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LINESCOPE   V.3.0

High Speed Signal Integrity Simulation Software

* APPLICATIONS ARE: HIGH SPEED BOARD DESIGN, IC DESIGN, CABLING SYSTEMS, BACK PLANES, ETC.

* SIMULATE THE PERFORMANCE OF CRITICAL INTERCONNECTION PATHS: CLOCK SKEWS, TIME DELAYS, SIGNAL DISTORTION, ETC.

* VIEW THE SIGNAL DISTORTION DUE TO HIGH FREQUENCY SIGNALS

* PERFORM TRUE LOSSY TRANSMISSION LINE ANALYSIS

* EVALUATE THE SKIN EFFECT ON THE SIGNALING AND PERFORMANCE

* DESIGN CONTROLLED IMPEDANCE TRANSMISSION SYSTEMS WITH PINPOINT ACCURACY AND DRASTICALLY REDUCE YOUR DESIGN CYCLE

* SIMULATE CLOCK DISTRIBUTION SYSTEMS

* VIEW THE FREQUENCY RESPONSE OF YOUR INTERCONNECTION SYSTEM

* ANALYZE THE FREQUENCY DEPENDENCE OF CHARACTERISTIC IMPEDANCE

LINESCOPE ™ V.3.0
High Speed Signal Integrity Simulation Software

LINESCOPE V.3.0 is a new generation signal integrity software suitable for design of High Speed Digital/Analog circuits and networks. Among its various applications, LINESCOPE can be used for design of High Speed Digital/Analog Circuits, Integrated Circuit Devices, Printed Wiring Boards, Circuit Boards, Back Planes, Wide Band Coax Networks, Balanced and Unbalanced Network applications. For example, you can use LINESCOPE to simulate critical paths in your system and detect any Reflections, Time delays, Clock skews, Attenuation, Band Width limitations, etc. LINESCOPE will improve your design cycle significantly by forecasting unwanted behavior of your interconnection network at System (e.g. Printed Wiring Board, Cabling, etc.) or Device (e.g. IC) level. Accuracy, Flexibility, Speed and Ease of Use have made LINESCOPE the most powerful signal integrity simulation tool available.

FEATURES OF LINESCOPE

The following describes the various aspects of LINESCOPE V.3.0.

Simulation Capabilities of LINESCOPE

LINESCOPE can analyze the signal integrity and performance of any Analog/Digital network or circuit using lossy transmission lines and lumped RLC elements. LINESCOPE provides a library of various transmission line configurations of both circular and rectangular cross sections. LINESCOPE can terminate any point in the network using a built-in library of shunt and/or series lumped RLC elements. Components and gates in the network (Analog or Digital) can also be included using their input or output impedance (depending on the component acting as load or source) and any termination elements. LINESCOPE simulates all aspects of the system under simulation including transmission line parameters, interconnection network configuration and excitation input signal. LINESCOPE virtually allows the use of any voltage waveform of any shape or frequency (subject to the host machine numerical limitations) as the clock source. This input voltage signal can be defined by the user and applied at any point on the network. Upon the completion of the analysis by LINESCOPE, a user can observe Voltage, Current and Frequency responses of the network at points of interest as well as line impedance of each transmission line in the network as a function of frequency. LINESCOPE permits independent modification of the parameters of any transmission line segment or other elements of the network. LINESCOPE also allows inclusion of wave guides and Vias as part of the network. There is no limitation as to the geometrical dimensions of the lines that are used in the networks simulated by LINESCOPE. This feature makes LINESCOPE capable of simulating board level as well as device level circuits.

Input Parameters to LINESCOPE

The only input parameters needed by LINESCOPE are: transmission line geometry, line configuration, interconnection pattern, physical media parameters and input signal. There is no need for the user to enter higher level parameters such as line inductance, capacitance, impedance, time delays; or perform field analysis of any kind.

LINESCOPE ™ V.3.0

A High Speed Simulator for High Frequency Applications

Other signal integrity software perform a parasitic element computation or use static finite element analysis to compute the static transmission line parameters. These techniques do not compute the actual distributed parameters as a function of frequency which is nonlinear in nature.

LINESCOPE's proprietary algorithm computes the distributed transmission line parameters for every frequency content of the excitation signal. As a result, LINESCOPE computes high frequency phenomena such as inductive and resistive skin effect with extreme accuracy, providing you with the most accurate lossy line solution. This is a unique and powerful feature of LINESCOPE which makes it ideal for high frequency applications even at extremely high frequencies (several Giga Hertz and above).

