套件供应

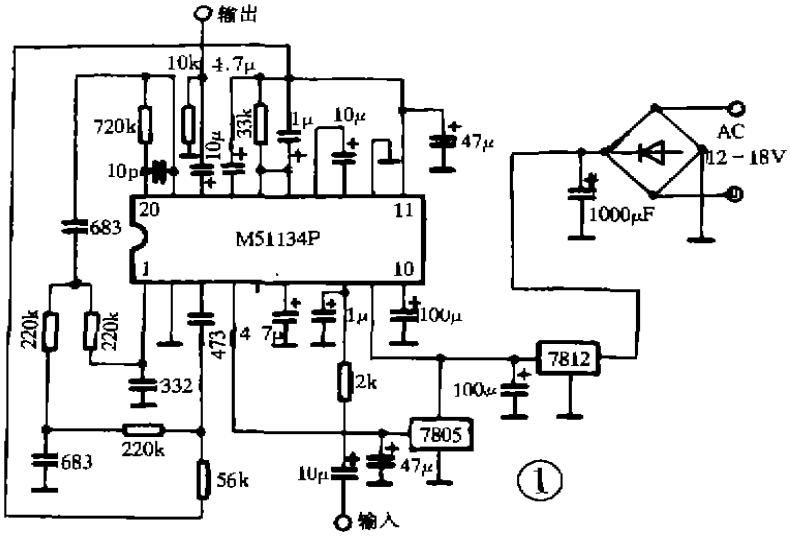
数码超重低音处理器M51134P

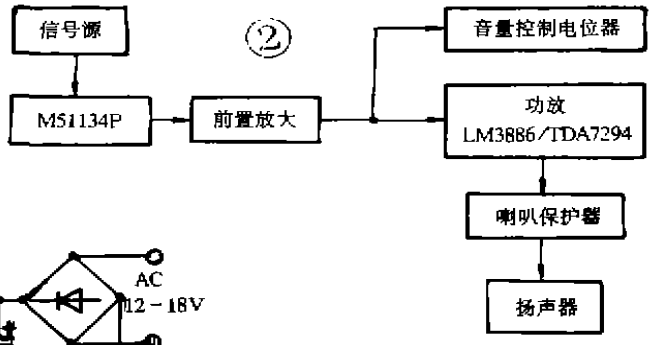
□莫爱雄

在欣赏电影故事片中，特别是一些情节紧张，场面激烈的战斗、打斗片，如果缺乏重低音的渲染，现场逼真的震撼感将无法真正去体现，更欠缺荡气回肠的感染力，可见重低音的重要性。

M51134P是日本三菱公司专门为AV影音系统开发的专用超重低音检测加强电路，该IC采用20脚双列直插封装，其内部包括：频率检测、调整器、电平检测、低通滤波、VCA压控放大器等。工作原理是采用数码滤波方式检测输入信号中的低频成分的电平高低，加强相应低频成分并进行低频动态扩展（由压控放大器完成），由此看出，其工作原理与一般的低通滤波器形式的重低音加强电路是不同的。一般的低通滤波器电路提供的重低音信号听感上缺乏力度，而M51134P提供的重低音效果有强烈的震撼感，特别是雷声、炮声、爆炸声等尤为突出。另外，M51134P只检测低于120Hz的信号，如果输入信号中无低于120Hz的成分，则该电路无任何输出，这一点在使用中要注意，不属故障。

M51134P工作电压7－18V（典型值12V），输出噪音低（－93dB）。图1是笔者根据其应用资料而设计的应用电路，实际应用时接一个5W以上，次级12V以上的变压器即可工作，图2是制作超重低音炮的连接方案（作低音炮的扬声器口径要大且功率也大，箱体要坚固，板材要厚。箱体外型及尺寸视个人喜好而自行设计）。





·套件供应·

本文中的M51134P超重低音板广东省郁南县美顺电子厂有邮购，详见本刊其它邮购广告，也可访问该厂网站：http://www.meishun.chn.net

◀

R3、R4、R5、C2构成TEC8445脚②的调整电平，建议在3.5～5V（V_{DD}=6.0V）为好。

R1、R2、C1为TEC8445脚①提供振荡器的时间常数。调整R2可调整最短延迟时间。C1的选择应和脚②的调整电平同考虑，当R1为最大值，R4动端居中时，多数IC满足最长延迟时间。TEC8445脚②的调整电平可使延迟时间调整范围达二倍之多，但调整电平取高些，抗干扰能力强。

