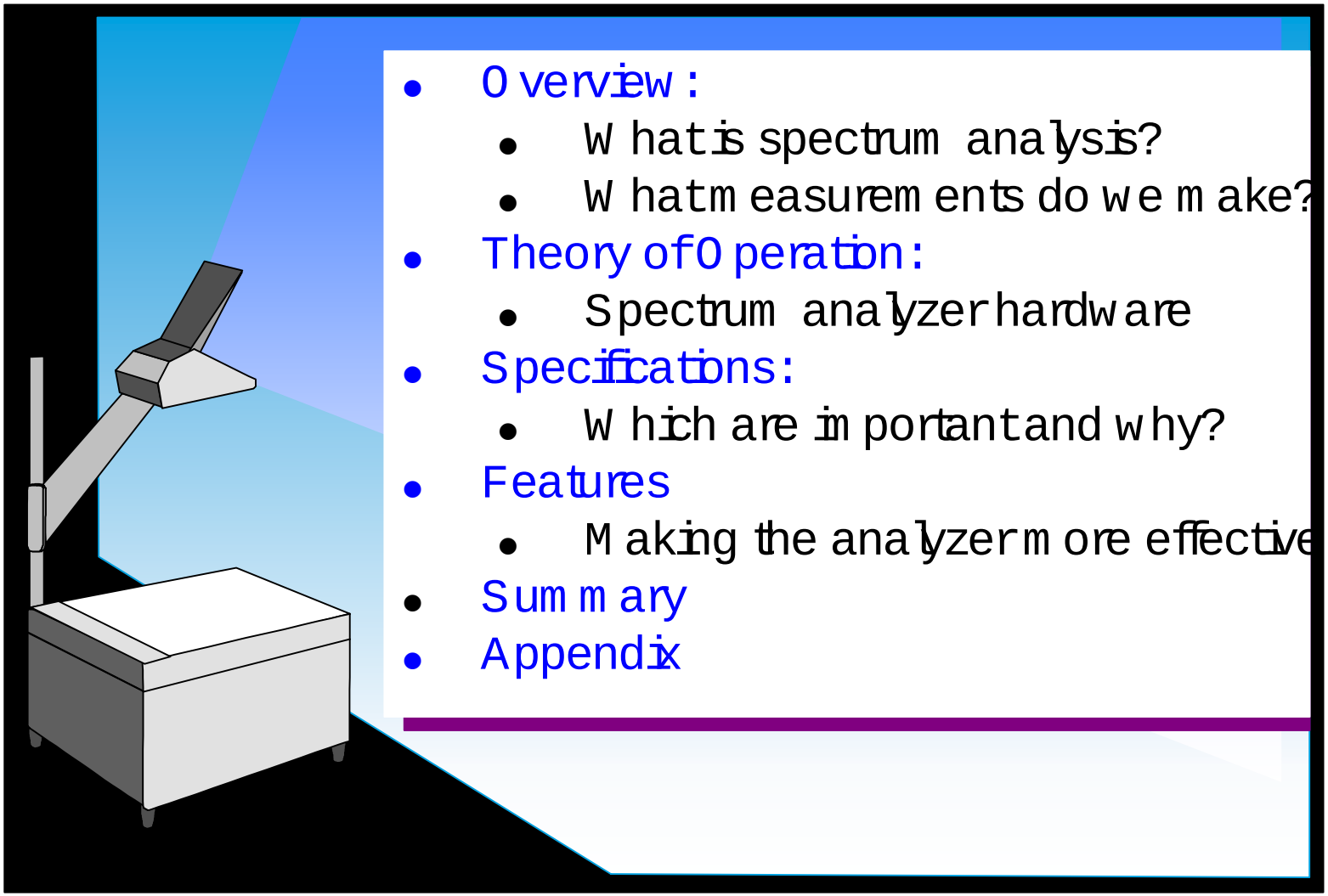
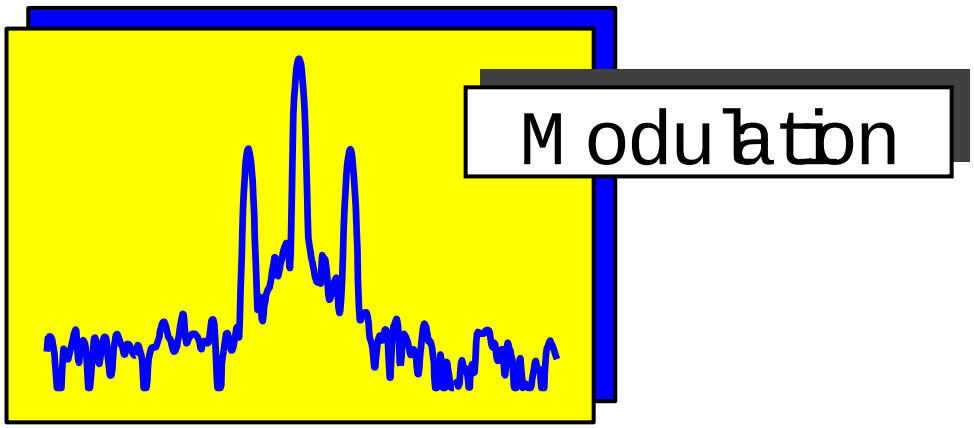
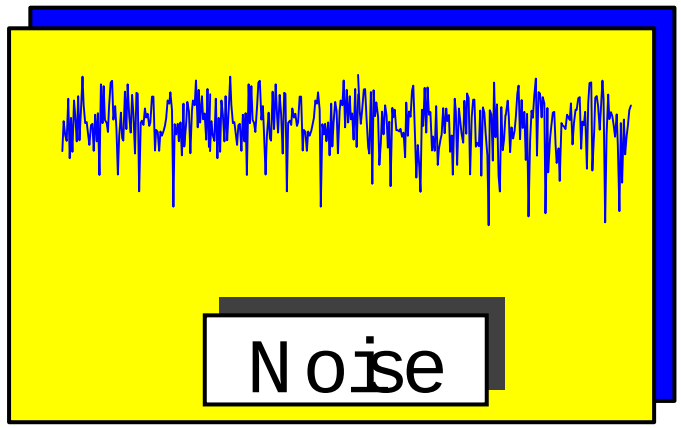
Agenda

