

### Features:

- \* Antenna Training System with over 25 Antennas
- \* PLL transmitter and receiver 86-860 MHz.
- \* 50 KHz step size with measurement in 0.1 dB resolution
- \* 110 dB dynamic range.
- \* Directional Coupler for VSWR/ Return Loss.
- \* Stepper motor antenna rotator.
- \* 1 degree resolution stepper motor
- \* RS232 interface with polar/cartesian plotting software
- \* All SMA connectors, Teflon Cables.
- \* All antenna gain, return loss and pattern plot provided
- \* 1000 location Frequency and level storage in receiver

### 1. PLL Synthesized Digital RF Transmitter/Receiver



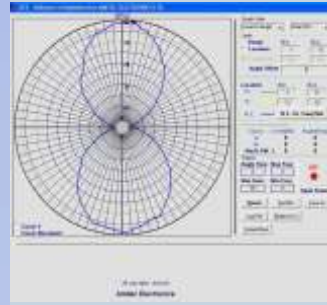
Frequency range: 86 - 860 MHz PLL for Tx and Rx  
 Step size: 0.05, 0.1, 0.25, 0.5, 1, 10, 100 MHz  
 Accuracy: 0.01%  
 Display: 16X2 Backlit LCD  
 Controls: Menu, Enter, Escape, Up & Down  
 Memory: 1000 frequency store/recall  
 Modulation FM: Internal 1KHz/ External Microphone  
 RF Level : +3 dBm typical  
 Attenuator: 35dB internal switchable  
 Impedance: 50 ohms SMA  
 Measurements: RF level in pW, dBm, dBuV, dBm  
 Resolution: 0.1dB  
 Dynamic range: 110 dB (75dB log +35dB attenuator)  
 Speaker: Inbuilt for Audio output  
 PC interface: RS 232 connectivity to PC for antenna plotting using supplied software  
 Auto mode: For antenna gain & SWR bandwidth with transmitter & polar/ cartesian plots with Stepper.  
 Demodulation: FM Demodulation out  
 Rotation: 0-359 degrees with 1 deg resolution  
 Angular steps: 1, 5, 10, 45 degrees  
 Auto mode: 1. Automatic rotation with receiver  
                   : 2. Tracking operation with Tx  
 Mode: CW/CCW rotation, Fast Slow speed modes  
 Down converter: 39MHz out for spectrum analyser  
 RSSI: Received Signal strength Indication for Fading analysis  
 Power Supply : 100-240V AC, 50-60 Hz

### 2. Stepper Motor Controller Unit



Display: 16X2 backlit LCD  
 Rotation: 0-359 degrees  
 Resolution: 1 degree.  
 Angular steps: 1, 5, 10, 45°  
 Memory: 1000 angular position store/recall  
 Auto mode: Automatic rotation with receiver  
 Mode: CW/CCW rotation, Fast Slow speed modes  
 Power Supply: 100-240V AC, 50-60 Hz

### 3. Software



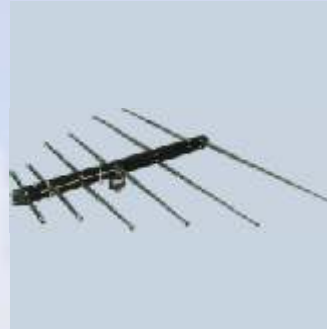
RS 232 interface with polar plotting with log, linear cartesian and polar plots,  $V_i$ ,  $V_r$  & Return loss plots, Multiple pattern overlay, Double cursor, Zoom, Colour editing, 1000 location editor, Absolute/Relative, 3dB/10dB beam-width, Gain, Front to back, Side lobe level and position, Plot rotate, File-edit, save, get.

### 4. Directional Coupler



Coupling: 17dB  
 Directivity: 20dB  
 Insertion Loss: <1.5dB  
 Bandwidth: 0.05 -1 GHz  
 Usage: Antenna forward & reverse power & VSWR measurements.  
 Connector : SMA

### 5. Log Periodic Dipole Array



S11: >10dB  
 Bandwidth: 600 ± 300 MHz  
 Gain: 4dBi  
 Beamwidth : E plane 60°  
 Beamwidth : H Plane 80°  
 Polarisation : Linear  
 Front to Back Ratio: >6dB  
 Connector : SMA

### 6. Biconical



S11: >10dB  
 Bandwidth: 600 ± 300 MHz  
 Gain: 2dBi  
 Beamwidth : E plane 60°  
 Beamwidth : H Plane 180°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### 7. Microstrip Slot



S11: >10dB  
 Bandwidth: 750 ± 20 MHz  
 Gain: 2dBi  
 Beamwidth : E plane 60°  
 Beamwidth : H Plane 180°  
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

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### 8, 9. Endfire & Broadside phased array



S11: >10dB  
 Bandwidth:  $800 \pm 50$  MHz  
 Gain: 3dBi  
 Beamwidth : E plane  $60^\circ$   
 Beamwidth : H Plane  $120^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### 16. Disccone



S11: >10dB  
 Bandwidth:  $600 \pm 300$  MHz  
 Gain: 0dBi  
 Beamwidth : E plane  $60^\circ$   
 Beamwidth : H Plane  $180^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### 10,11. Helix LHCP & RHCP