到达延迟时间，OUT输出高电平，经R10、C9接可控硅的控制极，使可控硅导通，继电器吸合，LED1点亮，R9为限流电阻。C6为滤波电容，D2消除继电器通断时产生高压脉冲。

R6为LED2的分流电阻，调整R6可调整LED2的亮度，此外当LED2损坏时，R6保证直流通路，继电器能正常工作。

TEC8445提供了极有用的TEST脚，调试振荡器时可将频率计一端接TEST脚，另一端接地，调整有关元件，直到所要求的振荡频率。动态调整非常方便。

外部时钟信号可加在TEST脚，OUT端子视S1和S2的状态相应动作。外部时钟信号频率可高达500KC，大大缩短测试时间。

TEC8445在一般工作状态时，TEST脚一定悬空，切记！

◀

M51134P/FP

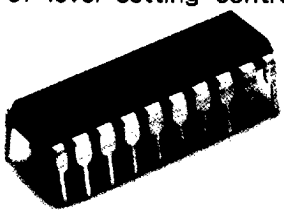
SUB-HORMONIZER FOR BASS EMPHASIS

DESCRIPTION

The M51134 is an IC developed for audio-visual applications to emphasize heavy bass. The IC is used to produce sound effects at the stage before power amplifier.

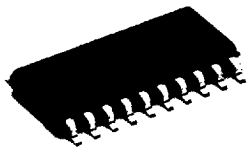
The M51134 offers capability of converting desired frequency into its half by setting a constant of external filter. The built-in VCA is also capable of level setting controlled by an externals source.

The IC is also suitable for 3-D systems.



Outline 20P4(P)

2.54mm pitch 300mil DIP
(6.3mm × 24.0mm × 3.3mm)



Outline 20P2N-A(FP)

1.27mm pitch 300mil SOP
(5.3mm × 12.6mm × 1.8mm)

FEATURES

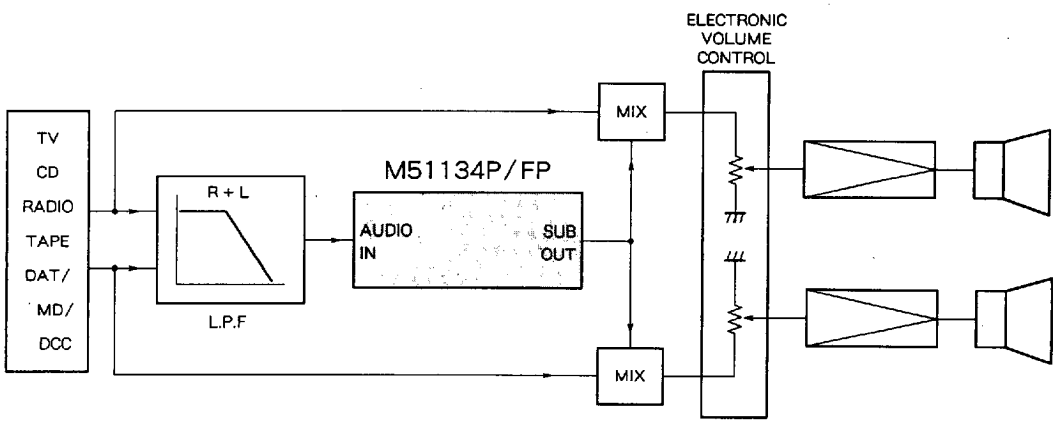
- Input sensitivity variable by input sensitivity adjust pin
- Built-in 5V regulator for single power supply
- Envelope detector facilitates level setting matching input level
- Capability of controlling VCA from external source facilitates level settings at will
- Maximum input voltage 3Vrms
- Low noise ..... – 92dBv
- Built-in OP-amp for low pass filter
- Built-in voltage control amplifier (VCA)
- Built-in Flip-Flop circuit for 1/2 frequency divider