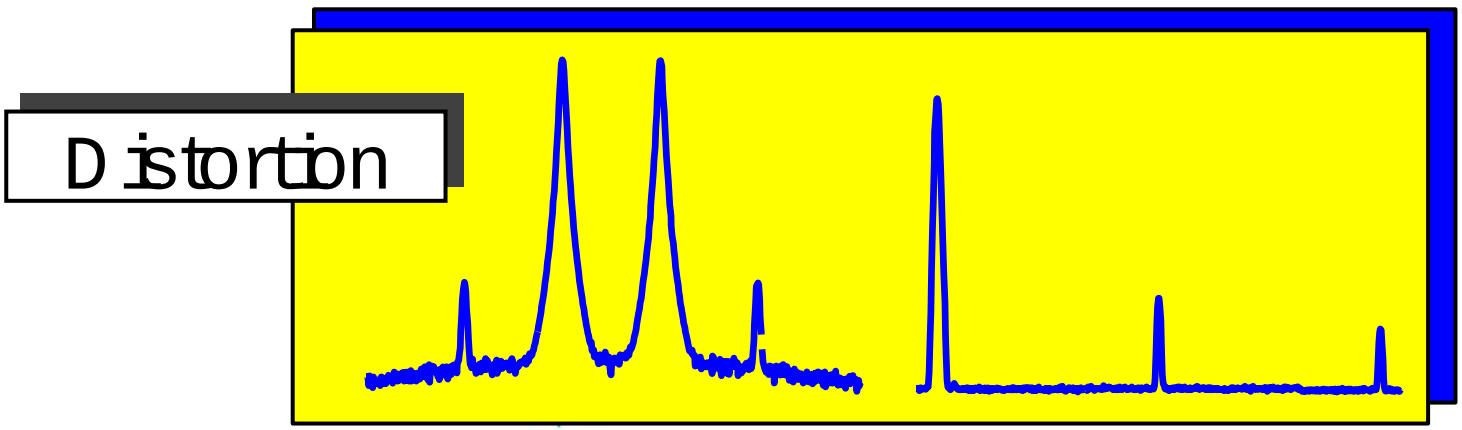


Overview

Types of Tests Made

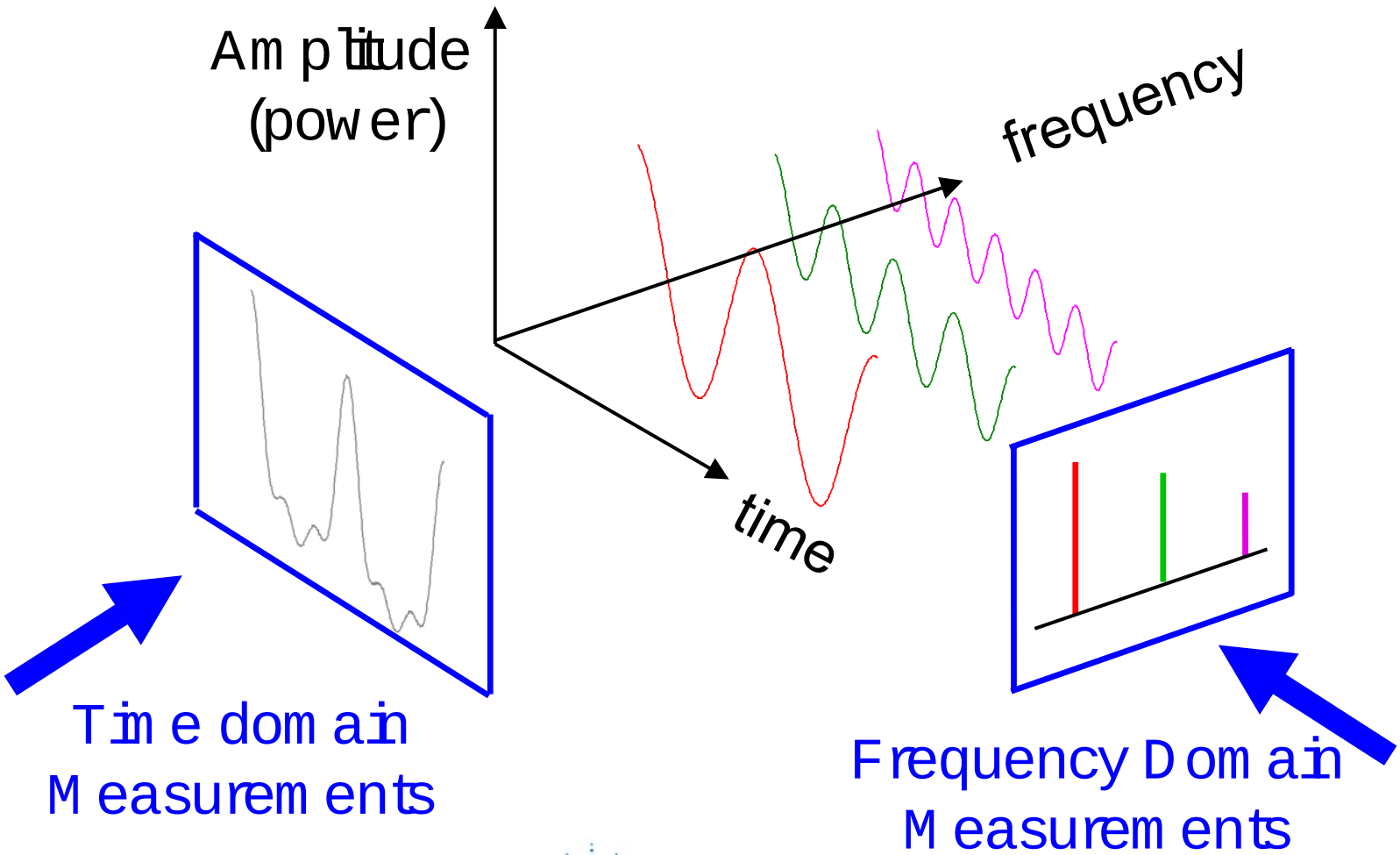






Overview

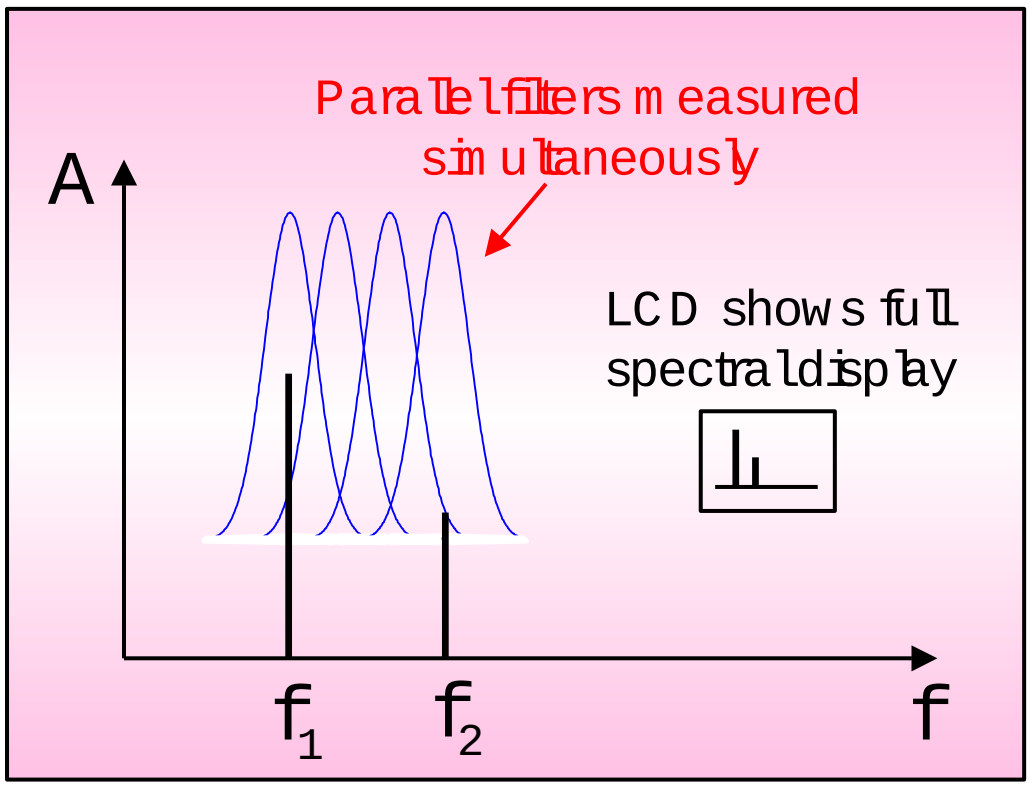
Frequency versus Time Domain



Overview

Different Types of Analyzers

Fourier Analyzer



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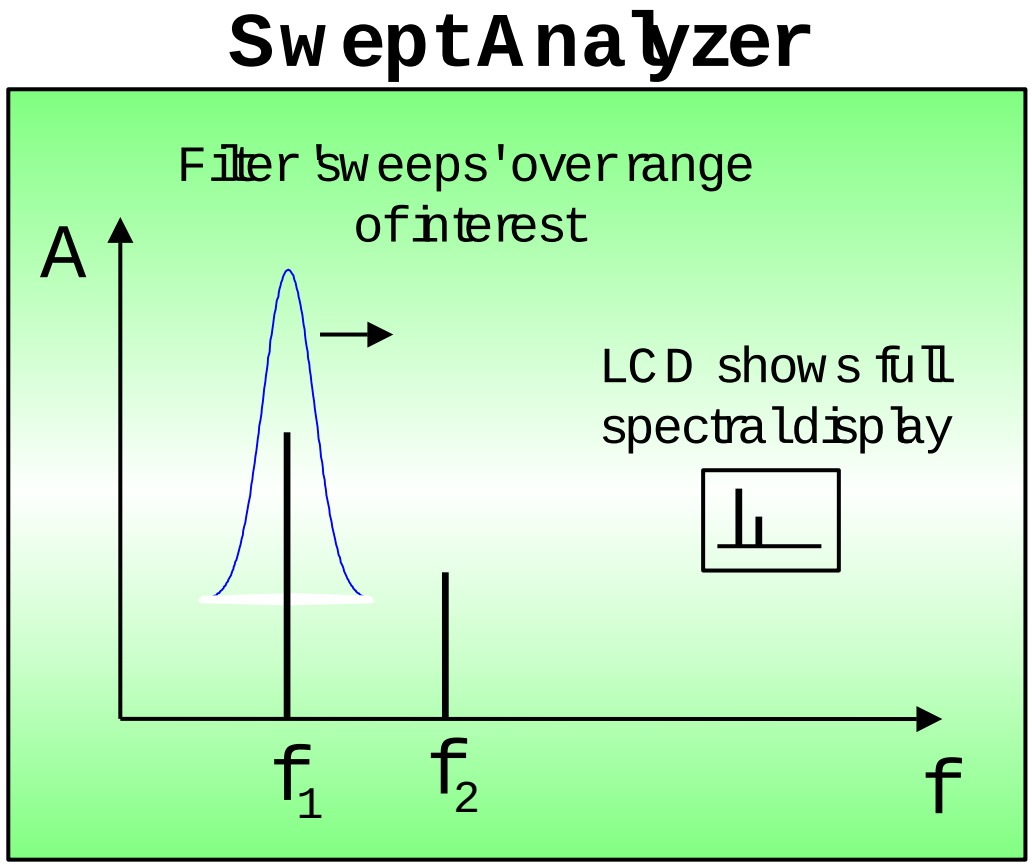
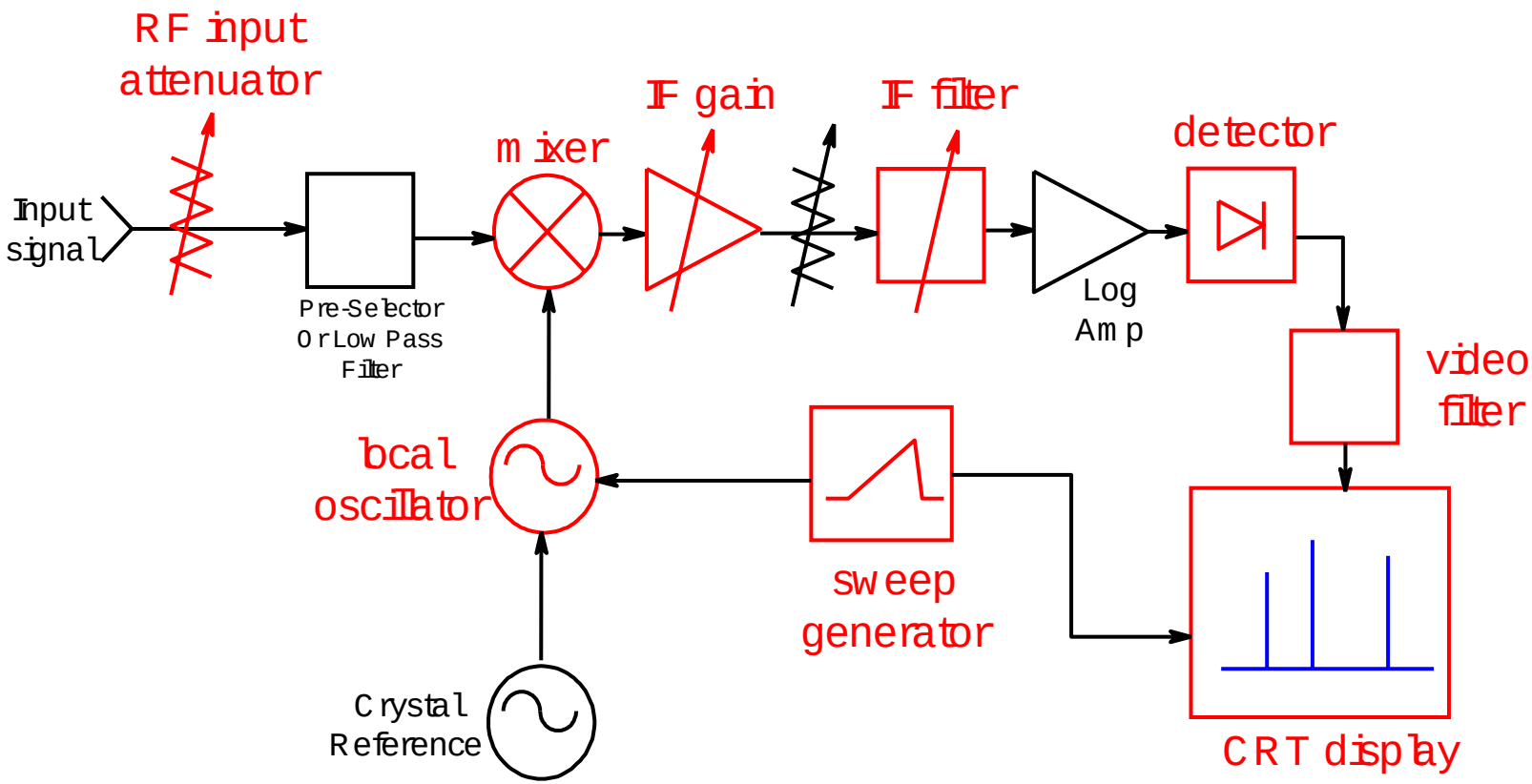
Overview

Different Types of Analyzers



Theory of Operation

Spectrum Analyzer Block Diagram



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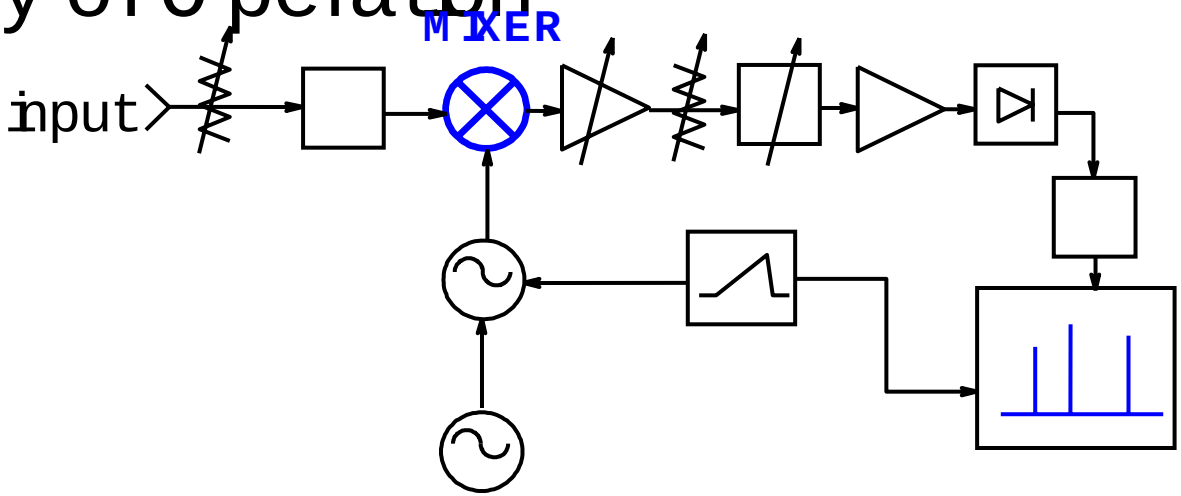
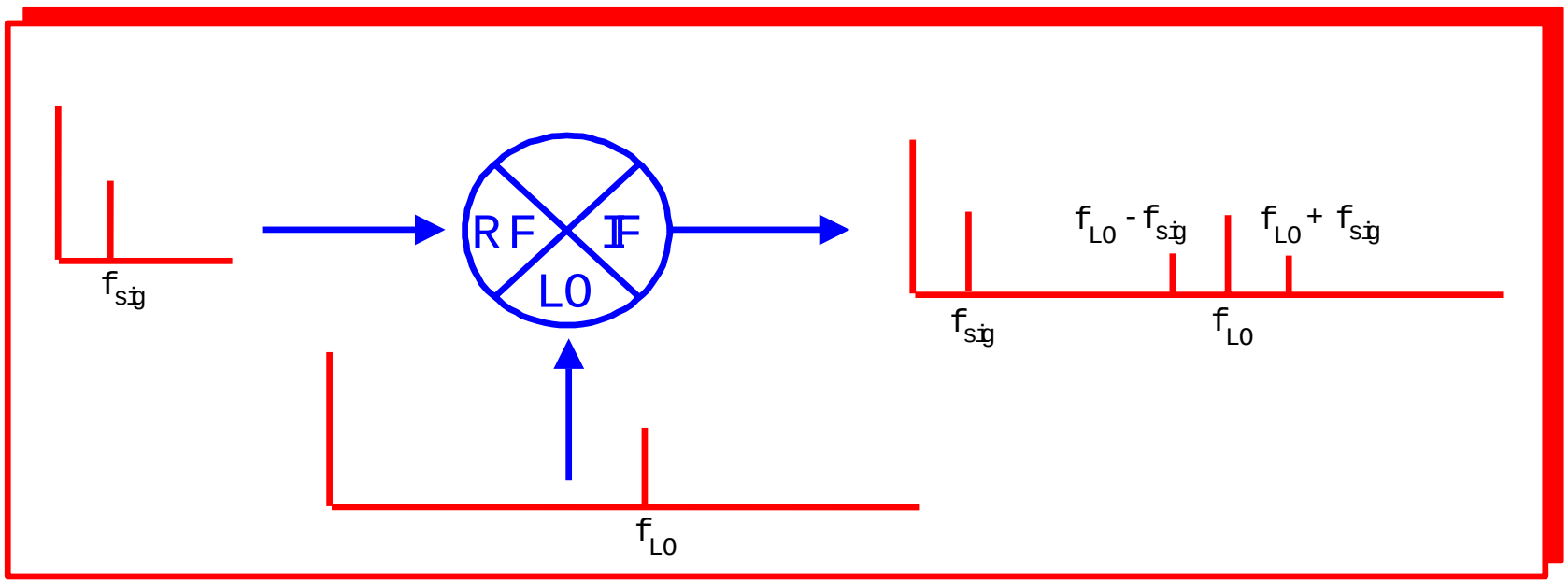
Theory of Operation

