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## FREE music lessons from Berklee College of Music

### Critical Listening

Lesson 1:  
Understanding Sound: EQ Bands

This lesson is excerpted from an online course. While the navigation links on each page are not active, all of the multimedia interactions are. Have fun!

Check out [Berkleeshares.com](http://berkleeshares.com) for more lessons just like this one.

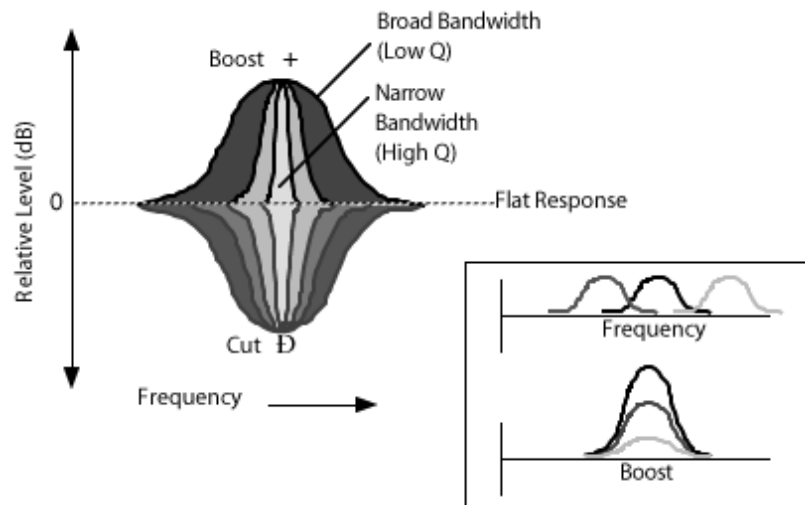


Berklee is offering free music lessons online designed to expand educational opportunities for musicians around the globe. The music lessons are available for free download from the [Berkleeshares.com](http://Berkleeshares.com) Web site and via a growing network of partner Web sites. These free music lessons are also available on digital file sharing networks. We encourage people to share our lessons with other musicians. While Berklee strongly disapproves of stealing copyrighted music online, we believe that file sharing offers new opportunities for musicians to learn, and to promote and distribute their work.



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One of the tools we have at our disposal both to identify and to alter frequency content is EQ (equalization). Equalizers come in different flavors, the simplest of which is perhaps the graphic EQ. Graphic EQ is typically divided into ten octave bands, ranging from 31 Hz to 16 kHz. These can be described as having a center frequency, a bandwidth of frequencies around that center frequency that will also be affected, and a level of applied boost or cut.

