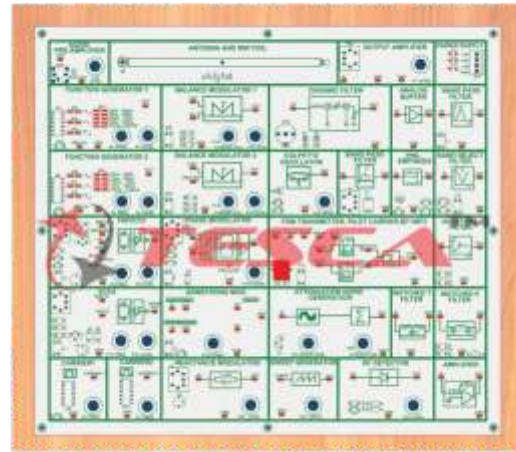




Transmitter



Receiver

Tesca 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. Theory comes to life as they build different Modulators and Receivers.

The System is completely self-contained with all required Modulating Signals, Carriers generated on Board and the students can connect respective functional blocks using patch-chord to build their required Modulation / Receiver Scheme. Waveforms can be displayed on a Digital Storage Oscilloscope which is generally available in the Laboratory.

This System covers the complete Analog Communication Curriculum and serves as a very good practical learning board to teach the fundamentals of Analog Communication.

Technical Specification - Transmitter

GENERATOR BLOCK

Function Generator 1

Waveform : Sine, Square & Triangular
Frequency : 1Hz to 100 KHz, Variable
Amplitude : 0 to 2V, Variable

Fuction Generator 2

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

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

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

Note: Specifications are subject to change.

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

Armstrong Modulator: 450 KHz Carrier Generator with 90° Phase Shifter

Phase Modulator: Adjustable to 400KHz to 500KHz

Reactance Modulator: Reactance modulator with variable amplitude

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

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

Note: Specifications are subject to change.

**Technical Specification - Receiver
RF AMPLIFIER BLOCK**

Rf amplifier: 600 KHz to 1650 KHz With adjustable gain

LOCAL OSCILLATOR BLOCK

Output signal: Sine wave for local oscillator input

Frequency: 900 KHz to 2.1MHz variable

Amplitude: Adjustable from 0 ~ 2Vp-p

Output impedance: 50 Ohms

MIXER BLOCK

Dual gate MOSFET IN

Inputs: Local oscillator and RF Signal

Output Frequency: 455KHz adjustable

Filter: Dual tune LC

IF AMPLIFIER & FILTER BLOCK

1st IF and 2nd IF amplifier

Central frequency: 455KHz

Load impedance: Variable R-L-C

Gain: 32dB with automatic gain control

Filter 1 & Filter 2: Cut off Frequency of 3.4KHz

DEMODULATOR BLOCK

Beat Frequency Oscillator

Central Frequency: Adjustable to 457KHz

Amplitude: 0 to 2V variable

Diode Envelope Detector

Detection of Positive & Negative envelope with variable RC filter DSB

Limiter:

455KHz central Frequency 1.5V output amplitude

Quadrature / Product Detector

Operating frequency : Adjustable from 400KHz ~ 500KHz SSB

Input amplitude : 1Vp-p

Foster Seeley / Ratio Detector

Operating frequency: Adjustable from 400KHz ~ 500KHz SSB

Input amplitude: 1Vp-p

PLL Detector

Operating frequency : Adjustable from 400KHz ~ 500KHz SSB

Input amplitude : 1Vp-p

Detuned Resonance Detector

Operating frequency: Adjustable from

Input amplitude: 1Vp-p

De-emphasis

Time Period with 50us

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

RECEPTION VIA ANTENNA AND APPLICATION BLOCK

Antenna: Ferrite Rod & MW coil

Audio Amplifier: Audio Amplifier with headphone
and adjustable gain.

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

Power Supply: GND, +5V, +12V, -12V

OPTIONAL MODULES

Module 1: Linear Modulation

- Amplitude Modulation
- Frequency Spectrum of AM
- Power in AM wave
- 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
- Armstrong Modulation

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 of FM
- Spectrum of FM
- Armstrong Modulation

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

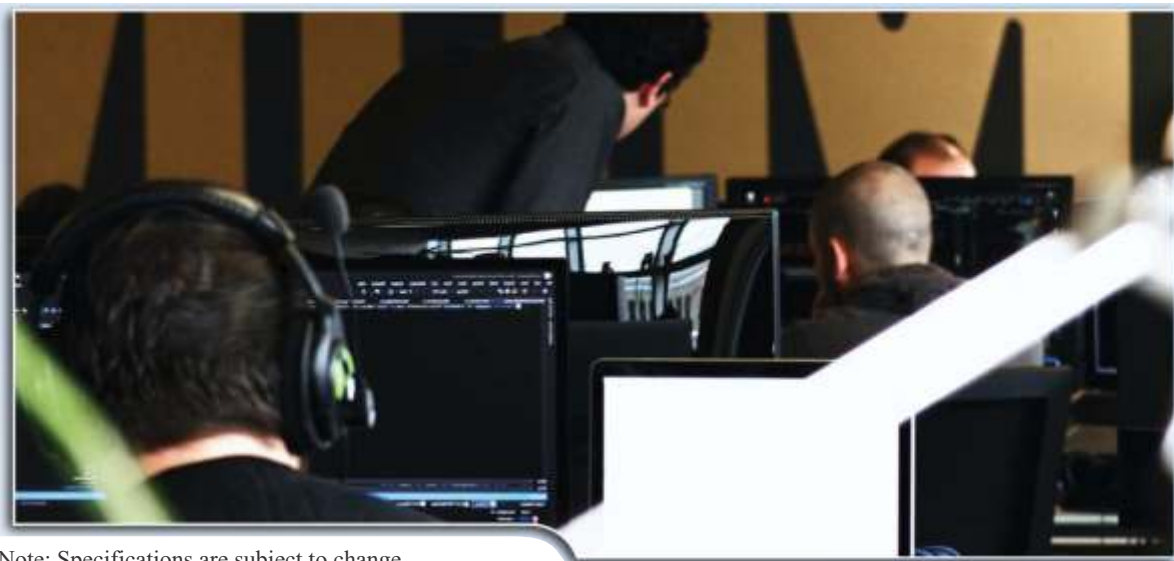
- Analog Communication
- Super-heterodyne receiver (AM and FM)
- Observed Frequency Response
of Ceramic Filter
- Study of Selectivity & Sensitivity of AM
Receiver
- Effect of Noise on Analog Systems
- Noise Power Spectral Density Measurement
- SNR and Noise Figure measurement

Module 6: Filter

- Study of Band Pass Filter
- Study of Band Reject Filter
- Study of High Pass Filter
- Study of Low Pass Filter
- Study of Matched T Filter
- Study of Matched II Filter

Module 7: Applications

- Transmit AM Signal Via Antenna
- Study of Amplifier Circuit
- Study of Voice communication
- Study of Switch Fault



Note: Specifications are subject to change.