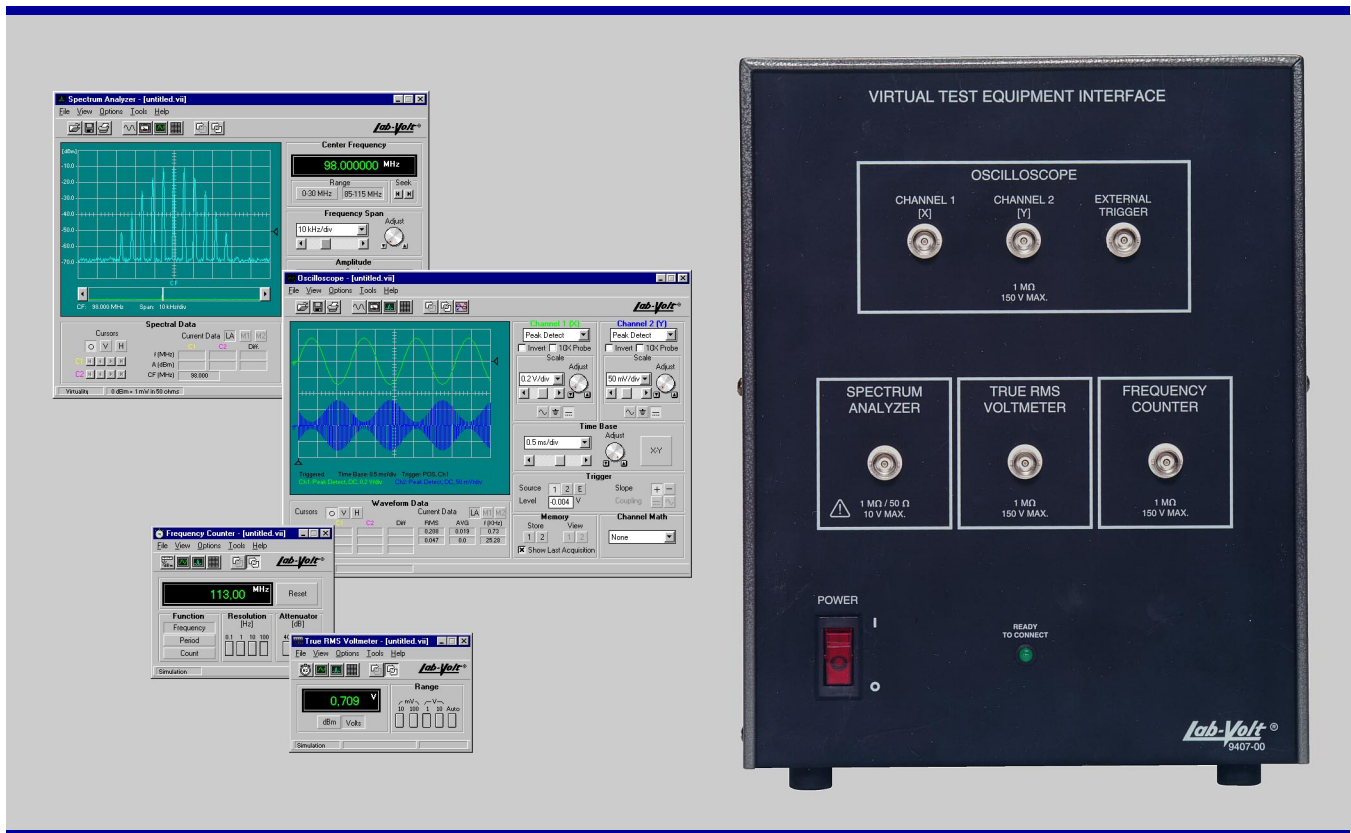




Telecommunications

DATA ACQUISITION AND MANAGEMENT FOR TELECOMMUNICATIONS MODEL 9407



GENERAL DESCRIPTION

The Lab-Volt Data Acquisition and Management for Telecommunications (LVDAM-COM), Model 9407, is a computer-based system for measuring, observing, and analyzing signals in telecommunications systems. It allows training in both analog and digital telecommunications systems using modern and versatile measuring instruments. A user manual provided with the LVDAM-COM system allows students to quickly familiarize with the instruments.