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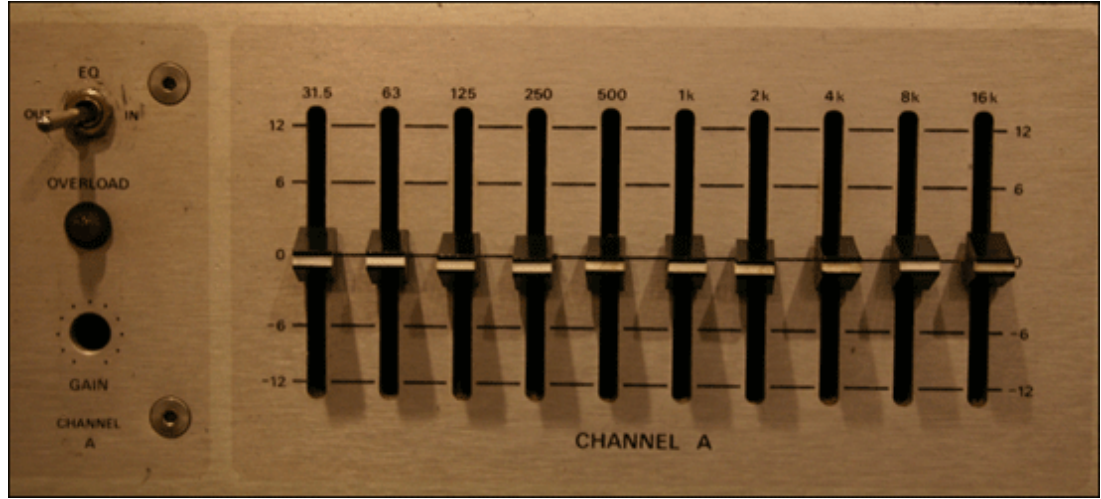
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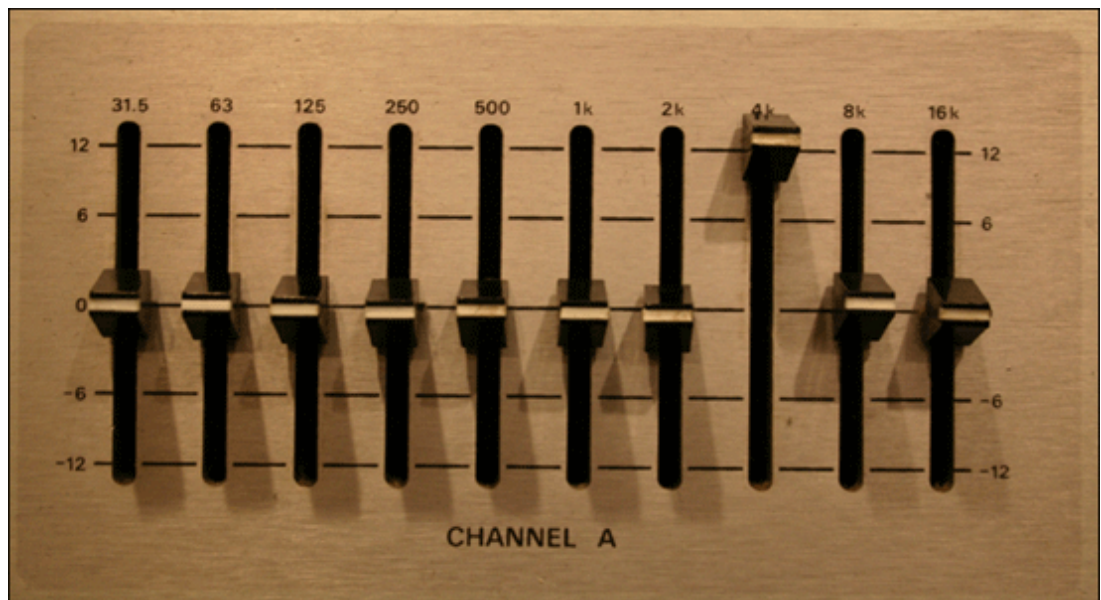
EQ Bands: Bandwidth, Boost/Cut, and Center Frequencies



