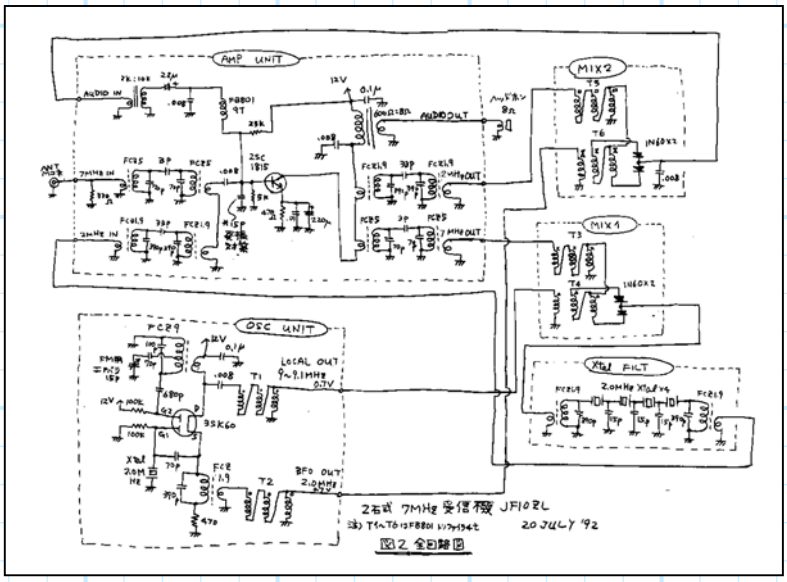
The Radio Receiver

There are 8 basic components in a **radio receiver**:

1) Antenna
2) Low-noise Amplifier (LNA)
3) Preselection Filter
4) Local Oscillator/Mixer
5) Intermediate Frequency (IF) Amplifier
6) IF Filter
7) Detector/Demodulator
8) The recovered signal $\hat{a}(t)$



← A **receiver** design schematic I found on the web.

Note the amplifier (amp), oscillator (osc), mixer (mix), and filter (filt) sections.

Let's examine each component:

1) **Antenna** – **Couples** the incoming e.m. propagating wave into the receiver.

2) **Low-Noise Amplifier** – **Boosts** the power of the initial signal above the receiver noise.

3) **Preselector Filter** – Allows **only** the frequency band of interest to pass into the receiver (e.g., for FM radio 88-108 MHz).

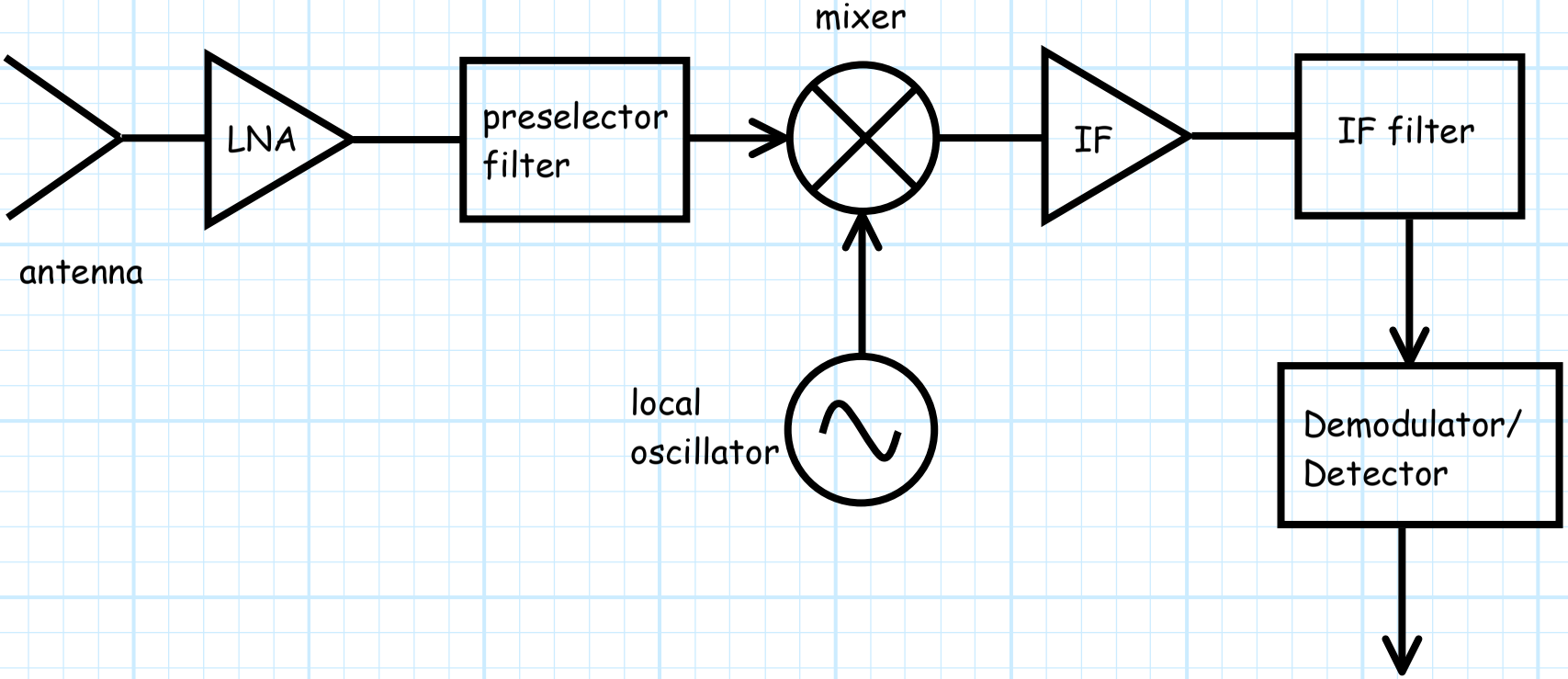
4) **Local Oscillator/Mixer** – **Translates** the signal from its propagation frequency to a lower, fixed intermediate frequency (IF).

5) **IF Amplifier** – A high-gain amplifier that greatly **increases** signal power (i.e., to a detectable level).

6) **IF Filter** - Allows **only** the signal of interest to pass. Bandwidth is typically that of the desired signal. (e.g., 200 kHz for FM radio, 20 kHz for AM radio).

7) **Detector/Demodulator** – **Extracts** the signal information (or, at least tries to !) from the IF signal.

8) **The Recovered Signal** $\hat{a}(t)$ - The receiver's "**guess**" at what the original signal was. Ideally, $\hat{a}(t) = a(t)$, but channel propagation "uncertainties" and noise make **perfect** reproduction impossible !



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A "Super Heterodyne"