

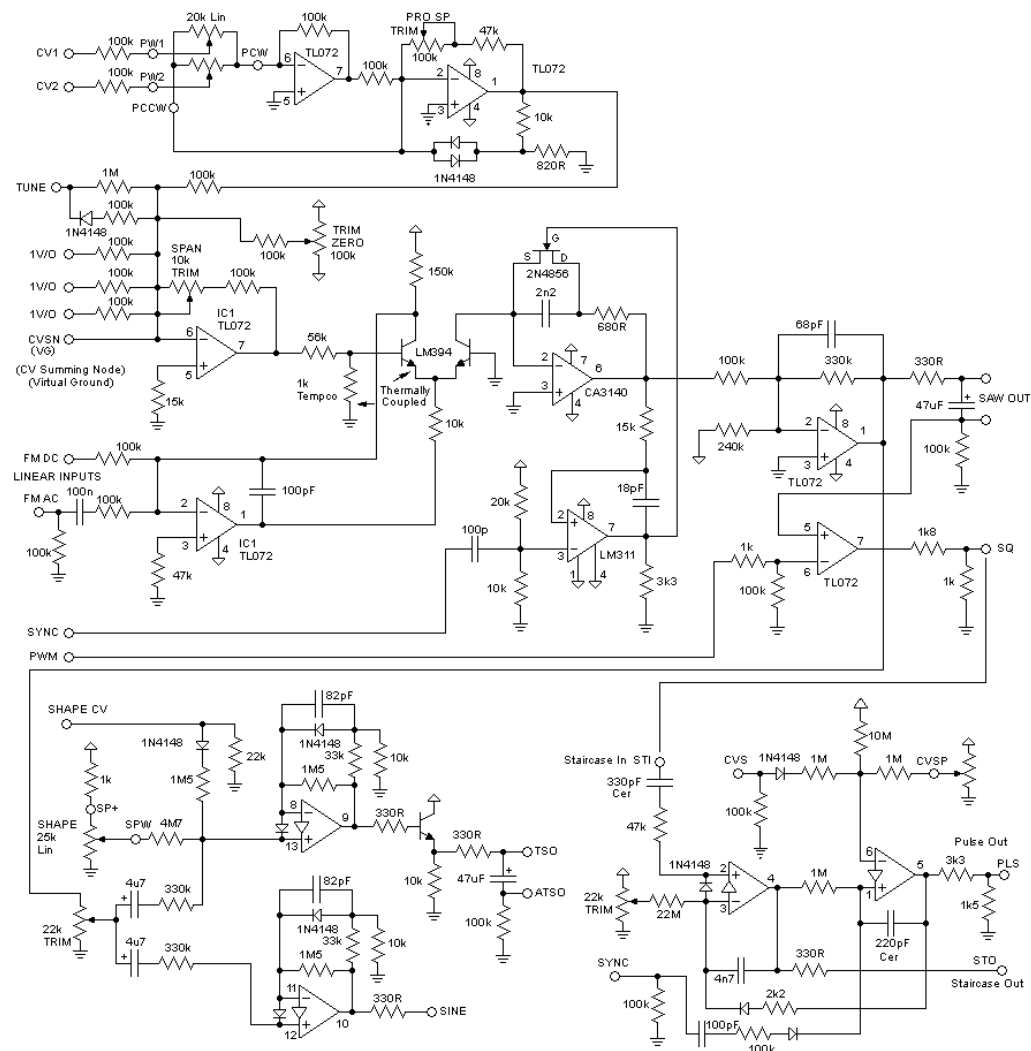
EE 140

Op Amps Are Everywhere

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1

- Op amps are everywhere in practical circuits: (e.g., for solid-state guitar amplifiers, instrumentation, measurement tools, etc.)