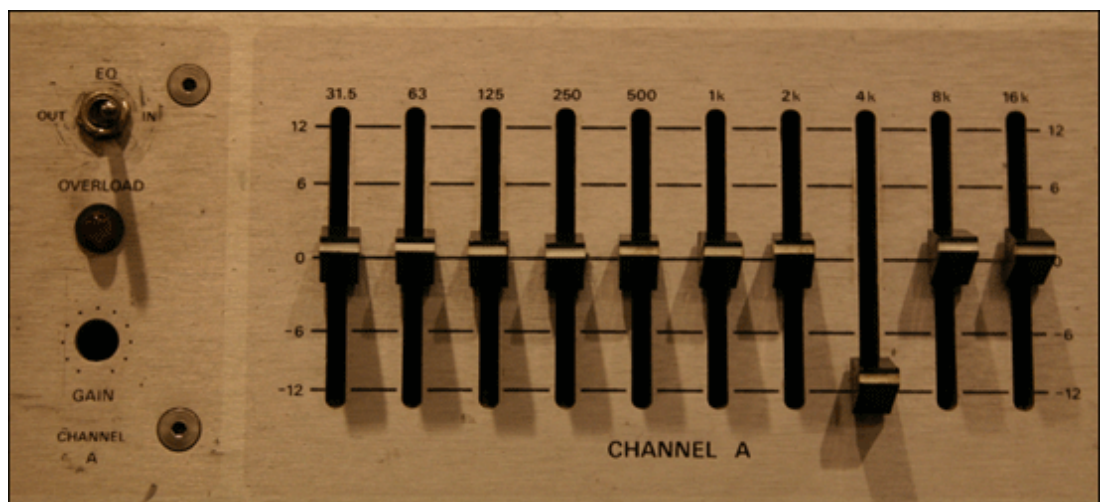
EQ Flat



EQ Boost



EQ Cut



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## What are the Ear Training Drills?



Each week you will have an Ear Training Drill. They are similar to traditional ear training drills, except that rather than trying to identify pitches and intervals, you will try to identify frequencies or frequency ranges. In these drills, different frequencies have been boosted or cut within a full-frequency audio signal using a **graphic EQ**. The source signal will be either **pink noise**, or **program material** (i.e., music).

These drills will help you develop the ability to hear frequency anomalies or deficiencies within your recorded tracks or live sound, and know where to reach for corrective or enhancing EQ (or preferably, move the mic or choose a different mic, if you are still in the act of recording). This is an essential part of the daily work of the engineer/producer and recording musician. If you stick to this, you will begin to identify sound spectra not just in your music but in all of the sounds that you hear.



**Warning:** Once you begin to hear this way, there is no turning back. Does that rainfall sound like it has a lot of 1 kHz or is it closer to 2 kHz? You get the idea.

With the pink noise drills, you will be tempted to equate the changes you hear to sounds that you know: subway, wind tunnel, sizzling bacon, and so on. This is a good place to start, but be aware that this kind of imagery will not necessarily translate well when the source is program material. Instead, you will probably want to develop a sense of the “highness” or “lowness” of a given octave band or frequency range. However, there is no single right way to do this, so find whatever works for you and stick with it.

You will start to hear things in your favorite CDs, and in your own recordings, that you never heard before. Eventually you want to be able to say: “That kick needs a 6 dB cut at 300 Hz,” rather than just “the kick is too tubby sounding,” or “that acoustic guitar would really benefit from a 3 dB boost at 16 kHz,” rather than just “that acoustic guitar needs to stand out more and sparkle.”



**Another Warning:** You will eventually realize that there is an audible difference between MP3s and CDs, let alone high-resolution recordings such as DVD-A and SuperAudio CD!

One thing is certain: the weekly drills get harder faster than you get better. Cuts are generally harder to hear than boosts. Those 24 dB boosts and cuts become 12 dB boosts **or** cuts, and so on. Not to worry. The drills are self-graded, and you can return to them as often as you like. In fact, I strongly suggest that you return to each drill as often in a week as is practical, in order to build up your aural memory. Do this, and you will find that you are making steady improvement. You will also find that towards the end of the course, when you go back to revisit earlier drills, they will seem dead-easy to you. This is the process of opening up your ears to a new level of listening, and more important, **hearing**.

It does not end, it only begins...



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[Next Activity: Ear Training Drill 1: Pink Noise](#)  
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The Ear Training Drill consists of three stages: Warm-Up Drill, [Quiz with ten examples](#), and Reinforce Drill.

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## Topic Preparation



Read *Understanding Audio*, by Daniel M. Thompson.

Chapter 2: The Modern Studio: p. 25

Chapter 4: Advanced Signal Flow: pp. 82–83

## Scoring System

The quiz has a unique automatic scoring system. Each correct answer is worth 10 points, with  $-1$  point for each octave band you guess away from the correct one. For example, if the answer is 31 Hz and you guessed 500 Hz, you get  $-4$  on that example, or 6 points. You can improve your score by taking the quiz as many times as you like.

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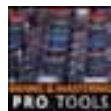
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