Mixer





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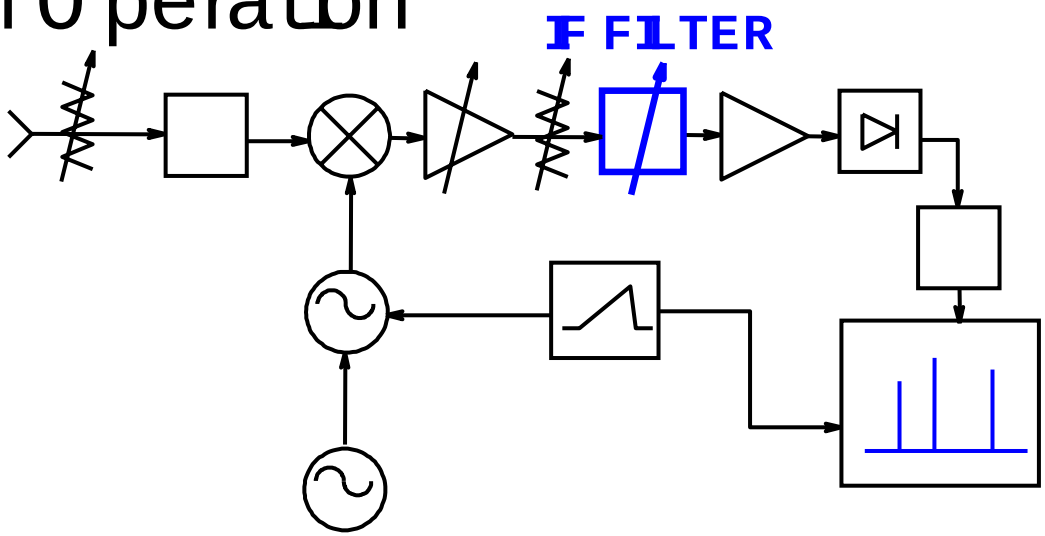
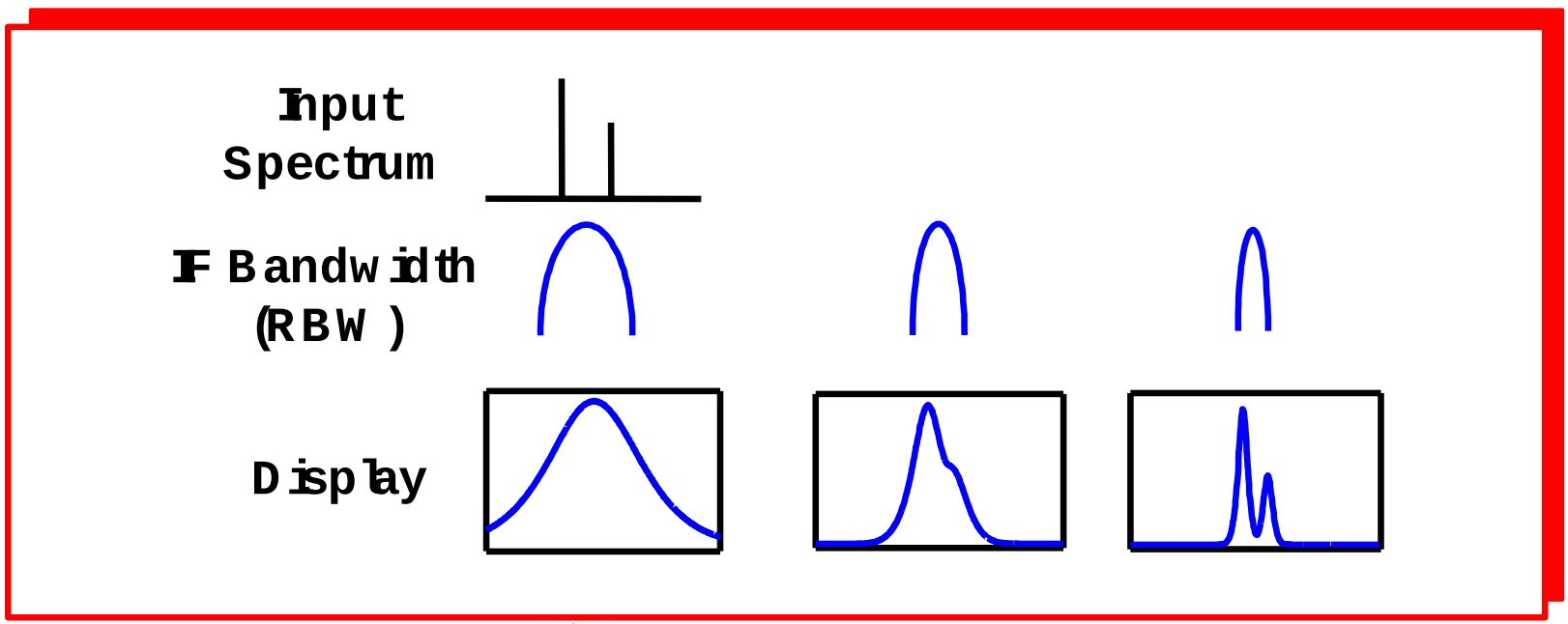
Theory of Operation

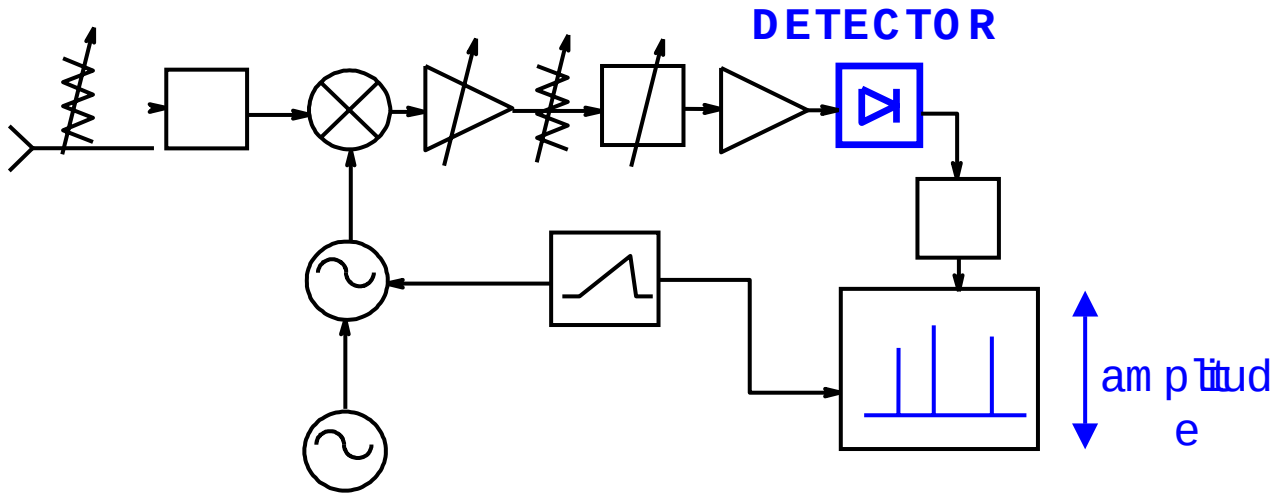
IF Filter

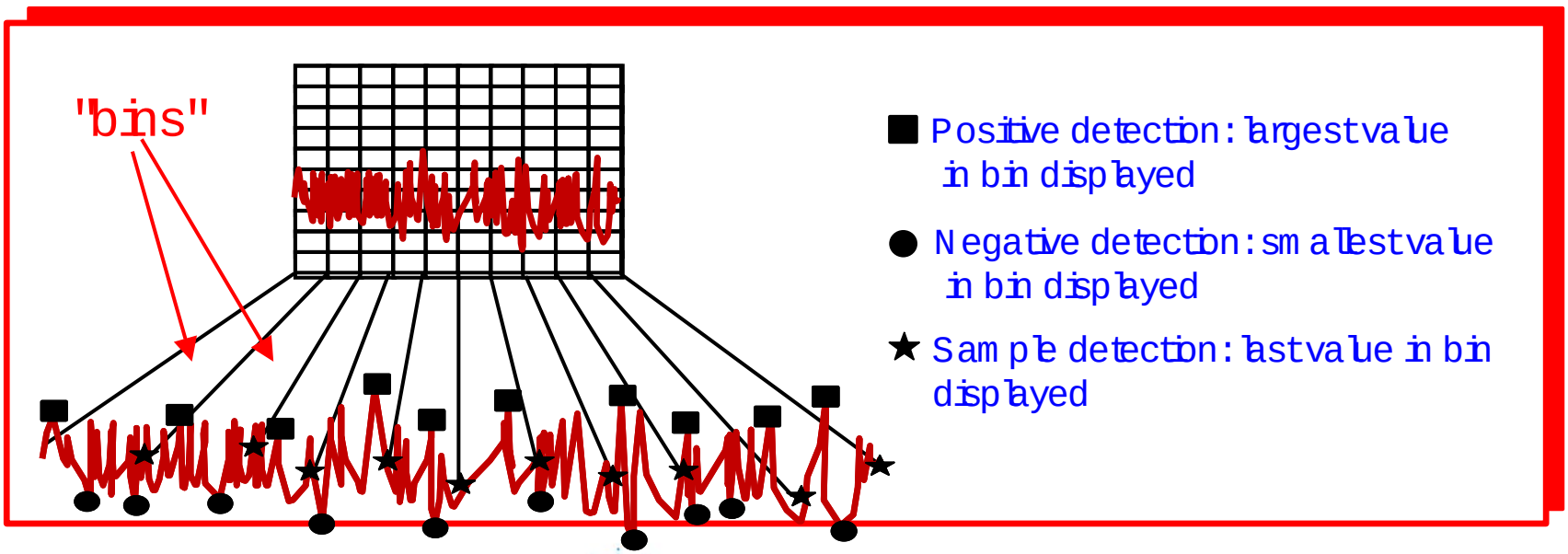




Theory of Operation

Detector





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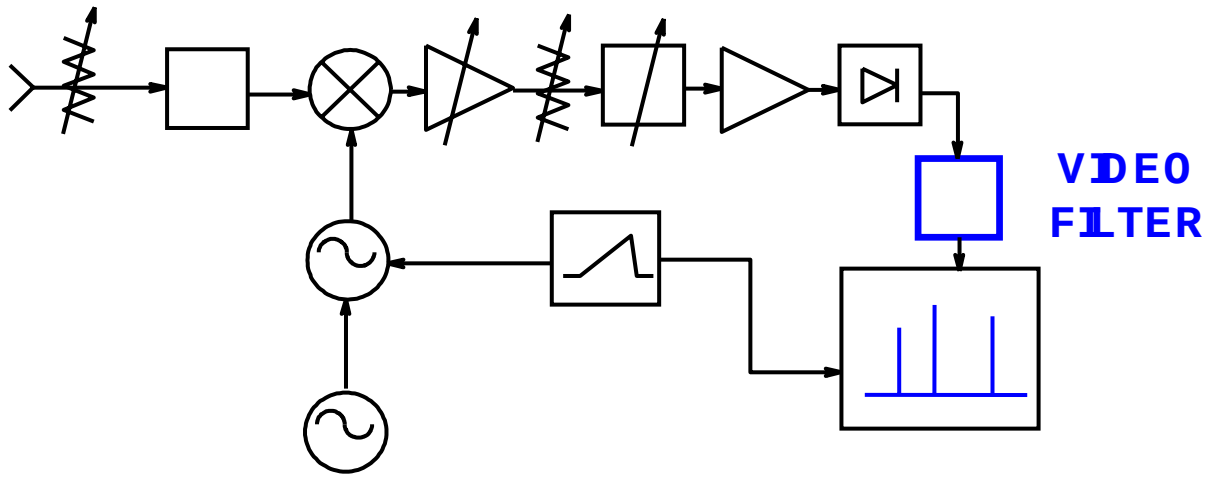
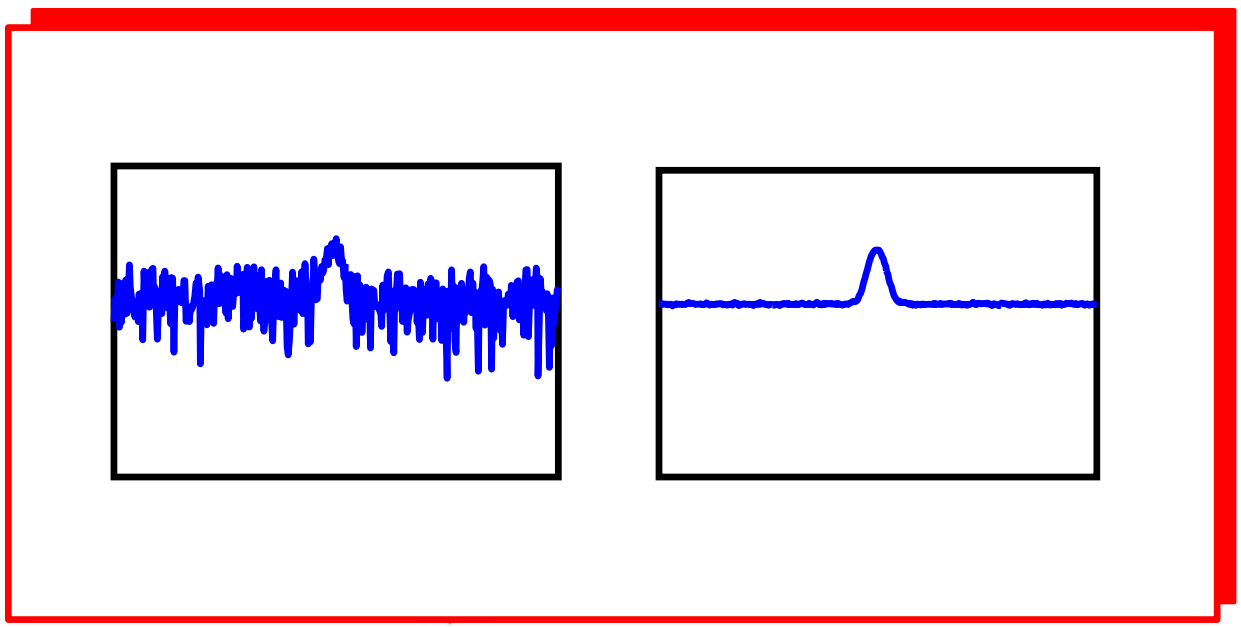
Theory of Operation

