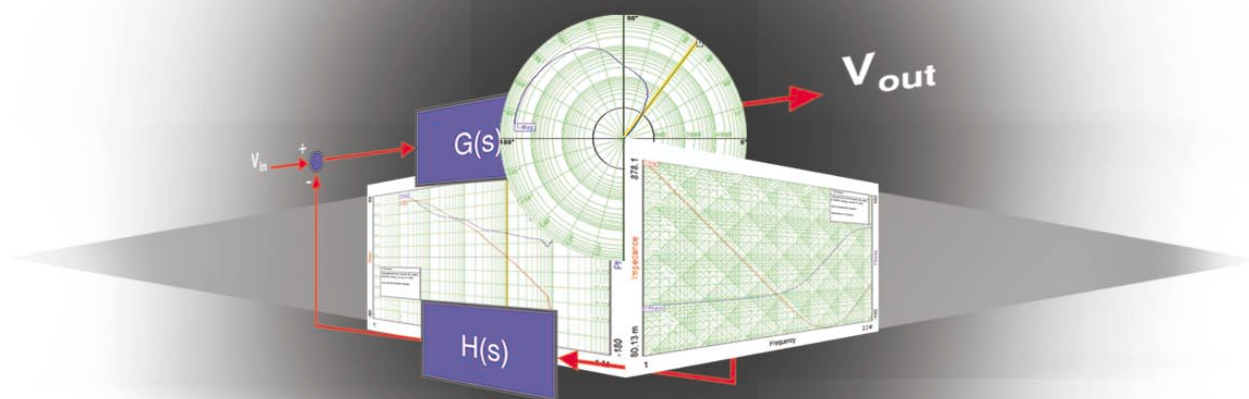


*a Venable company*



*“World leader in stability  
analysis systems and service”*

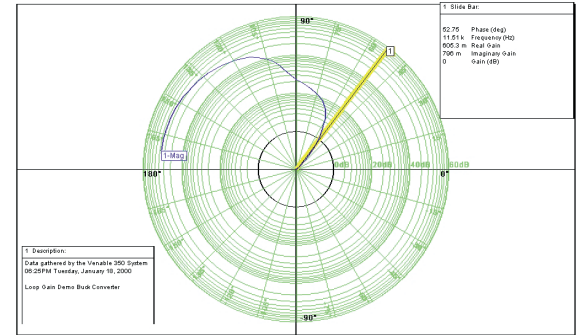
***Frequency Response Analysis Systems***

# Data Export Features

New data export methods have been implemented. One method saves or imports the data in tab delimited text file format for easy import or export into other applications such as Matlab or Excel. The other method saves plots in JPEG format, which can be read by any web browser or easily pasted into Word. These features are located under the File program menu.

## Graph Display

A Venable style Nyquist plot has been added to this release of the software. The magnitude is plotted as a radius in dB outside of the unity gain circle, which is colored black, and linearly inside the unity gain circle. This type of display allows all the data to be displayed while retaining the advantages of a standard Nyquist plot. Phase is plotted as an angle between +/-180 degrees. Because test data does not have the artificial inversion of classical analysis, the critical point is at the +1 or 0 degrees point on the unity gain (0dB) circle. Note that the test data can be artificially inverted, as in classical analysis, by using the Math Menu to multiply the data by the scalar -1.



## Features

### Save Settings

User settings for the Analyzer Control Menu, as well as, settings and text entered into the Error Amplifier Synthesis and Circuit Analysis menu are saved to a text file.

### Load Settings

Loads Settings feature allows the user to recall past settings preferred by the user or settings used for a specific test.

### Gain-Phase Display Slide Bar

The Get Unity Crossing button has been added to the slide bar dialog window on the gain-phase display.

### Data Set Properties Dialog Box

With the Data Set Properties Dialog Box open, any data set can be selected and its properties altered.

