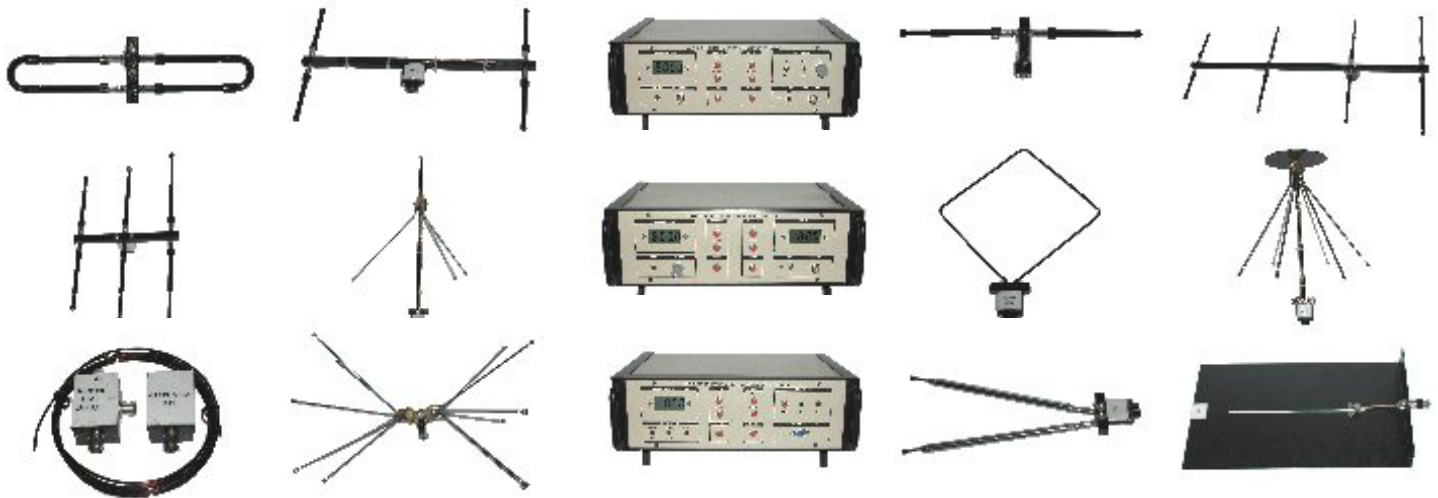
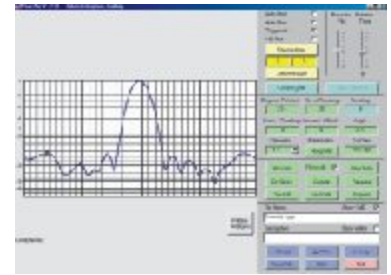
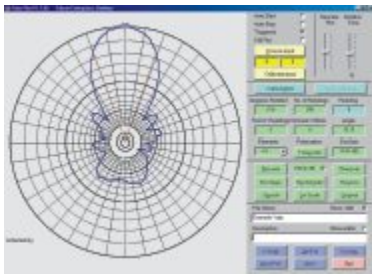


ANTENNA TRAINING SYSTEM



The Antenna Training System is a stand alone, very versatile table top system requiring no other high frequency equipments. It is a very useful tool that provides hands-on experimentation and understanding of the principle and working of commonly used antennas in the UHF-VHF-MICROWAVE band and to plot their polar plots. It can be used by students of all level. The antennas are designed for use at higher frequencies making them handy and smaller in size for better understanding. This system allows students to do analysis of radiation pattern, phenomenon of polarization, antenna parameters, antenna resonance, antenna reciprocity, ground reflection and hence to do the comparison of different types of antennas. Each kit includes Synthesized Digital RF Transmitter, Synthesized Digital RF Receiver, different types of Antennas and all the necessary cables and accessories. An exhaustive manual has been provided with the system covering all the experiments along with antenna theory and a set of polar graph paper for antenna radiation characteristics and all the other relevant documents. Antenna Training System has four different systems.

ATS-2000 is a fixed frequency Antenna Training System. This trainer works at 610 MHz frequency.

ATS-2001 is a basic Antenna Training System. This trainer provides antenna analysis at 100-850 MHz frequency range.

