



7. RADIO MEASUREMENTS AND PERFORMANCE

Chapter 7.3 Interference and Noise

ARRL Amateur Extra Class





Section 7.3

Intermodulation

Linear vs Nonlinear circuits

Linear

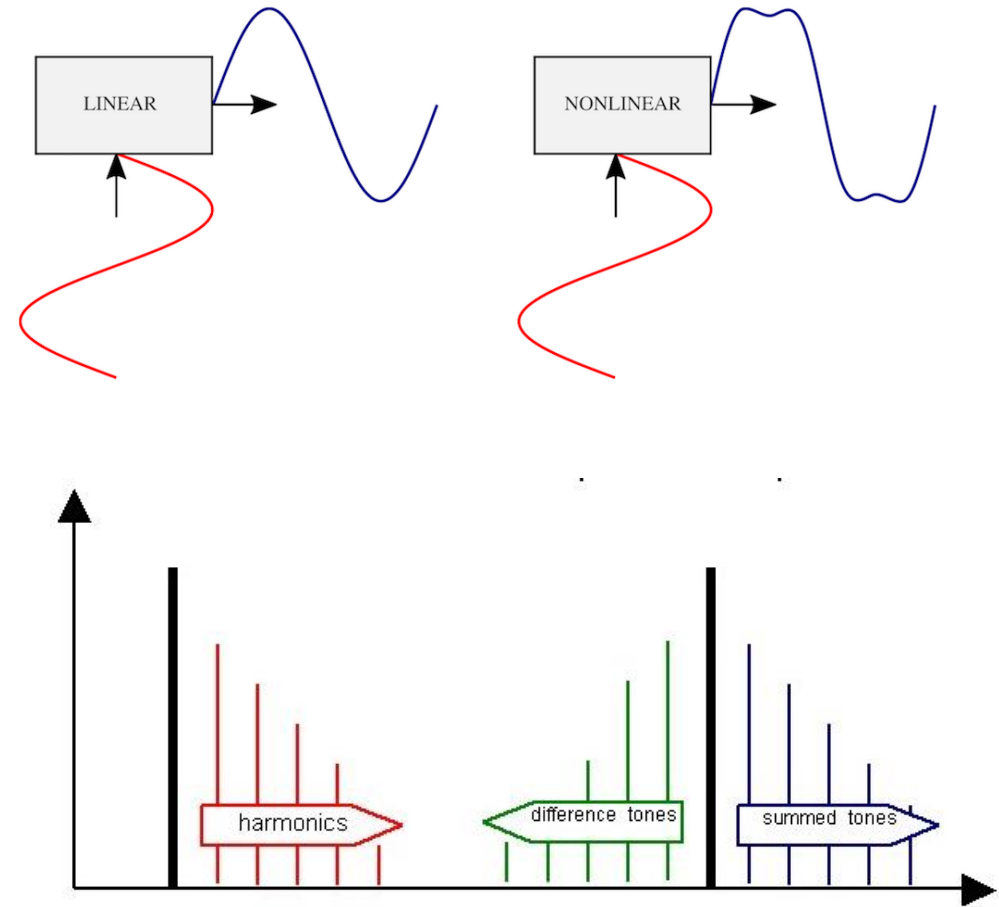
Does not change the **shape** of the signal