### Integration by Time

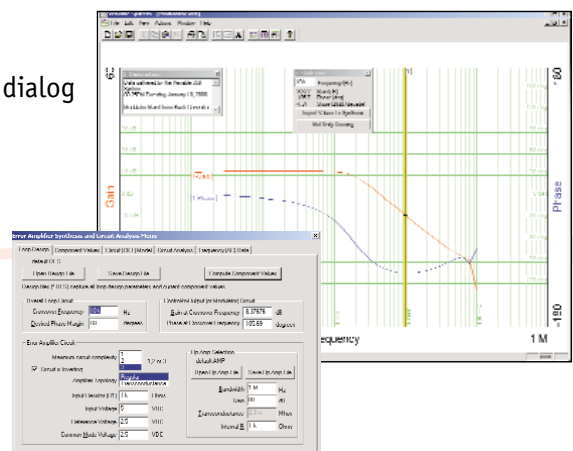
A longer integration time yields more accurate results. The range of acceptable values is 25.6 milliseconds to 10,000 seconds.

### Integration by Cycles

Integrating over more cycles (or wave form periods) also yields more accurate results. The range of acceptable values is 1 to 9999 cycles.

### Automatic Integration

Automatic Integration is an option that can be used with either integration by time or the integration by cycle method.



# A State-of-the-Art Analyzer and More

The Venable 350 makes it easy to model an analog circuit, plot the analysis results, specify design changes, test the frequency response of actual hardware, and then overlay model and test results – all with the same, high-performance system. Plus it's ideal for a diversity of other applications, including:

- **Stabilization of power supply loops**
- **Stabilization of other control loops**
  - Motor speed control loops
  - Position control loops
  - Disk read/write heads
  - Hydraulic aircraft control surfaces
  - Phase locked loops
  - Thermal control systems
  - Pressure, flow control
- **Filter design test and model response**
  - Active or passive
- **Circuit Analysis**
  - Model verification and test
  - Worst-case component tolerance
  - Monte Carlo analysis
- **Impedance testing**
  - Component impedance
  - Input impedance
  - Output impedance

Whatever the requirement, the Venable 350 Frequency Response Analyzer stands alone. Jobs will get done quickly and within budget.

## Optimized Engineering Automatically

The Venable 350, will cut project costs, increase development efficiency, and engineer products to optimum specifications all at the same time. Here's how: THE VENABLE 350 AUTOMATIC DESIGN FUNCTION.

To achieve optimum error amplifier or loop compensation design, engineers need only to decide the desired result. The Venable 350 system then automatically works backwards to determine the necessary component values. With just a few keystrokes, the system synthesizes the most stable, optimum error amplifier for the job.

Gone is the slow, expensive trial and error loop which can delay design sequence for days or even weeks. With the Venable 350, not only is the time required of the engineer minimized, but the solution is always optimum according to specifications.

## Value

### • Wide Frequency Range of 0.0001 Hz to 2.2 MHz

A full ten decade frequency range allows testing of a wide range of systems including electromechanical, thermal, mechanical servo systems, as well as electronic circuits and components.

### • Sine, Triangle, or Square Waveforms

The 350 incorporates all three waveforms in performing a wide range of tests. Utilizing a square wave, the 350 tests transient response. And utilizing triangle waves, the 350 accurately tests for rate limiting.

### EFFICIENCY

#### • Three Channels

Three channel testing allows the simultaneous measurement of three different transfer functions and enhances the oscilla-

tor's amplitude servo feature. Often a test is best performed with a constant level of stimulus at a particular node. With the third channel this can be automatically controlled even if the control node is not normally measured for the test in question.

### NOISE REJECTION

#### • Noise Harmonic 80

dB, Wideband 50 dB This high degree of noise rejection allows the unsurpassed capability to do clean measurements with very small amounts of stimulus.

#### • Resolution

1 microvolt With resolution of 1 microvolt, the 350 has the ability to pull very small signals out of noise.

