MARS

Advance Communication Lab Training Modules

ME 770 Frequency Modulation & Demodulation

Objective : To study and observe waveform of FM modulation (2 different Types) & FM demodulation (5 different type),
To study the noise effect in FM transmission & tuned circuit,
To study FM waveform using VCO.

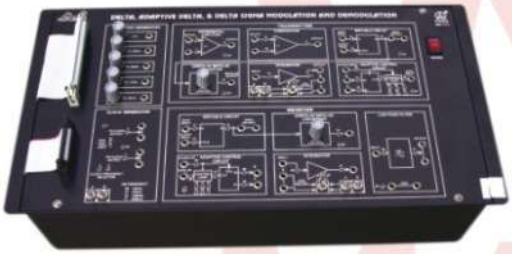
Technical Specifications :

Output voltage(Regulated)	: ±12V DC (Inbuilt)
Sine wave audio frequency	: 300Hz - 3.4KHz / 0-4V P-P Approx.
Carrier frequency	: 455KHz / 0-0.5V P-P Approx.
Low pass filter	: 3.4KHz with adjustable gain

Housed in ABS cabinet, block diagram printed, connections of Amplitude Limitor, Mixer/Amplifier, modulation (using Reactance Modulator & Varactor Modulator), demodulation(using Detuned resonant detector, Quadrature detector, Foster seeley detector, Ratio detector, PLL detector), 8 Nos. fault switches & 74 test points brought out at Glass epoxy (PCB) front panel.
Also provided with power chord, patch chords & instruction manual.
Optional Accessories : Dual Trace CRO 30MHz (ME 3030)

ME 771 Delta, Adaptive Delta & Delta Sigma Modulation & Demodulation

Objective : To study and observe waveforms of Delta , Adaptive delta, Delta sigma modulation & demodulation circuits.
To study Slope overload and integrator gain in delta modulation.
To study Amplitude overload in delta sigma modulation.



Technical Specifications :

Output voltage(Regulated)	: ±12V DC & 5V DC (Inbuilt)
Sampling clock frequency	: 32KHz, 64KHz, 128KHz & 256KHz : 5V P-P Approx.
Crystal frequency	: 4.096MHz
Sine wave generator	: 250Hz, 500Hz, 1KHz, 2KHz, separate variable (Synchronised & Adjustable) DC level / 0-12V P-P Approx.
Low pass filter	: 4th order butterworth with 3.4KHz cutoff frequency.

Housed in ABS cabinet, block diagram printed, connections of Integrator gain setting Norm x2, x4, x8(4 No's) & 59 test points brought at Glass epoxy (PCB) front panel.
Also provided with power chord, patch chords & instruction manual.
Optional Accessories : Dual Trace CRO 30MHz (ME 3030)

ME 772 TDM Pulse Code Modulation Transmitter

Objective : Observe Pulse Code Modulation, Analog to Digital Convertor parallel to serial data conversion, Time Division Multiplexing of PCM data & Error check codes.

Technical Specifications :

Output voltage(Regulated)	: ±12V DC, 5V DC (Inbuilt)
Sine wave generator	: 1KHz& 2KHz / 0-10Vpp Approx.
Variable DC level	: ± 5VDC(2Nos.)
Crystal frequency	: 12MHz
Input channel	: 2 No's
Operating mode (Slow/Fast)	: 1 Hz /240KHz Per channel (Approx.)

Housed in ABS cabinet, block diagram printed, connections of various components, 4 No's. fault switches & 49 test points brought out at Glass epoxy (PCB) front panel.
Also provided with power chord, patch chords & instruction manual
Optional Accessories : Dual Trace CRO 30MHz (ME 3030)

ME 773 TDM Pulse Code Modulation Receiver

Objective : Observe Time Division Demultiplexing of PCM data.
Clock regeneration by PLL & signal recovery in 3 connecting modes between Transmitter and Receiver.
Clock and frame synchronization in PCM system & effect of various faults.