The LVDAM-COM system consists of the Virtual Test Equipment Interface module and the Lab-Volt software Data Acquisition and Management for Telecommunications (LVDAM-COM). The LVDAM-COM system is a standard feature in the Lab-Volt Analog Communications Training System with LVDAM-COM, Model 8080-A, and Digital Communications Training System with LVDAM-COM, Model 8085-B. The LVDAM-COM system can replace the Lab-Volt conventional

instruments (Frequency Counter, Model 9403, True-RMS Voltmeter / Power Meter, Model 9404, and Spectrum Analyzer, Model 9405) in the Analog Communications Training System, Model 8080, and Digital Communications Training System, Model 8085-1.

Virtual Test Equipment Interface

The Virtual Test Equipment Interface (VTEI) module links the personal computer running the LVDAM-COM software with the Lab-Volt analog and digital training systems. Data exchange between the VTEI module and the personal computer is made through a standard parallel port. The VTEI module is designed to meet the high frequency signal requirements for telecommunications systems. It provides the necessary hardware to implement a dual trace oscilloscope, a spectrum analyzer, a true-RMS voltmeter, and a frequency counter. All inputs are fitted with BNC connectors and are fully

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protected against short circuits and misconnections made by the students. An instruction manual provides detailed information about the VTEI module.

LVDAM-COM Software

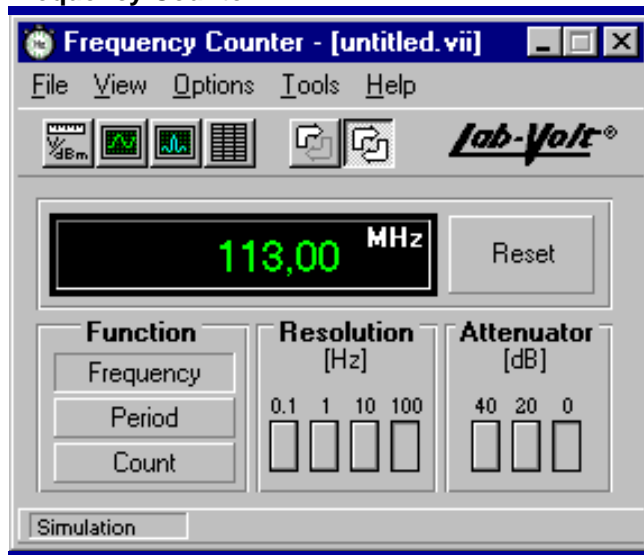
The LVDAM-COM software consists of a complete set of instruments that runs on a IBM®-compatible personal computer under the Microsoft® Windows™ operating environment. Each instrument appears as a window on the computer screen. Computer-based instruments provide instructors with the opportunity to clearly demonstrate concepts that, until now, could only be presented using traditional textbook methods and static drawings. They also enhance the overall presentation of course material with built-in capabilities for waveform observation, data storage, and graph plotting. The various instruments of the LVDAM-COM system are briefly described in the next section of this data sheet.

The LVDAM-COM software can operate in either of the following modes: acquisition and simulation. In the acquisition mode, the input signals are measured by the VTEI module and then transmitted to the LVDAM-COM software through the computer's parallel port. In the simulation mode, input signals are generated by the computer using user-defined simulation parameters. When used in conjunction with the Lab-Volt LVSIM®-COM - Virtual Laboratory Equipment for Analog Communications, Model 9480, a third mode, referred to as virtuality, is available. In this mode, input signals are generated by the computer using simulation parameters that are produced by the LVSIM®-COM software. See the data sheet of Model 9480 for additional information.

The LVDAM-COM software configuration, the recorded data, and the user-defined simulation parameters can be saved to files. All display screens obtained with LVDAM-COM can be printed out or pasted in any document.

