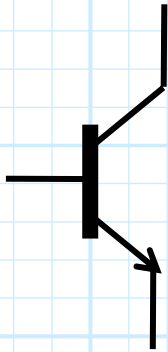


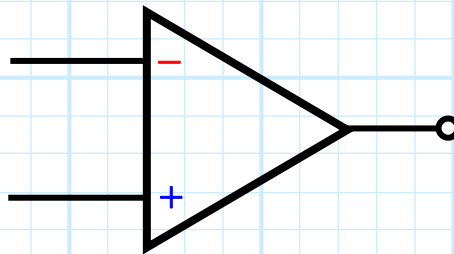
2.1 The Ideal Op-Amp



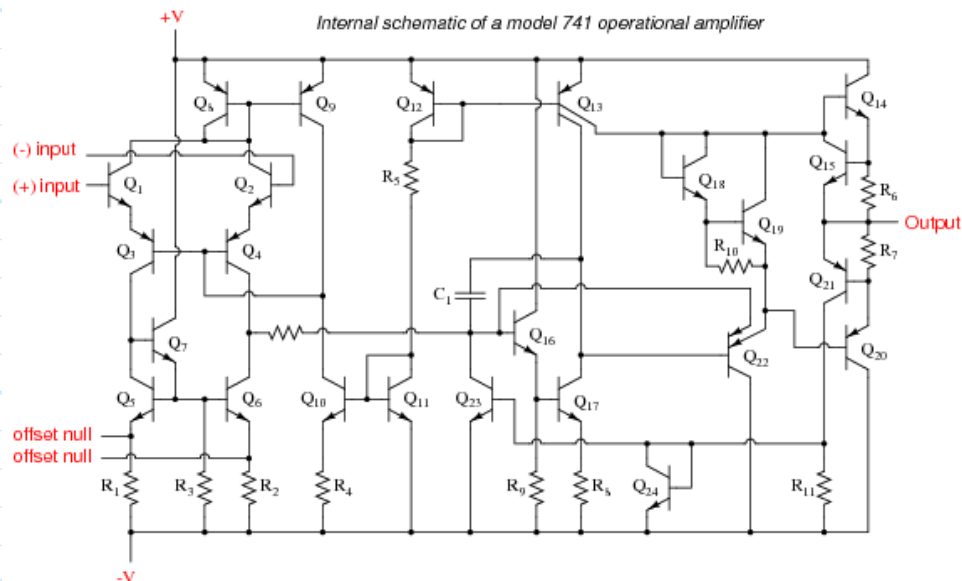
Reading Assignment: pp. 63-66

The **transistor** is the **fundamental** circuit element of modern electronics. We can use transistors to form very complex circuits that do all sorts of **useful** and wonderful things.

Yet, with respect to **analog** circuits, we might argue that the fundamental electronic circuit element is the **operational amplifier**, otherwise known as the **op-amp**.



Now, an op-amp is actually an **integrated circuit** that implements dozens, or even hundreds of **transistors**.

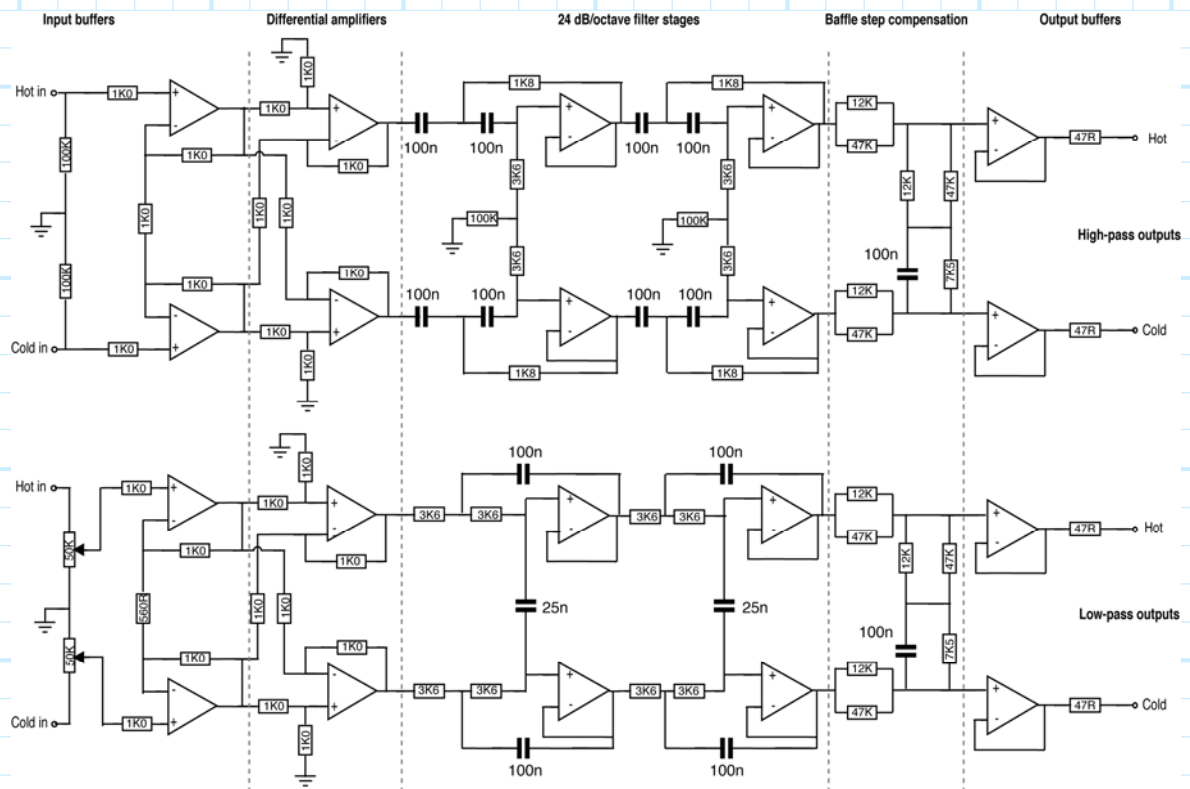




Q: So, how could such a complex circuit be considered to be a **fundamental circuit element**?

A: Despite its complexity, the behavior of an op-amp is **simple** and straight forward. In fact, we will find that the **math** describing op-amp operation is **far simpler** than the math describing transistor operation!

Likewise, we will find that (like the transistor) an op-amp **by itself** is a mostly **useless** device. Instead we must construct a circuit **around it** to achieve utility.



From: www.soton.ac.uk/~apm3/diyaudio/DAXO.html

And—like a transistor—the utility that we can achieve with an op-amp circuit is both **vast** and **substantial**.

In other words, the applications of op-amps to **analog** circuit design are nearly **limitless**!

Let' start by examining the characteristics of an **ideal** op-amp!

HO: THE IDEAL OP-AMP