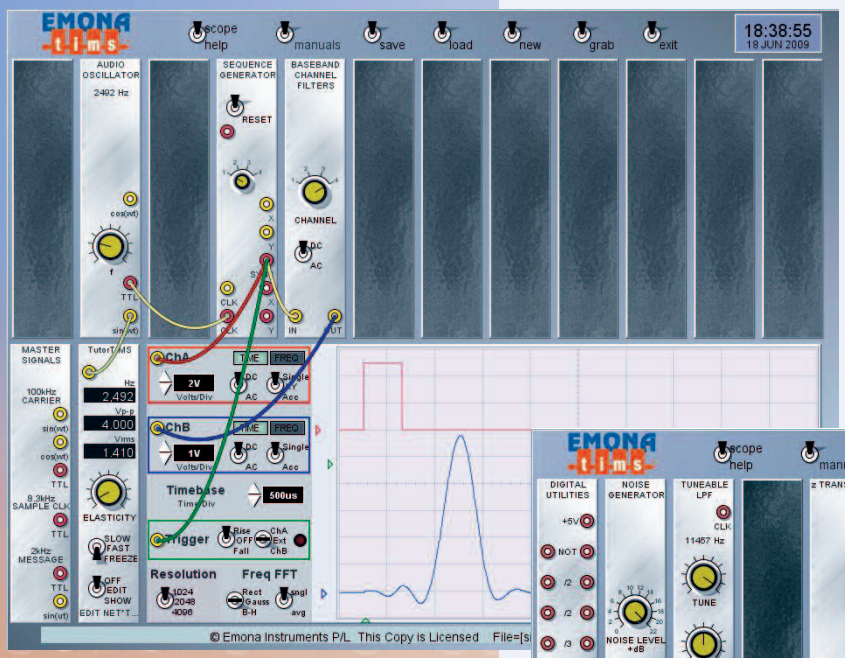
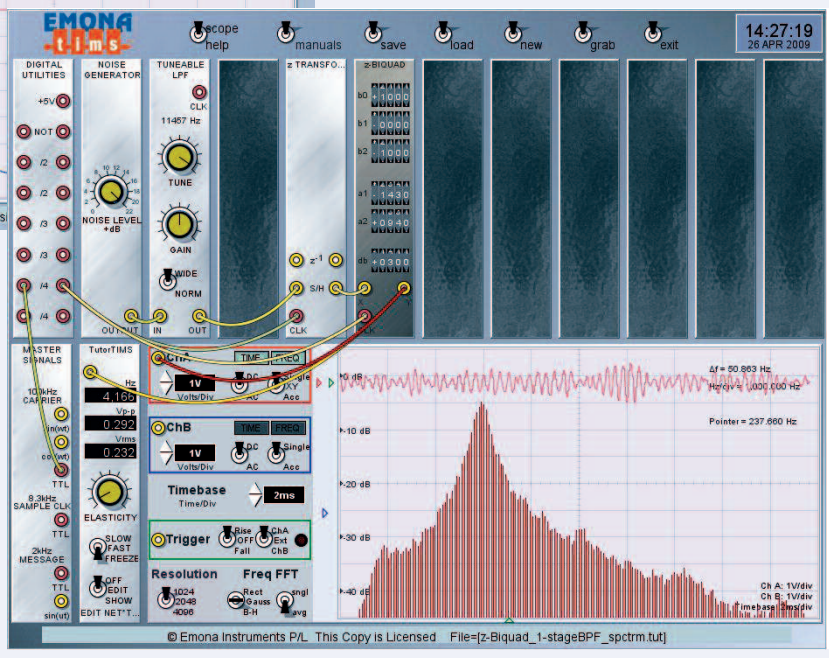
Emona TutorTIMS-R2 Software

Telecommunications and Signals & Systems Simulation Software for Technical College and University Students





True point-and-click technology: start patching telecommunications models in minutes.

TutorTIMS - Release 2

EMONA INSTRUMENTS
www.emona-tims.com

HOW TO BUILD TIMS & TutorTIMS TELECOMMUNICATIONS EXPERIMENTS

Students use exactly the same approach to building telecommunications experiments in both Emona TIMS hardware and Emona TutorTIMS software.