RECOMMENDED OPERATING CONDITIONS

Supply voltage range V_{CC1} = 7 to 15V, V_{CC2} = 4.5 to 5.5V

Rated supply voltage ..... V_{CC1} = 12V, V_{CC2} = 5V

SYSTEM CONFIGURATION



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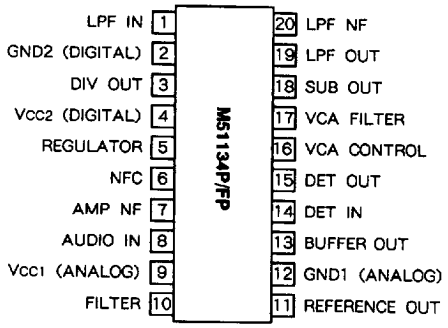
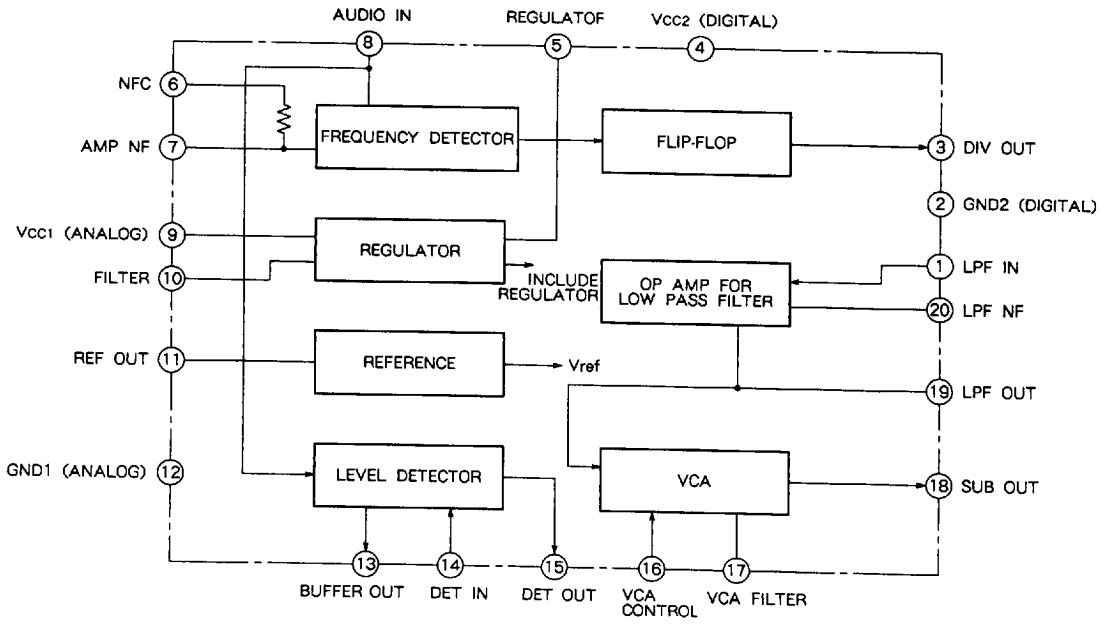
PIN CONFIGURATION (TOP VIEW)



Outline 20P4(P)
20P2N-A(FP)

IC INTERNAL BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS (Ta = 25℃, unless otherwise noted)

Symbol	Parameter	Ratings	Unit
V_{CC1}	Supply voltage (analog)	+16	V
V_{CC2}	Supply voltage (digital)	+5.5	V
P_d	Power dissipation	800(P)/500(FP)	mW
K_θ	Thermal derating	8.0(P)/5.0(FP)	mW/℃
T_{opr}	Operating temperature	−20 to +75	℃
T_{stg}	Storage temperature	−40 to +125	℃

ELECTRICAL CHARACTERISTICS (Ta = 25℃, V_{CC1} = 12V, V_{CC2} = 5V, f = 100Hz, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{CC1}	Quiescent circuit current	Quiescence	−	12	22	mA
I_{CC2}	Quiescent circuit current	Quiescence	−	0.95	2.5	mA
V_{imn}	Minimum detect input voltage		−	−55	−40	dBV
V_{ore}	Response output voltage range		35	47	−	dB
THD	Total harmonic distortion	V_i = −10dBV	−	1.3	2.5	%
T_{rsp}	Response time		−	2.5	3.5	mS
V_{iMAX}	Maximum input voltage	THD = 2.0%	+4	+10	−	dBV
V_{OMAX}	Maximum output voltage	THD = 2.0%	1.8	2.5	−	Vrms
N_O	Output noise voltage	DIN AUDIO	−	−93	−83	dBV

