

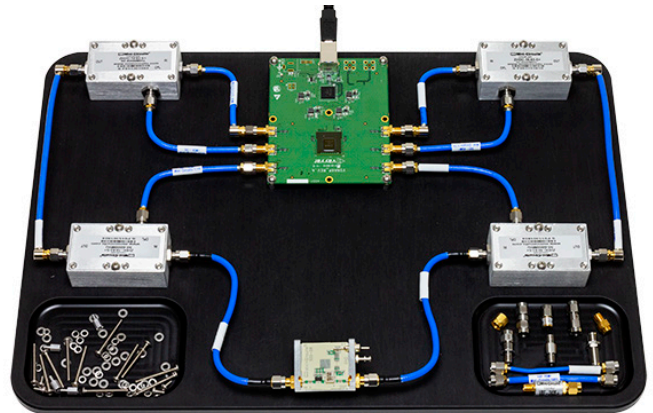
MICROWAVE TRANSCEIVER KIT

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



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

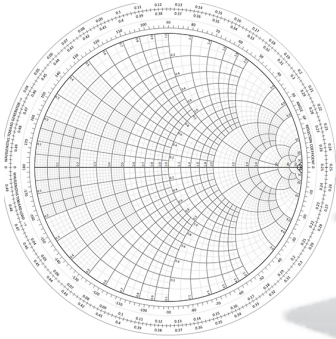
Access to Online Tutorials and Sample Code

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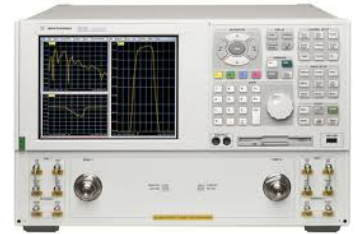
Project No. 1: DIY Vector Network Analyzer

Textbook Theory



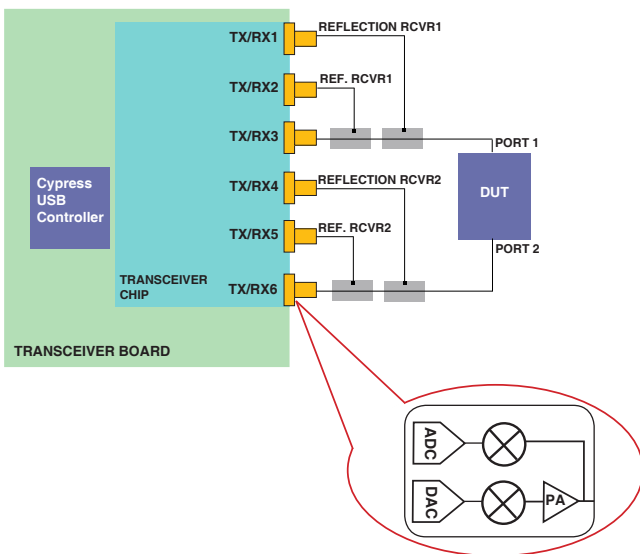
Bridging the gap

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
Operating Frequency	f	100		6000	MHz
TX Power Setting	P_{tx}	-26		0	dBm
TX Power Step size			2		dB
Port Matching	S_{11}		-12	-7	dBm
Vcc Supply Voltage	V_{cc}	4.75		5.25	V
Operational Current Consumption		0.4		0.65	A
Specification Temperature Range		18		35	$^{\circ}C$
Input Power (No damage)	$P_{in_{max}}$			10	dBm
Port Isolation	Iso	65	90		dB

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 displays the Spyder Python IDE environment. On the left, the code editor shows Python code for a VNA class, including methods for setting ports, recording, and plotting. 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 window shows a list of variables such as 'Agilent_85952D', 'vna_cal_kit_A', 'axes', 'called_dut', 'freq', 'my_dut', and 'my_ideals', with an arrow pointing to the text "List of Variables". Below the variable explorer, the Python console shows the execution of a command, with an arrow pointing to the text "Console". The console output includes a plot titled "20dB Attenuator S-Parameters" with subplots for "Uncalcd DUT" and "Calcd DUT", showing Magnitude (dB) and Phase (deg) versus Frequency (GHz).

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

The screenshot shows a web-based control interface for a VNA. It features a "Remote Control" section with a "Start Freq (MHz)" slider set to 100 and a "Stop Freq (MHz)" slider set to 6000. Below the sliders are input fields for "Start Freq (MHz)", "Stop Freq (MHz)", "Power Level (dBm)" (set to -10), "Number of points" (set to 2), "RBW (KHz)" (set to 10.000), "Number of ports" (set to "Dual Port"), and "Number of recordings" (set to 1). The "Status" is shown as "On". At the bottom, there are "Init", "Run", and "Shut Down" buttons. The interface is branded with "Mini-Circuits" and "vayyar" logos.

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Quantity	Description	Mini-Circuits Part No.
KIT COMPONENTS		
1	Vayyar Transceiver Board	TB-UVNA
1	Tray	B12-269-02
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	USB-CBL-AB-3+
4	141 Hand-Flex 3" Cable	141-3SM+
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+
DUT'S		
1	Band Pass Filter, 2450 MHz	VBF-2435+
1	Low Pass Filter, 1500 MHz	VLF-1500+
1	GVA-84 EVAL 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.