

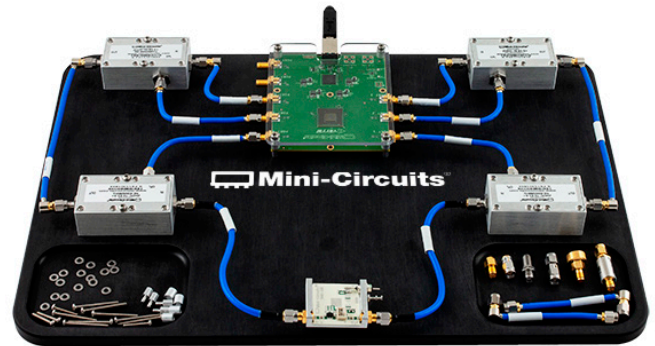
MICROWAVE TRANSCEIVER KIT

UVNA-63

Project No. 1: DIY Vector Network Analyzer

Features

- Hands-on learning tool for EM Course Work
- Complete kit for full 2-Port Vector measurements
- Open access to the entire VNA RF chain
- Implement in multiple software environments



Click Here for:

[Assembly Instructions >](#)

[Programming Guides >](#)

[Application Notes >](#)

[Software Downloads >](#)

UNIVERSITY PROJECTS



Build

Your Own Vector Network Analyzer with RF Transceiver Board, RF & Microwave components, cables and calibration standards



Develop

Real Time S-Parameter Measurement with Python or Matlab®



Learn

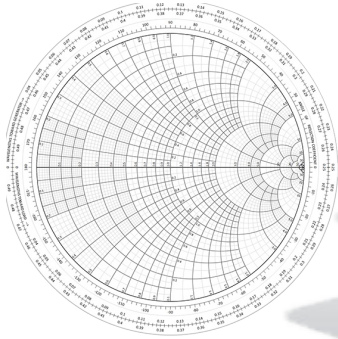
Access to Online Tutorials and Sample Code

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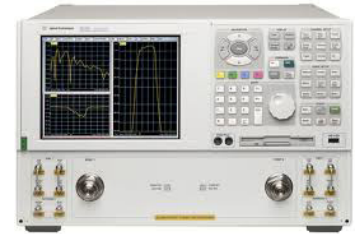
Project No. 1: DIY Vector Network Analyzer

Textbook Theory



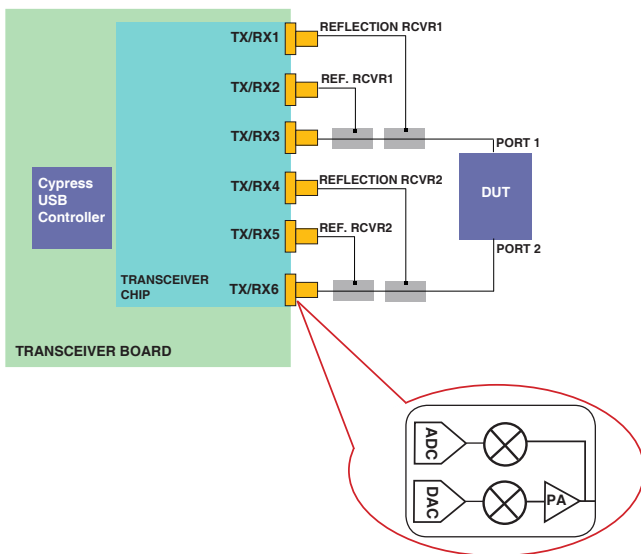
Bridging the gap

Lab Measurements



- Automated Measurements
- Automated Calibration
- Auto-port extension

Functional Block Diagram



Transceiver Electrical Specifications

Parameter	Symbol	Min.	Typ.	Max.	Units
Load Impedance	Z_L		50		Ω
Frequency Range	f_{LO}	100		6000	MHz
Isolation between ports	Iso		80		dB
Port Return Loss	RL		-10		dB
TX Output Power Setting	P_{tx_set}	-26		0	dBm
TX Power Step size	P_{tx_step}		2		dB
TX Power @ -10dBm Setting	$P_{tx_ -10\text{dBm}}$	-12		-8	dBm
Absolute Maximum Input Power				10	dBm
USB Supply Voltage	V_{SUPPLY}	4.75		5.25	V
Operational Current Consumption	I_{SUPPLY}	0.4		0.65	A
Operating Temperature		18		35	$^{\circ}\text{C}$

