TEST & MEASURING INSTRUMENTS

Analyzer

Vector
Network Analyzer **(4 Ports)** — 8GHz

Protek A338 4 Ports

Protek A338 vector network analyzer is one of a Protek network analyzer family line covering a wider frequency range up to 8.0GHz than 3.2GHz Protek A333 has.
The convenience and reliability of Protek A338 is inherited from Protek A333 and by the wider frequency range, the more applications can be used with Protek A338 in many industries.

Key Features

- Frequrncy Range : 300kHz ~ 8GHz, 16 Parameters support (S11 ~ S44)
- Measurement time per point : 100us per point
- Wide Output Power Range : -60dBm to +10dBm
- Dynamic Range : >150dB (1Hz IF bandwidth)
- Time domain and gating conversion included
- Two Independent Signal Sources
- Frequency offset mode, including vector mixer calibration measurements
- Up to 16 logical channels with 16 traces each
- Multiple precision calibration methods and automatic calibration
- Up to 500,001 measurement points
- Fixture simulation
- COM/DCOM compatible for LabView and automation programming

Measurement Capabilities

Measured Parameters	S11, S22, S33, S44, S12, S13, S14, S21, S23, S24, S31, S32, S34, S41, S42, S43 and absolute power of the reference and received signals at the port.
Number of Measurement Channels	Up to 16 independent logical channels : each logical channel is represented on the screen as an individual channel window. A logical channel is defined by such stimulus signal settings as frequency range, number of test points, or power level.
Data Traces	Up to 16 data traces can be displayed in each channel window. A data trace represents one of such parameters of the DUT as S-parameters, response in time domain, input power response.
Memory Traces	Each of the 16 data traces can be saved into memory for further comparison with the current values.
Data Display Formats	Logarithmic magnitude, linear magnitude, phase, expanded phase, group delay, SWR, real part, imaginary part, Smith chart diagram and plar diagram display formats are available.
Dynamic Rnage	Typical dynamic range of 150dB is achieved through the entire frequency range (at 1Hz IF bandwidth)
Low Measurement Errors	This devices have a low vatiation between a large pool of manufactured instruments. Low trace noise allows for particularly high-precision measurements.

Key Features

Sweep Features

Sweep Type	Linear frequency sweep, logarithmic frequecny sweep, and segment frequency sweep occur when the stimulus power is a fixed value. Linear power sweep occurs when frequency is a fixed value.
Measured Points Per Sweep	Set by the user from 2 to 500,001.
Segment Sweep Features	A frequency sweep within several independent user-defined segments. Frequency range, number of sweep points, source power, and IF Bandwidth should be set for each segment.
Power	Source power from -60dBm to +10dBm with resolution of 0.05dB. In frequency sweep mode, the power slope can be set to up to 2dB/GHz for compensation of high frequency attenuation in connection wires.
Sweep Trigger	Trigger Modes : continuous, single, or hold. Trigger Sources : internal, manual, external, bus

Trace Functions

Trace Display	Data trace, memory trace, or simultaneous indication of data and memory traces.
Trace Math	Data trace modification by math operations: addition, subtraction, multiplication or division of measured complex values and memory data.
Autoscaling	Automatic selection of scale division and reference level value allow the most effective display of the trace.
Electrical Delay	Calibration plane moving to compensate for the delay in the test setup. Compensation for electrical delay in a device under test (DUT) during measurements of deviation from linear phase.
Phase Offset	Phase offset is defined in degrees.

Frequency Scan Segmentation

This VNA has a large frequency range with the option of frequency scan segmentation. This allows optimal use of the device, for example, to realize the maximum dynamic range while maintaining high measurement speed.

Power Scanning and Compression Point Recognition

The power sweep feature turns compression point recognition, one of the most fundamental and complex amplifier measurements, into a simple and accurate operation.

Balanced Measurements

This function enables evaluation of devices with balanced ports, for instance, differential amplifiers or transformers, as pictured here.

