RTF PROCEDURE CDMS 26 August 1998
OPERATIONAL: BOARD # _____ STATUS _____ DATE _____

FILTERS & BUFFERS:

1. Setup:

The Operational test will measure circuit function, filter performance and parameters.

- This test will utilize the RTF section of the Breakout Box(BOB) and a function generator.
- Initial settings for the function generator are:
  Output waveform: Sinewave
  Amplitude: 400mVp-p
  Frequency: 100kHz.
- The function generator will be connected to the individual Q inner, Q outer, P1, P2, P3 and P4 inputs on the BOB for each section of the test.
- The discriminator tests to find the HI and LO trip points will require applying the input to multiple inputs.
- Making measurements: Measurements on the front panels are done with the scope set for an input of 1M ohm. Measurements from the frequency generator are done with the scope input set for an input of 50 ohms.
- Run RTF.PL for software inputs for testing.

2. Initial Settings:

Power up filter setting is 0.

filter settings
0: Av=1
1: 1kHz notch
2: Av=10 DC
3: Bessel LP

3. Test preparation settings:

Set up the frequency generator settings in the box.

Waveform:	Sine wave
Amplitude:	400mVp-p
Frequency:	50 kHz

4. Q inner test:

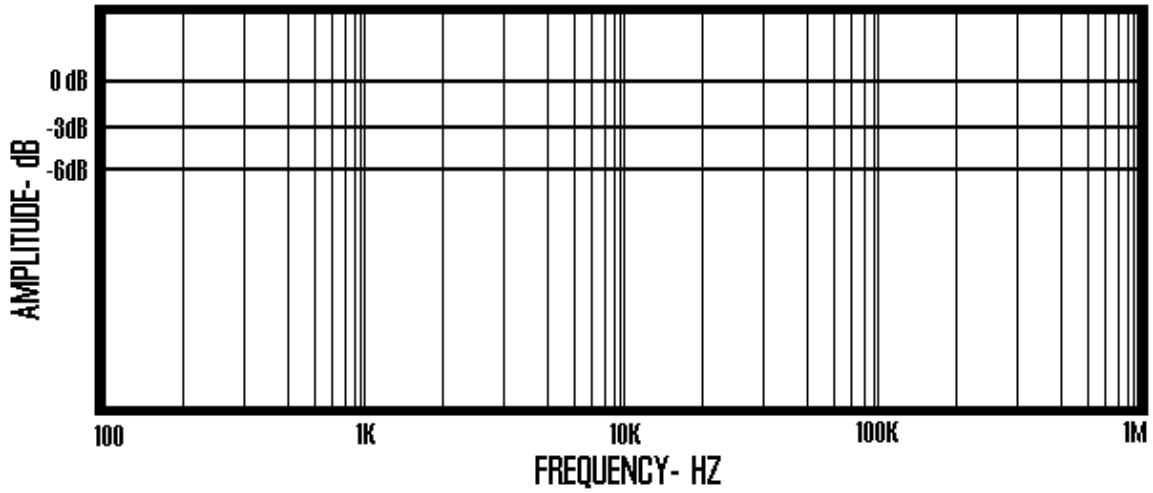
Q inner Filter 0

- Connect Freq. Generator to Q inner on BOB.
- Connect Oscilloscope to QI_OUT on front panel ***setFilter("Qi",0)*** Av=1
- Set sine wave frequency =50kHz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have detected and record the frequency.
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 50kHz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	10Hz	_____	_____
400mV	1kHz	_____	_____
400mV	50kHz	_____	_____
400mV	-3dB:_____	_____(1)	_____
400mV	-6dB:_____	_____(2)	_____

Av(50kHz)= _____
ΔF of -3dB & -6dB _____
ΔV of -3dB & -6dB _____
Slope of rolloff _____ dB/decade
1: .707*Vout
2: .500*Vout

Qi, Filter 0

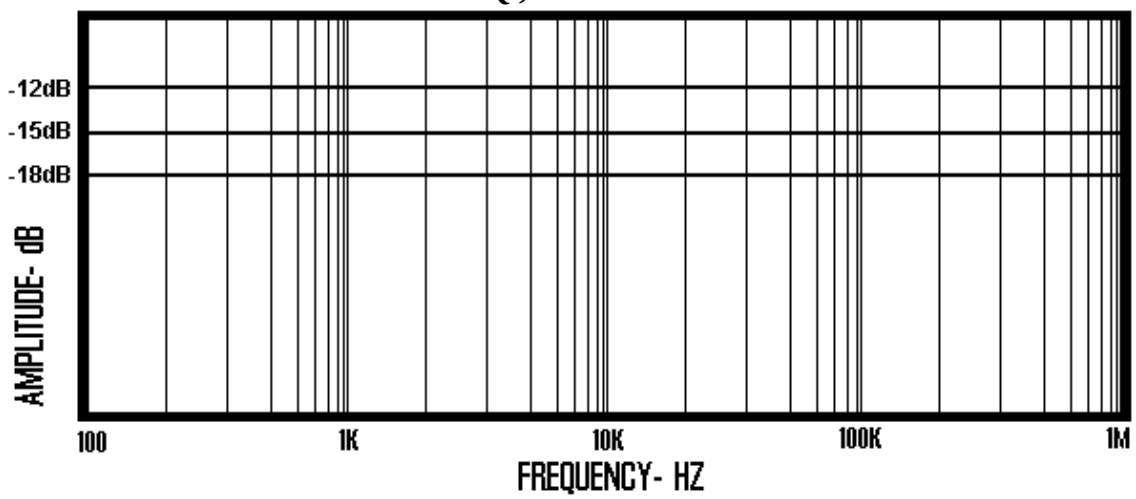


Q inner Filter 1

- ***setFilter("Qi",1)*** 1kHz notch filter, Av=.2
- Set sine wave frequency =50kHz.
- Set input amplitude = 400mVp-p.
- Record the output voltages at the listed frequencies.
- Measure signal on scope using AC setting, measure DC offset using DC setting.
- Calculate the -3dB(=.707*Vout) and dB(=.5*Vout) voltage levels in relation to the measured Vout at 5kHz and 50kHz(Very Hi values) and record.
- Identify and record the -3dB frequencies around the 1kHz notch (Lo, Hi) and the -3dB and -6dB frequencies on the upper level LP rolloff(VeryHi).
- Measure the time between the -3db and -6db points.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 50kHz.
- Plot the measurements on the graph.

