

### Features:

- \* Microwave Trainer with 21 Antennas like Parabolic dish, Patch arrays, Horn etc.
- \* X Band DRO stabilized antenna transmitter and receiver
- \* Microwave power meter receiver with 0.1dB resolution 70 dB dynamic range.
- \* Directional Coupler for VSWR/ Return Loss.
- \* Stepper motor antenna rotator with 1 degree resolution
- \* RS232 interface with polar/cartesian plotting software
- \* Microstrip antennas
- \* All antenna gain, return loss and pattern plot provided
- \* 1000 location Frequency and level storage in receiver
- \* Ability to transfer Digital signal over microwave.

### 1. X band DRO Transmitter



Frequency : X band Dielectric Resonator stabilized MESFET source on microstrip  
 Accuracy : 0.1%  
 Modulation: CW/ASK(DC-15 KHz) Ext  
 RF Level: 1mW typical  
 Output Z : 50 ohms with SMA connector

### 2. X Band DRO Receiver



Frequency : X band  
 Microwave receiver power meter  
 Accuracy : 0.1%  
 Sensitivity : -70 dBm typical  
 Input Z: 50 ohms with SMA connector

### 3. Signal Analyser/Stepper motor controller



Measure : Microwave power level in dBm & dBu  
 Resolution : 0.1dB  
 Demod : Digital out  
 PC interface : RS 232 to PC for antenna Plotting using supplied software  
 Display : 16x2 backlit LCD for angular Position and power level  
 Rotation : 0-359 degrees  
 Control : Menu , Enter , Escape, Up & Down  
 Angle : User selectable steps of 1, 5, 10, 45 degrees  
 Memory : 1000 memories for storing positions and RF levels for quick recall  
 Auto Mode : Automatic rotation in user steps with Datalogging facility.  
 Indication : Beep on reaching the selected Position  
 Power Supply : 100-240V AC, 50-60 Hz

### 1. Monopole



S11: >6dB  
 Bandwidth: 10.3 ± 0.5GHz  
 Gain: 1dB  
 Beamwidth : E plane 80°  
 Beamwidth : H Plane 180°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector: SMA

### 2. Dipole



S11: >6dB  
 Bandwidth: 10.3 ± 0.5GHz  
 Gain: 2dB  
 Beamwidth : E plane 60°  
 Beamwidth : H Plane 180°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector: SMA

### 3. Slot WG narrow wall



S11: >6dB  
 Bandwidth: 10.3 ± 0.5GHz  
 Gain: 4dB  
 Beamwidth : E plane 60°  
 Beamwidth : H Plane 60°  
 Polarisation : Linear  
 Front to Back Ratio: 10dB

### 4. Slot WG broad wall



S11: >6dB  
 Bandwidth: 10.3 ± 0.5GHz  
 Gain: 4dB  
 Beamwidth : E plane 60°  
 Beamwidth : H Plane 60°  
 Polarisation : Linear  
 Front to Back Ratio: 10dB

### 5,6. Helix (LHCP) X2Nnos



S11: >6dB  
 Bandwidth: 10.3 ± 0.5GHz  
 Gain: 16dB  
 Beamwidth : E plane 40°  
 Beamwidth : H Plane 40°  
 Polarisation : Circular LH  
 Front to Back Ratio: >10dB  
 Connector: SMA

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### 7,8. Helix (RHCP) X2 Nos



S11: >6dB  
 Bandwidth:  $10.3 \pm 0.5$ GHz  
 Gain: 16dB  
 Beamwidth : E plane  $40^\circ$   
 Beamwidth : H Plane  $40^\circ$   
 Polarisation : Circular RH  
 Front to Back Ratio: >10dB  
 Connector: SMA

### 13. Parabolic Dish



S11: >10dB  
 Bandwidth:  $10.3 \pm 0.5$ GHz  
 Gain: 16dB  
 Beamwidth : E plane  $10^\circ$   
 Beamwidth : H Plane  $20^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 25dB

### 9. Patch Microstrip



S11: >6dB  
 Bandwidth:  $10.3 \pm 0.5$ GHz  
 Gain: 6dB  
 Beamwidth : E plane  $10^\circ$   
 Beamwidth : H Plane  $20^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: >10dB  
 Connector: SMA

### 14. Conical Horn



S11: >6dB  
 Bandwidth: 8.2 - 12.4 GHz  
 Gain: 10dB  
 Beamwidth : E plane  
 Beamwidth : H Plane  
 Polarisation : Linear  
 Connector: SMA

### 10. Patch Microstrip Array 2x1



S11: >6dB  
 Bandwidth:  $10.3 \pm 0.5$ GHz  
 Gain: 6dB  
 Beamwidth : E plane  $10^\circ$   
 Beamwidth : H Plane  $20^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: >10dB  
 Connector: SMA

