### Seven Band Graphic Equalizer Data Sheet

#### Description-

The seven band graphic equalizer IC is a CMOS chip that divides the audio spectrum into seven bands, 63Hz, 160Hz, 400Hz, 1kHz, 2.5kHz, 6.25kHz and 16kHz. The seven 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

#### 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 Typical On Chip Oscillator **Output Multiplexor** Variable Decay Time 8 Pin Package

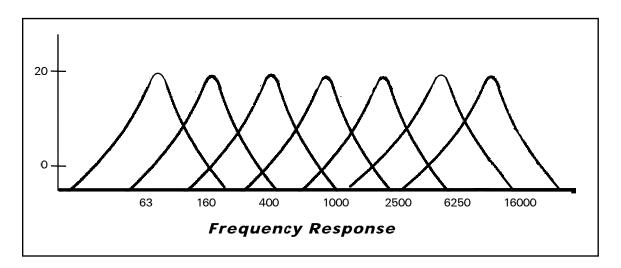
#### **Applications**

Portable Stereos Car Stereos Hi-Fi Stereos Spectrum Analyzers

#### Absolute Maximum Ratings-

Power Supply Voltage Storage Temperature **Operating Temperature** 

+6V -60 to + 150 C 0 to 70 C



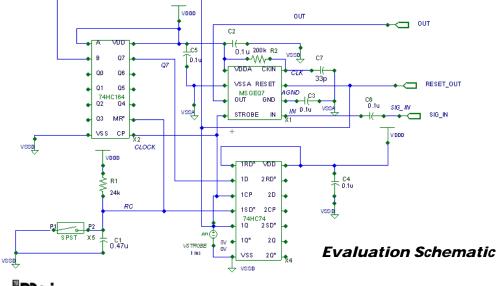
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#### Electrical Characteristics

 $(VDD = +5.0V, T = 25^{\circ}C)$ 

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Specifications	'					
Operating Voltage	VDD		2.7	5.0	5.5	V
Supply Current	IDD	1 Mohm Load on Output	0.5	0.8	1.0	mA
Output Drive	Ю			1		mA
Output Impedance	ZO			700		ohms
Output Offset	VOS				600	mV
Band Offset Difference		Same device			200	mV
AC Specifications					·	
Gain	AV	Peak input to DC output, Vin = 100 mVpp, fin = 1 kHz	20	22	24	dB
Filter Q	Q		5.5	6.0	6.5	
Output Swing		Vin = 0.3Vpp, fin = 1 kHz	3.5	4		V
Clock Frequency	FCLK	$C = 33 pF^*, R = 200 kohms$	145	165	180	kHz
Input Impedance	ZIN		1			Mohm

\* includes stray capacitance



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## **MSGEQ7**

#### Seven Band Graphic Equalizer Data Sheet

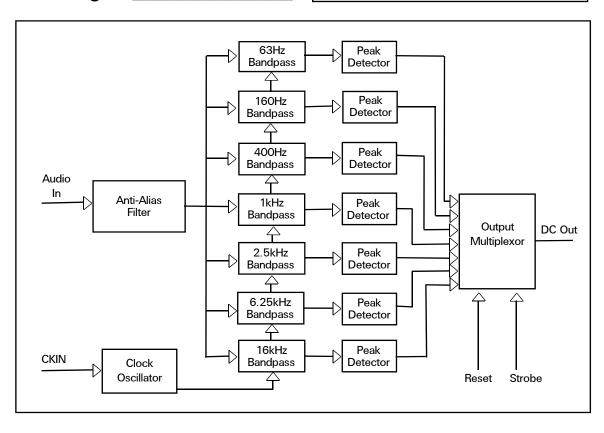
#### Pin Description\_\_

#### Pin Configuration\_

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	Internally Generated Ground
		Reference. Typically 2.5V
7.	RESET	Resets Multiplexor
8.	CKIN	Clock Oscillator Pin

#### VDDA 8 CKIN 7 RESET VSSA 6 GND OUT STROBE 4 IN

#### Block Diagram\_



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### \_ Typical Application\_\_\_\_

Seven Band Graphic Equalizer

#### Multiplexor Operation-

Data Sheet

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, 63Hz output is on OUT. Each additional strobe leading edge advances the multiplexor one channel (63Hz, 160Hz, 400Hz, 1kHz, 2.5kHz, 6.25kHz, 16kHz 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:

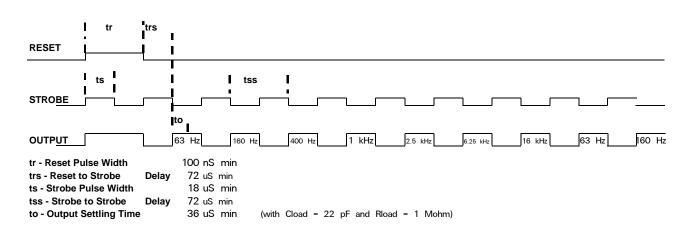
# VDDA C2 0.1u 200k R2 VSSD C7 VDDA CLK RESET IN RESET\_IN AGND C3 O.1u VSSA STROBE IN STROBE IN VSSA STROBE IN VSSA STROBE IN VSSA STROBE IN VSSA STROBE IN TICHER STROBE RESET\_IN RESET\_IN RESET\_IN RESET\_IN RESET\_IN SIN STROBE STROBE

#### Ordering Information\_

#### Part Number Package Operating Temperature

MSGEQ7N 8 Pin 150 mils SOIC 0-70 °C MSGEQ7P 8 Pin 300 mils PDIP 0-70 °C

MSGEQ7



#### Strobe Timing Diagram

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