

Features:

- * Inside outside precious metal plated with diamond polish.
- * Corrosion/Oxidation free welded construction for long life.
- * 100% Tested and calibrated on HP network analyser
- * Full band Gunn Oscillator, detector and other components
- * PC serial and audio communication link over microwave.
- * Additional DRO X band source
- * Low Noise High sensitivity of 1uV opamp based SWR meter
- * Directional Coupler and Slotted line for VSWR/ Return Loss.

1. Micrometer tunable Broadband Gunn Oscillator



Frequency: 8.2-12.4 GHz
 Power O/P: 10 mW typical
 S11: >10dB
 Calibration chart: steps of 100 MHz
 Body: Solid wire cut Aluminum for thermal stability and long life
 Tuning: Precision Micrometer Driven solid short

2. Broadband PIN Diode Modulator



S11: >15dB
 S12 off: 10dB
 S12 on: <2dB
 Bandwidth: 8.2-12.4 GHz
 Diode: Microwave SMD package

3. Broadband Ferrite Isolator / Circulator



S11: >20dB
 S12: >20dB
 S21: <1.5dB
 Bandwidth: 8.2 - 12.4 GHz

4. Calibrated Frequency Meter



S11: >20dB
 S12: >3dB at resonance
 Q factor: 1000
 Accuracy: 1%
 Calibration Chart: Frequency v/s micrometer in steps of 100 MHz

5. Broadband Waveguide Detector



S11: 20dB
 Sensitivity: 0.5mV/uW
 Bandwidth: 9.3 - 11.3 GHz

6. Slide Screw Tuner with Precision Micrometer



Resolution X Y: 0.05 mm
 Drive: Vernier on teflon bearing

7. Calibrated Precision Variable Attenuator



S11: >20dB
 S12: 1 to 25dB variable
 Resolution: 1dB
 Accuracy: ± 1.5 dB
 Calibration Chart: Attenuation v/s micrometer in steps of 1 dB

8. Solid Dielectric cell



Type: Waveguide cavity
 Dielectric: Bakelite, Teflon, Acrylic, Nylon, Polypropylene
 Length: 60 degree empty

9. Liquid Dielectric cell



Type: Waveguide cavity
 Window: Kapton
 Filling: Syringe
 Cavity Volume: 1.5cc
 Length: 60 degree empty

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10. Precision Slotted Line with Broadband Detector Probe



S11: >20dB
S12: <1dB
Resolution: 0.05mm using vernier
Sensitivity: 0.1mV/uW

11. Broadband Multihole Waveguide Directional Coupler



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

12. Hybrid / Magic Tee



S11: >10dB
Isolation: 20dB H & E arms
Bandwidth: 9.8-10.8GHz

13. Series E plane Tee



S11, S22, S33: >20dB
S12, S13: 3.5dB
Phase: 180 degree
Bandwidth: 8.2-12.4 GHz

14. Shunt H Plane Tee



S11, S22, S33: >20dB
S12, S13: 3.5dB
Phase: 0 degree
Bandwidth: 8.2-12.4 GHz

15. Broadband Pyramidal Horn Antenna



Gain: 16dB
S11: 20dB
Beamwidth : 30 degree E & H

16. Phase Shifter



S11: >15dB
S12: >15dB
Calibration: 10.3 GHz
Calibration Chart: Phase Vs. Micrometer reading

17. X Band Microwave Source



Frequency: 10.3 GHz typical
Construction: 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 N connector

18. Broadband Waveguide to Coax adapter



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

19. Broadband Matched Termination- 2 Nos.



S11: >25dB
Bandwidth: 8.2-12.4 GHz

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20. Waveguide stand - 5 Nos. & Manual Antenna Rotator-1