Vin(p-p)	Frequency	Vout(p-p)	dB value	offset
400mV	10Hz	_____		_____
400mV	200Hz	_____		_____
400mV	1kHz	_____		_____
400mV	5kHz	_____	_____	_____
400mV	50kHz	_____	_____	_____
400mV	Lo -3dB:_____	_____	5kHz dB-3dB	
400mV	Hi -3dB:_____	_____	5kHz dB-3dB	
400mV Very Hi -3dB:_____		_____	50kHz dB-3dB	
400mV Very Hi -6dB:_____		_____	50kHz dB-3dB	
ΔF of Very Hi -3dB & -6dB		_____		
ΔV of Very Hi -3dB & -6dB		_____		
Slope of rolloff _____ dB/decade				

Qi, Filter 1



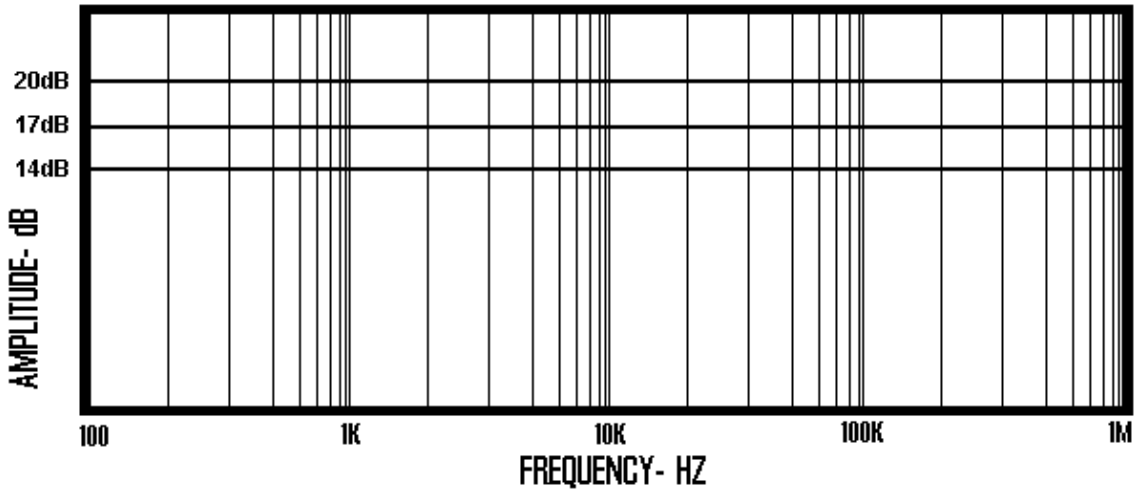
Q inner Filter 2

- ***setFilter("Qi",2)*** Av=10 {=20dB}
- Set sine wave frequency =50kHz.
- Set input amplitude = 100mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 50kHz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
100mV	10Hz	_____	_____
100mV	1kHz	_____	_____
100mV	50kHz	_____	_____
100mV	-3dB:_____	_____	_____
100mV	-6dB:_____	_____	_____

Av(50kHz)= _____
ΔF of -3dB & -6dB _____
ΔV of -3dB & -6dB _____
Slope of rolloff _____ dB/decade

Qi, Filter 2

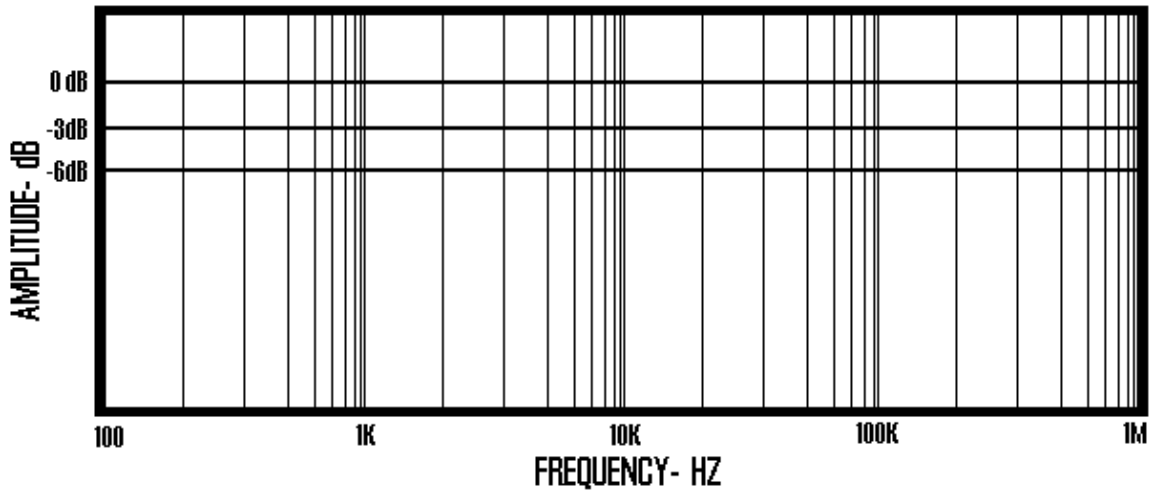


Q inner Filter 3

- ***setFilter("Qi",3)***
- Set sine wave frequency =12kHz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and 6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 20kHz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset	dB calc.
400mV	10Hz	_____	_____	
400mV	1kHz	_____	_____	_____
400mV	12kHz	_____	_____	_____
400mV	20kHz	_____	_____	_____
400mV	-3dB:_____	_____	_____	
400mV	-6dB:_____	_____	_____	
Av(12kHz)= _____				
ΔF of -3dB & -6dB _____				
ΔV of -3dB & -6dB _____				
Slope of rolloff _____ dB/decade				

Qi, Filter 3



5. Q outer test:

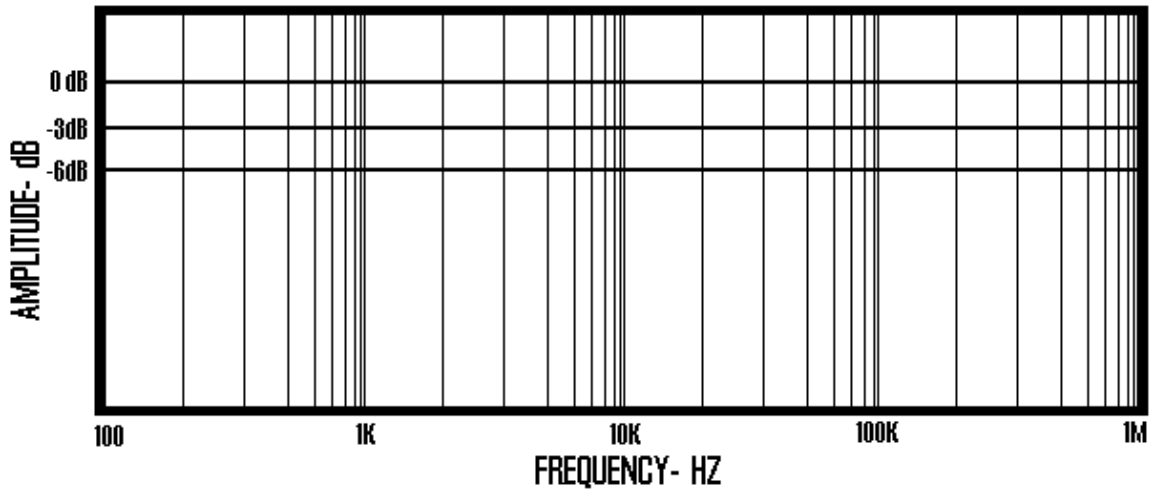
Q outer Filter 0

Input settings in Step 3 before starting test.

