

AKADEMIKA



Product Catalogue



Akademika is pleased to announce the Launch of Analog Communication System which allows the Students to learn the fundamental concepts by building the Analog Communication System experiments at the Block Diagram level.

SPECIFICATIONS

ANALOG COMMUNICATION SYSTEM- TRANSMITTER

a) GENERATOR BLOCK

• Function Generator1:

Waveform: Sine, Square & Triangular

Frequency: 1Hz to 100 KHz, Variable

Amplitude: 0 to 2V, Variable

• Function Generator2:

Waveform: Sine, Square & Triangular

Frequency: 1Hz to 100 KHz, Variable

Amplitude: 0 to 2V, Variable

• Carrier Generator 1:

Waveform: Square wave

Frequency: 1 KHz to 20 KHz, Variable

Amplitude: 2V, Fixed

• Carrier Generator 2:

Waveform: Square wave

Frequency: 1 KHz to 30 KHz, Variable

Amplitude: 2V, Fixed

• Voltage Controlled Oscillator (VCO) & FM Modulator:

Frequency: 400 KHz to 1500 KHz, Variable

Amplitude: 0 to 2V, Variable

• Voltage Controlled Oscillator (VCO2):

Frequency: 400 KHz to 1500 KHz, Variable

Amplitude: 0 to 2V, Variable

b) MODULATOR BLOCK

Balance Modulator 1:

• Modulation: Amplitude modulation, Double sideband, single sideband (USB and LSB)

• Carrier Input: 1-1000 KHz

• Modulation Input: 0.1 - 100 KHz

• Carrier Null: Adjustable

• Output Amplitude: Adjustable

Balance Modulator 2:

• Modulation: Amplitude modulation, Double side band, Single side band (USB and LSB).

• Carrier Input: 1MHz

• Modulation Input: 400-500KHz

• Carrier Null: Adjustable

• Output Amplitude: Adjustable

Colpitt's Oscillator:

1MHz Sine Wave with variable amplitude 0 to 2V

Ceramic Filter: Central Frequency 460KHz

Bandwidth 10 KHz + / - 3 KHz

Band Pass Filter: Central Frequency 1.455MHz

Bandwidth 10 KHz + / - 3 KHz

FDM Transmitter:

Input 1 Band Pass Filter: 7KHz to 11KHz $F_c = 9\text{KHz}$

Input 2 Band Pass Filter: 18KHz to 22KHz $F_c = 20\text{KHz}$,

Pilot Carrier 256KHz

Pre-emphasis: Time Period with 50us

Phase Modulator: Adjustable to 400KHz to 500KHz

Reactance Modulator: Reactance modulator with variable amplitude

c) NOISE GENERATOR & FILTER BLOCK

Noise Generator & Adder: Adjustable from 0V to maximum input value signal + Noise Adder stage 0 to 4V white noise

Sweep Generator: Sweep frequency-10Hz, Sweep depth-Adjustable Output for oscilloscope -X axis

RF/Spectrum Detector: Minimum.

Input- 100mVpp, Adjustable

Band Pass Filter: Frequency Range 7KHz to 13KHz

High Pass Filter: Cut off Frequency 3.4 KHz

Band Reject Filter: Frequency Range 7KHz to 13KHz

Matched T Filter: Cut off Frequency 20 KHz

Matched II Filter: Cut off Frequency 20 KHz

d) TRANSMISSION via ANTENNA and APPLICATION BLOCK

Antenna: Ferrite Rod & MW coil

Output Amplifier: 600 KHz to 1650 KHz with adjustable gain

Audio Pre-amplifier: Audio pre-amplifier with Microphone and adjustable gain

ANALOG COMMUNICATION SYSTEM- RECEIVER⁺

a) RF AMPLIFIER BLOCK

RF Amplifier: 600 KHz to 1650 KHz with adjustable gain

b) LOCAL OSCILLATOR BLOCK

- Output signal: Sine wave for local oscillator input
- Frequency: 900 KHz to 2.1 MHz variable
- Amplitude: Adjustable from 0 ~ 2Vp-p
- Output Impedance: 50 Ohms

c) MIXER BLOCK

- Dual gate MOSFET IN • Inputs: Local oscillator and RF Signal
- Output Frequency: 455 KHz adjustable
- Filter: Dual tune LC

d) IF AMPLIFIER & FILTER BLOCK

1st IF and 2nd IF amplifier

- Central frequency: 455 KHz
- Load impedance: Variable R-L-C
- Gain: 32 dB with automatic gain control
- Filter 1 & Filter 2: Cut off Frequency of 3.4 KHz

e) DEMODULATOR BLOCK

Beat Frequency Oscillator:

- Central Frequency: Adjustable to 457 KHz
- Amplitude: 0 to 2V variable

Diode Envelope Detector:

- Detection of Positive & Negative envelope with variable RC filter DSB

Limiter:

- 455 KHz central Frequency 1.5V output amplitude

Quadrature / Product Detector:

- Operating frequency: Adjustable from 400 KHz ~ 500 KHz SSB

Foster Seeley / Ratio Detector:

- Operating frequency : Adjustable
400 KHz ~ 500 KHz (SSB)

PLL Detector:

- Operating frequency : Adjustable
400 KHz ~ 500 KHz SSB

Detuned Resonance Detector:

- Operating frequency : Adjustable
400 KHz ~ 500 KHz (SSB)

De-emphasis: Time Period with 50 μ s

FDM Receiver:

- Band Pass Filter: 7 KHz to 11 KHz, $F_c = 9$ KHz,
- Band Pass Filter: 18 KHz to 22 KHz, $F_c = 20$ KHz

Power Meter with Integrator and Dump Circuit:

- 2 Digit Seven Segment Display with 1 - 15 sec Timer.
- Input signal Amplitude 0 to 2V

f) RECEPTION via ANTENNA and APPLICATION BLOCK

- Antenna: Ferrite Rod & MW coil
- Audio Amplifier: Audio Amplifier with headphone and adjustable gain.

g) Switch Fault:

- Switch Faults are provided to simulate fault condition in
- various parts of the Circuit.

h) Power Supply:

- GND, +5V, +12V, -12V

EXPERIMENTS

Module 1: Linear Modulation

- Amplitude Modulation
- Frequency Spectrum of AM
- Generation of AM signal
- Modulation Index of AM
- Observed Linearity Curve of AM Modulator
- SSB-SC / DSB-SC
- AM Demodulation - Envelope and Square Law Demodulation
- Phase Discriminator Method

Module 2: Frequency Division Multiplexing

- FDM

Module 3: Angle Modulation

- Principle of frequency and phase modulation – Relation between FM and PM waves
- Frequency deviation & Modulation Index of FM
- Bandwidth and spectrum of FM

Module 4: Demodulation of Angle Modulated Signals

- FM detectors – slope detectors
- Ratio detectors
- The Phase Locked Loop
- Pre-emphasis and de-emphasis.

Module 5: Receivers and Noise in Analog Communication

- Super-heterodyne receiver (AM and FM)
- Observed Frequency Response of Ceramic Filter
- Study of Selectivity & Sensitivity of AM Receiver
- Effect of Noise on Analog Systems
- Noise Power Spectral Density Measurement
- SNR and Noise Figure measurement

Filters : Study Of different filters

Our Products



Basic Electronics



Analog Communication



Digital Communication



RF/Antenna & Microwave



Fiber Optics



Radar



Wireless Communication



Network Laboratory



Processor



Controls & Instrumentation



Test & Measuring Instruments



Drone Technology Laboratory

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