Nonlinear

Creates new frequency components

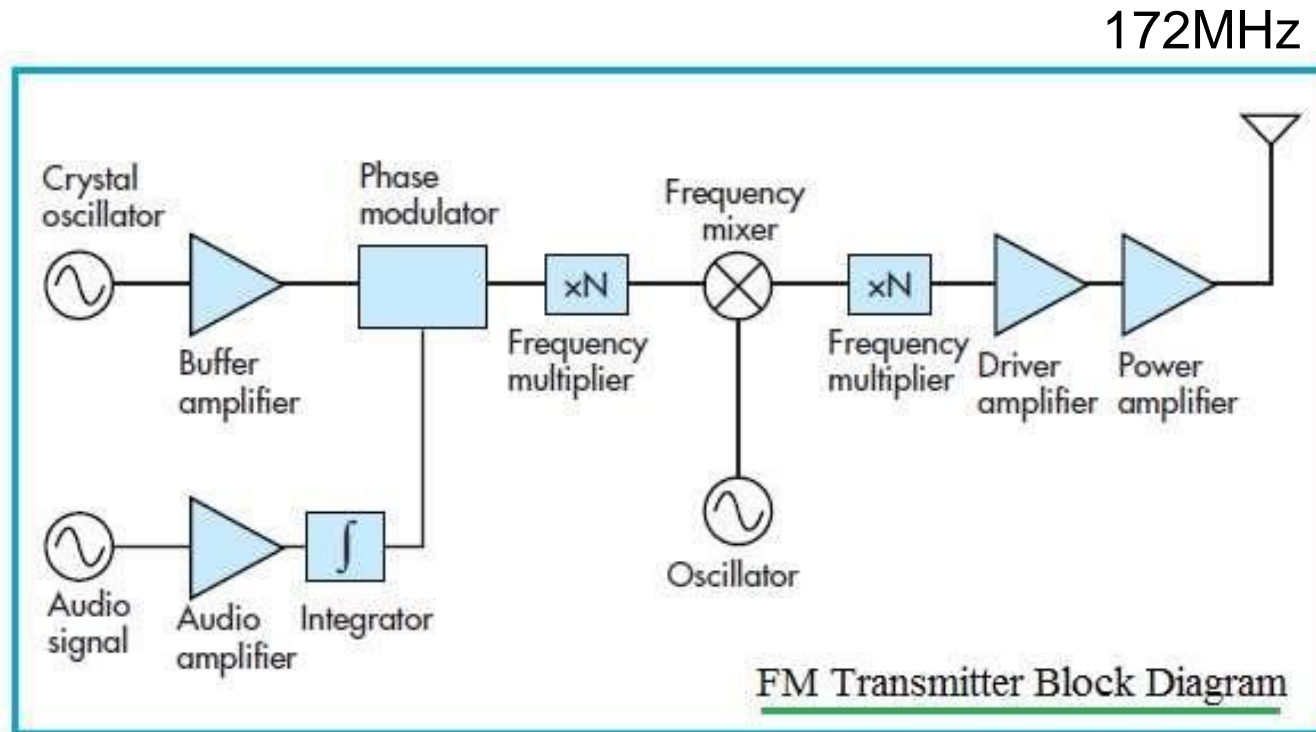
Mixing of signals in nonlinear circuits

Produce sum and difference





Intermodulation in a transmitter



$$172 - 27 = 145 \text{ MHz}$$



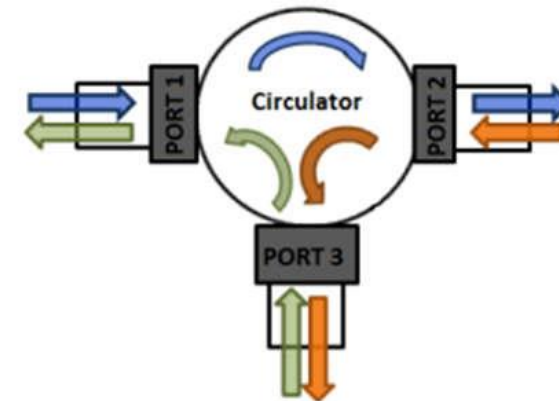
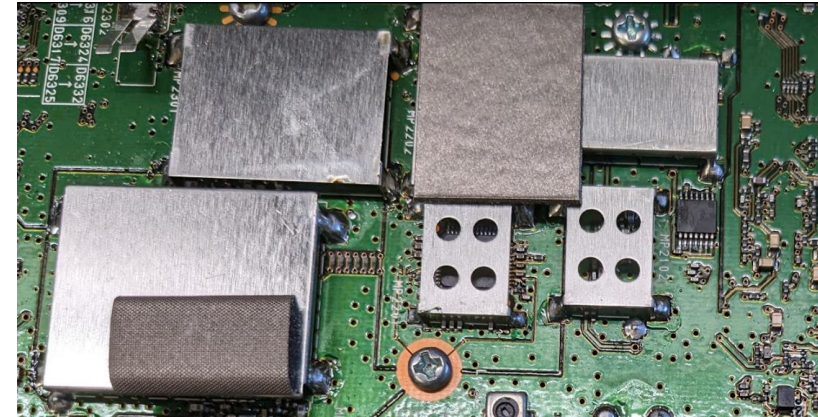
Avoiding Intermodulation

