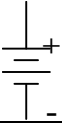
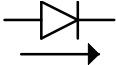
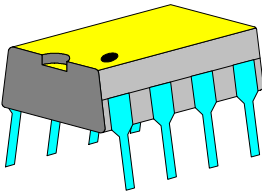
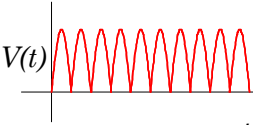
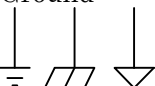


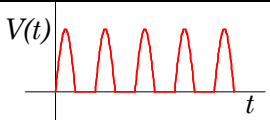
Glossary

50Ω Terminator 	A BNC plug that shorts the inner wire in a coax cable to the outer shield through a 50Ω resistor.
AC	A time varying voltage or current (originally from Alternating Current.)
Active	A circuit containing a control element (i.e. a circuit in which a signal controls some other voltage or current.) Generally needs some external power source.
Alligator Clip 	A clip with alligator shaped jaws.
Back Bias	See Reversed Bias.
Base	The control lead in a bipolar transistor.
Battery 	A fixed voltage source powered by chemical energy.
Bias	A voltage impressed across a component or circuit.
Bipolar Transistor	A transistor with back to back pn junctions.
BJT	Bipolar junction transistor.
Black Box	A box containing some internal circuitry with at least two external leads.
BNC	A standard connector used with coax cables.
BNC Cable 	A coaxial cable with standard BNC connectors on each end. The inner wire is usually connected to carry the signal, and the outer wire is used as a shield.

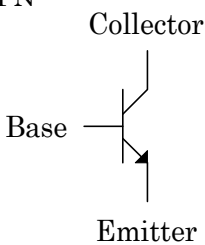
BNC T 	A connector used to "T" together two BNC coax cables and a BNC jack.
Bode Plot	The transfer function vs. frequency plotted on Log-Log axis.
Bottom View	To look at a component, typically a transistor or IC, with the leads extending towards you.
Bus	A wire that supplies a common voltage or signal to several different points in a circuit. Typical examples are the ground and power busses.
Capacitor 	A linear circuit element obeying the relation $Q = CV$
Capacitor, Electrolytic 	A high capacitance, polarized capacitor. Do not plug in backwards.
Carrier Frequency	The base or central frequency transmitted by a radio station. The carrier is modulated to transmit information.
Characteristic	The current voltage (IV) relationship of a nonlinear component.
Closed	A connected path through which current can flow.
Closed-Loop Gain	The gain of an amplifier after feedback is applied.
Coax(ial) Cable	A two lead cable used for transmitting signals and consisting of an inner wire surrounded by a coaxial, conducting cylinder.
Collector	The current between the emitter and collec-

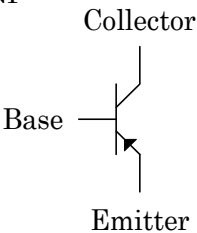
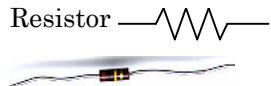
	tor is controlled in a BJT transistor.
Common	The zero potential reference point in a circuit.
Common Mode Voltage	A voltage common to both inputs to a differential amplifier; i.e. a voltage impressed on both inputs.
Crossover Distortion	Distortion that occurs when the output of a push-pull amplifier crosses zero.
Cutoff Frequency	The frequency at the end of the passband.
dB (decibels)	A logarithmic, normalized, voltage scale: $T = 20 \log_{10} V_{\text{out}} / V_{\text{in}} $
DC	A time invariant voltage or current (originally from Direct Current.) Alternately, a steady signal with frequency zero.
Differential Amplifier	An amplifier whose output is proportional to the difference between two input signals.
Diode  Current flow 	A semiconductor device that allows (positive) current to flow only from the anode to the cathode. The cathode is marked by a black band.
DIP 	Dual Inline Pin: a common type of IC package consisting of two sets of inline pins. Common sizes include 6, 8, 14, 16, 20, and 24 total pins.
Discrete Components	Single components packaged individually, as opposed to integrated circuits.
Distortion	Nonlinear waveform deformations in an amplifier's output.
DMM	Digital Multimeter

