

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.
- * Microwave power meter and sensor with 0.1dB Resolution and additional DRO X band source
- * X band Spectrum Analyser with near field probe provided for waveform analysis
- * Low Noise High sensitivity 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. X Band Microwave Source



Frequency: 10.5 GHz typical
 Construction: X band Dielectric Resonator stabilized MESFET source on microstrip
 Accuracy: 0.1%
 Modulation: CW/ASK(DC-15 KHz) Ext
 RF Level: 5mW typical
 Output Z: 50 ohms with SMA connector

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 1dB

8. Broadband Fixed attenuator



S12: 10dB
 S11: 15dB

9. 10. Broadband Matched Termination - 2 Nos.



S11: >25dB
 Bandwidth: 8.2-12.4 GHz

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11. Precision Slotted Line with Broadband Detector Probe



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

12. Broadband Multihole Waveguide Directional Coupler



S41 Coupling: 10dB
S34 Directivity: 30dB
S21 Insertion Loss: <1.5dB
Bandwidth: 8.2-12.4 GHz

13. Hybrid / Magic Tee



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

14. Series E plane Tee



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

15. Shunt H Plane Tee



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

16. Solid Dielectric cell



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

17. Liquid Dielectric cell



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

18. Rectangular waveguide



S11: >20dB
S12: <1dB
Bandwidth: 8.2 GHz -12.4 GHz
Length: 120mm typical

19. Calibrated Phase Shifter



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

20. Broadband Circulator/Isolator



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

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ISO 9001:2000
Quality Management System
Cert. No. 2919

21.22. Broadband Pyramidal Horn Antenna -2Nos



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

29. Reflector Panel



RCS: 0dBsm

23. Fixed Short



S11: >60dB
Flange: UG39/U

30. Manual Antenna Rotator



Mount: E & H plane WR90

24. Precision Movable Short



S11: >60dB
Drive: Precision Micrometer
Plunger: Solid Short

31. 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

25.26. Broadband Waveguide to Coax adapter - 2 Nos



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

32. SWR Meter square Law



Frequency: 1 KHz center
Bandwidth-3dB: 30 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
Amplifier Out: For CRO
Speaker: Inbuilt for audio link

27.28. Waveguide Stands - 7 Nos



Mount: E & H plane WR90

33. X band Spectrum Analyser



X Band 10-11GHz
Shows Gunn, Klystrons, Magnetrons, DRO's etc.
AM and FM modulation in frequency domain
Linear X and Log Y scales
10dB/500mV log factor
Sensitivity -70dBm
Variable center frequency, scan control, marker
X band current probe for near field analysis

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34A. X band Microwave Power Meter



Freq. range: 8.2 to 12.4 GHz
 Display: 16X2 Backlit LCD
 Power: +20dBm to -30dBm
 Measurement: dBm, dBμ, mW, dBW, dBuW With Digital Display
 Resolution: 0.1, 0.5 and 1dB
 Offset: For relative measure
 Level Indicator: Digital display and Bar Graph

34B. X band Microwave Power Sensor



Frequency Range: 8.2GHz to 12.4 GHz
 Power range: +20dBm to -30dBm
 Compensation: Temperature compensated thermistor
 Cable: Sensor cable 3m

35. Data Communication Software:



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

36. Accessories



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,
 SMA-SMA Coaxial RG316 Teflon low loss cable,
 Power Cord -4 pcs,

Dimension: 56 X45 X 36, Weight: 25 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. Fixed and 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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