### 15. Pyramidal Horn



S11: >20dB  
 Bandwidth: 8.2 - 12.4 GHz  
 Gain: 16dB  
 Beamwidth : E plane  $20^\circ$   
 Beamwidth : H Plane  $22^\circ$   
 Polarisation : Linear

### 11. Patch Microstrip Array 4x1



S11: >6dB  
 Bandwidth:  $10.3 \pm 0.5$ GHz  
 Gain: 10dB  
 Beamwidth : E plane  $10^\circ$   
 Beamwidth : H Plane  $20^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: >10dB  
 Connector: SMA

### 17. E Plane Sectoral Horn



S11: >20dB  
 Bandwidth: 8.2 - 12.4 GHz  
 Gain: 13dB  
 Beamwidth : E plane  $20^\circ$   
 Beamwidth : H Plane  $80^\circ$   
 Polarisation : Linear

### 12. Patch Microstrip Array 4x4



S11: >6dB  
 Bandwidth:  $10.3 \pm 0.5$ GHz  
 Gain: 11dB  
 Beamwidth : E plane  $10^\circ$   
 Beamwidth : H Plane  $20^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: >10dB  
 Connector: SMA

### 18. H Plane Sectoral Horn



S11: >20dB  
 Bandwidth: 8.2 - 12.4 GHz  
 Gain: 10dB  
 Beamwidth : E plane  $100^\circ$   
 Beamwidth : H Plane  $22^\circ$   
 Polarisation : Linear

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## 19. Dielectric Rod



S11: >6dB  
 Bandwidth:  $10.3 \pm 0.5$ GHz  
 Gain: 1dB  
 Beamwidth : E plane  $50^\circ$   
 Beamwidth : H Plane  $60^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector: SMA

## 20,21, 22. Waveguide to Coax adapter X 3 Nos



S11: 10dB  
 S12: 1.5dB  
 Frequency: 8.2-12.4 GHz  
 Connector: SMA

## 23. Multi Hole Directional Coupler



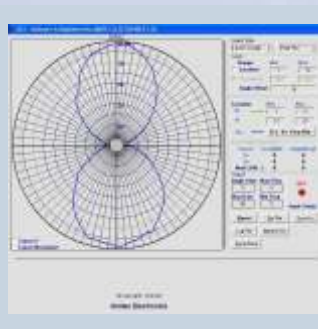
Coupling: 10dB  
 Directivity: 30dB  
 Insertion Loss: <1.5dB  
 Bandwidth: 8.2-12.4 GHz

## 24. Stepper motor controlled antenna monopod



Rotation: 0-359 degree  
 Azimuth  
 Mount: Waveguide WR990 E or H, 1/2" BSW  
 Offset: Adjustable for phase center  
 RCS: Low Non magnetic, non conductive, low dielectric  
 Motor: Stepper Motor with heavy duty reduction gearbox

## 25. Windows Software



RS232 interface with polar plotting software with log, linear cartesian and polar plots, Multiple pattern overlay, Double cursor measurement, Zoom, Colour editing, 1000 location editor, Absolute/Relative, 3dB/10dB beam-width measurement

## 26. Accessories

Non-radiating monopod for transmitting Antenna  
 All necessary connectors and cables  
 Students activity, Teachers Reference Manual  
 SMA - N, N-N Adapter,  
**E-Manual: Installation Video for ease of Learning**  
**Dimensions: 58X52X44cm.**  
**Weight: 21kg.**  
**Warranty: 3 yrs**

## List of Experiments:

- To measure the variation of field strength of radiated wave, with distance from transmitting antenna.
- To plot the radiation pattern of an omnidirectional antenna.
- To plot the radiation pattern of a directional antenna
- To measure axial ratio and cross polarisation discrimination of vertically horizontally and circularly polarized antennas.
- To measure the VSWR of the antenna
- To demonstrate that transmitting and receiving patterns of an antenna are equal and hence confirm the reciprocity theorem of antennas
- To plot the radiation pattern (E & H Plane Polar & Cartesian Plots on Log/Linear scale of an antenna on PC.
- To measure the ANTENNA PARAMETERS (directivity, gain, beam width (Half Power/10dB), front to back ratio, plane of polarization, cross polarization discrimination, side lobe level and its angular position from polar plot, VSWR/return loss) of Dipole antenna.
- To measure antenna parameters of Horn (E, H, Pyramidal) & open waveguide antenna.
- To measure antenna parameters of conical Horn antenna
- To measure antenna parameters of monopole antenna
- To measure antenna parameters of Slot(Narrow Wall & Broad Wall) Antenna
- To measure antenna parameters of Parabolic dish antenna
- To measure antenna parameters of Patch array antenna
- To measure antenna parameters of Helix (RHCP & LHCP) antenna. To measure the cross polarization discrimination for circular polarisation.
- To setup microwave data communication link.

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