- Op amps that can be used to build practical board-level circuits are often implemented via bipolar junction transistor technology

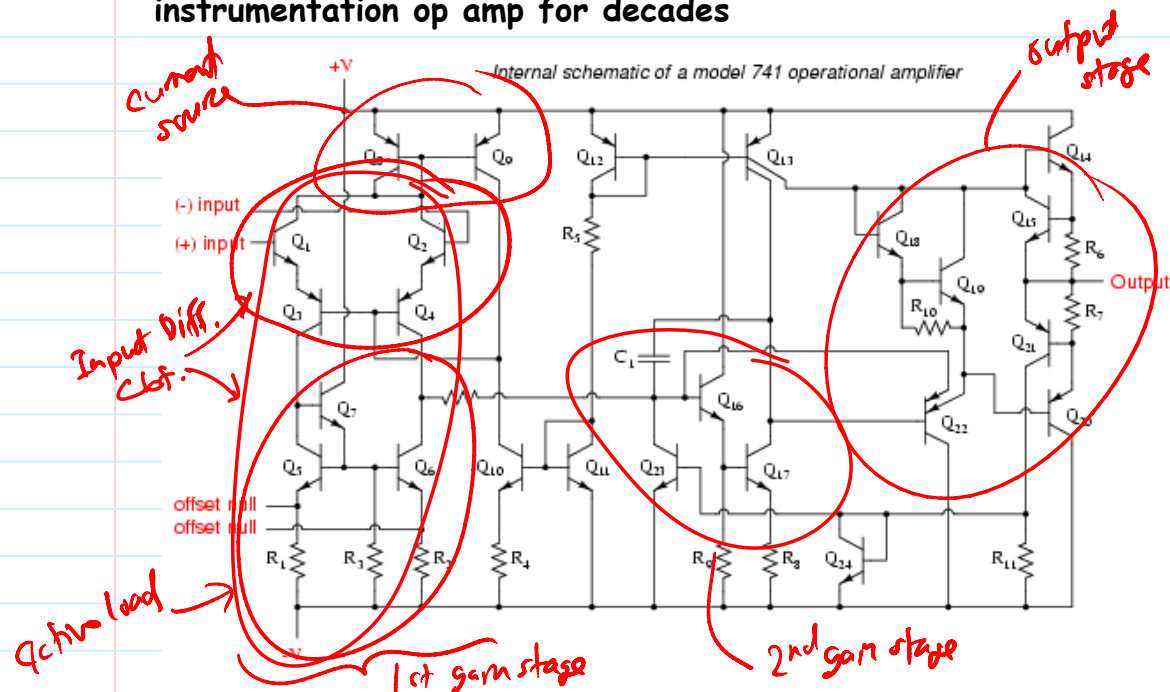
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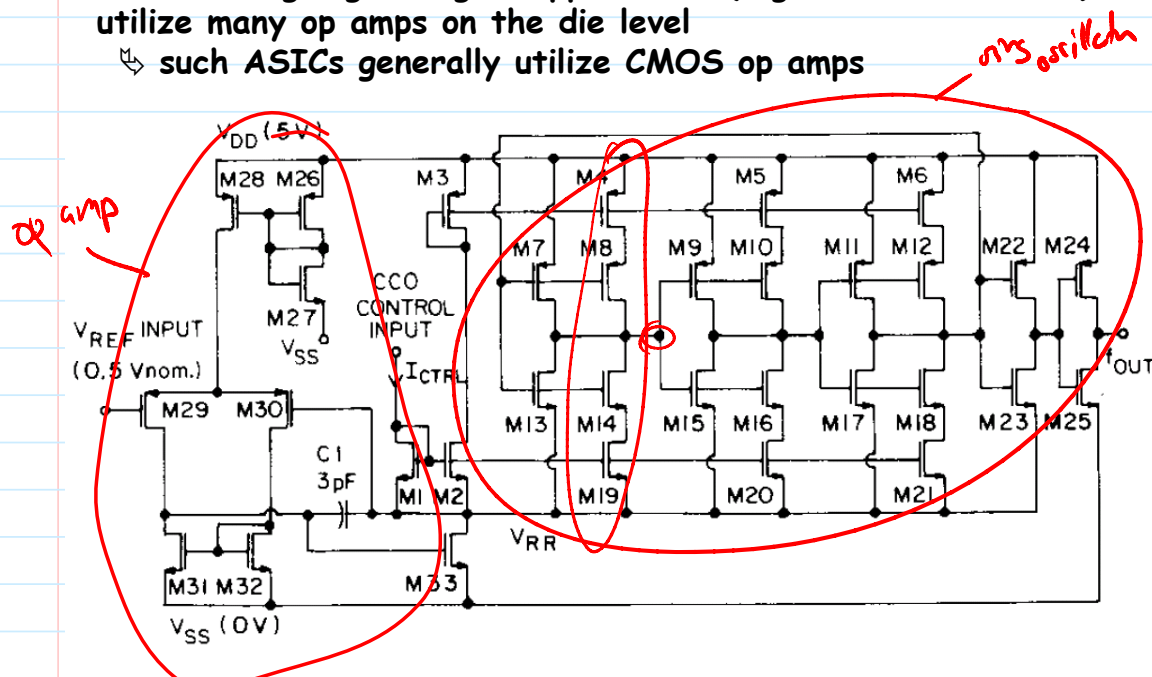
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2

