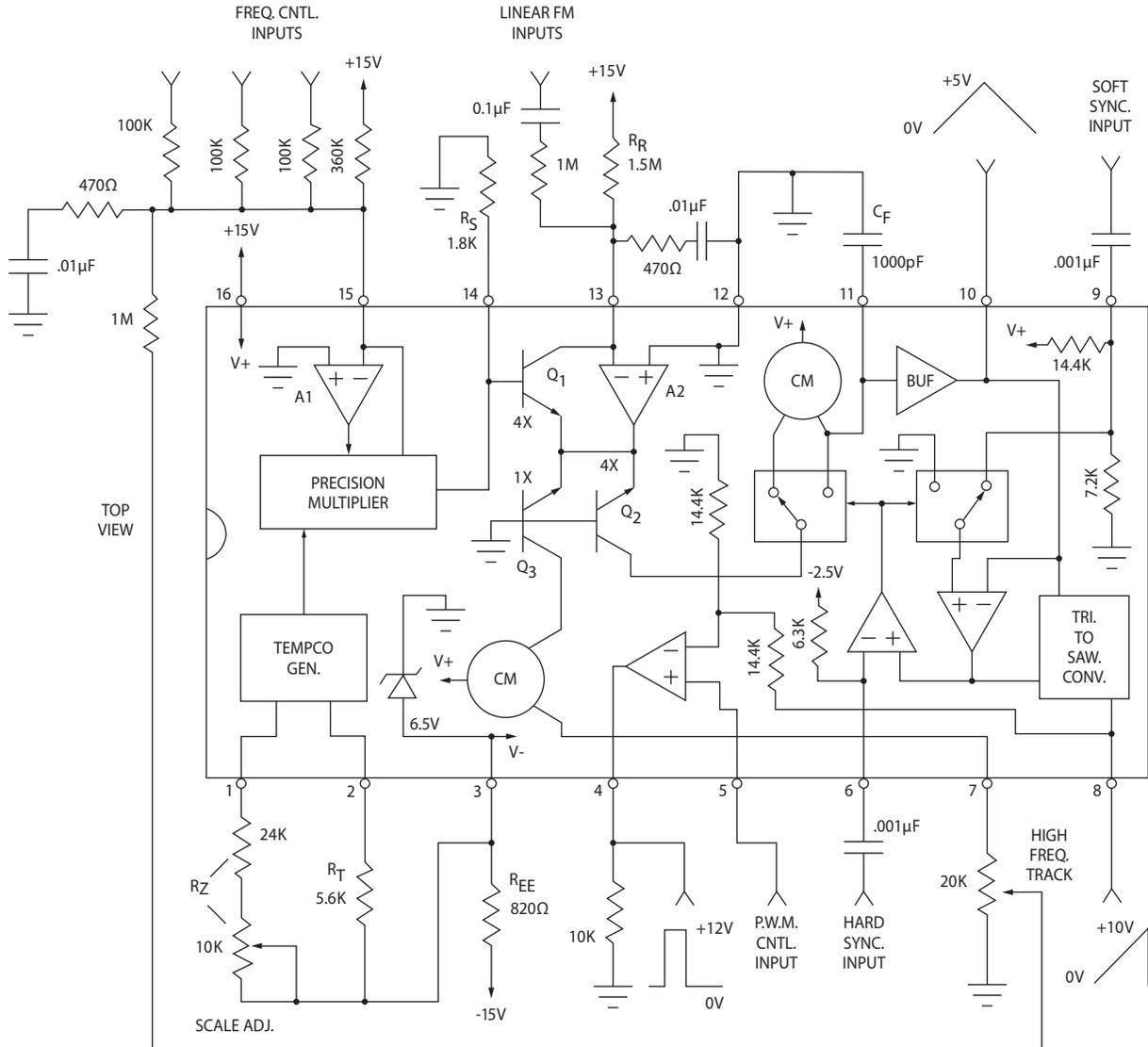
Features

- Large Sweep Range: 50,000 : 1 min.
- Fully Temperature Compensated
- 4 Output Waveforms available; no waveform trimming required
- Summing Node Inputs for Frequency Control
- High Exponential Scale Accuracy
- Low Temperature Drift
- Voltage Controlled Pulse Width
- Hard and Soft Sync Inputs
- Linear FM
- Buffered, Short Circuit Protect Outputs
- ±15 Volt Supplies

3.   Electrical Characteristics

V_{CC} = +15V V_{EE} = Internal Zener T_A = 20°C

Parameter	Min.	Typ.	Max.	Unit
Frequency Control Range	50K: 1	500K: 1	—	—
Exponential Scale Error, Untrimmed[1]	—	0.2	1	%
Exponential Scale Error, Trimmed[1]	—	0.05	0.3	%
Multiplier Gain Error[2]	—	0.0005	0.008	%µA
Tempo Cancellation[3]	-150	0	+150	ppm
Oscillator Drift[4]	—	±50	±200	ppm
Triangle Buffer Input Current	—	0.3	3	nA
Triangle Waveform Upper Level	4.85	5.0	5.15	V
Triangle Waveform Lower Level	-15	0	+15	mV
Triangle Waveform Symmetry	45	50	55	%
Sawtooth Waveform Upper Level	9.4	10.0	10.6	V
Sawtooth Waveform Lower Level	-25	0	+25	mV
Triangle Output Sink Capability	400	550	750	µA
Sawtooth Output Sink Capability	640	800	1000	µA
Triangle & Sawtooth Output Impedance[5]	65	100	150	Ω
Pulse Output Source Capability at +10 V	2.8	3.5	4.6	mA
Squarewave Output Levles[6]	-1.8, -0.4	-1.3, 0	-0.8, +0.4	V
PWM Input Pin Current[7]	.5	1.5	3.5	µA
PWM Input Voltage for 0% Pulse Width	-15	0	+15	mV
PWM Input Voltage for 100% Pulse Width	4.6	5.0	5.4	V
Input Bias Current at Reference and Control Current Inputs	80	200	400	nA
Tempco of Input Bias Currents	-1000	0	+1000	ppm
Offset Voltage at Reference and Control Current Inputs	-5	0	+5	mV
Hard Sync Reference Voltage	-2.3	-2.5	-2.8	V
Hard Sync Input Resistance	5	6.3	7.9	KΩ
Max Capacitor Charge / Discharge Current	400	570	800	µA
Positive Supply Current	4	5	6.5	mA
Positive Supply Voltage Range	+10	—	+18	V
Negative Supply Voltage Range[8]	-4.5	—	-18	V