Mixer/Converter Measurements

Scalar Mixer / Converter Measurements	The scalar method allows the user to measure only the magnitude of the transmission coefficient of the mixer and other frequency translating devices. No external mixers or other devices are required. The scalar method employs port frequency offset when there is a difference between the source port frequency and the receiver port frequency.
Scalar Mixer / Converter Calibration	This is the most accurate method of calibration applied for measurements of mixers in frequency offset mode.
Vector Mixer / Converter Measurements	The vector method allows the measurement of both the magnitude and phase of the mixer transmission coefficient.
Vector Mixer / Converter Calibration	This method of calibration is applied for vector mixer measurements.
Automatic Frequency Offset Adjustment	The function performs automatic frequency offset adjustment when the scalar mixer / converter measurements are performed to compensate for internal LO setting inaccuracy in the DUT.
Sweep Trigger	Trigger Modes : continuous, single, or hold. Trigger Sources : internal, manual, external, bus

Time Domain Measurements

This function performs data transformation from frequency domain into response of the DUT to various stimulus types in time domain. Modeled stimulus types: bandpass, lowpass impulse, and lowpass step. Time domain span is set by the user arbitrarily from zero to maximum, which is determined by the frequency step.

Time Domain Gating

This function mathematically removes unwanted responses in the time domain, which allows the user to obtain frequency response without influence from fixture elements.

Limit Testing

Limit testing is a function of automatic pass/fail judgment for the trace of the measurement results. The judgment is based on the comparison of the trace to the limit line set by the user and can consist of one or several segments.

Port Impedance Conversion

The function of conversion of the S-parameters measured at 50 port into the values, which could be determined if measured at a test port with arbitrary impedance.

S-Parameter Conversion

The function allows conversion of the measured S-parameters to the following parameters: reflection impedance and admittance, transmission impedance and admittance, and inverse S-parameters.

TFT Color LCD (10.4-inch)
Daylight viewable high resolution LCD display

Power & LED
Power On/Off
Greed LED: Power On Status
Red LED : External Power

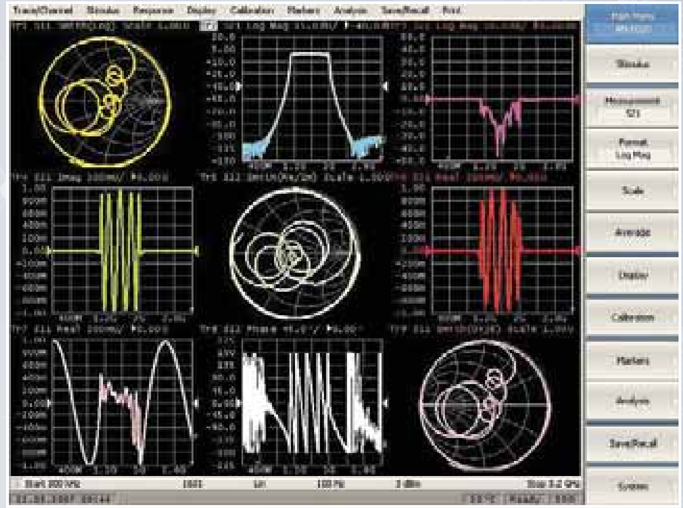
USB
Instrument states, Calibration data and Trace data can be stored on an external USB drive.

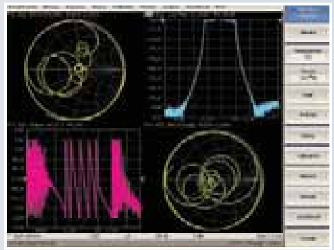
Screen Menu
Display selectable menu in connection with function keys or soft keys

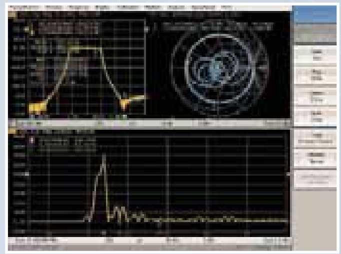
Soft Key
Selec menu displayed on the screen

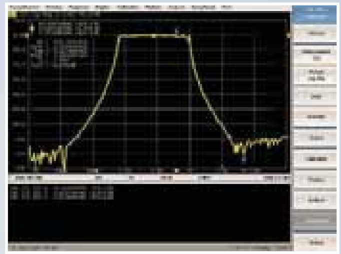
Enter
Input numeric values

Knob / Arrow
Move marker positions or items on the table list









Technical Specifications

Measurement Range

Impedance	50Ω
Test Port Connector	N-type, Female
Number of Test Ports	4
Frequency Range	300 KHz to 8.0 GHz
Full CW Frequency Accuracy	±5x10^{-6}
Frequency Setting Resolution	1Hz
Number of Measurement Points	1 to 500,001
Measurement Bandwidths	1 Hz to 30 KHz (with 1/1.5/2/3/5/7 steps)
Dynamic Range (IF Bandwidth 10 Hz)	
From 100 KHz to 300 KHz:	115 dB, typ. 125 dB
From 300 KHz to 8.0GHz:	135 dB, typ. 140 dB