TEST METHOD

Symbol	SW1	SW2	SW3	SW4	Conditions
I_{CC1}	1	2	1	2	Measure circuit current at pin⑨ for quiescent state.
I_{CC2}	2	1	1	2	Measure circuit current at pin④ for quiescent state.
V_{imn}	2	2	2	2	Measure minimum input voltage at pin③ output.
V_{ore}	2	2	2	2	Measure difference in output voltage at V_{omax} and V_{imin}.
THD	2	2	2	2	Measure distortion with f = 100Hz, V_i = −10dBV
T_{rsp}	2	2	2	2	Measure delay time between input signal and output signal.
V_{imax}	2	2	2	2	Measure output voltage with THD = 2%
V_{omax}	2	2	2	2	Measure input voltage with THD = 2%
N_O	2	2	2	1	DIN AUDIO

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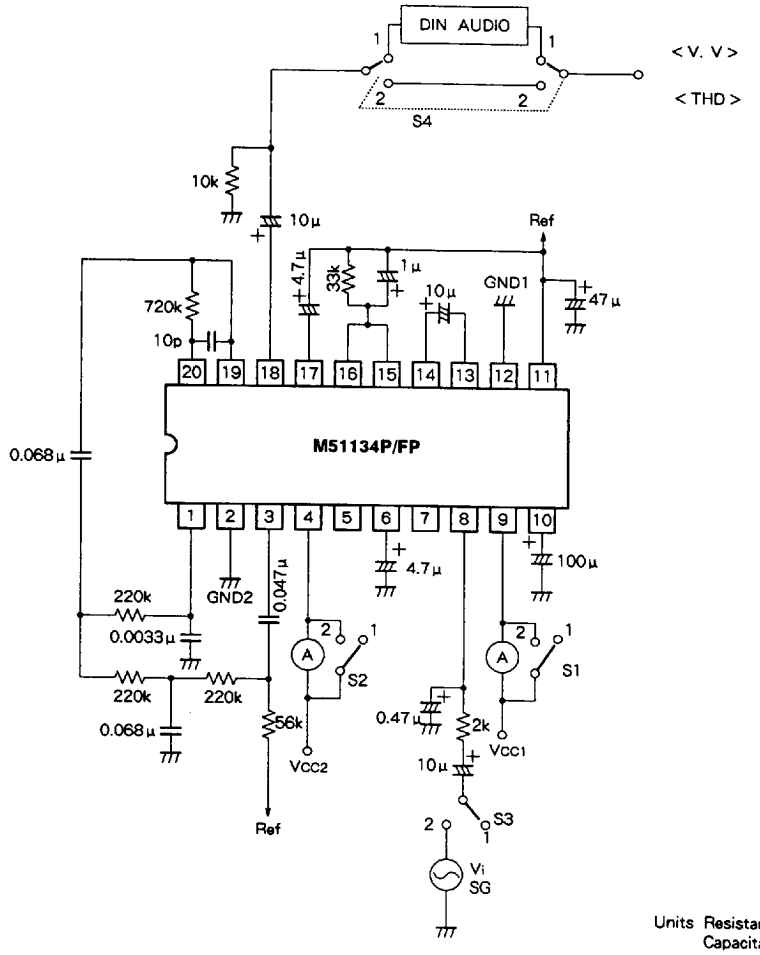
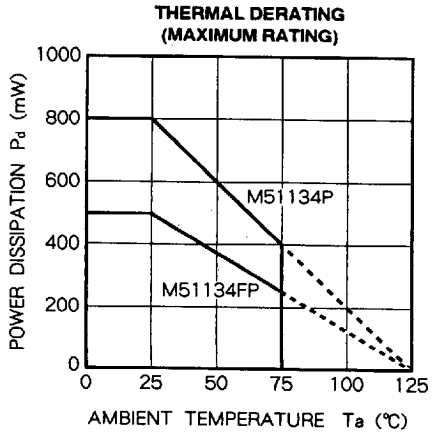
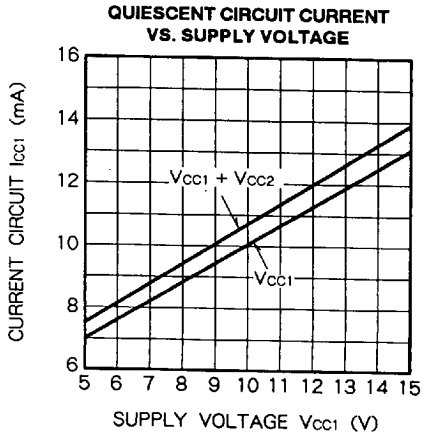
TEST CIRCUIT



