9/2004

Five Band Graphic Equalizer Data Sheet

MSGEQ5A

Description

The five band graphic equalizer IC is a CMOS chip that divides the audio spectrum into five bands, 100Hz, 330Hz, 1kHz, 3.3kHz and 10kHz. The five frequencies are peak detected and multiplexed to the output to provide a DC representation of the amplitude of each band. No external components are needed to select the filter responses. Only an off chip resistor and capacitor are needed to select the on chip clock oscillator frequency. The filter center frequencies track this frequency.

Other than coupling and decoupling capacitors, no other external components are needed. The chip supply can be between 2.7 and 5.5 volts with 5 volts providing the best performance. The device has very low quiescent current (less than 1ma typical) for portable audio devices. The multiplexor is controlled by a reset and a strobe, permitting multiplexor readout with only two pins. The multiplexor readout rate also controls the decay time (10% decay per read), so no external pins are needed for this function.

Features

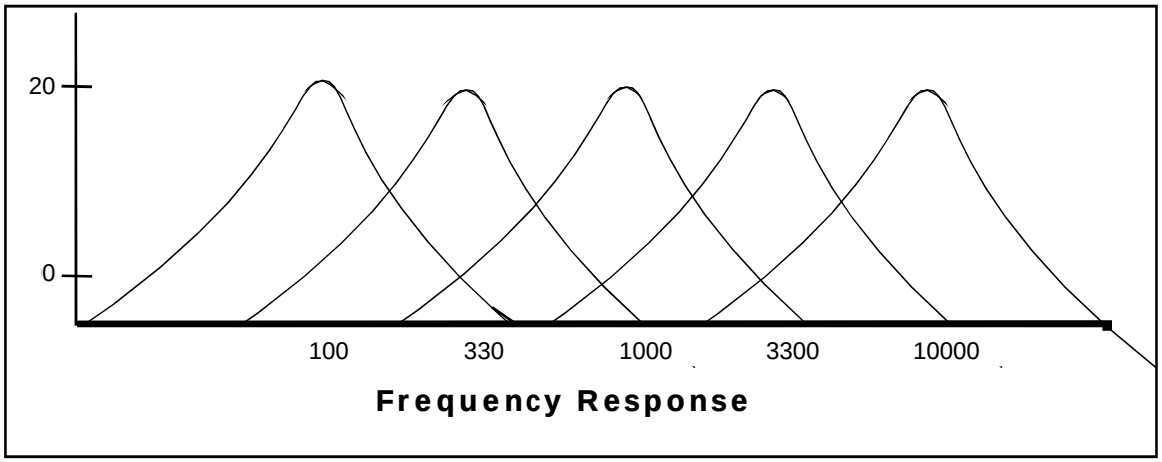
Low Power Consumption
Only Two External Components
On Chip Ground Reference
Switched - Capacitor Filters
3.3 or 5 volt Operation
20 dB of Gain
On Chip Oscillator
Output Multiplexor
Variable Decay Time
8 Pin Package

Applications

Portable Stereos
Car Stereos
Hi-Fi Stereos
Spectrum Analyzers

Absolute Maximum Ratings

Power Supply Voltage	+6V
Storage Temperature	-60 to + 150 C
Operating Temperature	0 to 7O C



Frequency Response

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Electrical Characteristics

(VDD = +5.0V, T=25°C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Specifications						
Operating Voltage	VDD		2.7	5.0	5.5	V
Supply Current	IDD		0.5	0.8	1.0	mA
Output Drive	I			1		mA
Output Impedance	Z			700		ohms
Output Offset	VOS				600	mV
Band Offset Difference		Same device			200	mV
AC Specifications						
Gain	AV	Peak input to DC output	20	22	24	dB
Filter Q	Q		3.5	4.0		Hz/Hz
Output Swing			3.5	4.0		V
Clock Frequency	FCLK	C = 33 pF*, R = 200 Kohms	145	165	180	kHz
Input Impedance	ZIN		1			Mohms

*includes stray capacitance

Ordering Information

Part Number	Package	Operating Temperature
MSGEQ5AP	8 Pin Dip	0-70° C

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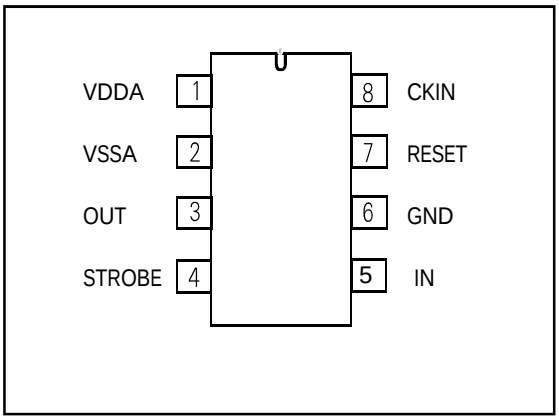
Pin Description

1. VDD — Positive Power Supply Typically 5 Volts
2. VSS — Negative Power Supply Typically 0 Volts
3. OUT — Multiplexed DC Output
4. STROBE — Channel Selection Pin
5. IN — Audio Input
6. GND — Internal Generated Ground Reference.Typically 2.5V
7. RESET — Resets Multiplexor
8. CKIN — Clock Oscillator Pin