- Connect Freq. Generator to Q outer on BOB.
- Connect Oscilloscope to QO_OUT on front panel
- ***setFilter("Qo",0)*** Av=1
- Set sine wave frequency =50kHz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and 6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = [V(-6db) - V(-3dB)]/time interval.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	10Hz	_____	_____
400mV	1kHz	_____	_____
400mV	50kHz	_____	_____
400mV	-3dB:_____	_____	_____
400mV	-6dB:_____	_____	_____
Av(50kHz)= _____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

Qo, Filter 0

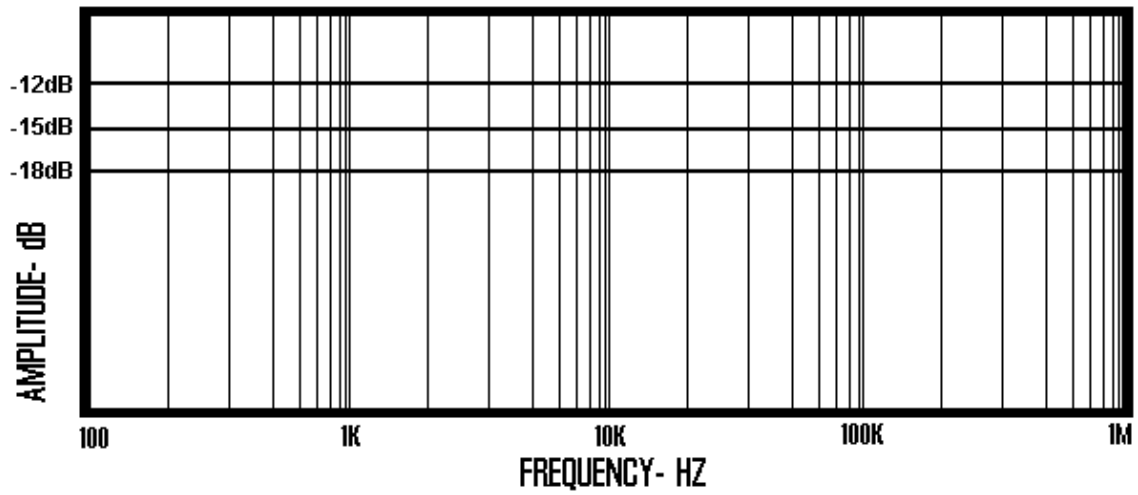


Q outer Filter 1

- ***setFilter("Qo",1)*** 1kHz notch filter, Av=.2
- Set sine wave frequency =50kHz.
- Set input amplitude = 100mVp-p.
- Record the output voltage at the listed frequencies.
- Measure signal on scope using AC setting, measure DC offset using DC setting.
- Calculate the -3dB(=.707*Vout) and dB(=.5*Vout) voltage levels in relation to the measured Vout at 5kHz and 50kHz(Very Hi values) and record.
- Identify and record the -3dB frequencies around the 1kHz notch (Lo, Hi) and the -3dB and -6dB frequencies on the upper level LP rolloff(Very Hi).
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 50kHz.
- Plot the measurements on the graph.

Vin(p-p)	Frequency	Vout(p-p)	dB value	offset
400mV	10Hz	_____		_____
400mV	200Hz	_____		_____
400mV	1kHz	_____		_____
400mV	5kHz	_____	_____	_____
400mV	50kHz	_____	_____	_____
400mV	Lo -3dB:_____	_____	5kHz dB-3dB	
400mV	Hi -3dB:_____	_____	5kHz dB-3dB	
400mV Very Hi -3dB:_____		_____	50kHz dB-3dB	
400mV Very Hi -6dB:_____		_____	50kHz dB-3dB	
ΔF of Very Hi -3dB & -6dB		_____		
ΔV of Very Hi -3dB & -6dB		_____		
Slope of rolloff _____ dB/decade				

Qo, Filter 1



Q outer Filter 2

- ***setFilter("Qo",2)*** Av=10 {=20dB}
- Set sine wave frequency =50kHz.
- Set input amplitude = 100mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 50kHz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
100mV	10Hz	_____	_____
100mV	1kHz	_____	_____
100mV	50kHz	_____	_____
100mV	-3dB:_____	_____	_____
100mV	-6dB:_____	_____	_____

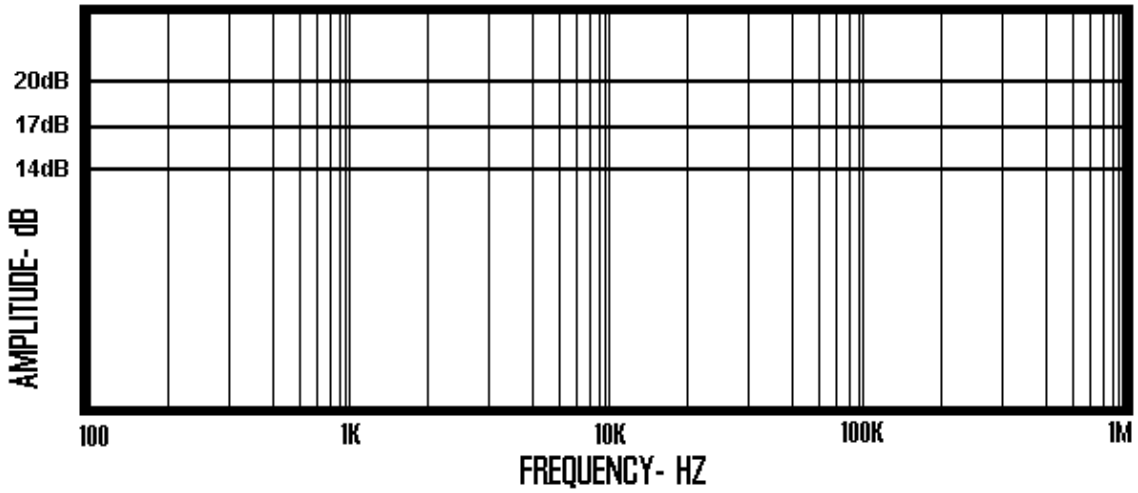
Av(50kHz)= _____

ΔF of -3dB & -6dB _____

ΔV of -3dB & -6dB _____

Slope of rolloff _____ dB/decade

Qo, Filter 2

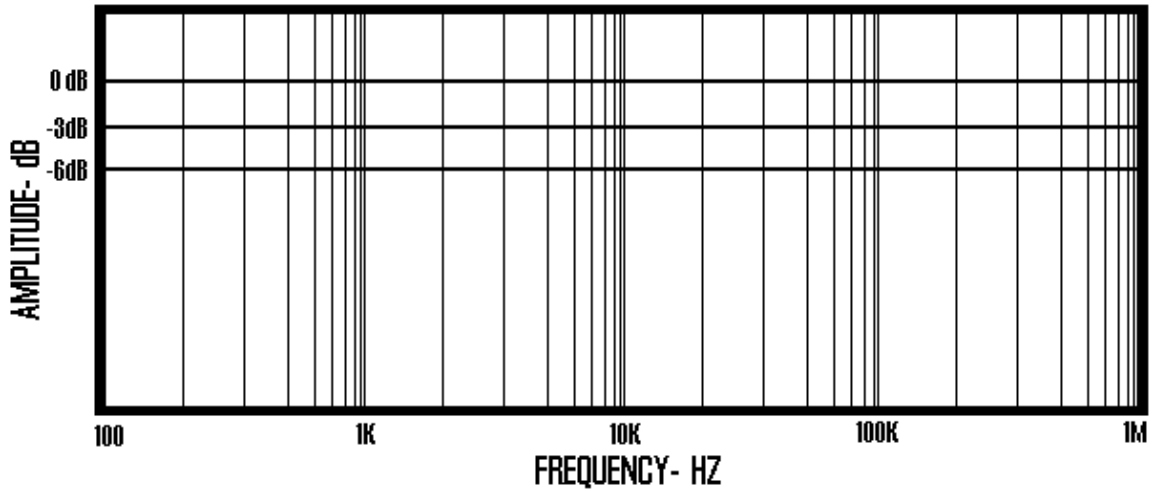


Q outer Filter 3

- ***setFilter("Qo",3)***
- Set sine wave frequency =12kHz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 20kHz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset	dB calc.
400mV	10Hz	_____	_____	
400mV	1kHz	_____	_____	_____
400mV	12kHz	_____	_____	_____
400mV	20kHz	_____	_____	_____
400mV	-3dB:_____	_____	_____	
400mV	-6dB:_____	_____	_____	
Av(12kHz)= _____				
ΔF of -3dB & -6dB _____				
ΔV of -3dB & -6dB _____				
Slope of rolloff _____ dB/decade				