ATS-2002 is a advanced Antenna Training System with software interface on PC. This trainer provides 86-860 MHz frequency range antenna analysis with Polar Plot software on PC. A stepper motor controller is provided to rotate receiving antenna circularly.

ATS-2003 is a advanced Antenna Training System. This antenna trainer covers frequency range from 5MHz to 2GHz and also provides Polar Plot software on PC. A stepper motor controller is provided to rotate receiving antenna circularly.

ANTENNA TRAINING SYSTEM

FEATURES:

- Tabletop stand-alone system requiring no other HF equipment.
- Different types of adjustable antennas with telescopic rod elements.
- PLL synthesized antenna transmitter and receiver operation for testing and modeling of antennas.
- User selectable transmitter & receiver frequencies and adjustable antenna lengths to cover wide frequency range for variety of experiments.
- Digital display of RF level in dBuV.
- Memories - in transmitter and receiver for storing various frequencies and rf levels for antenna measurements. Memories in stepper controller for storing various angular positions for radiation pattern.
- Stepper motor controlled antenna positioning tripod with polarization facility for accurate, repeatable measurements.
- User selectable steps to rotate either receiving or transmitting antenna with auto mode for plotting radiation pattern.
- Antenna Polar plotting software for antenna analysis with antenna beam width (3dB & 10dB), side lobe level and its angular position, Directive gain, Front to back ratio, Polar & Cartesian plot in Linear or log scale with printing and file saving facility, cursor measurements, front & back reading trimming, pattern overlay, plus numerous other features.
- RS-232 interface with customised software.

| List Of Experiments | ATS-2000 | ATS-2001 | ATS-2002 | ATS-2003 |
|--|----------|----------|------------|------------|
| 1. To prove the Inverse Square Law of Propagation. | ✓ | ✓ | ✓ | ✓ |
| 2. To plot the radiation pattern of Omni-Directional and Directional antennas. | ✓ | ✓ | ✓ | ✓ |
| 3. To study the phenomenon of polarization for (H) Horizontal, (V) Vertical and (C) Circularly polarized antennas. | ✓ H&V | ✓ H&V | ✓ H,V&C | ✓ H,V&C |
| 4. To study the difference between a Resonant and Non-Resonant antenna and hence calculate the resonant frequency and estimate the VSWR of a Resonant antenna. | | ✓ | ✓ | ✓ |
| 5. To demonstrate that the transmitting and receiving radiation patterns of an antenna are equal and hence confirm the reciprocity of antenna. | ✓ | ✓ | ✓ | ✓ |
| 6. To study the current distribution along the length of element of an antenna. | | ✓ | ✓ | ✓ |
| 7. Study of antenna parameters. | ✓ | ✓ | ✓ | ✓ |
| 8. To plot the radiation pattern (Azimuth & Elevation Plane - Polar and Cartesian plots on Log/Linear scale). | ✓ | ✓ | ✓ | ✓ |
| 9. From the radiation pattern, measure the directive gain, beam width (Half Power/10dB), front to back ratio, side lobe level and its angular position. | ✓ | ✓ | ✓ | ✓ |
| 10. To study antenna resonance and estimate VSWR and bandwidth using RLB and adjust the antenna dimensions for Resonance. | | ✓ | ✓ | ✓ |
| 11. Comparative study between various antennas based on Antenna parameters. | ✓ | ✓ | ✓ | ✓ |
| 12. To observe the significance of parasitic element dimensions on antenna parameters. | | ✓ | ✓ | ✓ |
| 13. To study antenna modeling. | | ✓ | ✓ | ✓ |
| 14. To construct your own antenna and study its parameters. | | ✓ | ✓ | ✓ |
| 15. To establish voice communication link using antennas. | ✓ | | ✓ | ✓ |