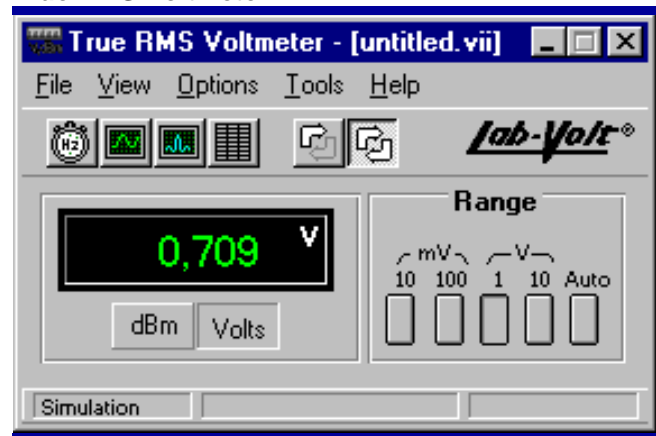
VIRTUAL INSTRUMENTATION

Frequency Counter



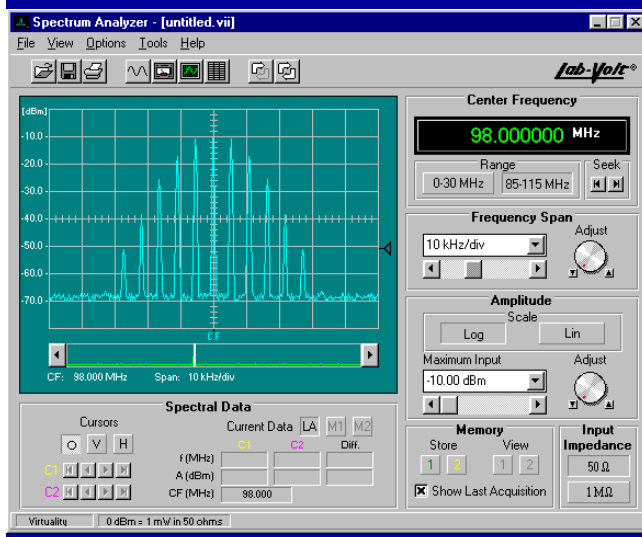
The Frequency Counter has three functions. It can measure the frequency of the input signal and display the frequency in Hz, kHz, or MHz. It can determine the period of the input signal and displays the result in ns, μ s, or ms. It can also be used as an event counter. The Frequency Counter resolution is software-selectable from 0.1 to 100 Hz.

True RMS Voltmeter



The True RMS Voltmeter is a dual function instrument that can measure the true RMS voltage or power of telecommunications signals. Voltage and power can be measured using any one of four software-selectable ranges (10 mV, 100 mV, 1 V, 10 V, and -27 dBm, -7 dBm, +13 dBm, +33 dBm).

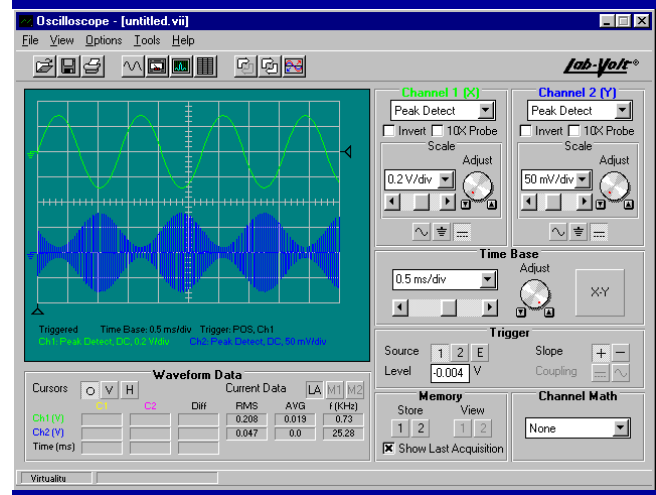
Spectrum Analyzer



The Spectrum Analyzer is used for frequency-domain observation of telecommunications signals. It is a frequency-selective instrument that allows the power level of the frequency components in the input signal to be displayed on a graduated screen. The Spectrum Analyzer has two selectable frequency ranges: 0 to 30 MHz, and 85 to 115 MHz. The center frequency can be selected directly by typing the frequency on the keyboard or by using the special *Seek* function which locates the closest spectral component within the selected frequency range. The total frequency span of the main screen can be varied from 20 kHz to 10 MHz.

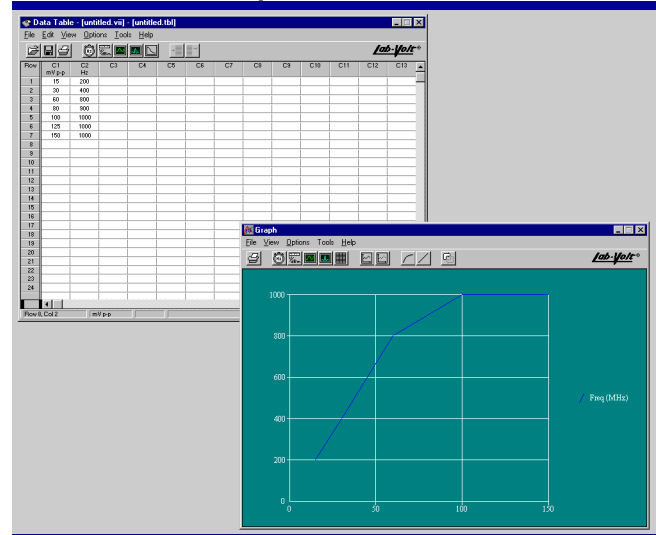
The Spectrum Analyzer includes a special window which allows the student to visualize all the spectral information contained in the selected frequency range. A portion of this spectral data can be zoomed in the main screen for precise analysis. The input impedance is selectable between 50 Ω and 1 M Ω . The input signal can be displayed using linear or logarithmic scales up to a maximum display range of 60 dB.