Qo, Filter 3



6. Phonon section test:

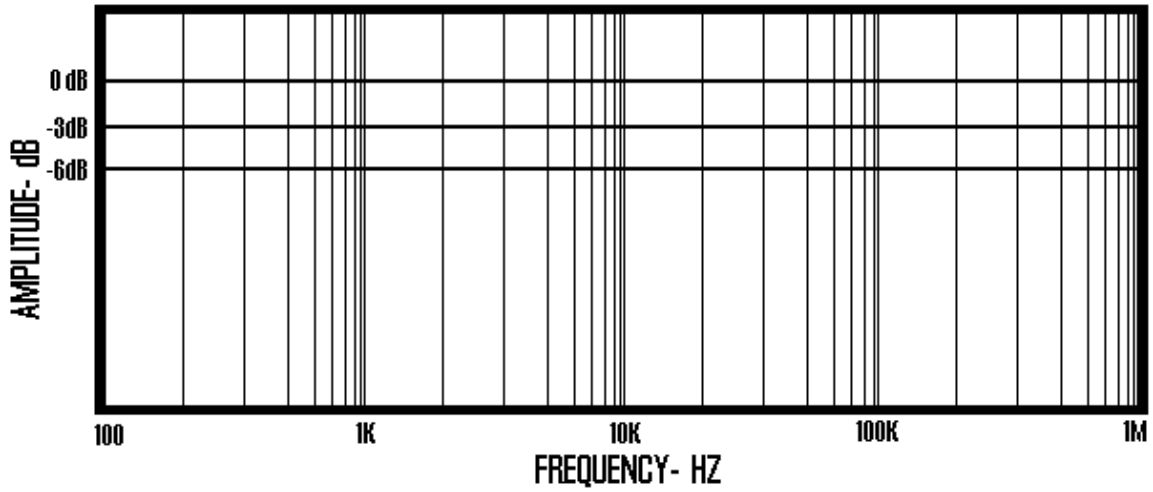
filter setting	
0: Av=1	1: Av=.1, .8V offset
2: Av=10 DC	3: Bessel LP

Phonon 1 Filter 0

- Connect Freq. Generator to P1 on BOB.
- Connect Oscilloscope to P1_OUT on front panel
- ***setFilter("P1",0)*** Av=1
- Set sine wave frequency =100Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	1Hz	_____	_____
400mV	10Hz	_____	_____
400mV	100Hz	_____	_____
400mV	-3dB:_____	_____	_____
400mV	-6dB:_____	_____	_____
Av(100hz)=_____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P1, Filter 0

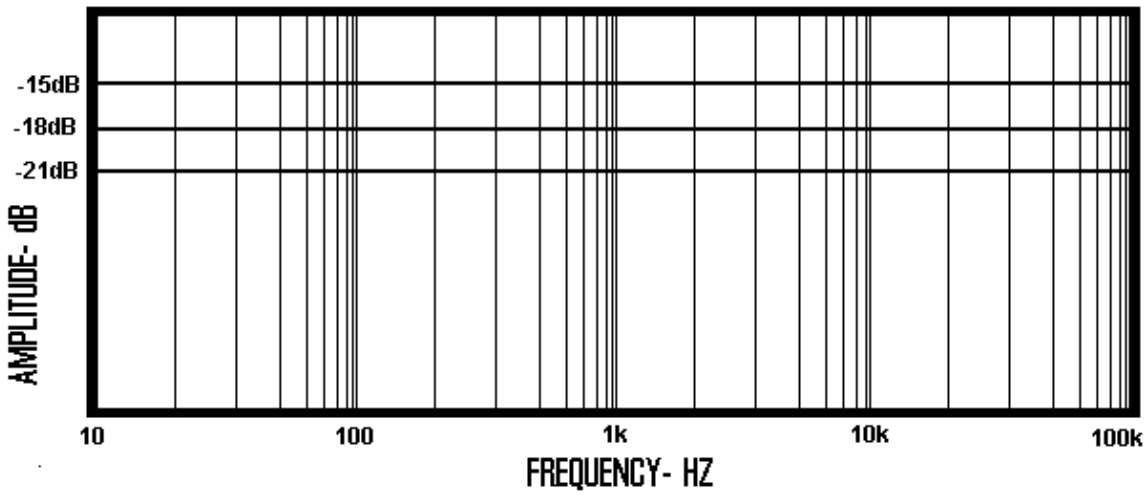


Phonon 1 Filter 1

- ***setFilter("P1",1)*** Av=.1{= -12dB}, DC offset= .8V
- Set sine wave frequency =100Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn down and up the input frequency until both levels have been detected and record the freq.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset	dB calc.
400mV	1Hz	_____	_____	
400mV	10Hz	_____	_____	_____
400mV	100Hz	_____	_____	_____
400mV(low)	-3dB:_____	_____	_____	_____
400mV	-6dB:_____	_____	_____	_____
Av(100hz)= _____				
ΔF of -3dB & -6dB _____				
ΔV of -3dB & -6dB _____				
Slope of rolloff _____ dB/decade				

P1, Filter 1

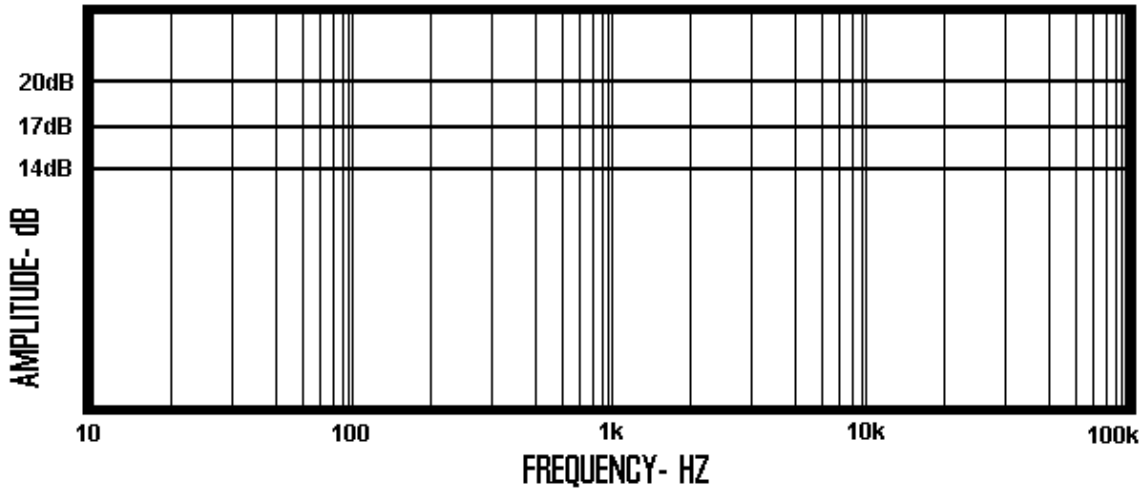


Phonon 1 Filter 2

- ***setFilter("P1",2)*** Av=10 {=20dB}
- Set sine wave frequency =100Hz.
- Set input amplitude = 100mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
100mV	1Hz	_____	_____
100mV	10Hz	_____	_____
100mV	100Hz	_____	_____
100mV	-3dB:_____	_____	_____
100mV	-6dB:_____	_____	_____
Av(100hz)= _____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P1, Filter 2