Shielding

Separating

Circulators

Isolators



Interference sources

Lightning

Electric motors / alternators

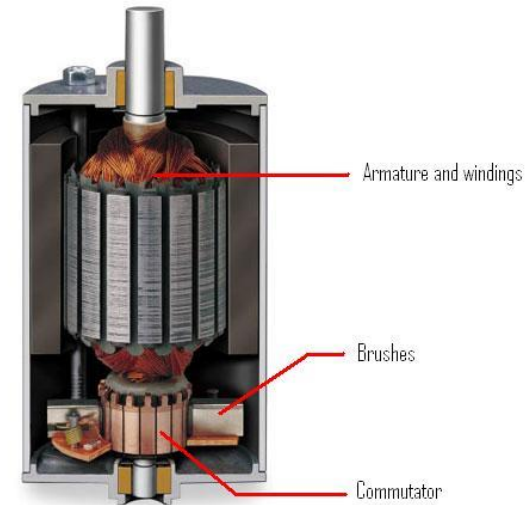
Spark plugs

Welding

Switching power supplies

Dimmers

..pretty much anything electric/electronic!





Noise paths & filtering

Radiated

Conducted

- Differential
- Common mode

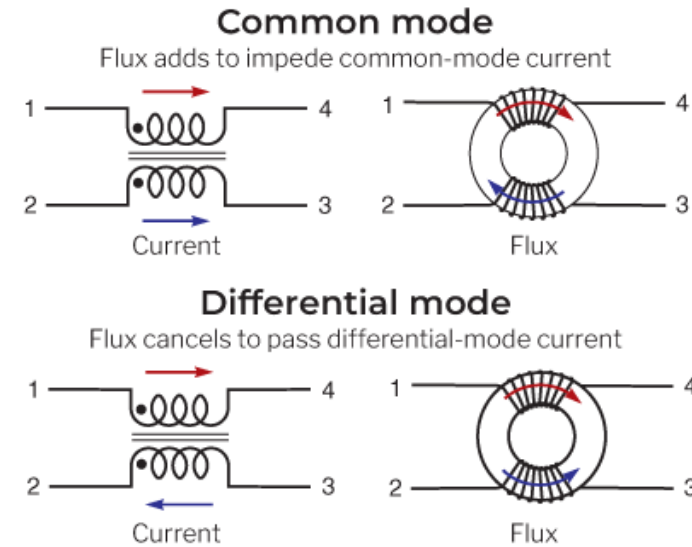
Shielding / distance

Good grounding

Filter capacitors (low pass filter)

Toroids (common mode)

Filters





Noise reduction in receivers

NB: Noise Blanker

- Cuts out sharp/strong signals
- Overloaded front end may cause issues

NR: Noise Reduction

- Helps the ear to separate noise from signal
- May be active/adaptive - DSP
- AI powered : RM Noise

Notch filter

- Cuts out a frequency
- Avoid with CW





QUESTIONS?

ONLINE EXAM REVIEW AND PRACTICE QUESTIONS:

<http://www.arrl.org/examreview>