Oscilloscope



The Oscilloscope is used for time-domain observation of telecommunications signals. It has two input channels and an external-trigger input. The Oscilloscope has the same features as a conventional oscilloscope (scales, time bases, trigger level, channel math, X & Y display), to which have been added digital properties such as auto scaling, cursors, waveforms memorization capabilities, and more.

Data Table and Graph



The Data Table window interacts with the four other computer-based instruments (Oscilloscope, Spectrum Analyzer, Frequency Counter, and True RMS Voltmeter) to record data in a table. Each of the four instruments contains a data area, and each cell in that data area can be linked to a column of the Data Table. With the press of a button, the data contained in the instrument is transferred into the Data Table. Once data is acquired, different graphs can be generated using the Graph Window.

DATA ACQUISITION AND MANAGEMENT FOR TELECOMMUNICATIONS, MODEL 9407

SPECIFICATIONS

Model 9407 Virtual Test Equipment Interface			
Power Requirement	120 V - 1.0 A - 60 Hz; 220 V - 0.5 A - 50 Hz; 240 V - 0.5 A - 50 Hz		
Frequency Counter			
Input Frequency Range	10 Hz - 200 MHz		
Input Period Range	5 ns - 0.1 s		
Count Range	0 - 268 435 456 (28 bits)		
Input Impedance	1 M Ω		
Sensitivity (Sine Wave RMS Value)	10 Hz - 140 MHz: 60 mV; 140-200 MHz: 200 mV		
Attenuator	0, 20 or 40 dB		
Resolution	0.1, 1, 10, 100 Hz		
True RMS Voltmeter			
Input Impedance	1 M Ω		
Voltage Ranges	10 mV, 100 mV, 1 V, 10 V		
Power Ranges	-27 dBm, -7 dBm, +13 dBm, +33 dBm, (0 dBm = 1 mW in 50 Ω)		
Operating Range	50 Hz - 12 MHz		
Accuracy	5%		
Crest Factor	5		
Spectrum Analyzer			
Input Frequency Ranges	0-30 MHz (500 Hz min.) and 85-115 MHz		
Input Impedance	50 Ω or 1 M Ω (software selectable)		
Input Signal Level	-70 to +30 dBm (50 Ω input)		
Maximum Input Signal Level	10 V peak		
Frequency Span	0 Hz/div; 2 kHz/div - 1 MHz/div		
Resolution Bandwidth (3 dB)	100, 500 Hz; 2, 20, 50 kHz (automatically selected)		
Dynamic Range (input signal measurements)	60 dB		
Selectivity (60 dB/3 dB)	Better than 13:1		
View Scale	Linear or Log		
Oscilloscope			
Channels 1 & 2	Impedance	1 M Ω	
	Coupling	AC or DC	
	Bandwidth	Channel 1: 40 MHz	
		Channel 2: 20 MHz	
	AC Coupling	Low limit 16 Hz	
	Voltage Range	5 mV/div - 5 V/div	
Time base	0.2 μ s/div - 0.2 s/div		
Triggering	Source	Channel 1, Channel 2, External	
	Slope	Positive or Negative	
External Trigger	Impedance	1 M Ω	
	Voltage Ranges	\pm 1 V and \pm 5 V	
	Coupling	AC or DC	
	Bandwidth	40 MHz	
A/D Conversion	Resolution	10 bits	
	Sampling Rate	Channel 1 maximum: 80 MSPS Channel 2 maximum: 40 MSPS	
Personal Computer Requirements		Minimum	Recommended
Type	IBM 486 DX		
Clock	50 MHz		
RAM	8 MB		
Hard Disk Free Space	3 MB		
Operating System	Windows™ 3.1	Windows™ 95	
Monitor	VGA		
Parallel Port	1		

ORDERING NUMBERS

MODEL NUMBER	120 V - 60 Hz			220 V - 50 Hz			240 V - 50 Hz
	ENGLISH	FRENCH	SPANISH	ENGLISH	FRENCH	SPANISH	ENGLISH
9407	9407-00	9407-01	9407-02	9407-05	9407-06	9407-07	9407-0A

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