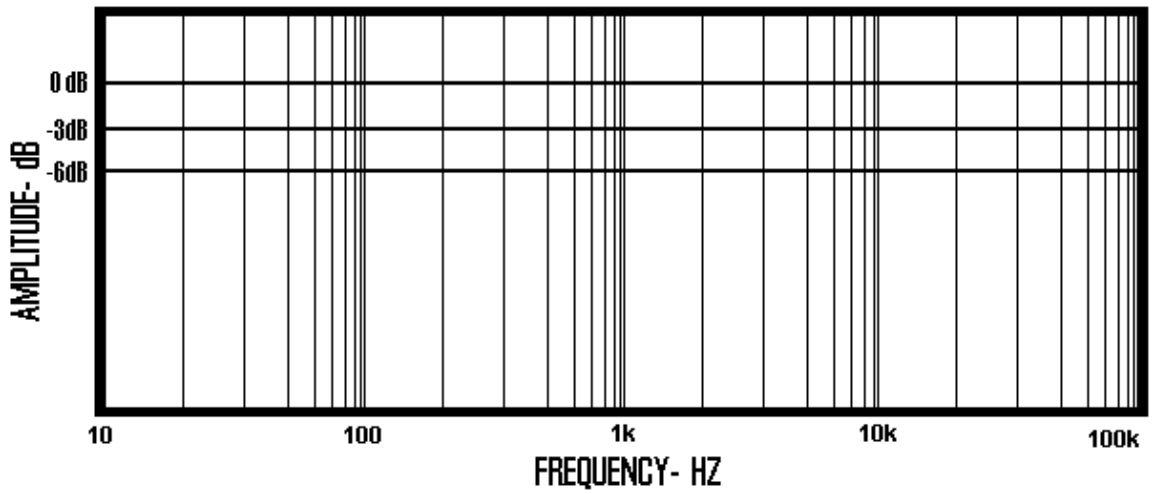


Phonon 1 Filter 3

- ***setFilter("P1",3)*** , Bessel filter
- Set sine wave frequency =20Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	1Hz	_____	_____
400mV	10Hz	_____	_____
400mV	20Hz	_____	_____
400mV	100Hz	_____	_____
400mV	-3dB:_____	_____	_____
400mV	-6dB:_____	_____	_____
Av(20hz)= _____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P1, Filter 3



Phonon 2 Filter 0

- Connect Freq. Generator to P1 on BOB.
- Connect Oscilloscope to P2_OUT on front panel
- ***setFilter("P2",0)*** Av=1
- Set sine wave frequency =100Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	1Hz	_____	_____
400mV	10Hz	_____	_____
400mV	100Hz	_____	_____
400mV	-3dB:_____	_____	_____
400mV	-6dB:_____	_____	_____

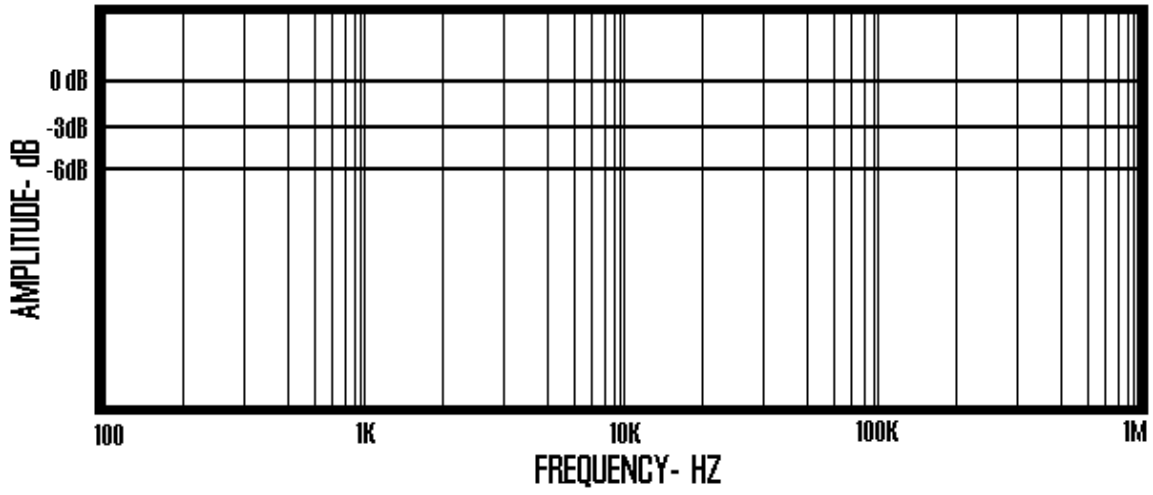
Av(100hz)=_____

ΔF of -3dB & -6dB _____

ΔV of -3dB & -6dB _____

Slope of rolloff _____ dB/decade

P2, Filter 0

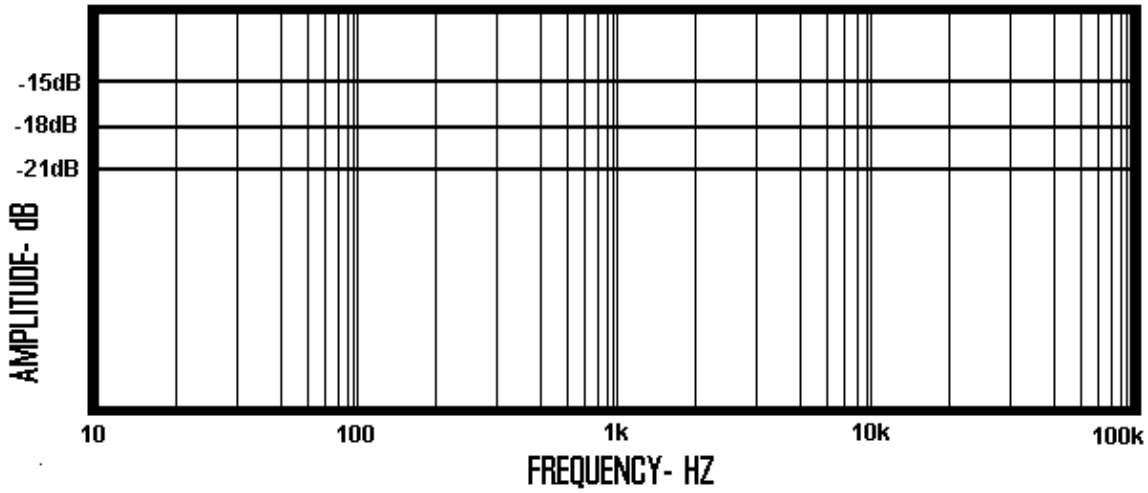


Phonon 2 Filter 1

- ***setFilter("P2",1)*** Av=.1, DC offset= .8V
- Set sine wave frequency =100Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset	dB calc.
400mV	1Hz	_____	_____	
400mV	10Hz	_____	_____	_____
400mV	100Hz	_____	_____	_____
400mV(low)	-3dB:_____	_____	_____	_____
400mV	-6dB:_____	_____	_____	_____
Av(100hz)= _____				
ΔF of -3dB & -6dB _____				
ΔV of -3dB & -6dB _____				
Slope of rolloff _____ dB/decade				