Lossy Transmission Line Network Simulation

LINESCOPE provides you with a library of the most widely used transmission line configurations, such as: Balanced and Unbalanced Microstrip or Strip line configurations with circular or rectangular cross section, Coax cables, Vias, Wave Guides, etc. You can create your own subset of these libraries. Each library type can be conformed to your design specification at the lowest level. User needs only to input media and line parameters such as dielectric constant and line geometry dimensions. These transmission lines can be interconnected in any tree-like fashion to create the network under test. Various types of lines can be interconnected regardless of the configuration. User can change any design parameter of any transmission line segment independently and perform a new simulation until a perfect design is obtained. All the transmission line segments in the network are analyzed and solved as a lossy line taking into account the high frequency phenomena such as skin effect, group delays and dispersion, multiple reflections and attenuation .

LINESCOPE's Output Response Types

LINESCOPE will provide you with the following response types:

1. Output Voltage and Current Response waveforms at any node in the network are displayed. You can observe any signal degradation (Dispersion, Reflections, Attenuation, Delay, etc.) as you would using an oscilloscope. **However LINESCOPE does not have the band width limitations of an oscilloscope.**
2. Frequency Response at any node in the network can be viewed graphically, displaying the frequency response and band width of your design at your node of interest.
3. Outputs of various nodes can be displayed in one grid enabling you to compare the signals and detect any clock skews and time delays between various nodes of interest quite easily.
4. Impedance values of any selected transmission line as a function of frequency are provided. Both the real and imaginary components of line impedance are provided for a range of frequencies.
5. Frequency spectrum of the input waveform is provided showing you the band width and the spectrum envelope of the periodic input voltage waveform you are applying.

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Accuracy and Speed

LINESCOPE uses ASA's proprietary Lossy Transmission Line Network Simulation method, creating an extremely fast and accurate solution to even the most complex networks. **You do not have to perform any electromagnetic field analysis or similar interim steps when you use LINESCOPE. LINESCOPE performs a complete analysis of the network and provides you with the crucial time and frequency domain responses of your network in one step in a matter of seconds.**

LINESCOPE is User Friendly

LINESCOPE is fully menu driven for ease of use. LINESCOPE user need not learn any SPICE-like circuit description language to define the network under test. LINESCOPE also has an extensive help facility describing the various aspects of simulation with LINESCOPE. User needs only to enter line geometry, select line configuration, enter transmission line media parameters such as dielectric constant and define an input waveform. LINESCOPE provides a one step solution to all your signal integrity problems. Any complex interconnection network can be constructed usually in a matter of seconds just by a few clicks of the mouse. LINESCOPE's advanced graphical user interface makes it extremely simple to use.

LINESCOPE's Graphical User Interface

LINESCOPE comes equipped with a powerful graphical user interface. Various aspects of LINESCOPE such as Menus, Networks, Transmission lines and Waveforms are all shown in full VGA color for ease of use. LINESCOPE can also print various items of interest directly from the screen into the supported Color and Black & White printers, thereby allowing the user to obtain a hard copy of various items of interest such as network configuration screens and output response waveforms at various points of the network.

Expert Technical Personnel

LINESCOPE is supported by an expert team of highly distinguished technical staff at Advanced Scientific Applications Inc., specialized in the field of High Speed Signal Integrity and Electrical Performance Simulation.