Note 1: This error represents the percentage difference in scale factors (volts per frequency ratio) of the exponential generator anywhere over the exponential generator current range of 50 nA to 100 µA. Most of this error occurs at the range extremities.

Note 2: This error represent the percentage difference in multipliers gains at any two input currents, within the range of 20 µA to 180 µA, per µA difference between the two corresponding outputs.

Note 3: This spec represent the difference between the actual tempco of the multiplier output voltage (expressed relative to the maximum output excursions) and the tempco required to precisely cancel the tempco of the exponential scale factor (q/KT).

Note 4: The multiplier output is grounded.

Note 5: For exponential generator currents less than 10 µA ; above 10 µA, impedance drops to 1/3 this value as the highest current is approached.

Note 6: With respect to the hard sync input reference voltage.

Note 7: For PWM control inputs between -1 and +6 volts. This current is significantly greater for inputs outside of this range.

Note 8: Current limiting resistor required for negative supplies greater than -6 volts.
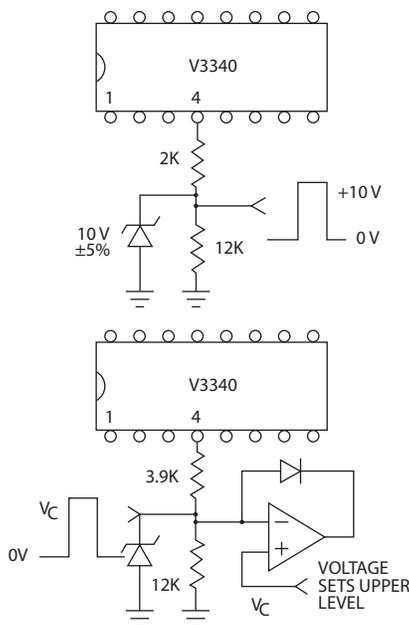
Figure 2: Clamping Pulse Upper Level
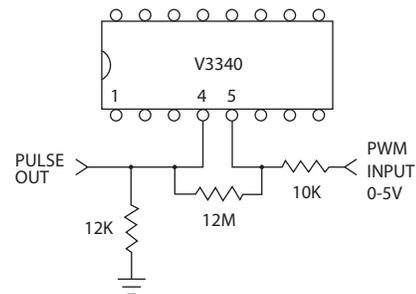
Figure 3: Adding Hysteresis to Pulse Shaper
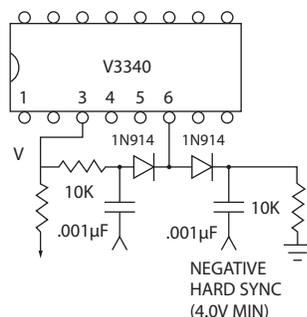
Figure 4: Method for Sync on Rising or Falling Edge
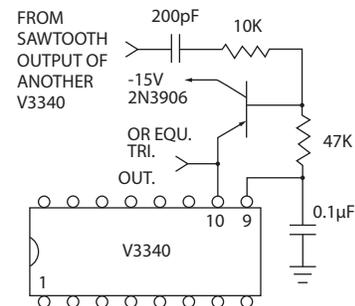
Figure 5: Conventional Hard Sync

4. Package Information

A | .750± .005

NOT INCLUDING MOLD FLASH
.01 MAX PER END

16   9

B

.25± .01
NOT INCLUDING
MOLD FLASH

PIN 1 ID
SUPPLIER'S
OPTION

1   8

4X .039 $^{+.006}_{-.009}$

4X .001 MIN

16X .060± .005

.145- .170

(.13)

C

.125- .135

SEATING PLANE

.015 MIN
TYP

14X .100

.16X .018 $^{+.004}_{-.003}$

⊕ .01Ⓜ C AⓈ BⓈ

.300- .325

.008- .012
TYP

95° ±5° TYP

.325 $^{+.040}_{-.015}$

Dimensions are in Inches
Dimensions in ( ) For Reference Only

0.394 (10,00)

0.386 (9,80)

C

16

9

0.244 (6,20)

0.228 (5,80)

0.157 (4,00)

0.150 (4,80)

D

1

8

Pin 1
Index Area

0.050 (1,27)

0.020 (0,51)

0.012 (0,31)

⊕ | 0.010 (0,25) | Ⓜ

0.069 (1,75) Max

0.010 (0,25)

0.004 (0,10)

0.010 (0,25)

0.005 (0,13)

Gauge Plane

0.004 (0,10)

Seating Plane

0.010 (0,25)

0° - 8°

0.050 (1,27)

0.016 (0,40)

Notes:

A. All linear dimensions are in inches (mm)

B. This drawing is subject to change without notice.

C Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0.15) each side.

D Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0.43) each side

E. Reference JEDEC MS-012 variation AC.

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