P2, Filter 1

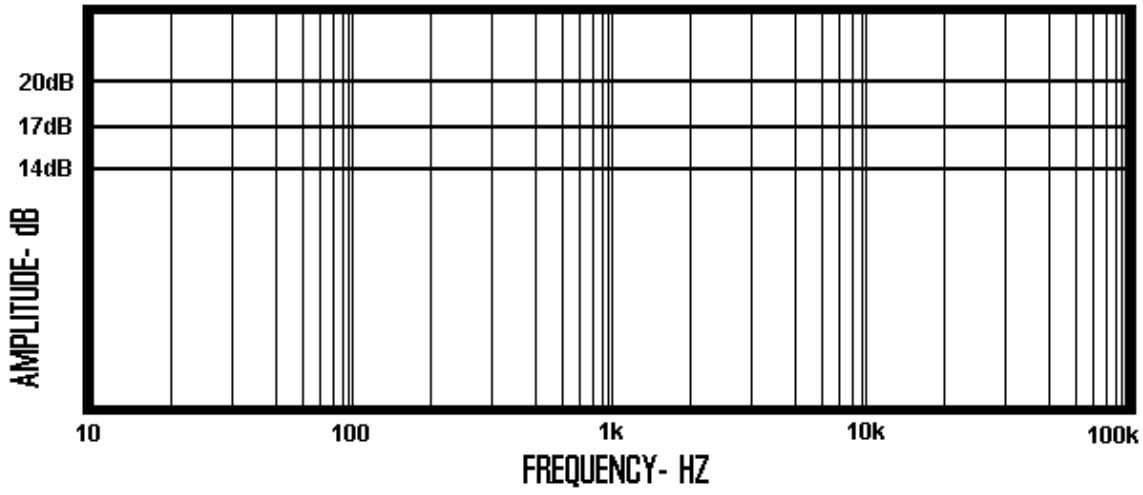


Phonon 2 Filter 2

- ***setFilter("P2",2)*** Av=10 {=20dB}
- Set sine wave frequency =100Hz.
- Set input amplitude = 100mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
100mV	1Hz	_____	_____
100mV	10Hz	_____	_____
100mV	100Hz	_____	_____
100mV	-3dB:_____	_____	_____
100mV	-6dB:_____	_____	_____
Av(100hz)= _____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P2, Filter 2

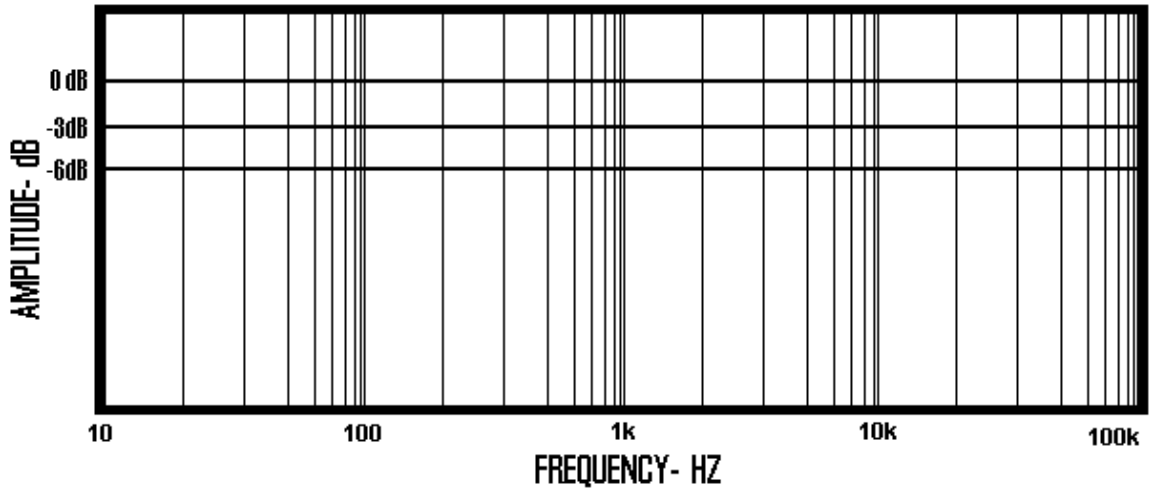


Phonon 2 Filter 3

- ***setFilter("P2",3)*** , Bessel filter
- Set sine wave frequency =20Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	1Hz	_____	_____
400mV	10Hz	_____	_____
400mV	20Hz	_____	_____
400mV	100Hz	_____	_____
400mV	-3dB:_____	_____	_____
400mV	-6dB:_____	_____	_____
Av(20hz)= _____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P2, Filter 3

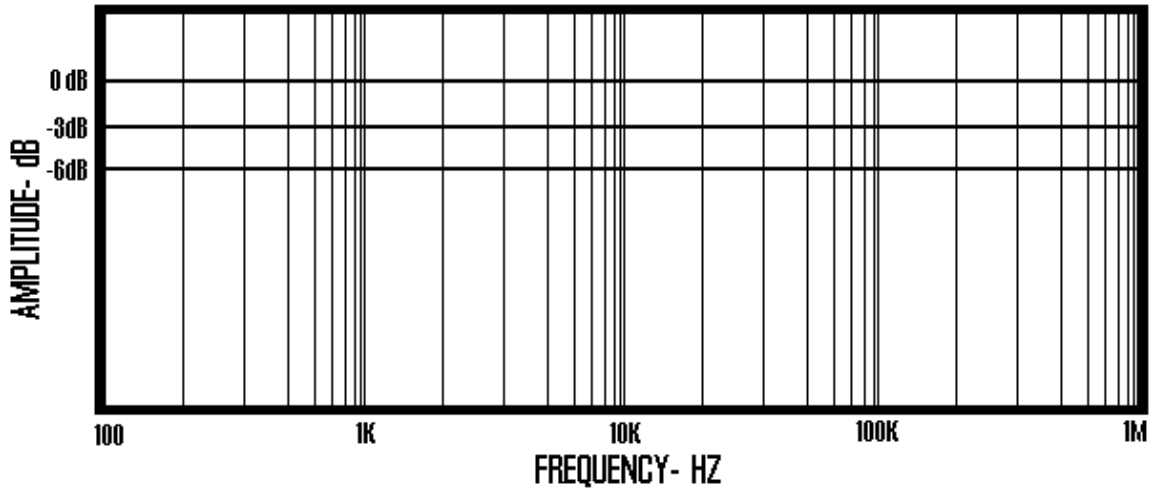


Phonon 3 Filter 0

- Connect Freq. Generator to P3 on BOB.
- Connect Oscilloscope to P3_OUT on front panel
- ***setFilter("P3",0)*** Av=1
- Set sine wave frequency =100Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	1Hz	_____	_____
400mV	10Hz	_____	_____
400mV	100Hz	_____	_____
400mV	-3dB:_____	_____	_____
400mV	-6dB:_____	_____	_____
Av(100hz)=_____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P3, Filter 0