Video Filter





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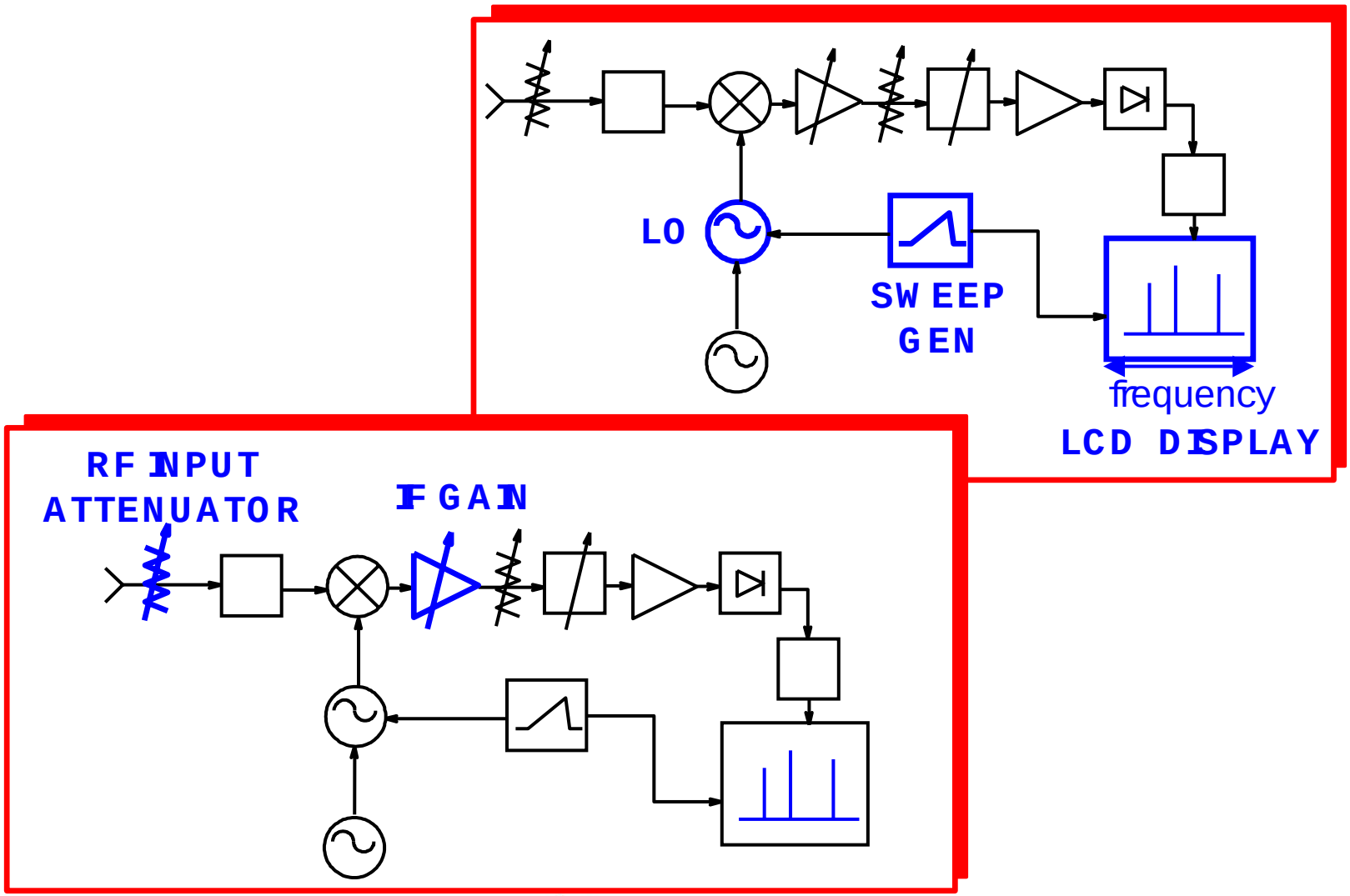
Theory of Operation

Other Components



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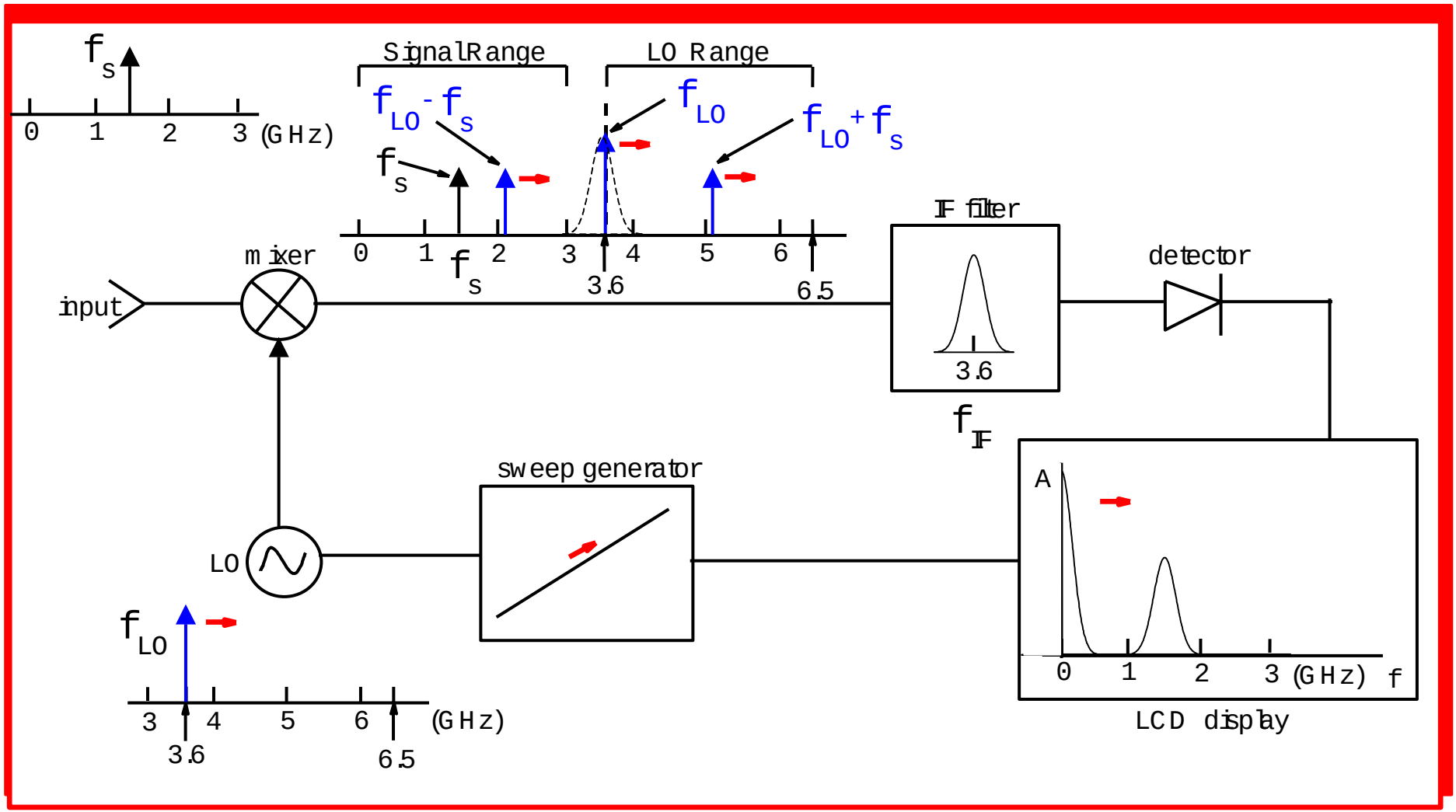
Theory of Operation

How it all works together



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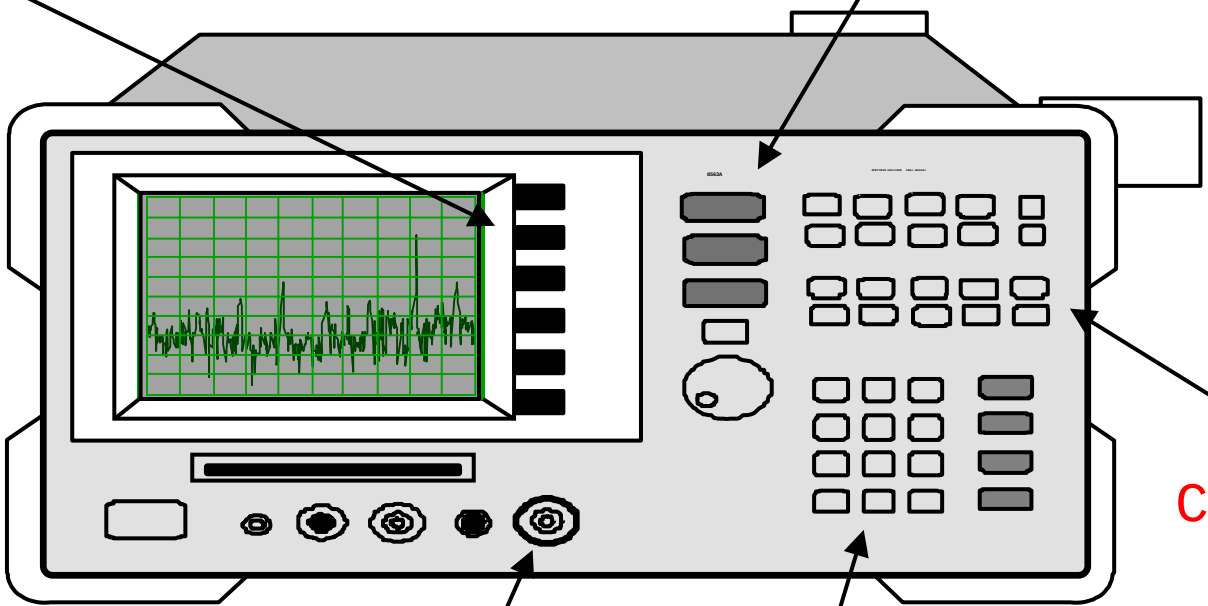
Theory of Operation

Front Panel Operation



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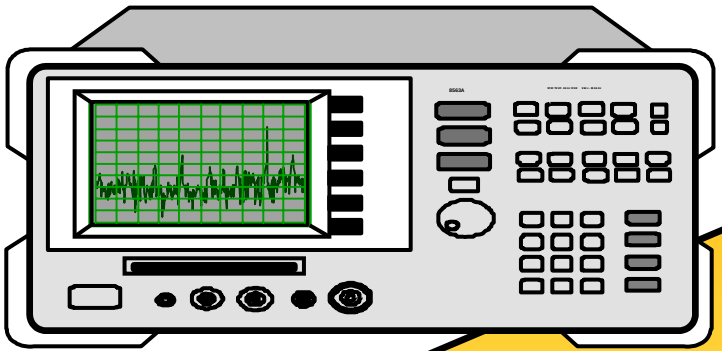
Specifications



- Frequency Range
- Accuracy: Frequency & Amplitude
- Resolution
- Sensitivity
- Distortion
- Dynamic Range

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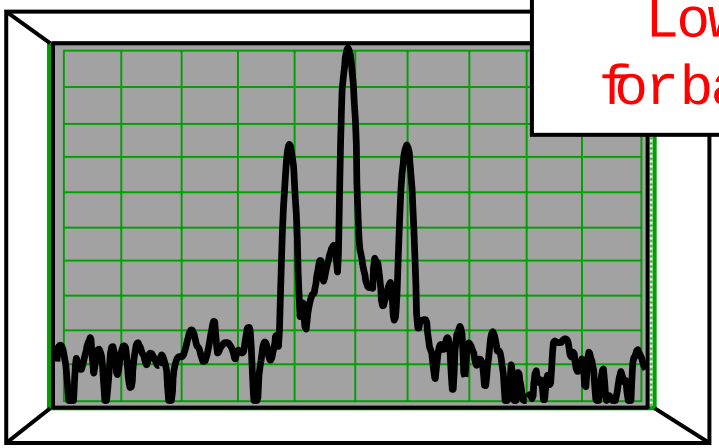
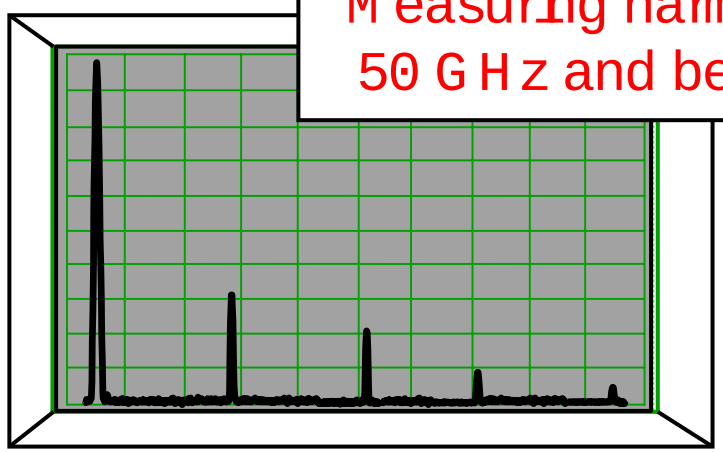
Specifications

Frequency Range



Low frequencies
for baseband and IF



Measuring harmonics
50 GHz and beyond!