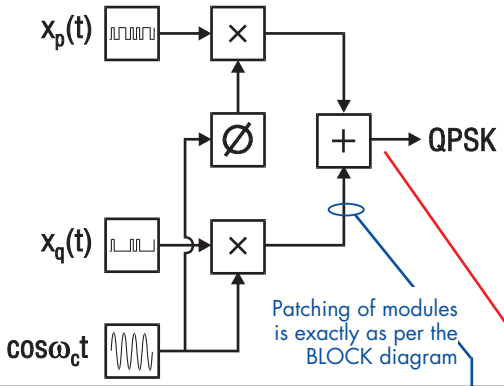
START WITH MATH OR THEORY

$$x_p(t).\cos \omega_c t + x_q(t).\sin \omega_c t = QPSK$$

where $x_p(t)$ and $x_q(t)$ are alternate elements of a digital sequence.

Telecommunications text books are a source of equations and theories. This is the starting point for a TIMS & TutorTIMS experiment.

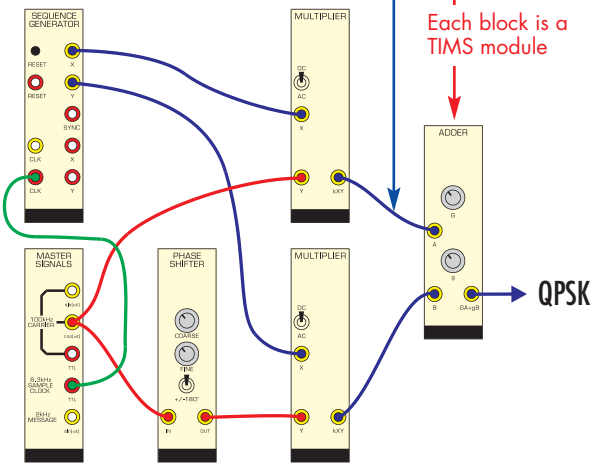
REPRESENT IT AS A BLOCK DIAGRAM



In telecommunications, Math and Theory is always expressed in the universal language of BLOCK DIAGRAMS.

Telecommunications engineers make sense of math and theory through BLOCK DIAGRAMS.

BUILD IT USING TIMS & TutorTIMS MODULES



TIMS & TutorTIMS both realise telecommunications BLOCK DIAGRAMS. TIMS realises block diagrams with real circuits. TutorTIMS realises block diagrams with on-screen graphical blocks, which run simulation code in the background.

TutorTIMS Modules - "#" are included with TutorTIMS-Basic

60kHz LPF #	Switches #	100kHz Channel Filters	Line-Code Decoder	SONET STS-1 Mux
Adder #	Tuneable LPF #	3-Input Adder	Line-Code Encoder	Seq. Generator: Signals & Systems
Audio Oscillator #	Twin Pulse Generator #	Baseband Chan. Filters	M-Level Decoder	z-Transform Module
Dual Analog Switch #	Utilities #	Block Code Decoder	M-Level Encoder	
Headphone Amplifier	VCO #	Block Code Encoder	Multiple Sequences Source	EXPERT MODULES:
Multiplier #	VCO FSK	CDMA Decoder	Noise Generator	FIR Module
Phase Shifter #	Variable DCV & Buffer Amplifiers #	Decision Maker	PCM Decoder	Laplace Biquad
Quadrature Phase Splitter #	Quadrature Utilities #	Digital Utilities	PCM Encoder	Wideband Oscillator
Sequence Generator #	Speech #	Error Counter	SONET STS-1 Demux	z-Biquad
		Laplace Module		

TutorTIMS TELECOMMUNICATIONS & SIGNALS EXPERIMENT CAPABILITIES

- Make telecommunications block diagrams and equations come to life, using simple building blocks.
- Front panels mimic TIMS lab hardware system to aid pre-lab learning and pre-lab experiment preparation.
- True open-ended modeling system allows professors and students to patch any experiment using the available modules.
- Continuously running, instant response simulation engine.

Modeling equations
Product demodulation
Superheterodyne principles
AM & DSBSC
SSB & ISB
Armstrong's Phase Mod.
Envelope detection
Phase Locked Loop, PLL
FM & PM
FSK & ASK
BPSK, QPSK, DPSK
Eye patterns
Sampling & Reconstruction
Nyquist Theorem
PAM & TDM
FDM & PDM

PWM & PPM
PRBS messages
The noisy channel
Recovery of a noisy data
Bit Error Rate measurement
SNR measurement
Line coding and decoding
Carrier acquisition

