[Communications Lab. (Fall 2017)]

AM - Demodulation

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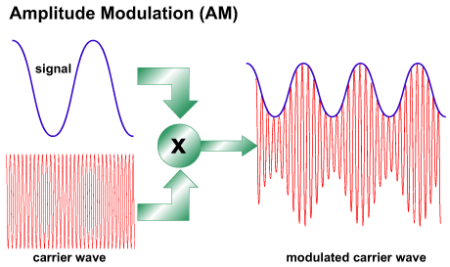
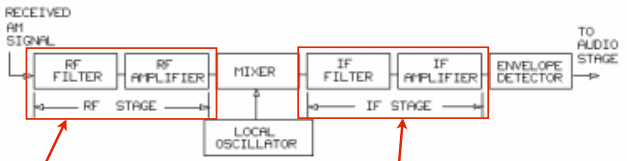
Recall: AM

- Amplitude of carrier signal is varied in accordance to instantaneous amplitude of modulating signal



AM Receiver



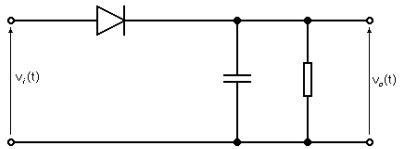
Radio Frequency

IF: Intermediate Frequency
- better amplification
- better selectivity

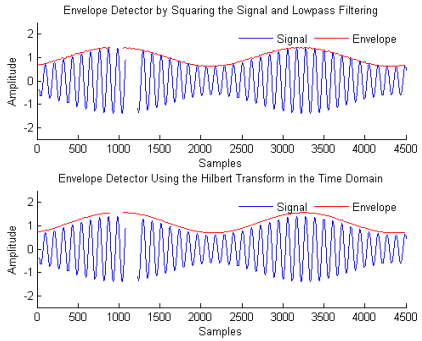
IF Filter: Passband filter with 20KHz BW

Envelope Detector

- Circuit
  - Input: high-frequency signal
  - Output: "envelope" of the original signal.
- Capacitor
  - stores up charge on the rising edge
  - releases it slowly through the resistor when the signal falls.

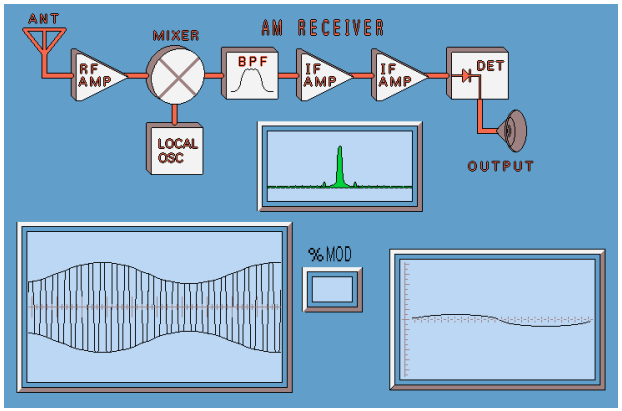


MATLAB Example

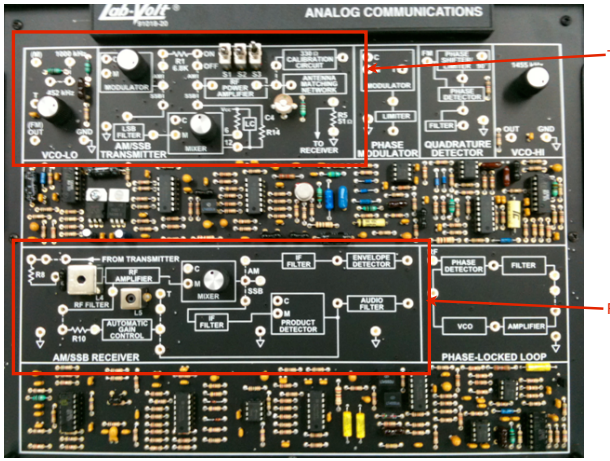


Try these examples by yourself!

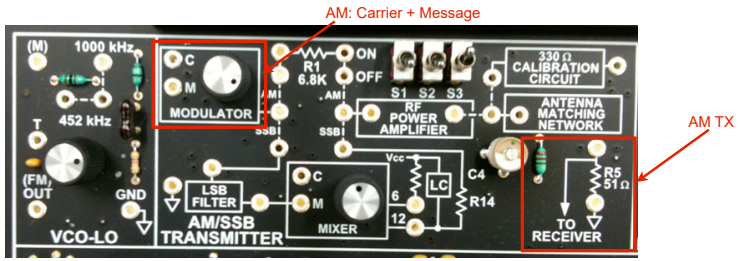
Animation



Your experiments...

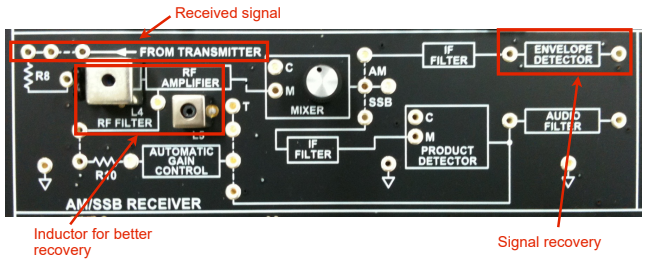


AM Transmitter



- You may play by changing
  - carrier frequency, modulation index, AM/SSB modes, etc.

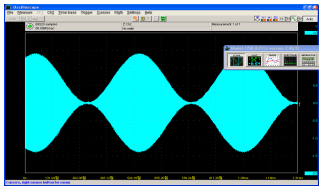
AM Receiver



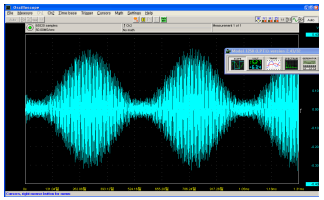
- Notes:
  - Inductors are very FRAGILE: Please be VERY careful to handle them
  - Sometimes, IF filter and envelope detector do not work well. In this case, try to see the very front input signal to these blocks – these are enough for your report (i.e, bypassing blocks that are not working)

Illustrative results

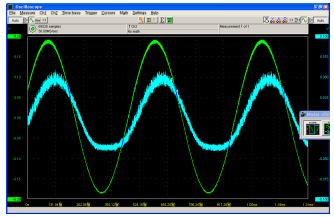
- Demodulated Signals



Received Signal



After RF



Recovered (Demodulated) signal