LINESCOPE's Platform Requirements

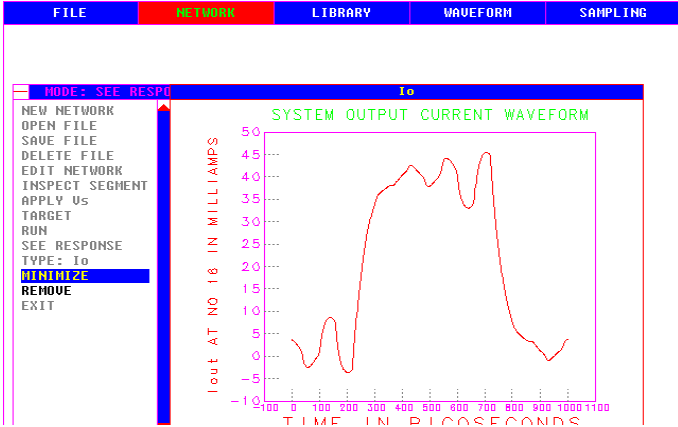**Operating system:** MS-DOS/WINDOWS/95-XP or higher
Hardware: IBM PC or compatibles, 386+ (386, 486, etc.), MS-Mouse or compatible, VGA Monitor and Video card
Memory Requirements: 64 Megabytes of RAM or MORE
Disk Space Requirements: 35 Megabytes (Minimum)
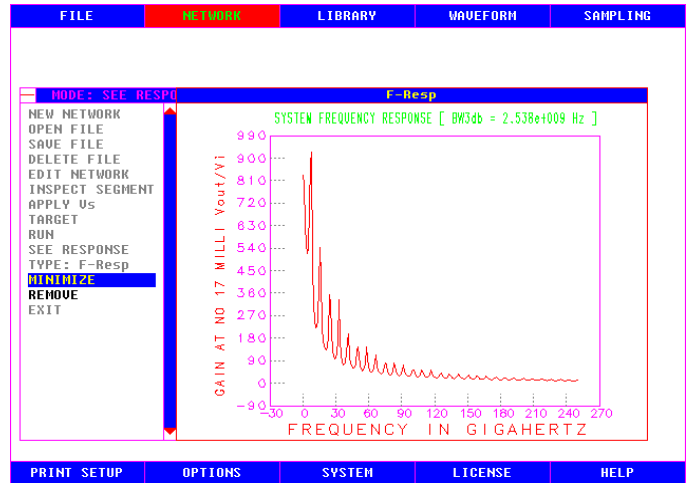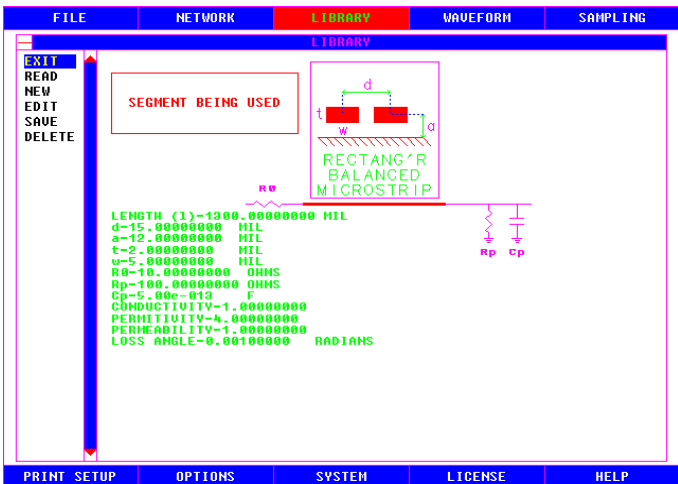
LINESCOPE V.3.0

LINESCOPE's Current Response
LINESCOPE provides you with the exact current, voltage and frequency responses of the interconnection network taking into account high frequency phenomena, skin effect, dispersion, multiple reflections and attenuation**.**


LINESCOPE's Frequency Response
Among various network performance measurements, LINESCOPE provides you with the Network band-width and frequency response and current and voltage response waveforms at any target point (or points). Use LINESCOPE's frequency response output to evaluate the ability of your interconnection network and circuit to handle high frequencies.

