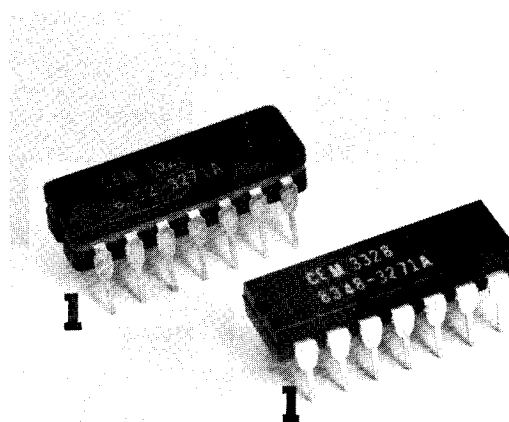


CEM 3328

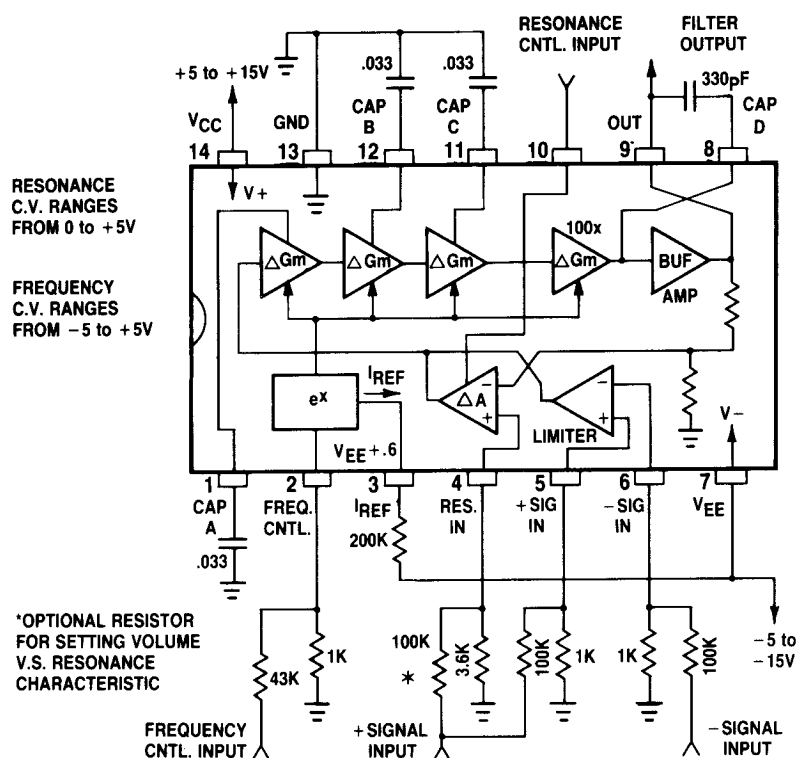
Four Pole Low-Pass VCF

Special care has been taken in the design to minimize trimming: a fixed external resistor ensures the initial frequency is maintained to within $\pm 1/3$ octave, and amount of resonances is held to within $\pm 15\%$ from unit to unit. Finally, frequency drift is minimized using temperature

Offering high performance and flexibility over a wide supply range, the CEM 3328 is an ideal choice in those musical applications requiring a four pole low-pass VCF.



Circuit Block and Connections Diagram

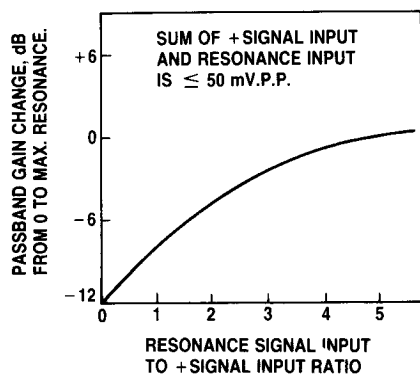


- Low Cost
- Low External Parts Count
- Open Loop Design for Enhanced Sound Richness
- Tight Parameter Spreads for Minimal Trimming
- Wide Sweep Range, Low Control Feedthrough, and Low Noise
- Temperature Compensated Transconductors
- Custom Tailoring of Volume vs. Resonance
- Differential Inputs
- Internal Buffer
- Wide Supply Range
- Large Output Swings Even at $\pm 5V$ supply

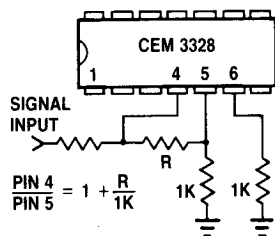
CEM 3328

Electrical Characteristics

$V_{CC} = +12V$ $V_{EE} = 12V$ $R_{REF} = 100K$ $T_A = 20^\circ C$				
Parameter	Minimum	Typical	Maximum	Units
Frequency Control Range	14	—	—	octaves
Frequency Control Voltage for 14 Octave Range	—	-150 to +130	—	mV
Frequency Control Scale Factor	+18.5	+20.0	+21.5	mV/octave
Exponential Scale Error, Midrange	—	0.3	1.0	%
TC of Frequency Control Scale	+3000	+3300	+3600	ppm
Frequency Control Input Bias Current	-0.4	-1.2	-3.5	μA
Initial Frequency at $V_{FREQ} = 0$ ($C_A = C_B = C_C = 0.03\mu F$; $C_D = 300pF$)	260	350	470	Hz
Frequency Temperature Coefficient ($V_{FREQ} = 0$)	-500	0	+500	ppm
Resonance Control Range	0dB	—	oscillation	—
Resonance Control Voltage Required for Oscillation	+2.7	+3.2	+3.7	V
Resonance Control Input Bias Current	-0.1	-0.4	-1.2	$\mu A/V$
Input Signal for 1% THD	—	50	—	mV.P.P.
Signal Gain to Output from	—	—	—	—
+ Input	+110	+130	+150	—
- Input	-110	-130	-150	—
Resonance Input	0 to	0 to	0 to	—
Signal Input Bias Current,	+105	+125	+145	μA
$\pm$ Input	-0.1	-0.3	-1.0	μA
Resonance Input	-0.2	-0.8	-2.4	μA
Maximum Output Swing with $\pm 5V$ Supplies	—	—	8.5	V.P.P.
Nominal Output Swing for 1% THD (No Resonance)	—	6.5	—	V.P.P.
Nominal Output Swing with Resonance	—	3.2	—	V.P.P.
Oscillation Output Swing	1.0	2.3	3.5	V.P.P.
DC Output Shift Over 10 Octave Range (-90mV < V_{FREQ} < +110mV)	—	60	250	mV.P.P.
Output Noise, Filter Wide Open	—	—	200	μV R.M.S.
Buffer/Amp Input Bias Current	—	± 0.7	± 5	nA
Output Sink Current	-1.0	-1.5	-2.3	mA
Output Source Drive Current	—	—	+3.0	mA
Voltage at I_{REF} Pin(3) Relative to V_{EE}	—	—	—	—
$V_{EE} = -12V$	+0.75	+0.85	+0.95	V
$V_{EE} = -5V$	+0.50	+0.58	+0.66	V
Positive Supply Range	+4.5	—	+16.0	V
Negative Supply Range	-4.5	—	-16.0	V
Supply Current	4.8	6.8	9.5	mA



VOLUME CHANGE V.S. RESONANCE SIGNAL INPUT



ALTERNATE METHOD
FOR TAILORING VOLUME
V.S. RESONANCE
CHARACTERISTIC



CURTIS ELECTROMUSIC SPECIALTIES