ANTENNA TRAINING SYSTEM

| SPECIFICATIONS | ATS-2000 | ATS-2001 | ATS-2002 | ATS-2003 |
|---------------------------------|---|---|--|---|
| TRANSMITTER | | | | |
| FREQUENCY | 610 Mhz approx. | 100 - 850 MHz comb generator for frequencies at 50MHz intervals | 86 - 860 MHz PLL Synthesized | 5MHz - 2GHz PLL Synthesized in 3 ranges with 3 outputs using Up & Down Converters |
| FREQ. RESOLUTION | - | - | 50,100, 250, 500KHz, 1&10MHz | 50,100, 250, 500KHz, 1&10MHz |
| FREQ. ACCURACY | - | 0.01% | 0.01% | 0.01% |
| DISPLAY | - | - | LCD | LCD |
| CONTROLS | - | - | Menu, Enter, Escape, Up & Down buttons. | Menu, Enter, Escape, Up & Down buttons. |
| MEMORY | - | - | 1000 individual freq. can be stored. | 1000 individual freq. can be stored. |
| MODULATION FM | Internal 1KHz / External Microphone. | - | Internal 1KHz / External Microphone. | Internal 1KHz / External Microphone. |
| RF LEVEL | 90 dBuV | 90dBuV | 100 dBuV | 100 dBuV |
| ATTENUATOR | - | 40dB | 40dB | 40dB |
| OUTPUT IMPEDANCE | 75 ohms | 75 ohms | 75 ohms | 75 ohms |
| POWER SUPPLY | 220V AC \pm 10% | 220V AC \pm 10% | 220V AC \pm 10% | 220V AC \pm 10% |
| RECEIVER | | | | |
| FREQUENCY | 610 Mhz approx. | 100 - 850 MHz PLL Synthesized | 86 - 860 MHz PLL Synthesized | 5MHz - 2GHz PLL Synthesized in 3 ranges with 3 inputs using Up & Down Converters |
| FREQ. RESOLUTION | - | 50,100, 250, 500KHz, 1&10MHz | 50,100, 250, 500KHz, 1&10MHz | 50,100, 250, 500KHz, 1&10MHz |
| FREQ. ACCURACY | - | 0.01% | 0.01% | 0.01% |
| DISPLAY | - | LCD | LCD | LCD |
| CONTROLS | - | Menu, Enter, Escape, Up & Down buttons. | Menu, Enter, Escape, Up & Down buttons. | Menu, Enter, Escape, Up & Down buttons. |
| MEMORY | - | 1000 individual freq. can be stored. | 1000 individual freq. can be stored. | 1000 individual freq. can be stored. |
| MEASUREMENTS | RF level in dBuV with 0.1dB resolution. | RF level in dBuV with 0.1dB resolution. | RF level in dBuV with 0.1dB resolution. | RF level in dBuV with 0.1dB resolution. |
| DYNAMIC RANGE | 60 dB logarithmic | 110 dB (70dB logarithmic + 40dB attenuator) | 110 dB (70dB logarithmic + 40dB attenuator) | 110 dB (70dB logarithmic + 40dB attenuator) |
| INPUT IMPEDANCE | 75 ohms | 75 ohms | 75 ohms | 75 ohms |
| SPEAKER | Inbuilt for Audio output | | Inbuilt for Audio output | Inbuilt for Audio output |
| PC INTERFACE | - | - | Easy connectivity to PC (Rs232) for polar plotting using supplied software | Easy connectivity to PC (RS232) for polar plotting using supplied software |
| POWER SUPPLY | 220V AC \pm 10% | 220V AC \pm 10% | 220V AC \pm 10% | 220V AC \pm 10% |
| STEPPER MOTOR CONTROLLER | | | | |
| DISPLAY | - | - | LCD for angular position. | LCD for angular position. |
| ROTATION | - | - | 0-359 degrees. | 0-359 degrees. |
| CONTROL | - | - | Menu, Enter, Escape, Up & Down buttons | Menu, Enter, Escape, Up & Down buttons |
| ANGULAR STEPS | - | - | User selectable steps of 1, 5, 10, 45 degrees. | User selectable steps of 1, 5, 10, 45 degrees. |
| MEMORY | - | - | 1000 for storing angular positions and quick recall. | 1000 for storing angular positions and quick recall. |
| AUTO MODE | - | - | Automatic rotation in user selectable steps. | Automatic rotation in user selectable steps. |
| INDICATION | - | - | Beep on reaching the selected position. | Beep on reaching the selected position. |
| POWER SUPPLY | - | - | 220V AC \pm 10% | 220V AC \pm 10% |