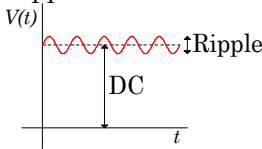
Dopant	An atom that has been doped into a semiconductor.
Dope	Deliberately add a contaminant to a semiconductor to change its properties
Drain	The current between the source and drain is controlled in a JFET transistor.
Emitter	The current between the emitter and collector is controlled in a BJT transistor. The BJT base is normally biased relative to the emitter.
Error Voltage	The difference between V_+ and V_- in an op amp circuit.
Exponential Source 	A Spice voltage source that can produce an exponentially increasing or decreasing signal.
FFT	Fast Fourier Transform: a numerically efficient method of taking a Fourier Transform.
Forward Biased	Biased in the proper direction.
Forward Voltage Drop	The voltage drop across a forward biased pn junction.
Front End	The input of a complex circuit.
Full Wave Rectified 	A rectified sine wave in which the resultant signal is the absolute value of the original signal.
Gate	The control lead in a JFET.
Ground 	A common wired to the earth.
Half Wave Rectified	A rectified sine wave where only one polarity is preserved.

	
Hysteresis	A history dependent effect.
Impedance	A complex resistance used to include phase information. Often a function of frequency.
Impulse	Formally a Dirac-delta signal used to excite a circuit. In practice any sharp blow to a circuit.
Inductor 	A linear circuit element obeying the relation $V = -LdI/dt$
Input Bias Current, I_B	The average of the current sinked or sourced by an op amp's inputs.
Input Offset Current, I_{os}	The difference between the currents sinked or sourced by an op amps inputs.
Input Offset Voltage, V_{os}	The voltage difference between the two inputs of an op amp necessary to make the output zero.
Integrated Circuits, IC	Multiple, interconnected components fabricated on a single piece of silicon and packaged together, as opposed to discrete components.
IV Relation	The relationship between current and voltage of a nonlinear component
Jack	An input plug.
JFET	A junction field effect transistor.
Large Signal	A large, non-perturbative signal. Often drives a circuit or component nonlinear.
Linear Regime	A JFET operating regime in which the output current is pro-

	portional to the voltage across the noncontrol leads.
Load (noun)	A resistor (or other component or circuit) attached to, and drawing current and power from, the output of a circuit.
Load (verb)	The act of attaching a load (noun) to the output of a source or circuit, normally used when the load draws enough current to decrease the source's open-circuit output voltage.
Load Line	A line on an IV plot showing the currents and voltages permitted by the load.
Male/female	In a mating pair of connectors, one (male) connector has some sort of pin that plugs into a hole on the other (female) connector. Hence male power plugs and female wall receptacles.
Matched Pair	A pair of transistors with nearly identical parameters, obtained either by fabricating the transistors on the same piece of silicon, or by carefully selecting discrete transistors.
Minigrabber 	A retracting hook used to probe a circuit. Usually comes in a pair attached to BNC connector. In the BNC pair, the red grabber is the signal lead and the black lead grabber is the ground.
Modulate	To vary the amplitude or frequency of a carrier wave.

N/C	No connection.
Nominal	The spec'd or rated value of a component. The actual value of the component should be within the spec'd tolerance of the nominal value.
NPN 	A bipolar transistor with a common p layer, operated with its collector more positive than its emitter, and controlled by positive voltages on its base.
n—type semiconductor	A semiconductor doped to have an excess number of free electrons.
Open, Open Circuit	A disconnected path through which no current flows.
Operating Point	The equilibrium voltage across a nonlinear circuit element.
Open-Loop Gain	The gain of an amplifier before feedback is applied.
Parasitic Oscillations	Unwanted, high frequency oscillations that often plague circuits, caused by unintentional capacitive coupling between the input and output of amplifiers.
Passband	The unattenuated region in a filter, usually extending to the filter's 3dB attenuation point.
Passive	A circuit or circuit component that contains only elements like resistors, capacitors or inductors. The opposite of active.
peak to peak (p-p)	The difference between the minimum and maximum of an AC signal.

