



Advanced Microwave Integrated Circuit Lab

Nvis 9008 / Nvis 9008A



Advanced Microwave Integrated Circuit Lab includes instruments and accessories for studying the characteristics of any MIC (Microwave Integrated Circuits) component over the Frequency Range 2.2 to 3GHz. Characteristics and measurements like Transmission Loss and Reflection Loss of different MIC components can be studied with the help of instruments provided with Nvis 9008/Nvis 9008A. Directivity and Gain of Antennas can also be measured with the setup provided. The theoretical background on these components and experimental details are provided in the learning material CD.

Features

- Complete setup with Generator, MIC Components and Meter
- Gold Plated Components and Connectors
- Microwave Generator with internal AM and FM
- PC to PC Data Communication
- Antenna Radiation Pattern measurement
- Directivity and Gain measurement
- Online product tutorial

MIC Components	Nvis 9008	Nvis 9008A
50V Microstrip Line	✓	✓
Band Stop Filter	✓	✓
Parallel line Directional Coupler (15 dB)	✓	✓
Wilkinson Power Divider (3 dB)	✓	✓
Branchline Directional Coupler (3 dB)	✓	✓
Low Pass Filter	✓	✓
Band Pass Filter	✓	✓
Ring Resonator	✓	✓
Rat-Race Hybrid Ring Coupler (3 dB)	✓	✓
MIC Patch Antennas (2 Nos.)	✓	✓
Yagi antenna	✓	✓
Dipole Antenna	✓	✓
MIC Amplifier Nvis 10	✓	✓
RF Switch Nvis 10B	Optional	✓
RF Mixer Nvis 10C	Optional	✓
Local Oscillator Nvis 10A	Optional	✓
Measuring Line Nvis 10G	Optional	✓
Isolator Nvis 10E	Optional	✓
Circulator Nvis 10F	Optional	✓
Vector Network Analyser (3MHz-3GHz)	Optional	Optional



This Training System Includes

1. Nvis 104 Microwave Generator (2.2 - 3GHz)
2. Nvis 1103 VSWR Meter
3. MIC Components
4. Learning Material CD
5. Transmitting and Receiving mast

Nvis 104 Microwave Generator

Frequency Range	: 2.2 - 3GHz continuously variable
Display	: 16 x 2 LCD
Display Accuracy	: 40MHz
Impedance	: 50V
Min RF level	: 5mW
Output Level Variation	: 10 - 20 dB
Operating Modes	: Sweep, CW, Int. AM, Int. FM, Ext. AM, PC communication
Modulating Frequency	: 100Hz to 5kHz AM square wave, FM triangular wave
Power Supply	: 230V \pm 10%, 50Hz
Power Consumption	: 5VA (approximate)
Dimension (mm)	: W 262 x D 316 x H 130

Nvis 103 VSWR Meter

Sensitivity	: 0.1 μ V for 200W input impedance for full scale deflection
Noise Level	: Less than 0.02 μ V
Range	: 0 - 60 dB in 10 dB steps
Input	: Un-biased low and high impedance crystal biased crystal (200 and 200K)
Meter Scale expand	: SWR 1-4, SWR 3-10, dB 0-10, SWR 1-1.3, dB 0-2
Gain Control	: Adjusts the reference level, variable range 0 -10 dB (approximate)
Input Connector	: BNC (F)
Input Frequency	: 1000Hz \pm 10%
Power Supply	: 230V \pm 10%, 50Hz / 60Hz on request
Power consumption	: 2VA (approximate)
Dimension (mm)	: W 262 x D 316 x H 130

Scope of Learning

- PC to PC Data Communication using MIC components
- Measurement of Transmission Loss and Reflection Loss
- Measurement of substrate dielectric constant using Ring Resonator
- Measurement of power division, isolation and return loss characteristics
- Measurement of coupling, isolation and return loss characteristics
- Measurement of coupling and directivity
- Measurement of Low Pass Filter characteristics
- Measurement of Band Pass Filter characteristics
- Measurement of Band Stop Filter characteristics
- Measurement of characteristics of Patch Antennas
- Measurement of characteristics of an MIC Amplifier
- To study RF switch
- To study RF Mixer
- Measurement of Guide wavelength, Free Space Wavelength and SWR using Measuring Line
- Measurement of Directivity and Gain of Antennas : Y a g i Antenna, Patch Antenna, Dipole Antenna
- To study the characteristics of Isolator
- To study the characteristics of Circulator



Accessories

- Matched Loads (5 Nos.)
- Short
- Coaxial Detector
- Microstrip Directional Coupler (10 dB)
- SMA to SMA Adapters (Both male & female)
- SMA (male) connector fitted cables
- Attenuator (3 dB)
- +12V DC Adaptor
- Transmitting and Receiving Mast
- SMA (Male) to BNC (Female) adaptor
- 3-pin Lunar cable