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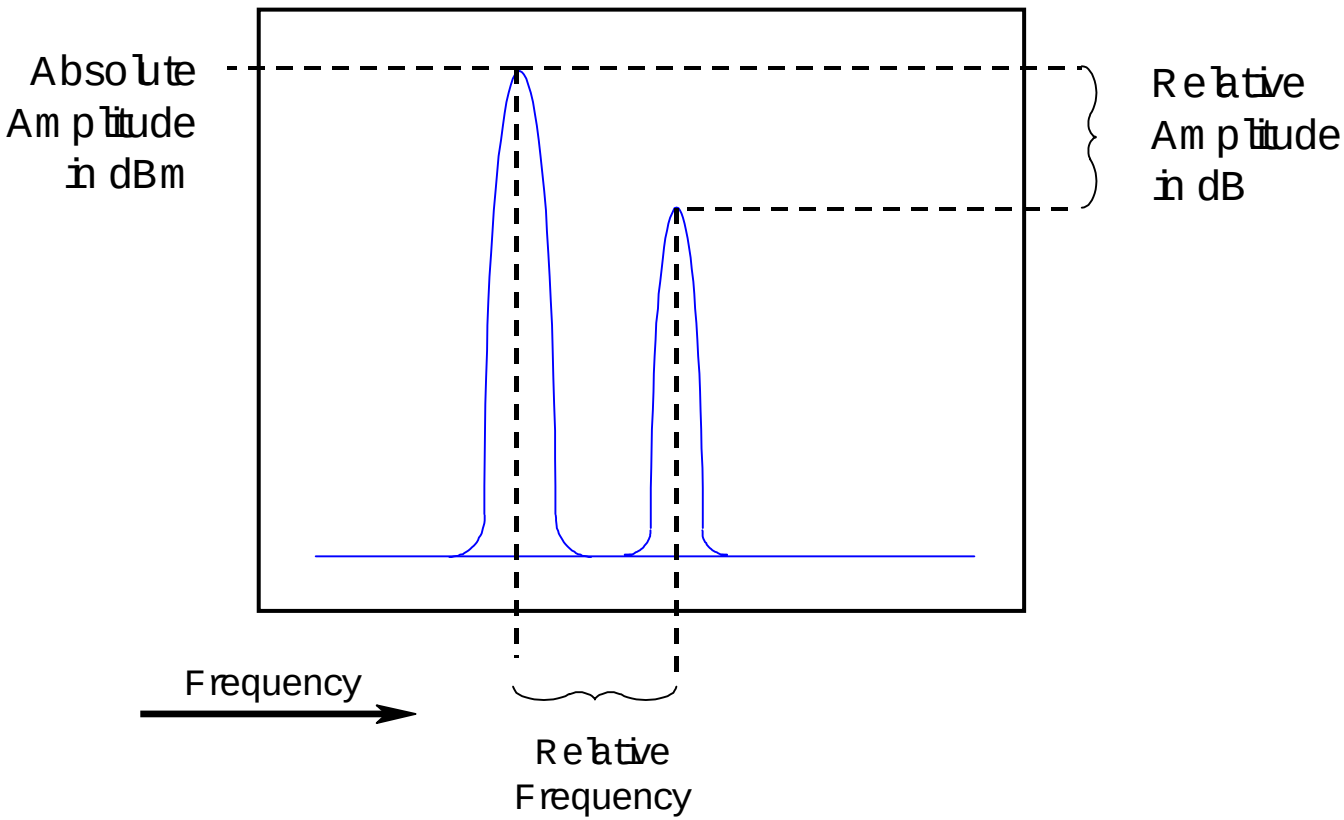
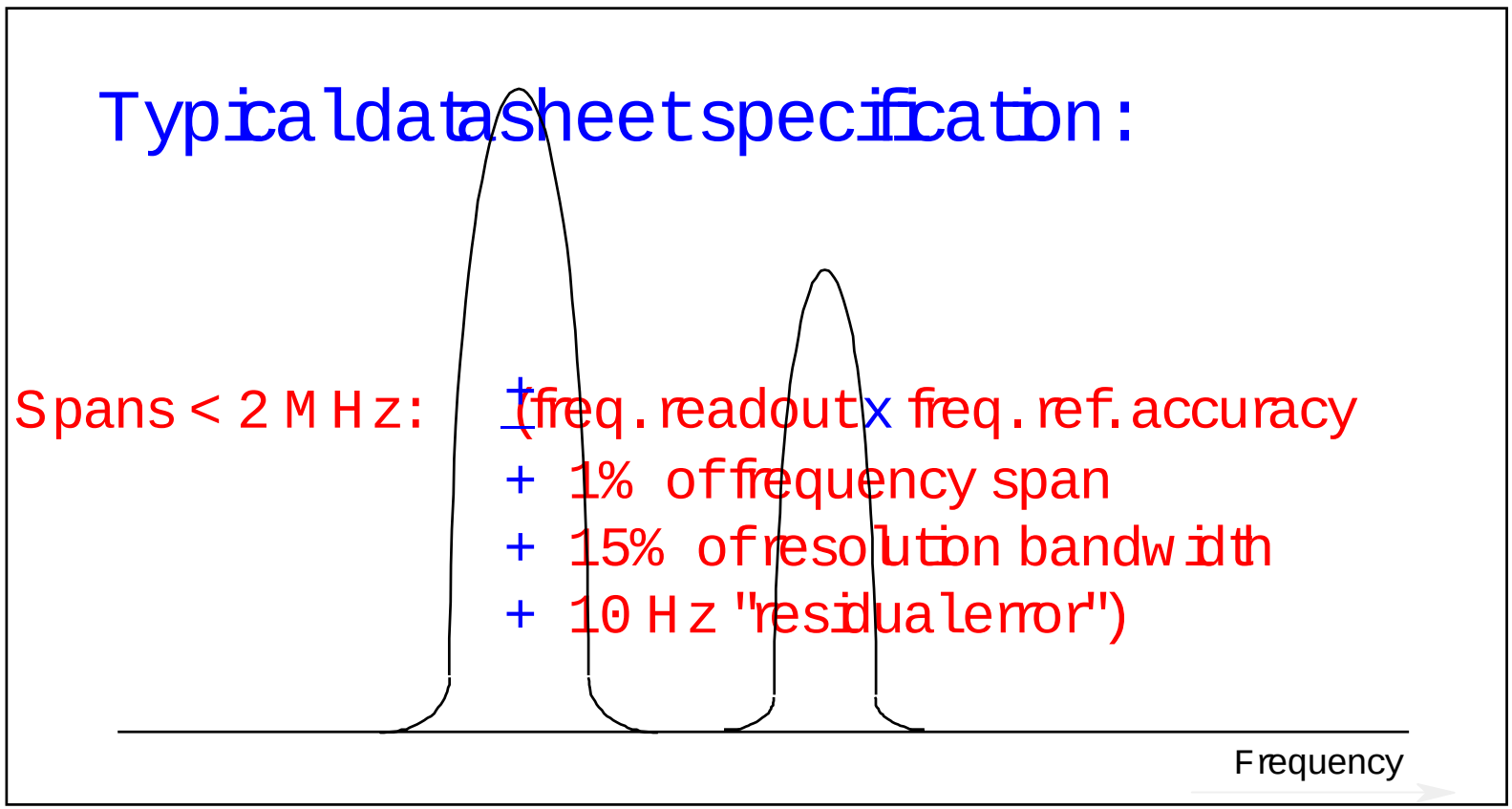
Specifications

Accuracy



Specifications

Accuracy: Frequency Readout Accuracy



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Specifications

Accuracy: Frequency Readout Accuracy Example

Single Marker Example:

2 GHz
400 kHz span
3 kHz RBW

Calculation: $(2 \times 10^{9}\ \text{Hz}) \times (1.3 \times 10^{-7}\ /\text{yr. ref. error}) = 260\ \text{Hz}$

1% of 400 kHz span = 4000 Hz

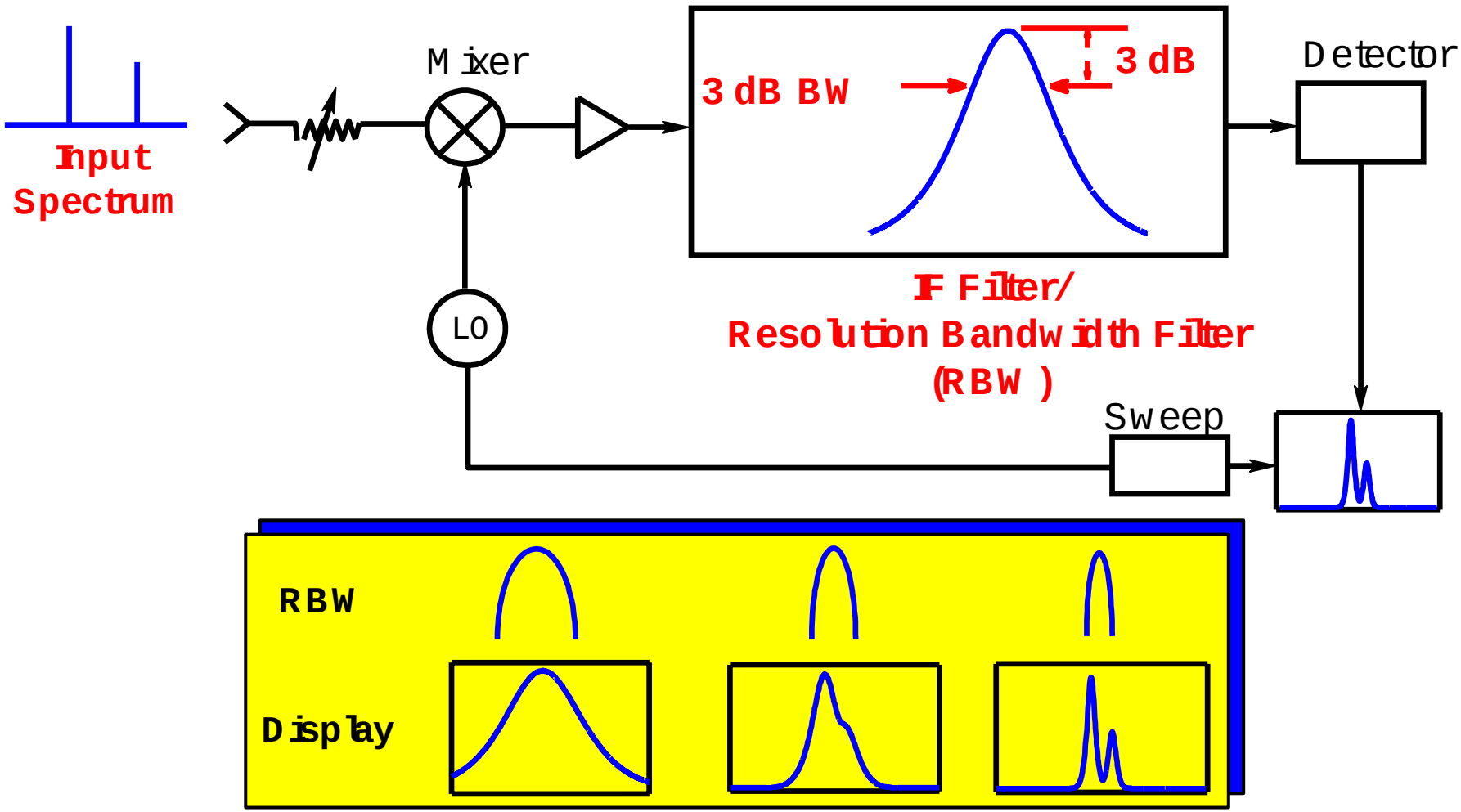
15% of 3 kHz RBW = 450 Hz

10 Hz residual error = 10 Hz

Total = ± 4720 Hz

Specifications

Resolution: Resolution Bandwidth



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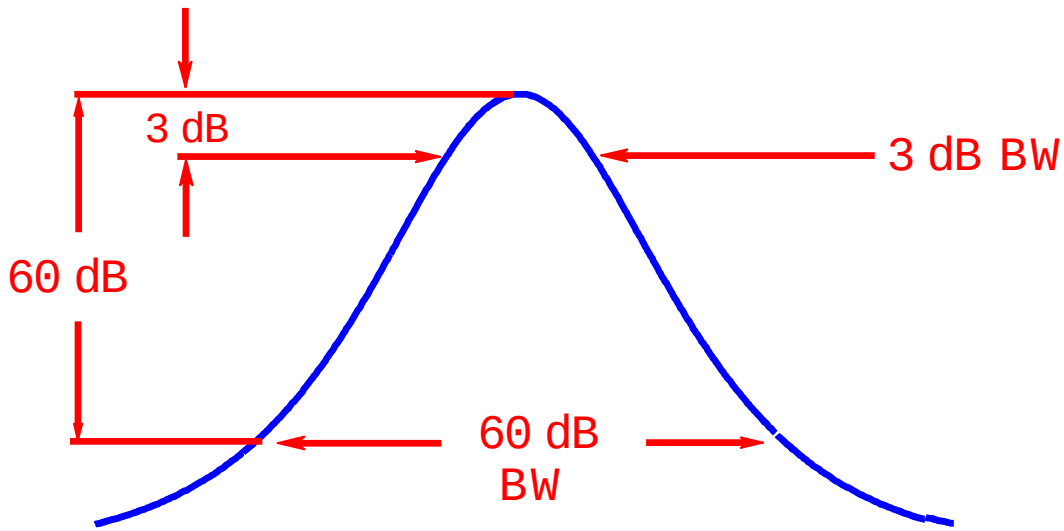
Specifications