Project No. 1: DIY Vector Network Analyzer

Create S-Parameter Algorithms to perform functions on Transmit, Reflected and Reference Signals to produce real-time results

The screenshot shows the Spyder Python IDE interface. On the left, a code editor displays Python code for a VNA calibration routine. A blue box highlights a section of the code, with an arrow pointing to the text "Code in Spyder Editor". On the right, the Variable Explorer shows a list of variables, with a blue box highlighting it and an arrow pointing to the text "List of Variables". Below the code editor, the Python console displays a plot titled "20dB Attenuator S-Parameters Calcd DUT". The plot shows Magnitude (dB) and Phase (deg) versus Frequency (GHz) for three different attenuators (S11, S12, S22). An arrow points from the plot to the text "Console".

Configure transceivers for sweep, RBW, power and step size through simple API

The screenshot shows a web-based control interface for a VNA. On the left, there are sliders and input fields for configuring the sweep: Start Freq (MHz) is 100, Stop Freq (MHz) is 6000, Power Level (dBm) is -26, Number of points is 2, RBW (KHz) is 10.000, Number of ports is Dual Port, and Number of recordings is 1. There are buttons for "Init", "Run", and "Shut Down". On the right, there is a diagram of the VNA hardware with Port A and Port B labeled. The interface is branded with Mini-Circuits and vayyar logos.

Project No. 1: DIY Vector Network Analyzer

Quantity	Description	Mini-Circuits Part No.
KIT COMPONENTS		
1	Vayyar Transceiver Board	TB-UVNA
1	Tray	B12-269-02-1+
1	Clear Cover 0.125" Thick	B13-269-02+
2	16dB High Directivity Coupler	ZHDC-16-63-S+
2	10dB High Directivity Coupler	ZHDC-10-63-S+
1	USB 3.0 Cable 2.69 ft	B66-275+
4	141 Hand Flex 4" Cable	141-4SM+
2	141 Hand-Flex 3" Cable	141-3SMRSM+
2	141 Hand-Flex 6" Cable	141-6SMR+
1	141 Hand-Flex 12" Cable	141-12SMR+
2	Flexible 141 6" Test Cable	FL141-6SM+
CALIBRATION KIT		
1	Female - Open	B20-64-F6+
1	Female - Short	B20-64-F7+
1	Female - Load	ANNE-50F+
1	Female - Thru	SF-SF50+
DEVICES UNDER TEST		
1	Band Pass Filter, 2450 MHz	VBF-2435+
1	Low Pass Filter, 1500 MHz	VLF-1500+
1	GVA-84 Evaluation Board	TB-410-84+
1	3 dB Attenuator, 1 Watt	VAT-3+
1	6 dB Attenuator, 1 Watt	VAT-6+
1	15 dB Attenuator, 1 Watt	VAT-15+
1	50 Ohm Termination	ANNE-50+
2	SMA Male - SMA Male Adapter	SM-SM50+
2	SMA Female - SMA Female Adapter	SF-SF50+
SUPPLEMENTAL		
1	SMA Wrench	B85-TM-134

About Mini-Circuits & Vayyar

Mini-Circuits is a global leader in the design, manufacturing and distribution of RF, IF, and microwave components and integrated modules covering the DC to 65 GHz band. With over 25 different product lines and over 10,000 active models, rapid response, demanding quality standards, value pricing, on-time delivery, and top-notch customer service have helped make Mini-Circuits the world's preferred supplier of RF and microwave products for over 50 years.

Founded in 2011, Vayyar started with the vision to develop a new modality for breast cancer detection by using RF to quickly and affordably look into human tissue to detect malignant growths. As the technology matured and evolved, Vayyar leveraged it to develop a unique System-on-Chip (SOC) to open up new capabilities and widen its original application scope to additional markets including robotics, smart home, retail and testing.

Over a simple dinner meal, these two companies realized that there was a gap in the RF industry in how new engineers were linking the knowledge they learn in the classroom to the sophisticated equipment they were using in their respective careers. Combining Mini-Circuits components and the Vayyar SOC, a powerful learning tool could be created to teach new and practicing engineers the challenges and wonders of the RF world.