ANTENNA TRAINING SYSTEM

| SPECIFICATIONS | ATS-2000 | ATS-2001 | ATS-2002 | ATS-2003 |
|-------------------------|---|---|---|---|
| ANTENNAS | <ol style="list-style-type: none"> 1. End Fire 2. Dipole (2 Nos.) 3. Folded Dipole 4. Yagi (3 ele) 5. Loop Antenna | <ol style="list-style-type: none"> 1. Monopole 2. Dipole (2 Nos.) 3. Folded Dipole 4. Yagi (3 ele) 5. Yagi (4 ele) 6. Biconical 7. Discone 8. Sleeve 9. Slot 10. End Fire 11. Broad Side 12. Whip 13. Microstrip Patch 14. Square Loop 15. V Antenna | <ol style="list-style-type: none"> 1. Monopole 2. Dipole (2 Nos.) 3. Folded Dipole 4. Crossed Dipole (RHCP) 5. Crossed Dipole (LHCP) 6. Yagi (3 ele) 7. Yagi (4 ele) 8. Biconical 9. Discone 10. Log Periodic 11. Sleeve 12. Slot 13. End Fire 14. Broad Side 15. Whip 16. Helix (RHCP) 17. Helix (LHCP) 18. Square Loop 19. Quad 20. V Antenna 21. Microstrip Patch | <ol style="list-style-type: none"> 1. Monopole 2. Dipole (2 Nos.) 3. Folded Dipole 4. Crossed Dipole (LHCP) 5. Crossed Dipole (RHCP) 6. Yagi (3 ele) 7. Yagi (4 ele) 8. Biconical 9. Discone 10. Log Periodic 11. Sleeve 12. Slot 13. End Fire 14. Broad Side 15. Helix (RHCP) 16. Helix (LHCP) 17. Whip 18. Square Loop 19. Quad 20. Spiral 21. V antenna 22. Patch 23. Parabolic Dish 24. Ground Plane with Reflector & Director 25. Collinear 26. /4 Phase Array 27. Blade 28. Conical Horn 29. Batwing 30. Stacked Yagi |
| WINDOWS SOFTWARE | - | - | Antenna plotting in Polar & Cartesian planes with cursor measurement facility, Data logging facility via RS-232 interface. Edit, Save, Print, Overlay facilities. Software on CD | Antenna plotting in Polar & Cartesian planes with cursor measurement facility, Data logging facility via RS-232 interface. Edit, Save, Print, Overlay facilities. Software on CD |
| ACCESSORIES | <ul style="list-style-type: none"> • Non-conductive and non-radiating tripod for mounting transmitter and receiving Antenna • Condenser microphone • All necessary connectors and cables • Students activity, Teachers Reference and Theory manuals | <ul style="list-style-type: none"> • Antenna Fabrication kit • Return Loss Bridge with 0.1 to 1GHz frequency response and 20dB mid-band directivity for antenna VSWR estimation • Non-conductive and non-radiating tripod for mounting transmitter and receiving Antenna • All necessary connectors and cables • Students activity, Teachers Reference and Theory manuals • Sniffer Probe | <ul style="list-style-type: none"> • Antenna Fabrication kit • Return Loss Bridge with 0.1 to 1GHz frequency response and 20dB mid-band directivity for antenna VSWR estimation • Non-conductive and non-radiating tripod for mounting transmitter Antenna • Stepper motor controlled non-conducting and non-radiating tripod stand for rotation of receiving antenna • Condenser microphone • All necessary connectors and cables • Students activity, Teachers Reference and Theory manuals • Sniffer Probe | <ul style="list-style-type: none"> • Antenna Fabrication kit • Return Loss Bridge/ Directional Coupler with 0.1 to 2GHz frequency response and 20dB mid-band directivity for antenna VSWR estimation • Power Divider for Diversity reception • Non-conductive and non-radiating tripod for mounting Antenna • Stepper motor controlled non-conductive and non-radiating tripod stand for rotation of receiving antenna • Condenser microphone • All necessary connectors and cables • Students activity, Teachers Reference and Theory manuals • Sniffer Probe • NG-03 Noise Generator 0.01-2GHz (Optional) |