Mount: E & H plane WR90

21. Digital Gunn Power Supply



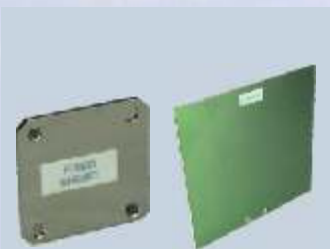
Display: LCD for voltage / current
 Gunn Bias Voltage: 2-10 V
 Gunn Current: 0-500 mA
 PIN Mod. Frequency: 800-1200Hz Square wave
 PIN Mod. Voltage: 0-10 V p/p
 PIN Offset Voltage: 0-10 V
 RS 232 port: PC interface for serial data communication
 MIC input: Audio communication

22. SWR Meter square Law



Frequency: 1 KHz center
 Bandwidth-3dB: 100 Hz
 Sensitivity: 1 uV
 Display: Analog meter 85mm
 Attenuator: 70 dB in 5 dB steps
 Scale: Normal /Expand
 RS232 port: PC interface for data serial communication
 Demod. Out: For audio link
 Speaker: Inbuilt for audio link

23. Accessories



Microphone,
 BNC- BNC Cable - 5 pcs,
 M4X12 Screw 10 pcs,
 M4X20 screw - 50 pcs,
 RS232 cable - 2 pcs,
 E manual Video + Software CD for ease of learning
 Power Cord -4 pcs,
 Reflector Panel
 Fixed Short
 S11: >60dB
 Flange: UG39/U

24. Data Communication Software:



Emulation:RS232 with selection of comports,
 Baud rates: (1200 to 38,400), parity, Data bits, stop bits, Flow control

Dimension: 55 X45 X 36, Weight: 21 Kg, Warranty: 3 yrs.

List of Experiments:

1. Gunn oscillator
 - i) Measurement of current vs. voltage characteristic
 - ii) Measurement of Gunn oscillator power vs supply voltage.
 - iii) Measurement of Gunn oscillator frequency vs supply voltage.
2. Modulator and crystal detector
 - i) Operation of PIN diode modulator & crystal detector.
 - ii) Study of square wave modulation of PIN modulator.
 - iii) Measurement of square law behavior of detector.
3. Propagation modes, wavelength and phase velocity
 - i) Measurement of frequency of source.
 - ii) Measurement of free space & guide wavelength
4. Q and bandwidth of resonance cavity of frequency meter
 - i) Measurement of Q using power measurement techniques.
 - ii) Measurement of Q using SWR meter
5. Power Measurements
 - i) Direct measurement of power
 - ii) Power measurement using directional coupler
 - iii) Measurement of Conjugate and Zo power.
 - iv) Measurement of modulated signals
 - v) Measure the tracking of dB scale with attenuator
 - vi) Study mismatch loss and maximum power transfer
6. VSWR and Reflection Coefficient by Standing wave and Double Minimum Method
 - i) Measurement of low, medium & high SWR using slotted line
 - ii) Measurement of High SWR using calibrated attenuator
6. Impedance Measurement
 - i) Measurement of unknown Impedance of load
 - ii) To match an unknown impedance.
7. Waveguide Hybrid(Magic) Tee
 - i) Measurement of Power division or Decoupling between H-arm and E- arm of a Magic Tee.
 - ii) Measurement of Insertion loss of a Magic Tee.
 - iii) Measurement of Return Loss of H arm of a Magic Tee
 - vi) Measurement of VSWR of ports of Hybrid (Magic) Tee
8. Properties of Directional Coupler
 - i) Measurement of coupling factor.
 - ii) Measurement of Directivity.
 - iii) Measurement of return loss of a load.
 - iv) Main line insertion loss, VSWR of ports.
9. Variable Attenuator
 - i) Measurement of attenuation using the Power Ratio and RF substitution method
 - ii) Measurement of low values of attenuation.
 - iii) Measurement of S parameters of variable attenuator.
10. To measure dielectric constant of a solid/liquid.
11. To study & calibrate a phase shifter.
12. To study and measure S parameters of waveguide to coax transition
12. To measure insertion loss/isolation/S parameters of isolators & circulator.
13. To establish a Microwave audio & PC-PC serial data communication link.
14. 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 given antenna.

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