Units Resistance : Ω
Capacitance : F

TYPICAL CHARACTERISTICS





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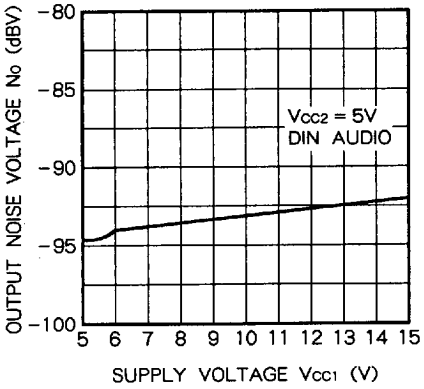
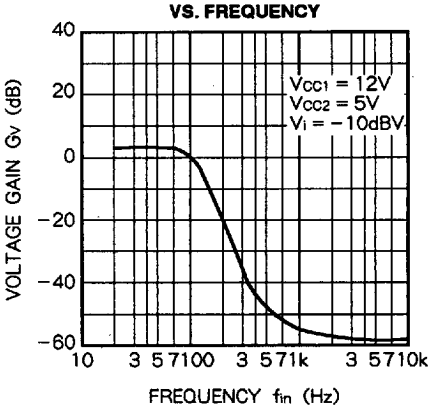
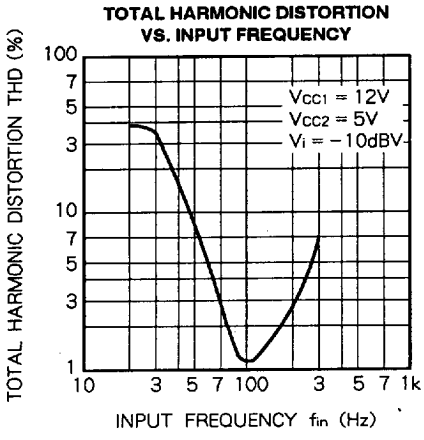
OUTPUT NOISE VOLTAGE VS. SUPPLY VOLTAGE



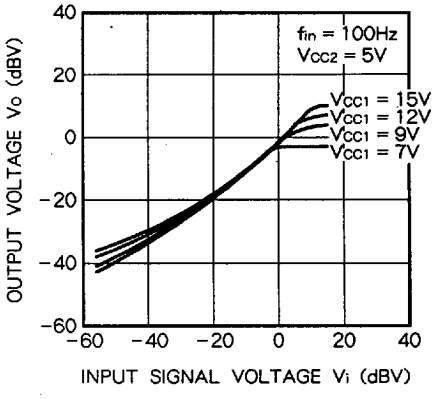
VOLTAGE GAIN VS. FREQUENCY



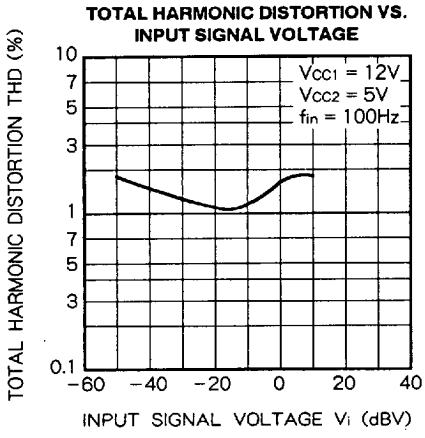
TOTAL HARMONIC DISTORTION VS. INPUT FREQUENCY