Technical Specifications :

Output voltages (Regulated)	: ±12VDC & 5VDC (Inbuilt)
Clock regeneration	: using PLL technique
Operating mode (Approx.)	: Fast 240KHz / channel, Slow 1Hz / channel
TDM serial input	: 2 Sets
Low pass filters	: 4th order butterworth with 3.4KHz cutoff frequency

Housed in ABS cabinet, block diagram printed, Connections of various components, 4No's. fault switches & 56 test points brought out at Glass ppoxy (PCB) front panel.
Also provided with power chord, patch chords & instruction manual.
Optional Accessories : Dual Trace CRO 30MHz (ME 3030)

Advance Communication Lab Training Modules

ME 774 Data Formatting & Carrier Modulation Transmitter

Objective : Conversion of NRZ data to other data formats NRZ (L), NRZ(M) RZ, AMI, RB,Biphase (Manchester), Biphase (MARK), Differentially encoded dibit pair.
To study ASK, FSK, BPSK, DPSK, & QPSK carrier modulation techniques & their comparison.

Technical Specifications :

Output voltages (Regulated)	: ±12VDC & 5VDC (Inbuilt)
Input	: 2 Channel Time Division Multiplexed Data from ME 772 or ME 780
Carrier frequency	: Sine waves synchronized to Transmitted data at 1.44 Mhz, 960 Khz, (0 deg. Phase) 960 Khz (90 deg. Phase)

Housed in ABS cabinet, block diagram printed, connections of various components/ block diagrams & 38 test points brought at Glass epoxy (PCB) front panel.
Also provided with power chord, patch chords & instruction manual
Optional Accessories : Dual Trace CRO 30MHz (ME 3030) & 8 bit Variable Data Generator (ME 780)

ME 775 Data Reformatting & Carrier Demodulation Receiver

Objective : Conversion of different data formats to NRZ data formats ASK, FSK, BPSK, DPSK, & QPSK carrier demodulation techniques.

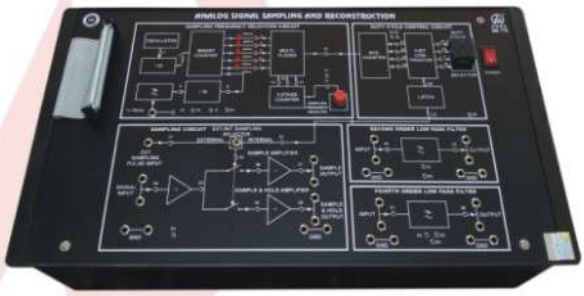
Technical Specifications :

Output voltages (Regulated)	: ±12VDC, 5VDC (Inbuilt)
Input	: Input from ME 774
Output	: 2 Channels TDM Multiplexed data stream
Demodulation	: NRZ(M), RZ, AMI, RB, Biphase (Manchester), Options Biphase (MARK) Differentially encoded dibit to NRZ (L)
Carrier demodulation	: ASK Rectifier Diode, FSK PLL Detector, PSK & DPSK Square Loop Detector, QPSK Forth Power Loop Detector
Biphase clock receiver	: using PLL

Housed in ABS cabinet, block diagram printed, connections of various components / block diagrams & 38 test points brought at Glass epoxy (PCB) front panel.
Also provided with power chord, patch chords & instruction manual
Optional Accessories : Dual Trace CRO 30MHz (ME 3030)

ME 776 Analog Signal Sampling & Reconstruction Trainer

Objective : Signal Sampling & Reconstruction technique.
Effect on amplitude of reconstructed signal by varying sampling pulse duty cycle in sample & sample/hold output.
Aliasing & effect on reconstruction of signal due to various sampling frequencies, 2nd & 4th order butterworth filters comparison & signal sampling and reconstruction using external sampling input



Technical Specifications :

Output voltages(Regulated)	: ±12VDC, 5VDC (Inbuilt)
Crystal frequency	: 6.4MHz
Sampling frequency	: 2, 4, 8, 16 & 32KHz (Switch selectable with LED display)
Sine wave generator	: Synchronised 1KHz/ 5V P-P
Low pass filters	: butterworth 2nd & 4th order with 3.4 KHz cut off frequency

Housed in ABS cabinet, block diagram printed, connections of various components/ block diagram & 51 test points brought at Glass epoxy (PCB) front panel.
Also provided with power chord, patch chords & instruction manual
Optional Accessories : Dual Trace CRO 30MHz (ME 3030)