Pin Configuration



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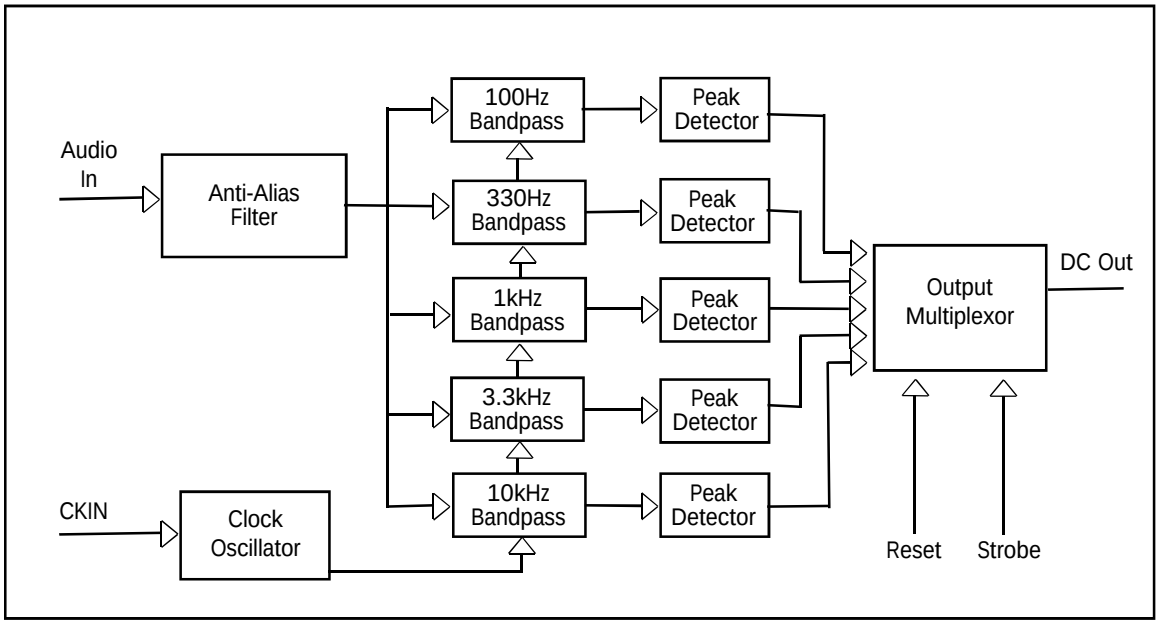
Block Diagram



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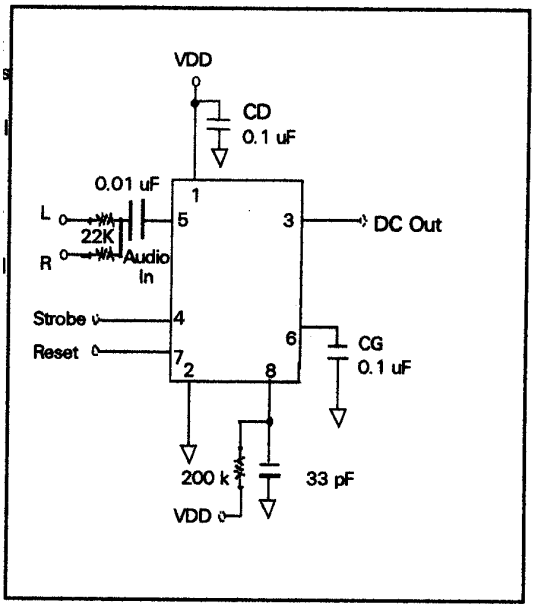
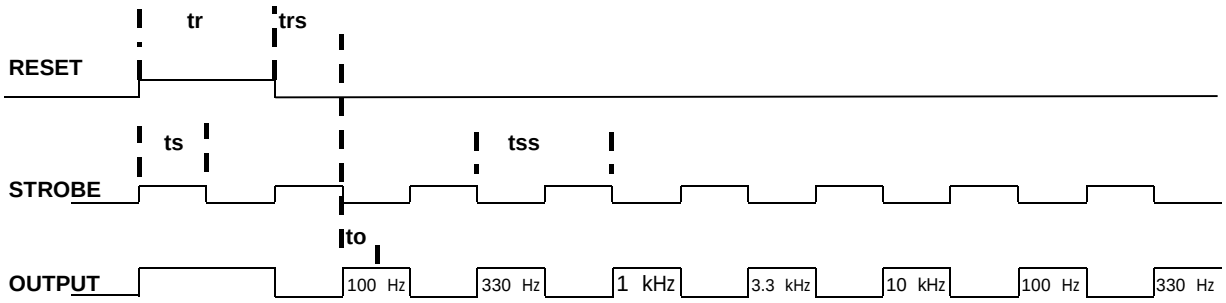
Multiplexor Operation

The DC peak output for measurement is selected using the reset and strobe pins. Reset high resets the multiplexor. Reset low enables the strobe pin. After the first strobe leading edge, 100Hz output is on OUT. Each additional strobe leading edge advances the multiplexor one channel (100Hz, 330Hz, 1kHz, 3.3kHz, 10kHz, etc.) and this will repeat indefinitely. The multiplexor read rate is also the output decay time control. Each read decays that channel approximately 10%. The strobe timing is shown below:

Typical Application





tr - Reset Pulse Width		100 nS min	
trs - Reset to Strobe	**Delay**	72 uS min	
ts - Strobe Pulse Width		18 uS min	
tss - Strobe to Strobe	**Delay**	72 uS min	
to - Output Settling Time		36 uS min	(with Cload = 22 pF and Rload = 1 Mohm)

Strobe Timing Diagram

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