The Radio Transmitter

There are **5** main components of a transmitter:

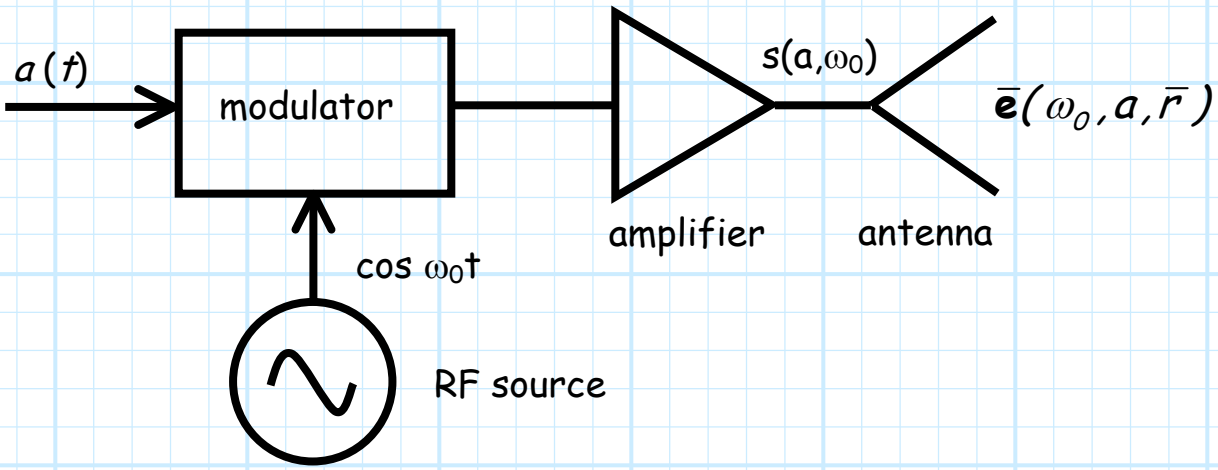
1) The signal *a(t)*

2) The radio frequency (RF) source

3) The modulator

4) The amplifier

5) The antenna



The Radio Transmitter System

Let's examine each component:

1) **The signal *a(t)*** – This is the information we are trying to transmit. It may be in either digital or analog form. It also may have been encoded to remove redundancy, in a process known as source coding.

2) **RF source** – Generates electromagnetic energy at RF/microwave frequencies that are suitable for electromagnetic propagation (subject to FCC restrictions !).

3) **Modulator** – Places signal *a(t)* (i.e., the information) onto the RF signal, known as the carrier. Accomplished by modulating some parameter of the carrier signal – e.g., magnitude, phase, frequency, or some combination thereof. In general, this process is called channel coding. Its goal is to maximize the rate at which information is sent, while minimizing the effect of unknown channel parameters.

4) **Power Amplifier** – Increases the power (i.e., energy flow) of the modulated carrier signal, without (hopefully) distorting it.

5) **Antenna** – Acts as the coupling mechanism between the bounded e.m. wave of a transmission line and the unbounded propagating wave in space. Often, an antenna is required to launch the unbounded wave in a specific direction.