Resolution: RBW Type and Selectivity



$$\text{Selectivity} = \frac{\text{60 dB BW}}{\text{3 dB BW}}$$

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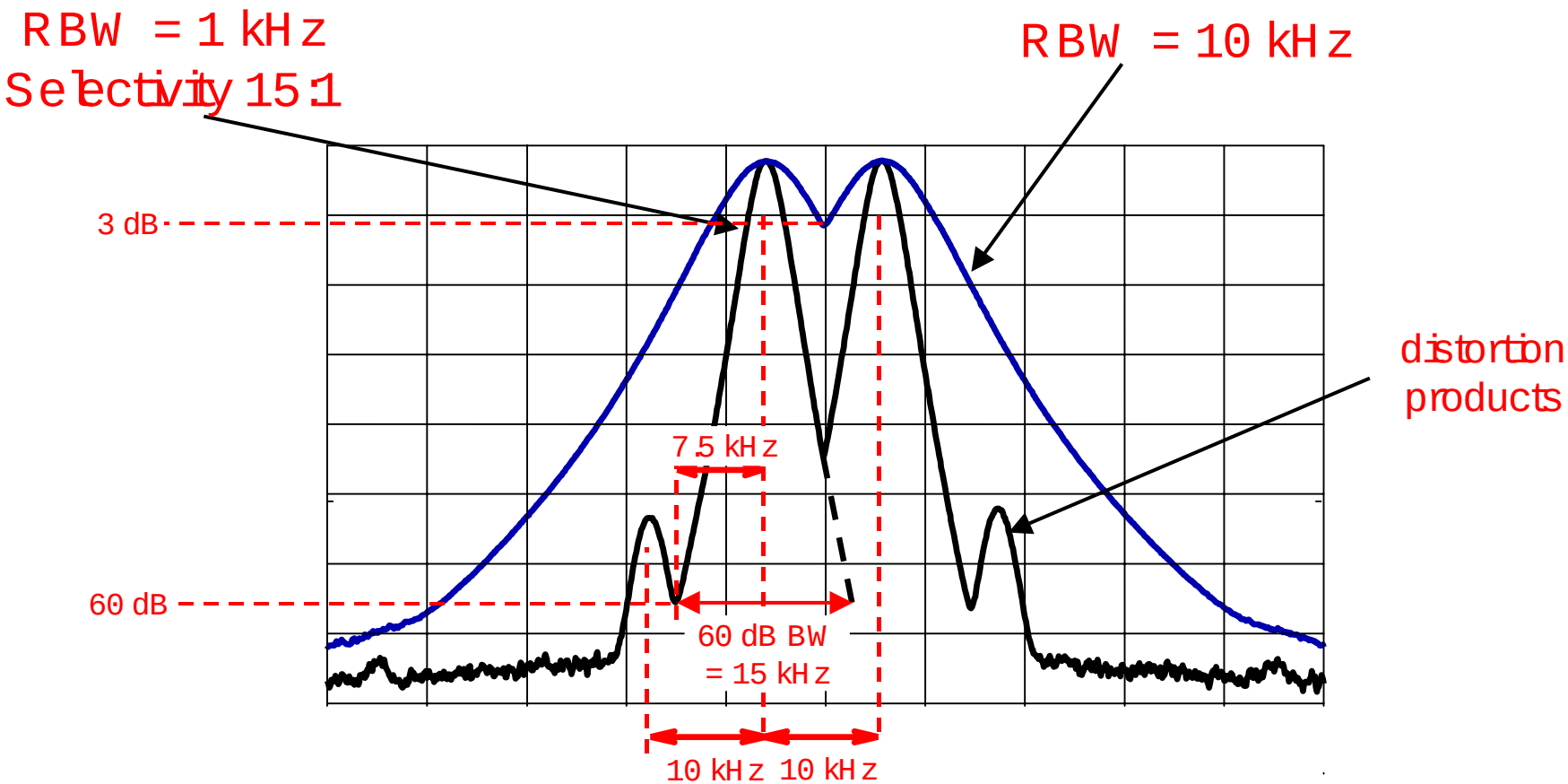
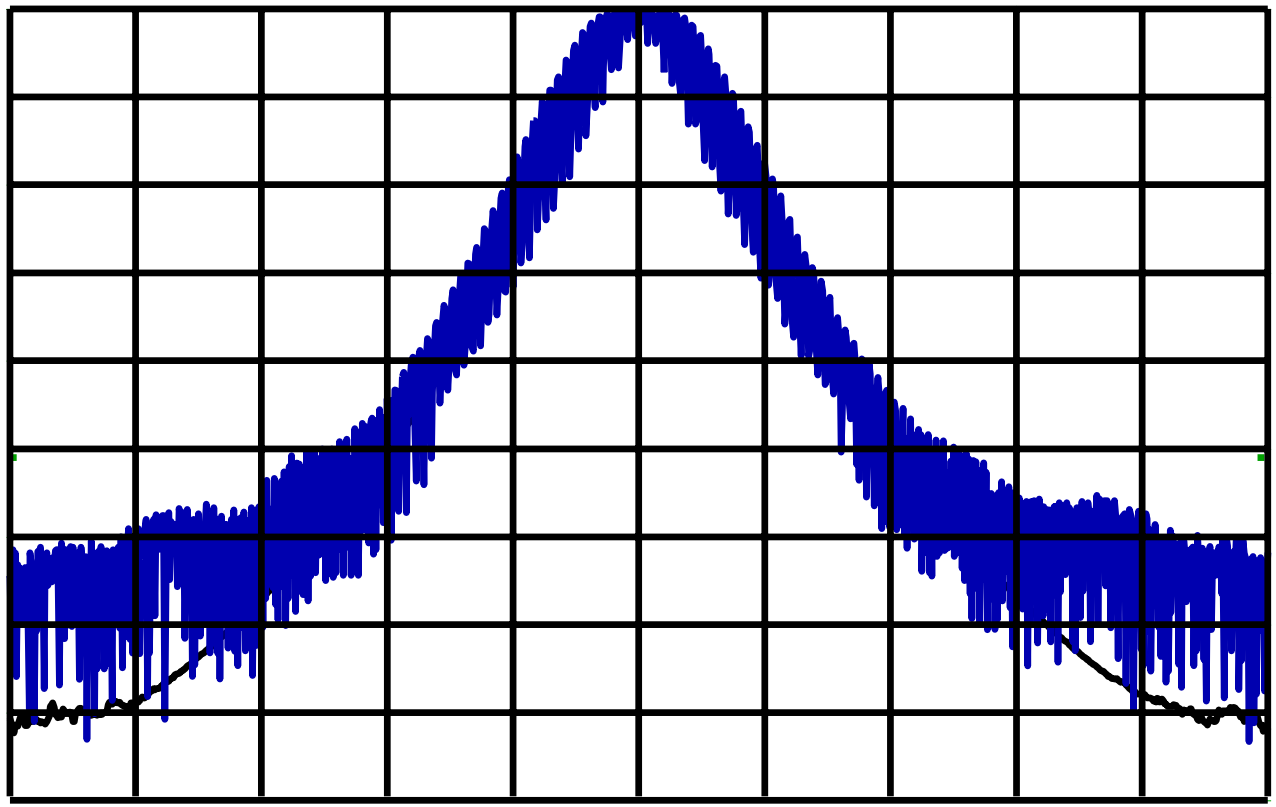
Specifications

Resolution: RBW Type and Selectivity



Specifications

Resolution: Residual FM



Residual FM
"Smears" the Signal

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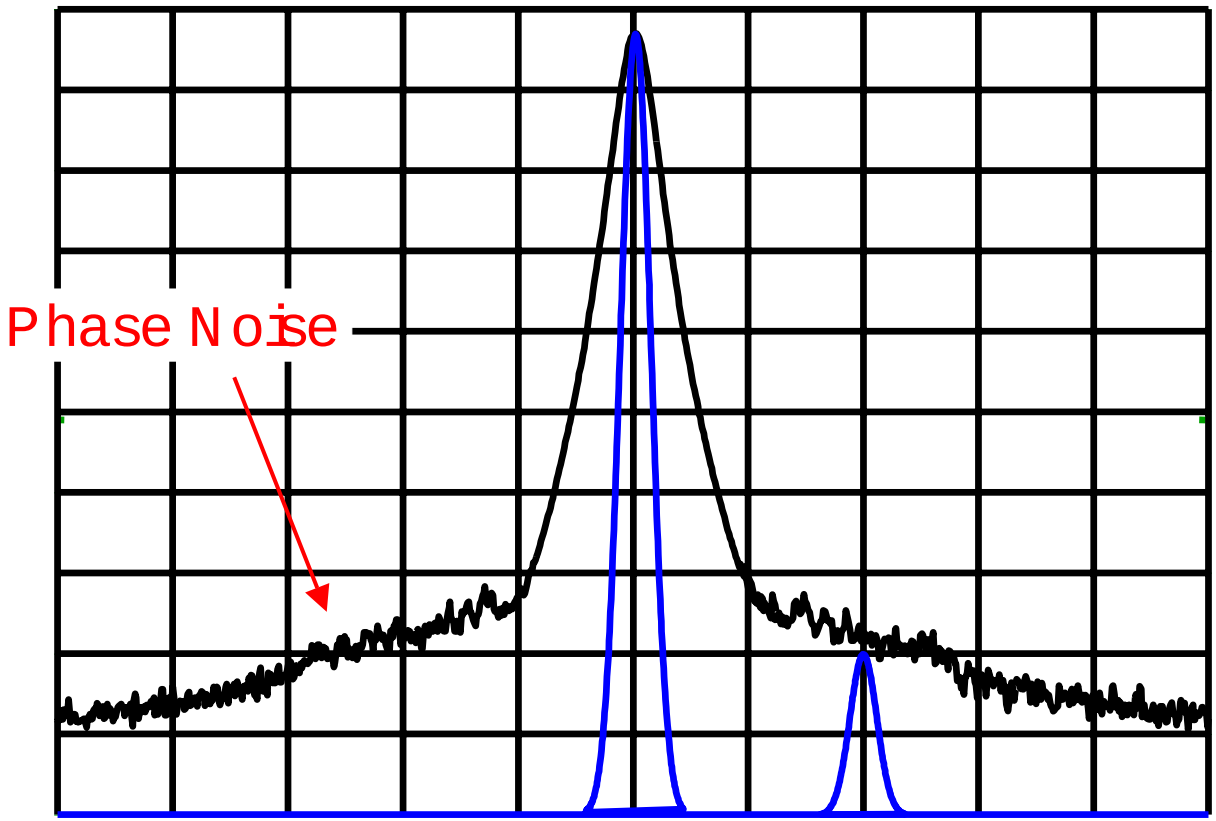
Specifications

Resolution: Noise Sidebands



Noise Sidebands can prevent resolution of unequal signals

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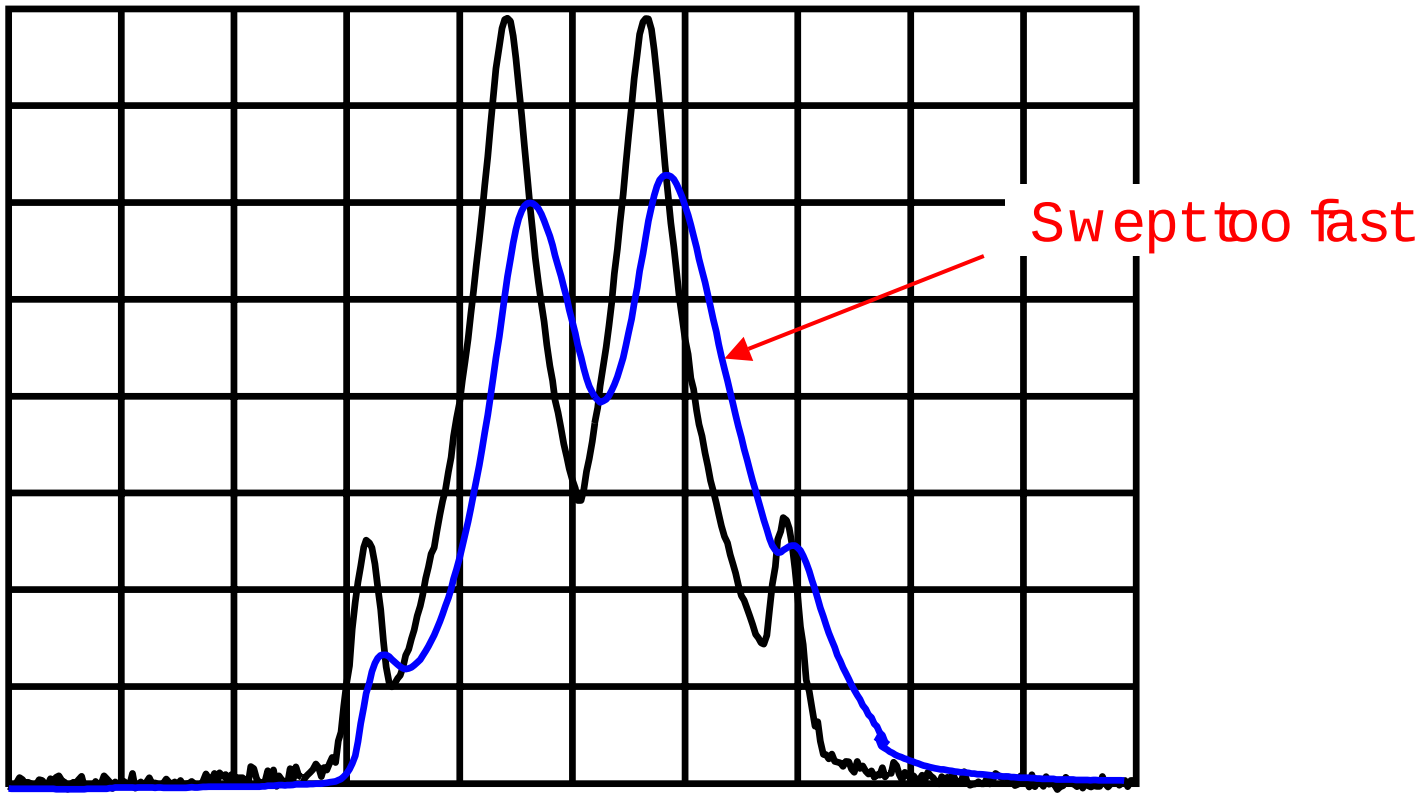
Specifications