Specification of MIC Components

- 1) Test Jig
It includes of the following:
 - a) 10 dB directional coupler
 - b) Detector
 - c) Shorts
 - d) Matched Loads
 - e) Attenuator
- 2) Low pass Filter
Cut off frequency : 2.5GHz (approximate)
Dielectric material : Ceramic Substrate
Dielectric constant : 3.02
- 3) Band Pass Filter
Center frequency around:2.4GHz
Dielectric material : Ceramic Substrate
Dielectric constant : 3.02
- 4) Band Stop Filter
Center frequency around:2.4GHz
Dielectric material : Ceramic Substrate
Dielectric constant : 3.02
- 5) Branch Line Coupler
Dielectric material : Ceramic Substrate
Dielectric constant : 3.02
Coupling : 3dB
- 6) Rat-Race Coupler
Dielectric material : Ceramic Substrate
Dielectric constant : 3.02
Coupling : 3dB
- 7) Parallel Line Directional Coupler
Dielectric Material : Ceramic Substrate
Dielectric Constant : 3.02
Coupling : 15dB
- 8) Power Divider
Dielectric Material : Ceramic Substrate
Output Power : 3dB
Return Loss : 8dB
Dielectric Constant : 3.02
- 9) Ring Resonator
The Resonance freq. : 2.4GHz
Dielectric material : Ceramic Substrate
Dielectric constant : 3.02
- 10) 50E Microstrip Line
Dielectric material : Ceramic Substrate
Dielectric constant : 3.02
- 11) RF Switch (Pin Modulator)
Frequency Range : DC to 5GHz
Rise/fall time : 6 ns typical
Type : SPDT
- 12) RF Mixer
Frequency Range : 2.0 to 7.0GHz
Conversion Loss : 6.2dB typical
L-R Isolation : 30 dB typical
RF Power : 50mW
- 13) Local Oscillator
Frequency Range : 2.2 to 3GHz
Tuning Voltage : 5V DC
Operating Voltage : 5V DC
- 14) Measuring line
Dielectric Material : Ceramic Substrate
Dielectric Constant : 3.02
- 15) Isolator
Isolation : 15dB
Impedance : 50 Ohms
Insertion loss : 0.8dB Max
Avg Power : 5W
Design Tolerance : $\pm 5\%$
- 16) Circulator
Isolation : 15dB
Impedance : 50 Ohms
Insertion loss : 0.8dB Max
Avg Power : 5W
Port : 3
Design Tolerance : $\pm 5\%$

3MHz - 3GHz Full S-Parameter Vector Network Analyser (Optional)

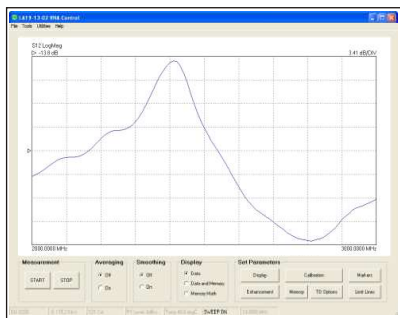
It is a PC-driven Vector Network Analyser which is suitable for measuring a wide range of devices from 3MHz to 3GHz with 100Hz resolution. It is housed in a small lightweight package making it very portable. The user interface control software provides many useful features including memory functions, limit lines, de-embedding, time-domain and reference plane extension. Also, utilities such as measurement of power at the 1dB gain compression point and AM to PM conversion factor add versatility to the instrument.

Unique features include OSL calibration that does not require a precision load and importing of data files into memory traces for live comparison with measurements.

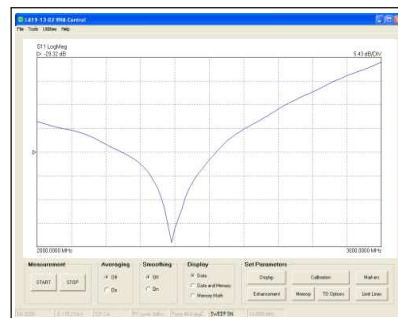


Features

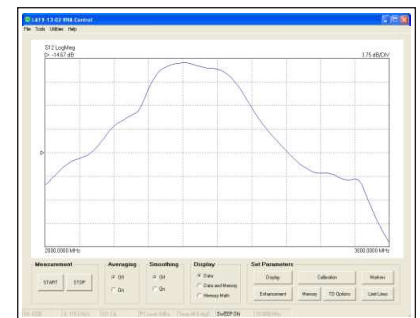
- 3MHz–3GHz range
- 100Hz resolution
- 80dB dynamic range
- Full s-parameter test set
- De-embedding capability
- Time domain facility
- P1dB and AM-PM measurements
- Light weight and small footprint
- Low cost
- Exhaustive learning material



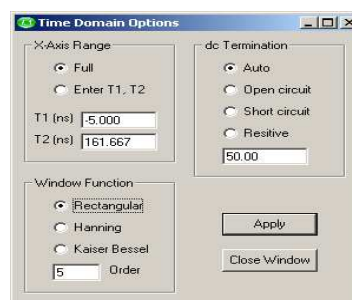
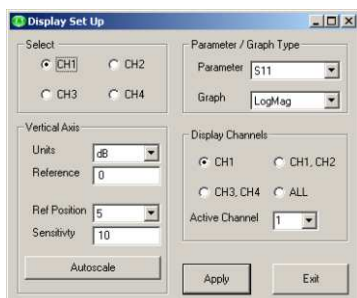
Transmission Characteristic of Ring Resonator (S12)



Reflection Characteristic of Ring Resonator (S11)



Transmission Characteristic of Bandpass Filter (S12)



Software Window