Phase Probe 	Spice phase marker or probe; the phases at this point relative to the circuit voltage source are recorded to be graphed later.
PNP 	A bipolar transistor with a common n layer, operated with its collector more negative than its emitter, and controlled by negative voltages on its base.
Pole	A high pole filter is steeper than a low pole. The number of poles is related to the number of capacitors and inductors in the filter. The name comes from the number of poles in the complex plane.
Potentiometer 	A variable resistor.
p—type semiconductor	A semiconductor doped to have an excess number of holes.
Push pull	A circuit that provides high current, undistorted outputs.
Q	The “quality” of an oscillator.
Reactance	The real part of the impedance.
Rectifier	A diode.
Rectify	Change AC signals into DC.
Resistor 	Perhaps the most common circuit element.
Reverse Bias	A bias impressed with opposite polarity from normal: no current flows in a reversed bias diode, while a reversed biased electrolytic capacitor will be destroyed.
Reverse Leakage	The current leaking

Current	through a pn junction when the junction is reversed biased.
rf	radio frequency commonly used to mean a high (>100kHz) frequency signal
Ring	The decaying oscillations of a resonator.
Ripple 	A small (hopefully) AC signal riding on top of a DC voltage.
RLC meter	Resistance, Inductance and Capacitance meter
RMS	The square root of the time-average of the square of the amplitude of a signal.
Saturation Regime	A JFET operating regime in which the output current is roughly independent of the voltage across the noncontrol leads.
Short, Short Circuit	A sometimes inadvertent zero resistance connection between two points in a circuit.
Sine Wave Source 	A voltage source that produces a sine wave.
Skirt	Transition region.
Slew Rate	The maximum rate that an op amps output can change (or slew), expressed in V/ms .
Small signal	A small, perturbative signal often superimposed on a large signal
Source	The current between the source and drain is controlled in a JFET transistor. The JFET gate is normally biased relative to the source.
Source Follower	A common current-amplifier configura-

	tion.
Spec	A parameter or specification listed on a component data sheet.
Stiff	A voltage or current source whose output is relatively independent of its load. Thus a stiff voltage source can tolerate a low impedance load without significantly changing its output voltage, and a stiff current source can tolerate a very large impedance load without significantly decreasing its current.
Stopband	The attenuated region in a filter.
Tank circuit	A parallel LC resonant circuit.
Top View	To look at a component, typically a transistor or IC, with the leads extending away from you.
Toroid 	A doughnut shaped ferrite piece. The one drawn to the left is wired as a 5:1 transformer.
Transconductance	The proportionality between a transistor's input voltage and output current.
Transfer function	The ratio of the output to the input voltage of a circuit, is usually expressed in terms of decibels:
Transient Response	The response of a circuit to an impulse excitation.
Transition region	The region between the passband and the stopband in a filter.
Trim	Adjust some circuit parameter, typically a resistor, to optimize a circuit's output. Hence trim pot for trimming potentiometer.

	ter.
Tweak	To optimize some aspect of a circuit performance by making small adjustments to some circuit parameter.
Variable Resistor 	A resistor whose resistance can be varied.
Vernier control, adjustment, knob, etc.	A “fine” scale adjustment.
Virtual Ground	A point held at ground by the action of feedback in an op amp circuit.
Voltage Probe 	Spice voltage marker or probe; voltages at this point are recorded to be graphed later.
White Noise	Noise that is evenly distributed over all frequencies. Examples of white noise include the steady drone from a distant highway or waterfall.