Resolution: RBW Determines Measurement Time

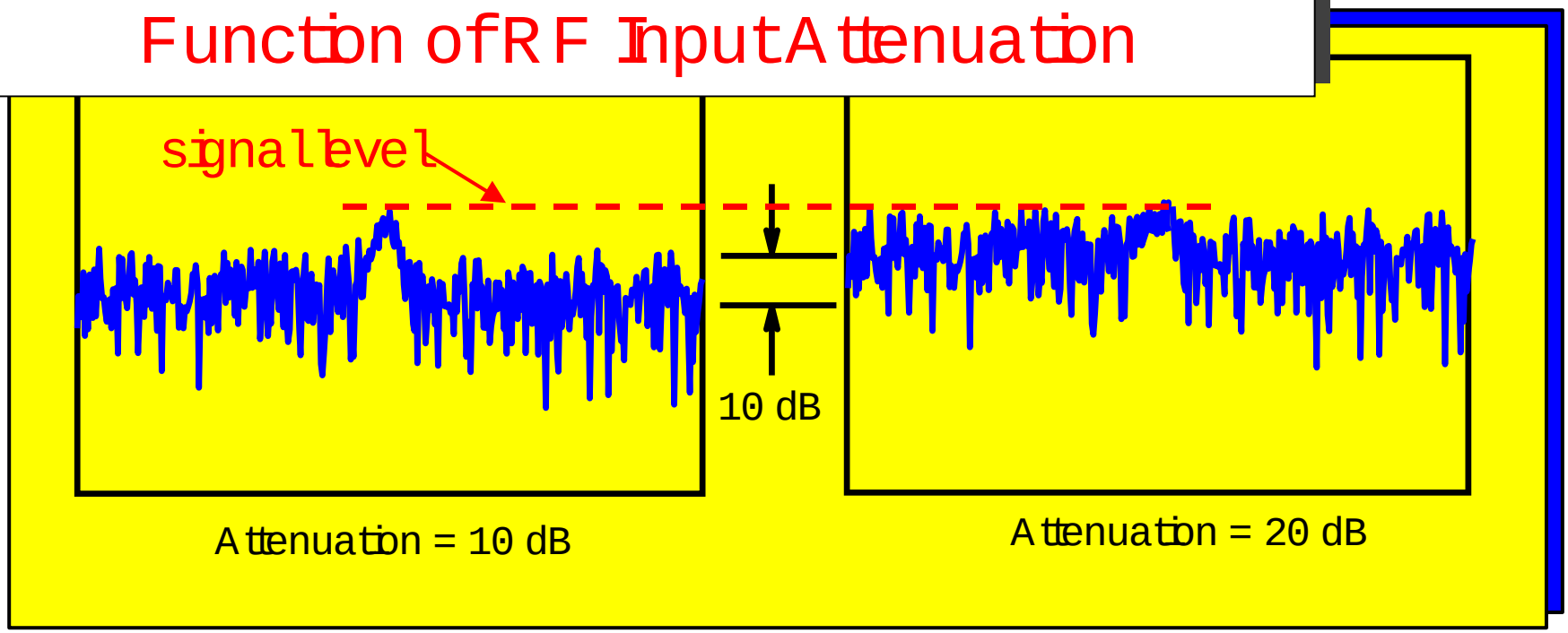


Penalty For Sweeping Too Fast
Is An Uncalibrated Display

Specifications

Sensitivity/DANL

Effective Level of Displayed Noise is a Function of RF Input Attenuation



Signal-To-Noise Ratio Decreases as RF Input Attenuation is Increased

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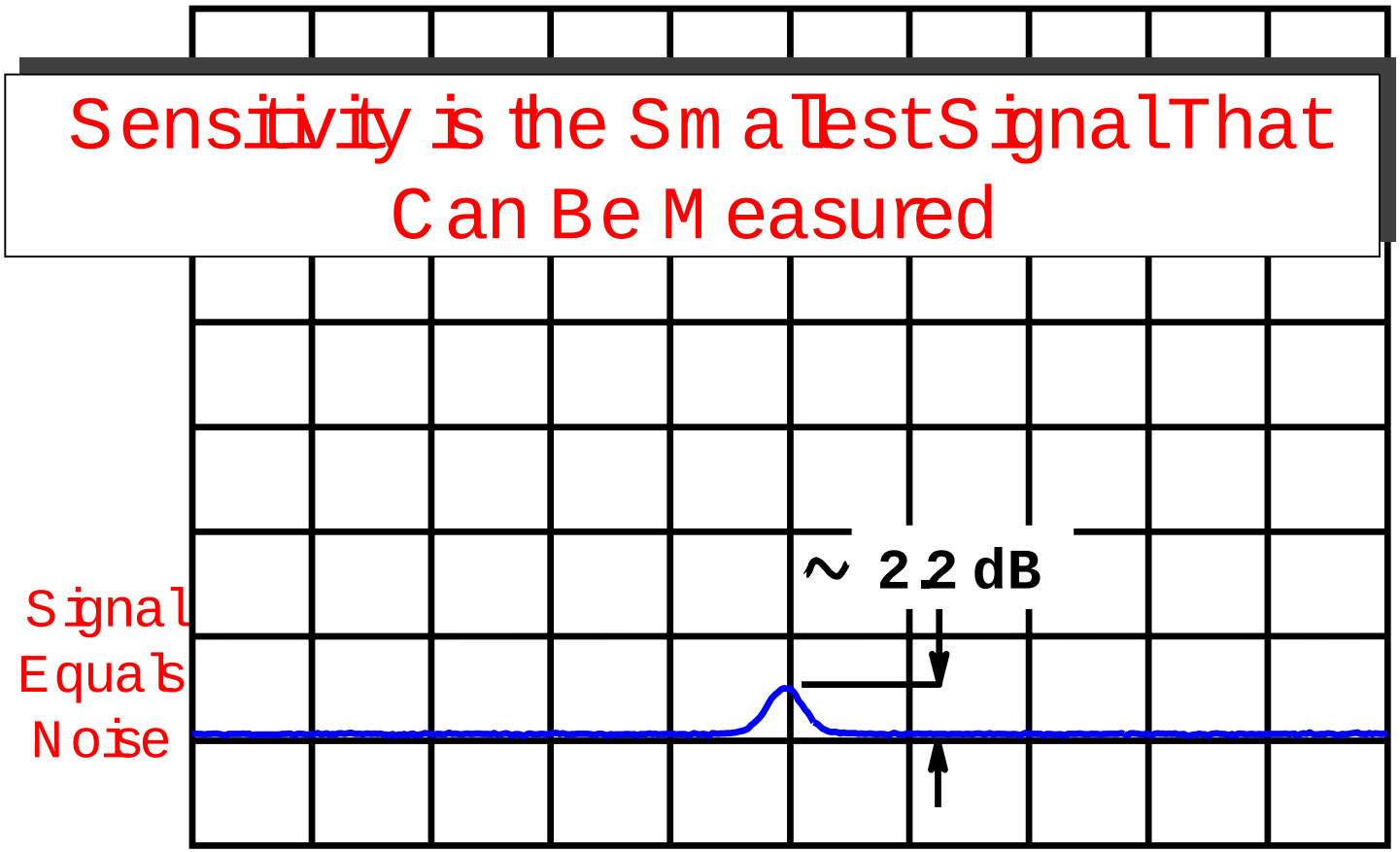
Specifications

Sensitivity/DANL



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Specifications

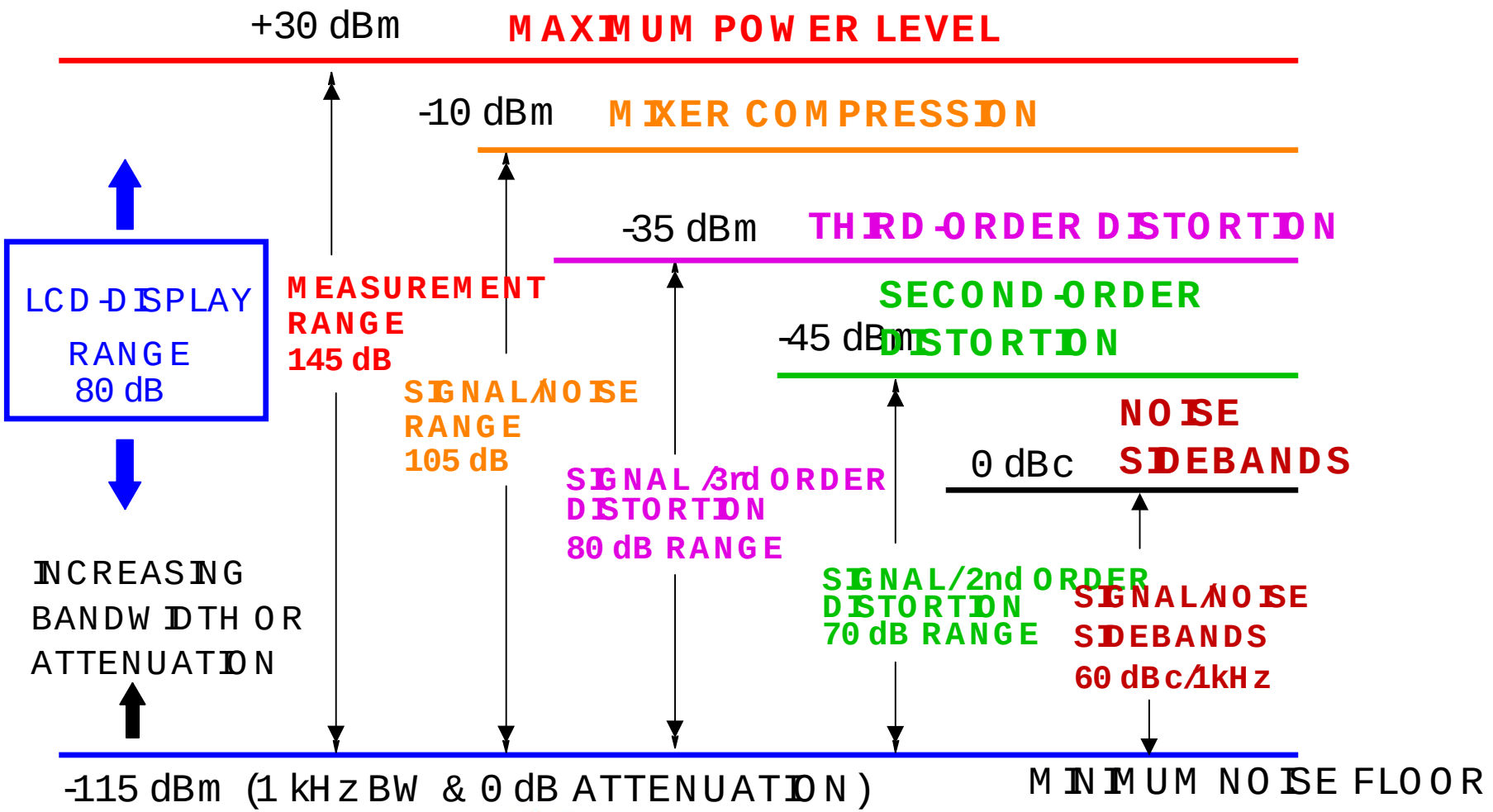
Sensitivity/DANL

For Best Sensitivity Use:

- ★ **Narrowest Resolution BW**
- ★ **Minimum RF Input Attenuation**
- ★ **Sufficient Video Filtering (Video BW < .01 Res BW)**