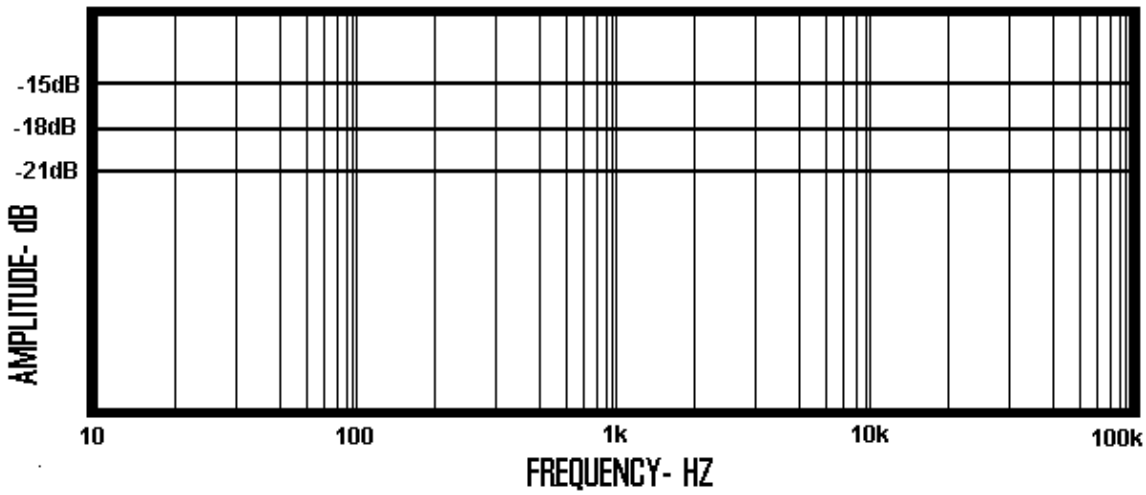


Phonon 3 Filter 1

- ***setFilter("P3",1)*** Av=.1, DC offset= .8V
- Set sine wave frequency =100Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset	dB calc.
400mV	1Hz	_____	_____	
400mV	10Hz	_____	_____	_____
400mV	100Hz	_____	_____	_____
400mV(low)	-3dB:_____	_____	_____	_____
400mV	-6dB:_____	_____	_____	_____
Av(100hz)= _____				
ΔF of -3dB & -6dB _____				
ΔV of -3dB & -6dB _____				
Slope of rolloff _____ dB/decade				

P3, Filter 1

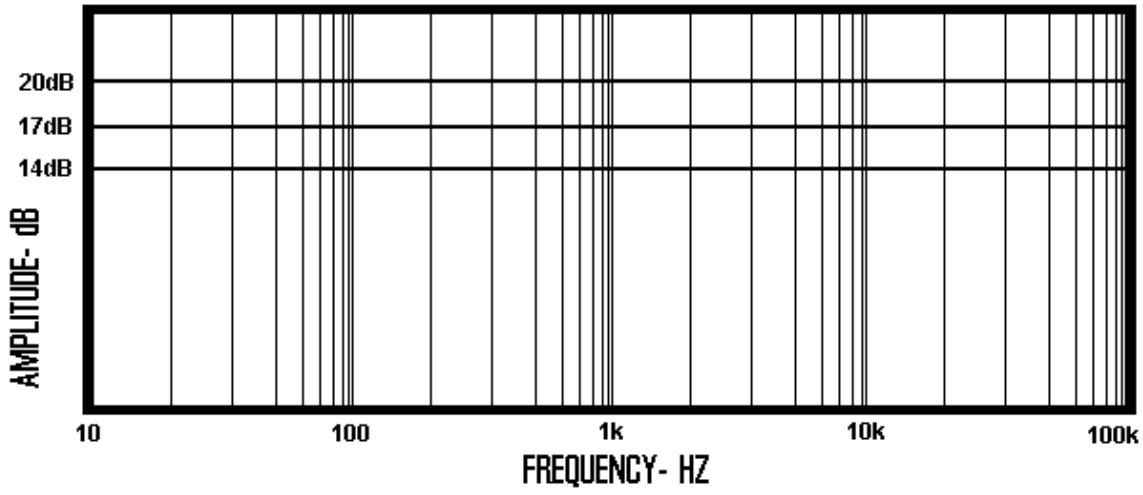


Phonon 2 Filter 2

- ***setFilter("P3",2)*** Av=10 {=20dB}
- Set sine wave frequency =100Hz.
- Set input amplitude = 100mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
100mV	1Hz	_____	_____
100mV	10Hz	_____	_____
100mV	100Hz	_____	_____
100mV	-3dB:_____	_____	_____
100mV	-6dB:_____	_____	_____
Av(100hz)= _____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P3, Filter 2



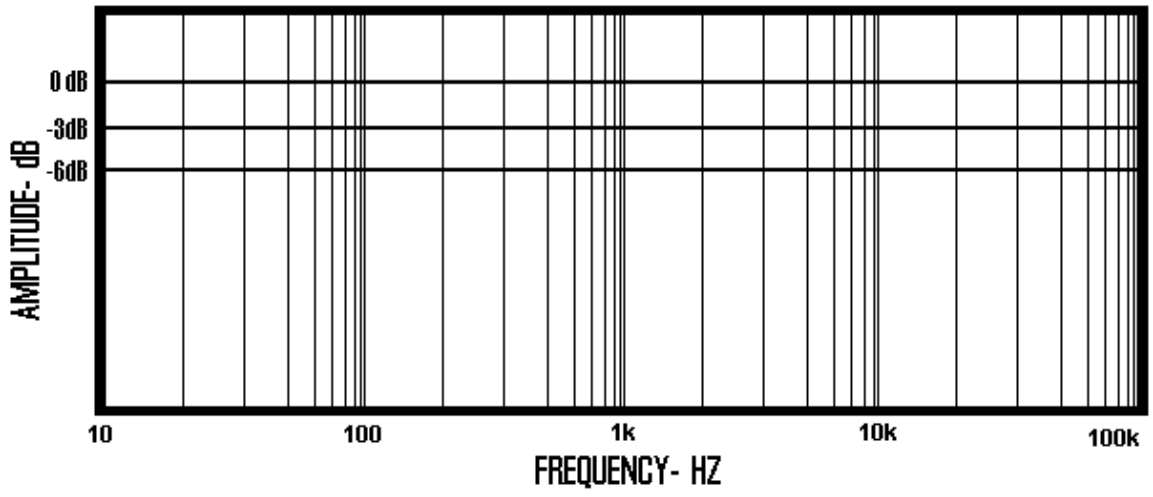
Phonon 3 Filter 3

setFilter("P3",3) , Bessel filter

- Set sine wave frequency =20Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	1Hz	_____	_____
400mV	10Hz	_____	_____
400mV	20Hz	_____	_____
400mV	100Hz	_____	_____
400mV	-3dB:_____	_____	_____
400mV	-6dB:_____	_____	_____
Av(20hz)= _____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P3, Filter 3