LINESCOPE's Segment Library Definition and Editing Menu
LINESCOPE enables the users to create their own library of segment definitions. Each segment can be defined at the lowest level using the LINESCOPE's transmission line library and editing systems.
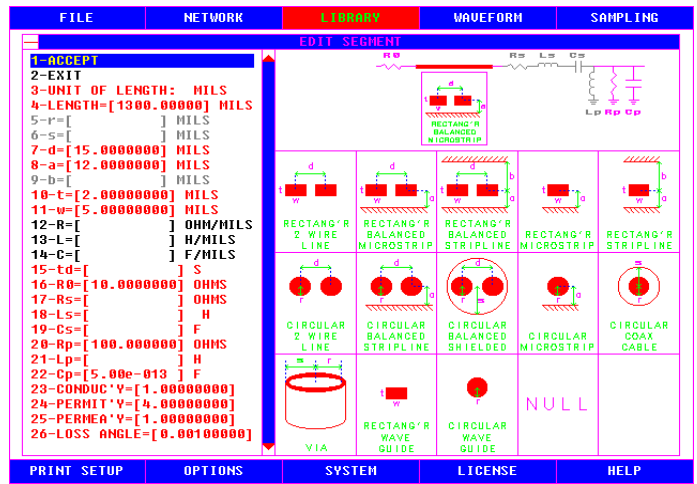
LINESCOPE's Transmission Line Library
LINESCOPE provides a library of widely used transmission line configurations. User can select any available configuration and tailor it according to the desired design specifications. LINESCOPE is capable of simulating conductors with rectangular or circular cross sections as well as Vias.
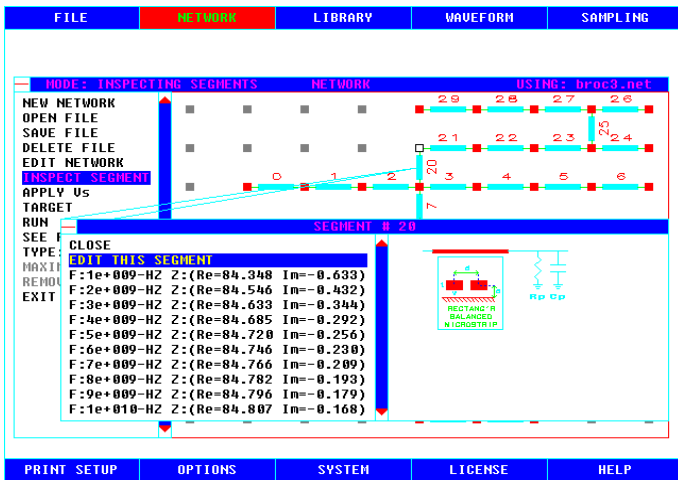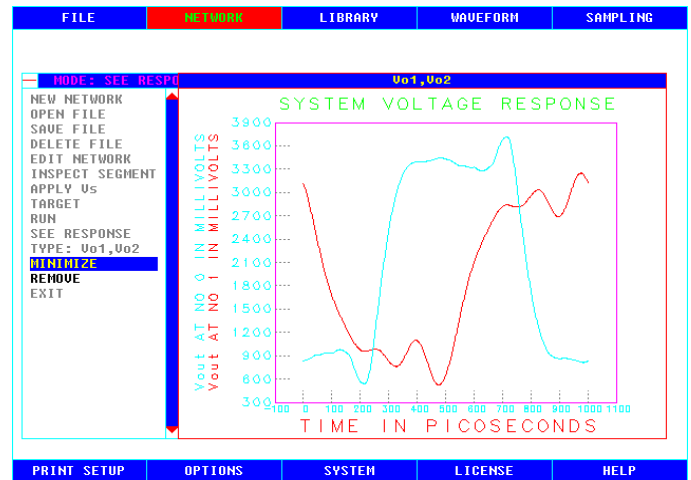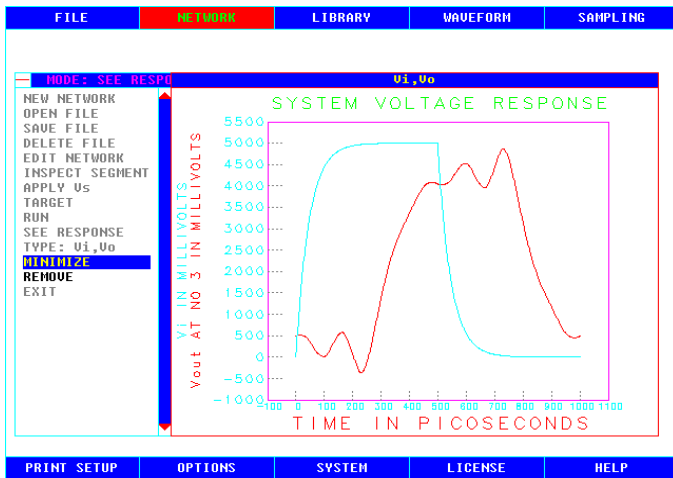
LINESCOPE V.3.0

LINESCOPE's Network Construction , Segment and Impedance Inspection System

LINESCOPE allows the user to construct an interconnection network very quickly and easily. Each segment of the network can be independently defined and can be a combination of transmission lines and lumped elements. LINESCOPE provides true Characteristic Impedance of any transmission line as a function of frequency just by a click of the mouse.
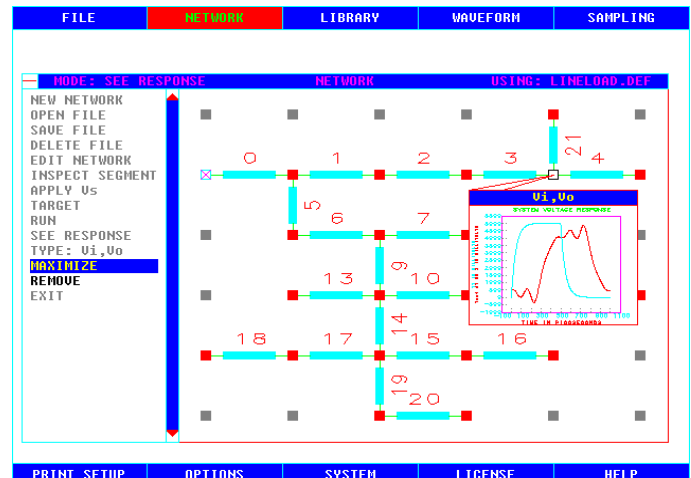

LINESCOPE's Network Multiple Output Voltage Response Waveforms

LINESCOPE can display multiple Output voltage trace waveforms at various points on the network simultaneously. These traces can be used to observe the time delay and compare the signal integrity between various points.

LINESCOPE's   Full Scale Input/Output Voltage Response Waveforms

LINESCOPE can display output voltage response at various target points on the network along with the input signal, all in one full size grid. LINESCOPE provides information on clock skews, delays, signal distortion and system's band width limitation early in the design stage, **even before any prototyping**.

LINESCOPE's In-Network Input/Output Voltage Response Waveforms

User can look at any one of Input/Output Voltage, Current and Frequency Responses at any point on the network just by a click of the mouse at the desired point.