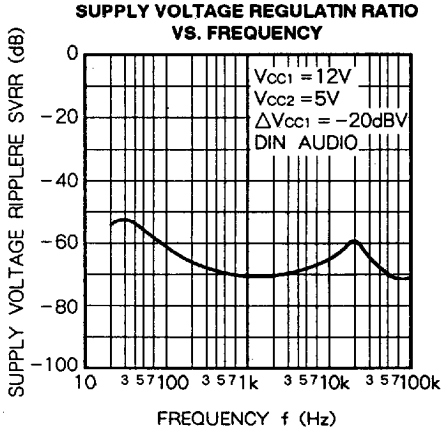
OUTPUT VOLTAGE VS. INPUT SIGNAL VOLTAGE



TOTAL HARMONIC DISTORTION VS. INPUT SIGNAL VOLTAGE



SUPPLY VOLTAGE REGULATIN RATIO VS. FREQUENCY



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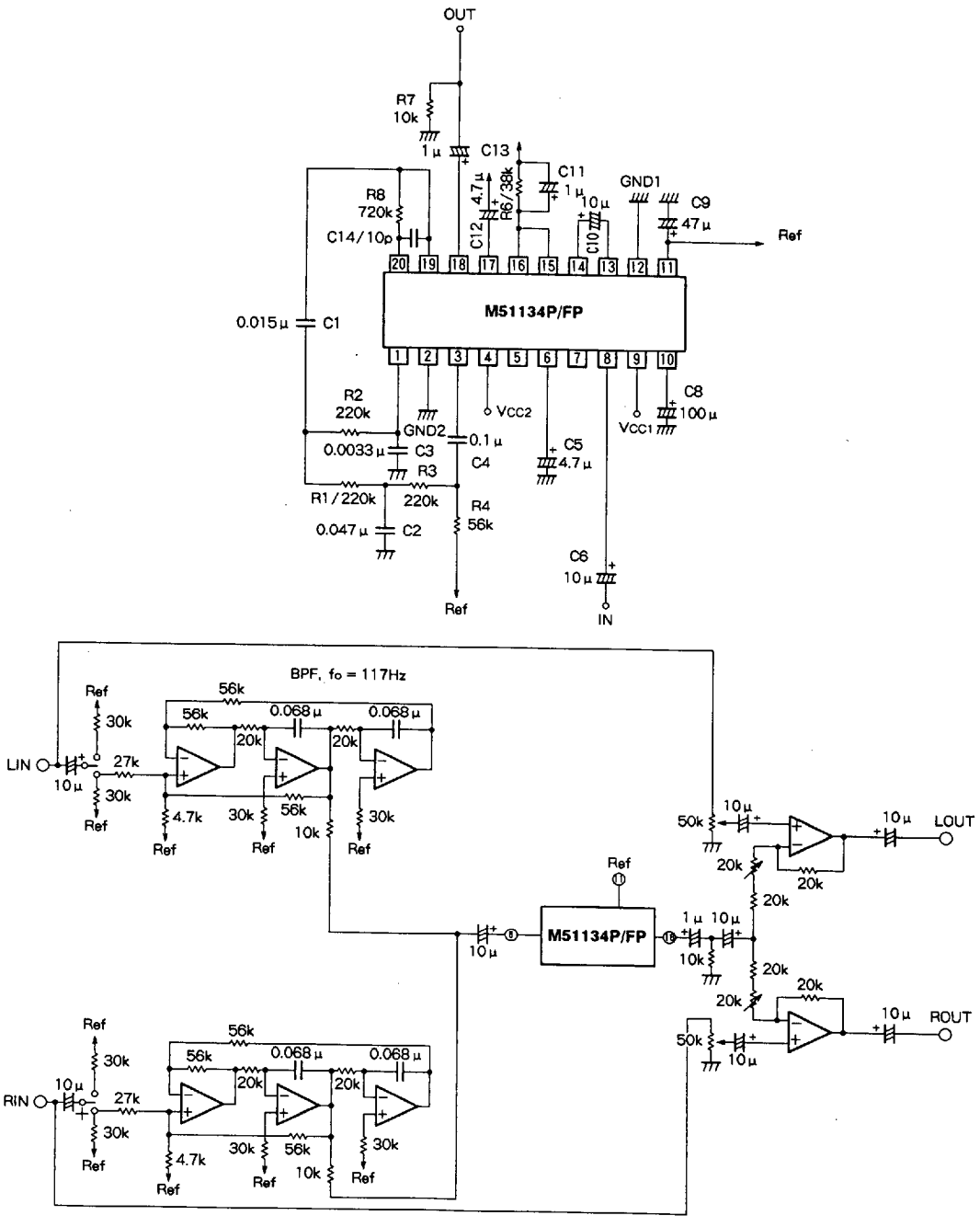
APPLICATION EXAMPLE



It's neccessary to check input BPF and Built-in LPF cut off frequency at the system.

Units Resistance : Ω
Capasitance : F

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