S11: >10dB  
 Bandwidth:  $750 \pm 100$  MHz  
 Gain: 4dBi  
 Beamwidth : E plane  $60^\circ$   
 Beamwidth : H Plane  $120^\circ$   
 Polarisation : Circular RH  
 Front to Back Ratio: 6dB  
 Connector : SMA

### 17, 18. Crossed Dipole



S11: >10dB  
 Bandwidth:  $700 \pm 50$  MHz  
 Gain: 2dBi  
 Beamwidth : E plane  $90^\circ$   
 Beamwidth : H Plane  $180^\circ$   
 Polarisation : Circular LH & Circular RH  
 Front to Back Ratio: 0dB  
 Connector : SMA

### 12. Square Loop



S11: >10dB  
 Bandwidth:  $600 \pm 50$  MHz  
 Gain: 2dBi  
 Beamwidth : E plane  $80^\circ$   
 Beamwidth : H Plane  $120^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### 19. Yagi 3el



S11: >10dB  
 Bandwidth:  $700 \pm 100$  MHz  
 Gain: 4dBi  
 Beamwidth : E plane  $60^\circ$   
 Beamwidth : H Plane  $80^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: >6dB  
 Connector : SMA

### 13. Quad



S11: >10dB  
 Bandwidth:  $600 \pm 50$  MHz  
 Gain: 4dBi  
 Beamwidth : E plane  $60^\circ$   
 Beamwidth : H Plane  $80^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 6dB  
 Connector : SMA

### 20. Yagi 4el



S11: >10dB  
 Bandwidth:  $700 \pm 50$  MHz  
 Gain: 5dBi  
 Beamwidth : E plane  $60^\circ$   
 Beamwidth : H Plane  $80^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: >6dB  
 Connector : SMA

### 14. V antenna, 15. Rhombus



S11: >10dB  
 Range:  $800 \pm 100$  MHz  
 Gain: 2dBi  
 Beamwidth : E plane  $60^\circ$   
 Beamwidth : H Plane  $100^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 6dB  
 Connector : SMA

### 21. Sleeve



S11: >10dB  
 Bandwidth:  $750 \pm 20$  MHz  
 Gain: 2dBi  
 Beamwidth : E plane  $70^\circ$   
 Beamwidth : H Plane  $180^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

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### 22. Monopole



S11: >10dB  
 Bandwidth:  $600 \pm 300$  MHz  
 Gain: 1dBi  
 Beamwidth : E plane  $70^\circ$   
 Beamwidth : H Plane  $180^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### 28. Top Loaded



S11: >10dB  
 Bandwidth:  $600 \pm 200$  MHz  
 Gain: 2dBi  
 Beamwidth : E plane  $70^\circ$   
 Beamwidth : H Plane  $180^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### 23,24. Dipole L/2 & L/4



S11: >10dB  
 Bandwidth:  $600 \pm 300$  MHz  
 Gain: 2dBi  
 Beamwidth : E plane  $70^\circ$   
 Beamwidth : H Plane  $180^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### 30. Antenna azimuth positioner



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

### 25. Folded Dipole



S11: >10dB  
 Bandwidth:  $600 \pm 200$  MHz  
 Gain: 2dBi  
 Beamwidth : E plane  $70^\circ$   
 Beamwidth : H Plane  $180^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### Accessories

- 1) Transmitter antenna mounting stand.
- 3) All necessary connectors & Teflon RF cables.
- 4) Students activity & Teachers reference Manual
- 5) Software CD
- 6) Antenna Kit
- 7) Voltage Probe
- 8) Measuring Tape
- 9) RS232 Lead
- 10) SMA-SMA lead 1.5m

### 26. L/4 Phase Array



S11: >10dB  
 Bandwidth:  $800 \pm 200$  MHz  
 Gain: 3dBi  
 Beamwidth : E plane  $70^\circ$   
 Beamwidth : H Plane  $180^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 0dB  
 Connector : SMA

### E-Manual: Installation Video for ease of Learning

Dimension : 75 X 55 x 45 cms. Weight : 30 Kg  
 Warranty: 3 yrs.

### Areas of Experimentation and scope of study

- \* Inverse square law of propagation.
- \* Radiation pattern of an Omni and directional antenna.
- \* Vertical, Horizontal and Circularly polarized antennas.
- \* Polarization discrimination linear & circular antennas
- \* Resonant and non-resonant antenna.
- \* Reciprocity of antenna.
- \* Current distribution of an antenna.
- \* Antenna parameters:
- \* Radiation pattern E & H Plane - Polar & Cartesian Plots
- \* Directive gain, beam width (Half Power/10dB), front to back ratio, plane of polarization, side lobe level & angle.
- \* Antenna resonance, VSWR and bandwidth using directional coupler and adjust the antenna.
- \* Comparative study of antennas.
- \* Significance of parasitic element dimensions.
- \* Construct antenna using antenna kit
- \* Voice communication link using antennas. Plus lot more.

### 27. Ground Plane



S11: >10dB  
 Bandwidth:  $600 \pm 200$  MHz  
 Gain: 3dBi  
 Beamwidth : E plane  $70^\circ$   
 Beamwidth : H Plane  $180^\circ$   
 Polarisation : Linear  
 Front to Back Ratio: 4dB  
 Connector : SMA

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