# Specifications

## SYSTEM

Maximum output (AC + DC)  
Output Control

Frequency sweep- Range  
- Sweep step  
Linear Sweep  
Isolation- Withstanding voltage  
- Capacitance

Voltage:  $\pm 20V$  Current:  $\pm 100mA$   
Signal output always starts and stops at phase 0 degrees. Output level is settled to 0V just on moment the setting of 0V is performed. ON/OFF control for output of AC or DC is independently available.  
0.0001 Hz to 2.2 MHz  
Log sweep: 0.1 to 2000 steps/decade or 1 to 20684 steps/sweep  
Frequency (within a 4 digit decimal of max. sweep frequency) or 1 to 10000 steps/sweep  
 $\pm 500Vdc$  (to chassis)  $\pm 300Vdc$  (to signal input)  
Less than 700pF

## ANALYZER

Input channel  
Impedance  
IMRR

3 channels (CH-1, CH-2, CH-3)  
1 Megaohm  $\pm 2\%$ , shunted by  $50 \pm 5pF$   
DC to 60Hz: more than 120dB  
DC bias elimination Automatically eliminated

Isolation  
- Withstanding voltage  
- Capacitance  
Frequency range  
Amplitude  
Max. Input voltage  
Overload indication

$\pm 500Vdc$  (to chassis)  $\pm 300Vdc$  (to oscillator output)  
Less than 220pF (to chassis)  
0.1 mHz to 2.2 MHz  
10mV to 100 Vrms (10dB step) Fixed or Auto ranging selectable  
AC + DC 300V peak AC 140 Vrms Overload lamp lights and buzzer alarms also available

## MEASUREMENT

Repeat  
Single  
Sweep

Repetitive measurements at fixed frequency  
Single measurements at fixed frequency  
AUTO: Starts sweep and measurement automatically within a sweep range by start command. MANUAL: Starts single step sweep and measurement by start command.

Delay Time  
Integration Time  
Auto integration

0 to 9999 cycles 0 to 10000s  
1 to 9999 cycles  $2.56E - 2$  to 10000s  
Integral calculation is repeated until the confidence interval with confidence level of 90% reaches:  
SHORT: Within less than  $\pm 10\%$  of reading LONG: Within less than  $\pm 1\%$  of reading

## HARMONICS AND NOISE REJECTION

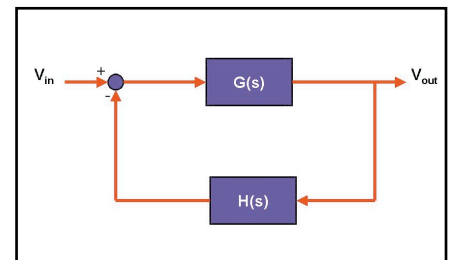
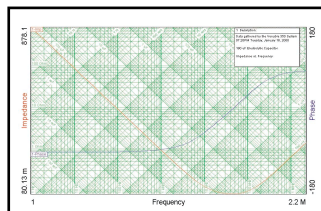
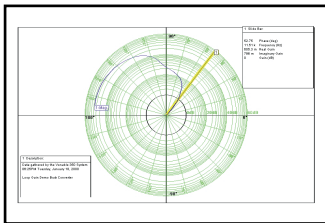
Normal mode DC  
Wide band white noise  
Harmonics (less than 10th)

:60dB  
:50dB  
:60dB (less than 100 kHz): 40dB (less than 2.2 MHz)

## GENERAL

Power requirement  
Display Indicator  
Display Contents  
Remote Control  
Calibration

AC 90 to 132V or 180 to 264V 48 to 62 Hz 140VA  
40 X 2 characters liquid crystal display  
Measurement result of selected channel Frequency OSC output level OSC DC BIAS level Error status  
Full programmable GP-IB interface  
Internal oscillator calibrates each gain of analysis channel.



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Asia

Europe