- e.g., the 741 op amp, which has been a workhorse instrumentation op amp for decades



- Today, application specific integrated circuits (ASICs) for mixed analog/digital signal applications (e.g., A/D converters) utilize many op amps on the die level
 - such ASICs generally utilize CMOS op amps



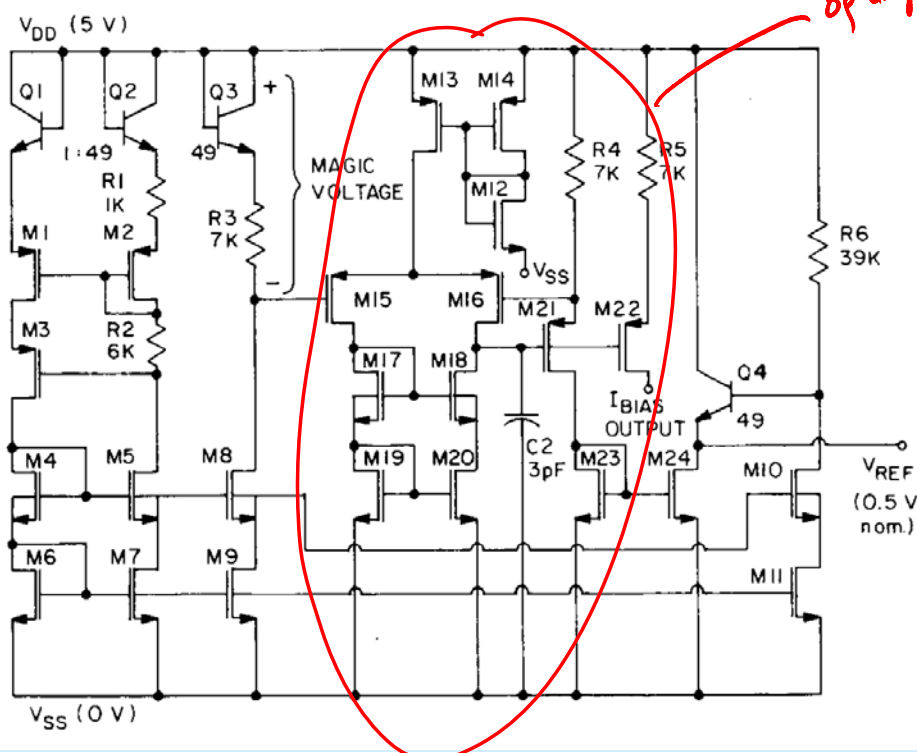
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3

- Below: bandgap reference using a CMOS op amp



- Again, this course will focus mainly on the innards of op amps
- Focus: CMOS, with some BJT coverage so you can work with practical board-level circuits, as well
- The first step towards analyzing and designing op amps is to understand the transistor technologies upon which they are based