ME 780 8 Bit variable Data Generator

Technical Specifications :
8 Bit variable output
Internal clock frequency 240KHz
External clock frequency upto 1MHz
80ns rise time approx.
Also provided with power chord, patch chords & instruction manual

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ME 777 TDM Pulse Amplitude Modulation & Demodulation

Objective : Pulse amplitude modulation technique & Time division multiplexing and demultiplexing

PLL as frequency multiplier to generate clock from sync signal

- 1 connection (information only) clock and sync derived at receiver
- 2 connections (information sync) clock regenerated at receiver
- 3 connection between transmitter & receiver (clock, sync & Information)

Effect of varying duty cycle of sampling pulse on signal Reconstruction

Technical Specifications :

Output voltages (Regulated) : ±12V, +5V / 500mA (Inbuilt)
4 analog input channel
16KHz / channel sampling rate
Crystal frequency : 6.4MHz
Analog signal frequency : 250Hz, 500Hz, 1KHz, 2KHz
Low pass filter frequency : 3.4KHz Cut off frequency

Housed in ABS cabinet, block diagram printed, connections of Ceramic bandpass filter, Audio output amplifier with Speaker, various components/block diagram, 8 fault Switches & 52 test points brought at Glass epoxy (PCB) front panel.

Also provided with power chord, patch chords & instruction manual

Optional Accessories : Dual Trace CRO 30MHz (ME 3030)

ME 781 DSB/SSB AM Transmitter Trainer

Objective : Study of carrier frequency generation, DSB & SSB AM Generation and transmission & transmitter tuned circuit.

Technical Specifications :

Output voltages (Regulated) : ±12V, 5V / 500mA (Inbuilt)
Balanced Modulators : 455KHz , 1MHz with band pass filter (2 No's)
Audio oscillator : 300Hz ~ 3.4KHz / 0-4V P-P
Carrier frequency : 1MHz
Transmitter amplifier output : DSB (1MHz), SSB (1.445MHz) (Gain adjustable) connected to Antenna/cable

Housed in ABS cabinet, block diagram printed, connections of Ceramic bandpass filter, Audio output amplifier with Speaker, various components/block diagram, 8 fault Switches & 27 test points brought at Glass epoxy (PCB) front panel.

Also provided with Antenna, power chord, patch chords & instruction manual

Optional Accessories : Dual Trace CRO 30MHz (ME 3030)

ME 782 DSB/ SSB AM Receiver Trainer

Objective : Study of DSB & SSB AM reception & detection by Diode / Product detector.

Study of Sensitivity, Selectivity & Fedelity of receiver.

Study of Automatic gain control (AGC) & Receiver tuned circuits.

Technical Specifications :

Output voltage(Regulated) : +12V DC (Inbuilt)
Receiver Frequency : 980KHz - 2.060MHz (Super Heterodyne)
Intermediate Frequency (IF) : 455KHz
Receiving media : Telescopic Antenna/ RF Cable

Housed in ABS cabinet, block diagram printed, connections of input circuits (RF Amplifier, Mixer, Local oscillator, Beat frequency oscillator, IF Amplifier 1& IF Amplifier 2) , Detector Circuits (Diode detector-DSB, Product detector-SSB), Audio output amplifier with Speaker, AGC, 8 Nos. fault Switches & 50 test points brought at Glass epoxy (PCB) front panel. Also provided with Antenna, power chord, patch chords & instruction manual

Optional Accessories : Dual Trace CRO 30MHz (ME 3030) & Function Generator

ME 785 Transmission Line Trainer

Objective : Measurement of stationary wave, line properties & line Attenuation. Measurement with matched, short, open end of the line in pulsed condition, Frequency char. & input impedance of the Line. Phase shift along the line & Fault localization within the line.

Technical Specifications :

Transmission Line Coaxial cable : 100m (25 x 4)
Impedance Matching Resistance : 0-100Ω, 2 Nos.
Test Generators
(Sine Wave) : 4KHz ~ 4MHz / 0-1V P-P
(Square Wave) : 40KHz ~ 4MHz 0-1V P-P

Housed in ABS cabinet, block diagram printed, 10 test points brought at Glass epoxy (PCB) front panel.

Also provided with power chord, patch chords & instruction manual

Optional Accessories : Dual Trace CRO 30MHz (ME 3030)