Measurement Accuracyv

Accuracy of Transmission Measurements (Magnitude / Phase)

+5 dB to +15 dB	0.2 dB / 2°
-50 dB to +5 dB	0.1 dB / 1°
-70 dB to -50 dB	
From 100 KHz to 300 KHz:	1.5 dB / 10°
From 300 KHz to 8.0 GHz:	0.2 dB / 2°
-90 dB to -70 dB	
From 300 KHz to 8.0 GHz:	1.0 dB / 6°

Trace Stability

Trace Noise Magnitude (IF Bandwidth 3 KHz)	
From 100 KHz to 300 KHz:	5 mdB rms
From 300 KHz to 8.0 GHz:	1 mdB rms
Temperature dependence (Per One Degree of Temperature Variation)	0.02 dB

Test Port

Directivity (without system error correction)	100 KHz to 300 KHz: 15 dB 300 KHz to 8.0 GHz: 18 dB

Test Port Input

Match (without system error correction)	18 dB
Damage Level	+26 dBm
Damage DC Voltage	35 V
Noise Level (defined as the rms value of the specified noise floor, IF bandwidth 10 Hz)	From 100 KHz to 300 KHz: -105 dBm From 300 KHz to 8.0 GHz: -125 dBm

Test Port Output

Match (without system error correction)	18 dB
Power Range	
100 KHz to 6.0 GHz	-60 dBm to +10 dBm
6.0 GHz to 8.0 GHz	-60 dBm to +5 dBm
Power Accuracy	±1.5 dB
Power Resolution	0.05 dB
Harmonics Distortion	
From 300 KHz to 8.0 GHz:	-25 dBc
Non-harmonic Spurious	
From 300 KHz to 8.0 GHz:	-30 dBc

Measurement Speed

Measurement time per point	100 µs
Source to receiver port switchover time	10 ms

Typical Cycle Time Versus Number of Measurement Points

		51	201	401	1601
Start 100 KHz, stop 10 MHz, IF bandwidth 30 KHz	Uncorrected	13.1 ms	51.3 ms	102.3 ms	408.3 ms
	Full Two-port Calibration	45.5 ms	122.0 ms	230.5 ms	840.5 ms
Start 10 MHz, stop 8.0 GHz, IF bandwidth 30 KHz	Uncorrected	6.5 ms	21.1 ms	40.5 ms	157.7 ms
	Full Two-port Calibration	32.4 ms	61.7 ms	100.3 ms	333.0 ms

General Data

External Reference Frequency

External Reference Frequency	10 MHz
Input Level	2 dBm ± 3 dB
Input Impedance at <<10 MHz>> Input	50Ω
Connector Type	BNC Female

Output Reference Signal

Output Reference Signal Level at 50Ω Impedance	3 dBm ± 2 dB
<<OUT 10 MHz>> Connector Type	BNC Female

Atmospheric Tolerances

Operating Temperature Range	+41 °F to +104 °F (+5 °C to +40 °C)
Storage Temperature Range	-49 °F to +131 °F (-45 °C to +55 °C)
Humidity	90% at 77 °F (25 °C)
Atmospheric Pressure	84 to 106.7 kPa

Calibration Frequency

Calibration Interval	3 years

External PC System Requirements

Operating System	Windows XP
CPU Frequency	1 GHz
RAM	512 MB

Power Supply

Power Supply	110-240 V, 50/60 Hz
Power Consumption	80 W
Dimensions (L x W x H)	320 x 439 x 238 mm)
Weight	11.7 kg

Protek

www.gsinstrument.com

This is global GSI

HEAD OFFICE
GS Instruments Co.,Ltd.
70, Gilpa-ro 71beon-gil, Nam-gu, Incheon 402-854, Korea
Tel : +82-1688-6820
Fax : +82-32-870-5640
isale@gsinstrument.com
www.gsinstrument.com

USA OFFICE
GS Teletech Inc.
320 NW Victoria Dr, Lee's Summit MO64086, USA
Tel : +1-913-469-6699
Fax : +1-913-661-0163
protek@gsteletechinc.com
www.gsteletechinc.com

CHINA OFFICE
HCQ Electronics Co., Ltd.
Danshan Industrial Park, Chengyang District, Qingdao, Shandong, China
Tel : +86-532-66913900
Fax : +86-532-66910908
sales@hcqelectronic.com
www.hcqelectronic.com

www.gsi-protek.com