Specifications

Dynamic Range



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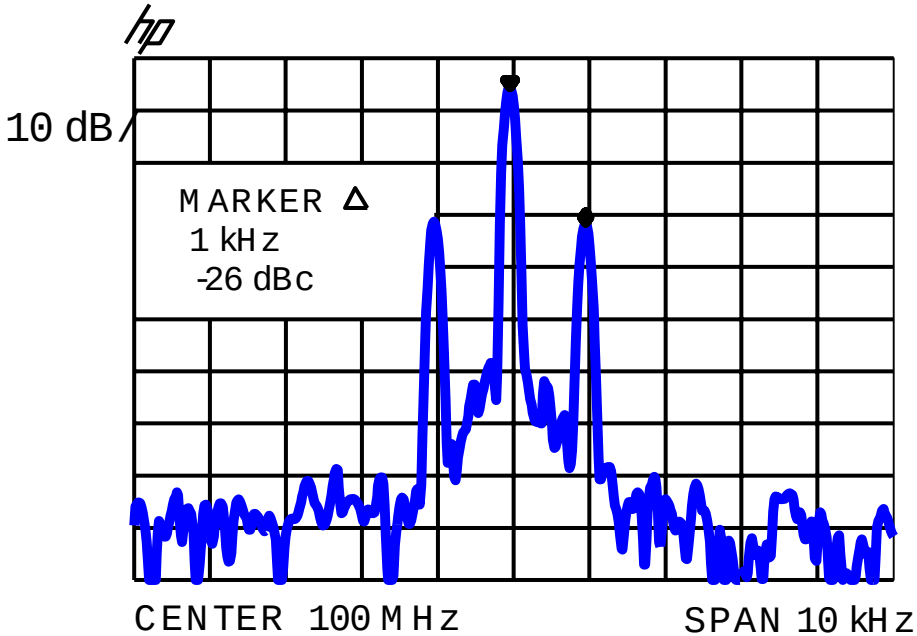
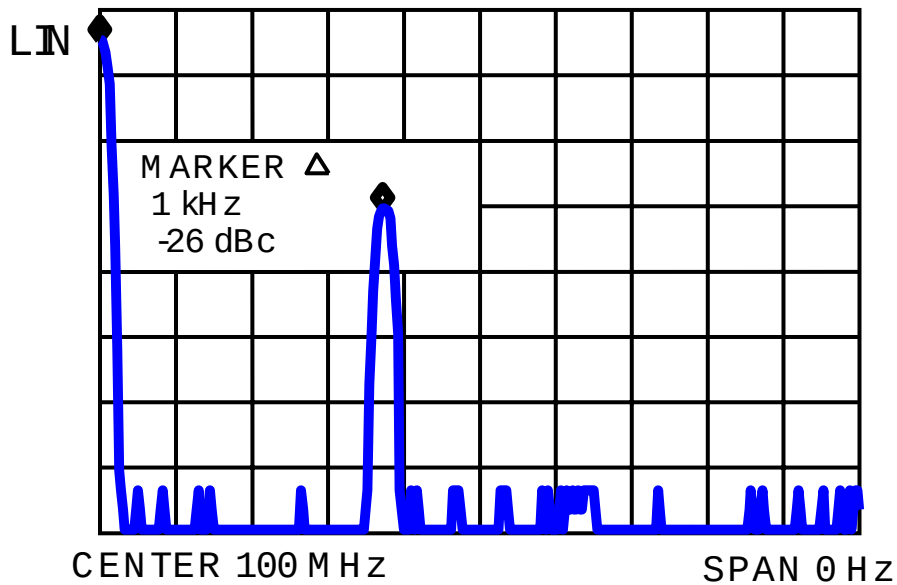
Features

Modulation Measurements: FFT

Swept Frequency Domain

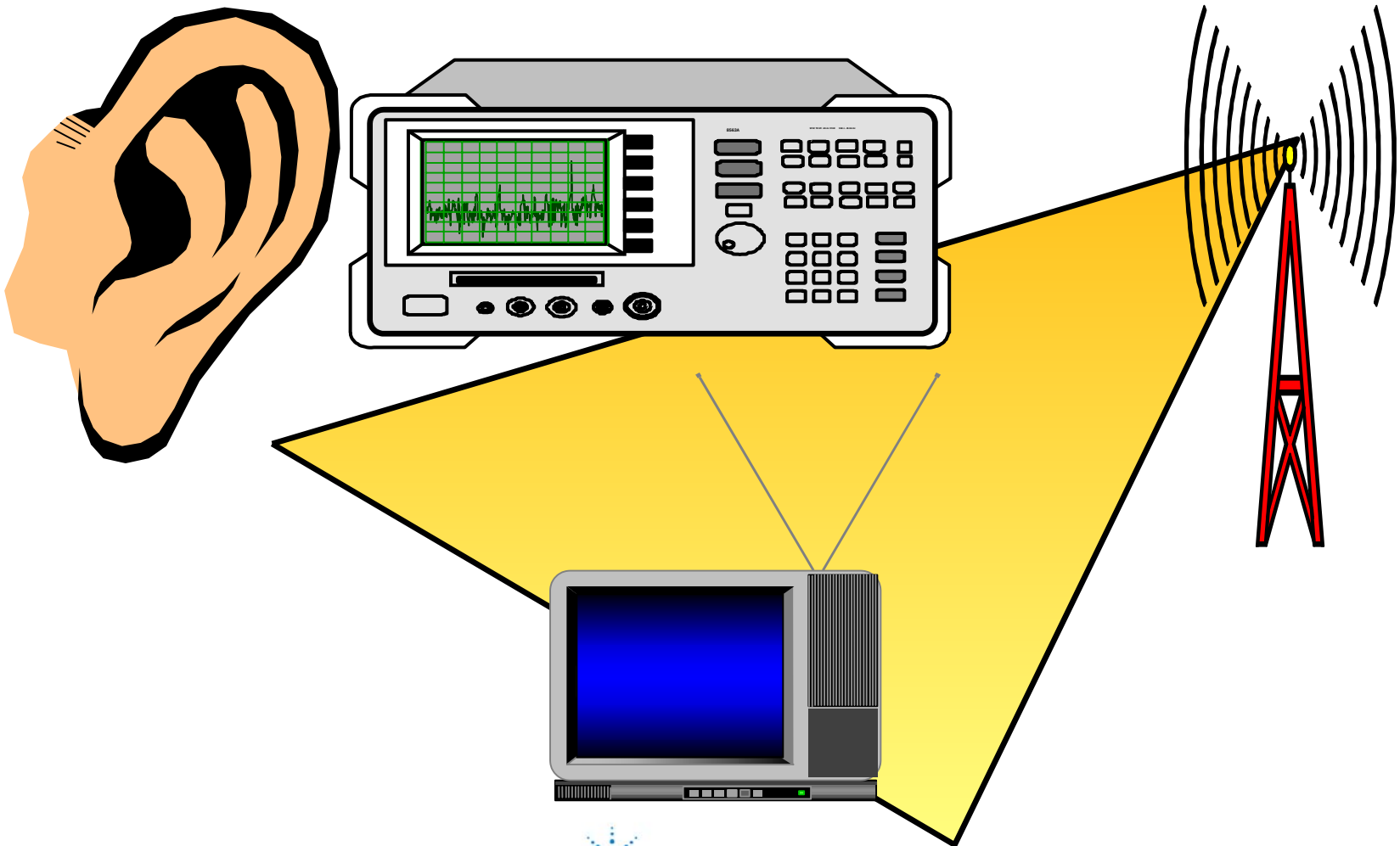


FFT Frequency Domain



Features

Modulation Measurements: AM/FM Detector with Speakers



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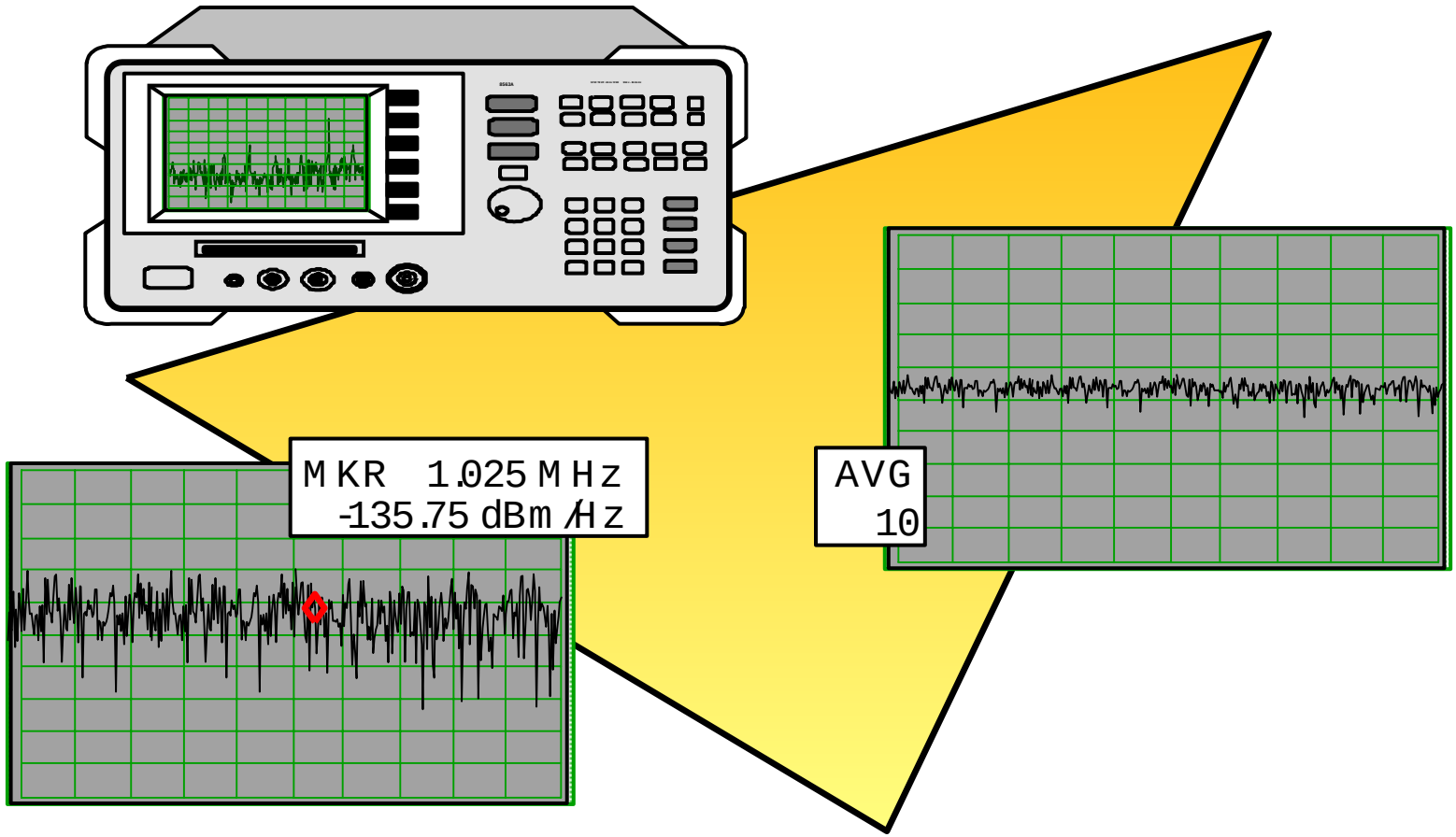
Features

Noise Measurements: Noise Marker & Video Averaging



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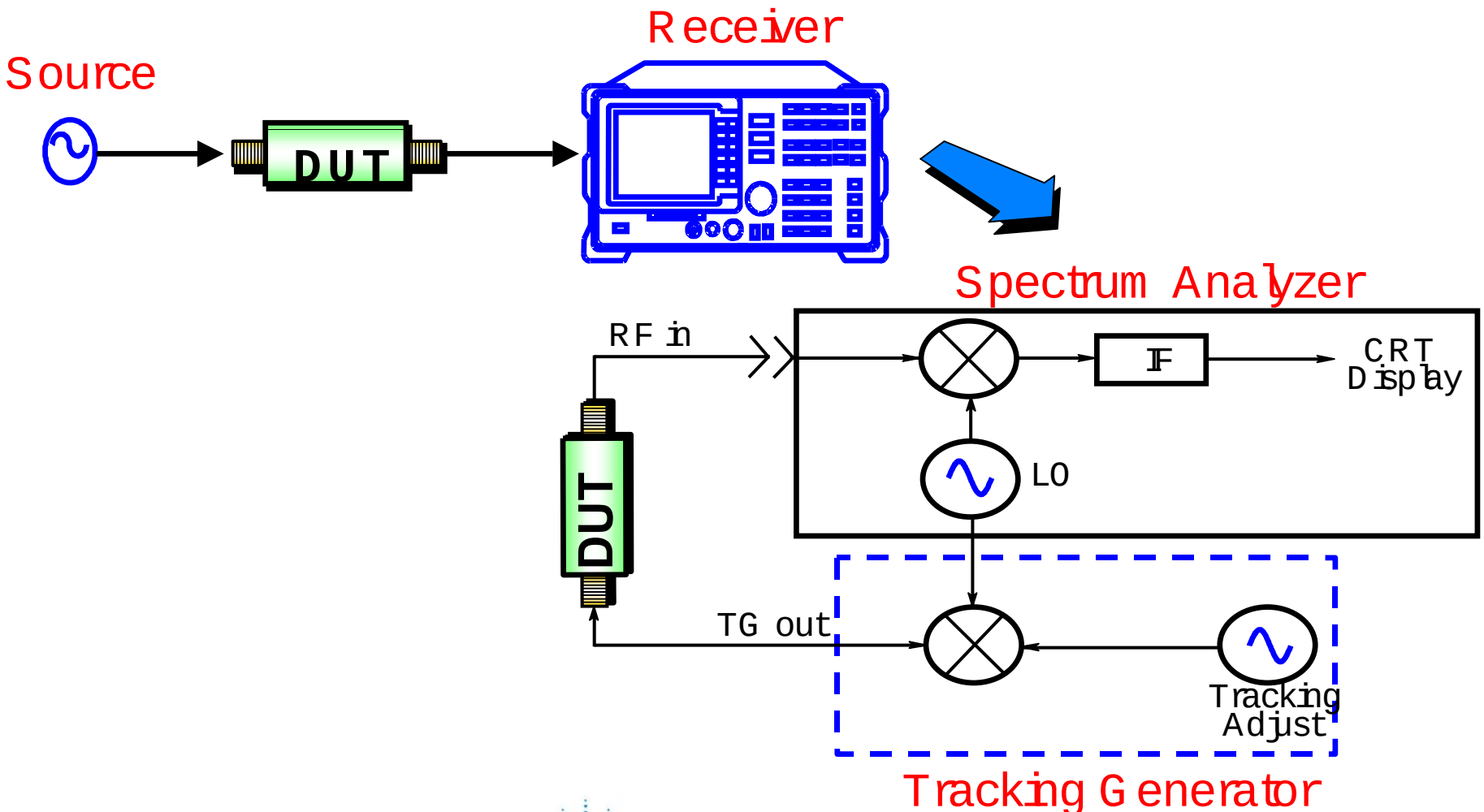
Features

Stimulus Response: Tracking Generator



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