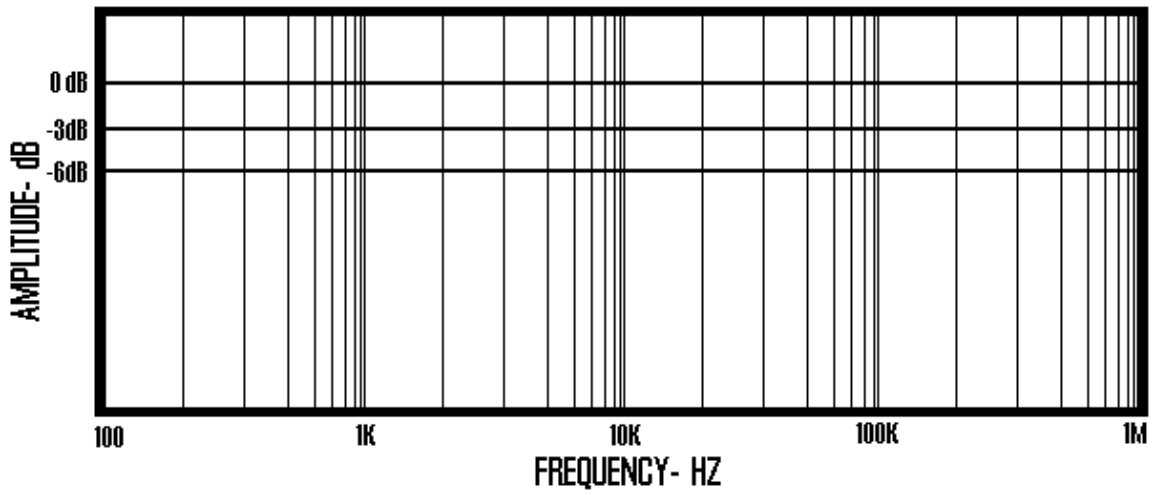


Phonon 4 Filter 0

- Connect Freq. Generator to P1 on BOB.
- Connect Oscilloscope to P1_OUT on front panel
- ***setFilter("P4",0)*** Av=1
- Set sine wave frequency =100Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	1Hz	_____	_____
400mV	10Hz	_____	_____
400mV	100Hz	_____	_____
400mV	-3dB:_____	_____	_____
400mV	-6dB:_____	_____	_____
Av(100hz)=_____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P4, Filter 0

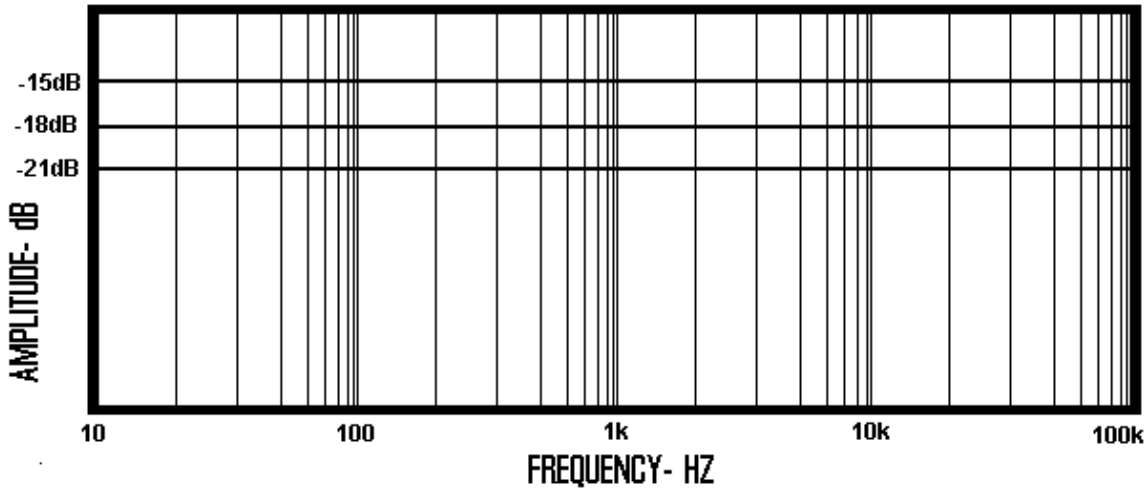


Phonon 4 Filter 1

- ***setFilter("P4",1)*** Av=.1, DC offset= .8V
- Set sine wave frequency =100Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset	dB calc.
400mV	1Hz	_____	_____	
400mV	10Hz	_____	_____	_____
400mV	100Hz	_____	_____	_____
400mV(low)	-3dB:_____	_____	_____	_____
400mV	-6dB:_____	_____	_____	_____
Av(100hz)= _____				
ΔF of -3dB & -6dB _____				
ΔV of -3dB & -6dB _____				
Slope of rolloff _____ dB/decade				

P4, Filter 1

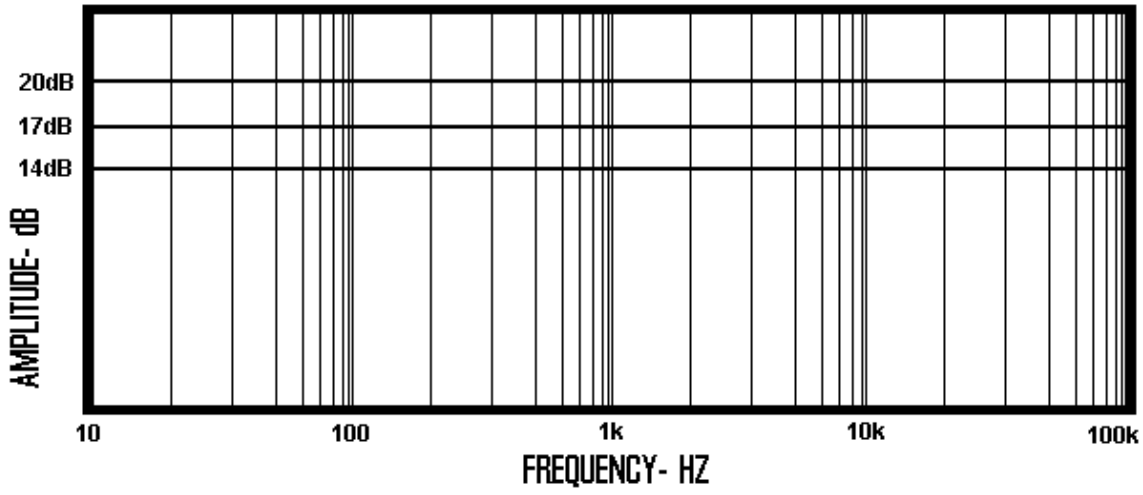


Phonon 4 Filter 2

- ***setFilter("P4",2)*** Av=10 {=20dB}
- Set sine wave frequency =100Hz.
- Set input amplitude = 100mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = ($\Delta V/V$)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
100mV	1Hz	_____	_____
100mV	10Hz	_____	_____
100mV	100Hz	_____	_____
100mV	-3dB:_____	_____	_____
100mV	-6dB:_____	_____	_____
Av(100hz)= _____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P4, Filter 2



Phonon 4 Filter 3

- ***setFilter("P4",3)*** , Bessel filter
- Set sine wave frequency =20Hz.
- Set input amplitude = 400mVp-p.
- Measure the output at the listed frequencies and record in the chart.
- Calculate the -3dB(=.707*Vout) and -6dB(=.5*Vout) voltage levels and record.
- Turn up the input frequency until both levels have been detected and record the frequency.
- Calculate the slope of the roll off. Slope = (ΔV/V)/ ΔF. V=Vout @ 100Hz.
- Graph the measurements.

Vin(p-p)	Frequency	Vout(p-p)	DC offset
400mV	1Hz	_____	_____
400mV	10Hz	_____	_____
400mV	20Hz	_____	_____
400mV	100Hz	_____	_____
400mV	-3dB:_____	_____	_____
400mV	-6dB:_____	_____	_____
Av(20hz)= _____			
ΔF of -3dB & -6dB _____			
ΔV of -3dB & -6dB _____			
Slope of rolloff _____ dB/decade			

P4, Filter 3