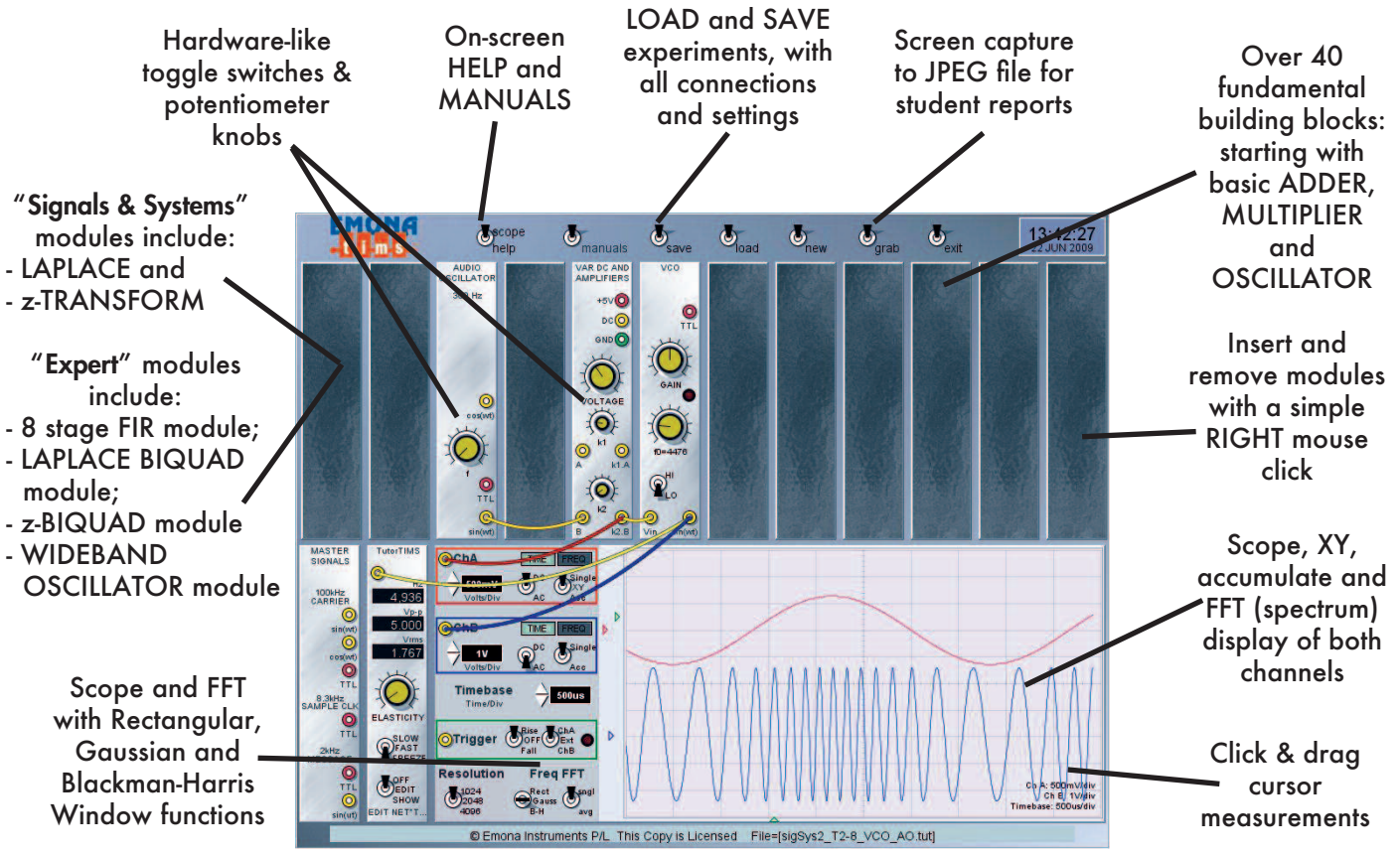
and much more . . . . PLUS

SIGNALS & SYSTEMS EXPERIMENTS

Lab 1: Special signals - characteristics and applications
Lab 2: Modeling linear and nonlinear systems with TIMS
Lab 3: Unraveling convolution
Lab 4: Comparing responses in the time & frequency domains
Lab 5: A Fourier series analyzer
Lab 6: Spectrum analysis of various signal types
Lab 7: Using Laplace domain poles and zeros as a system design tool
Lab 8: Sampling and aliasing
Lab 9: Getting started with analog-digital conversion
Lab 10: Discrete-time FIR filters
Lab 11: Using poles and zeros in the complex z plane: Discrete-time filters
Lab 12: Discrete-time filters - applications

EASY ACCESS TO ALL TutorTIMS FUNCTIONS

TutorTIMS is particularly easy for students to use quickly. All TutorTIMS functions are directly accessible at the front panel screen. There are no menu structures and there is no syntax to learn. All HELP and manuals are available via the front panel toggle switch. No programming is required to build TutorTIMS telecommunications experiments.



TutorTIMS Versions

	TutorTIMS-Advanced with Signals & Systems		TutorTIMS-Basic with Signals & Systems	TutorTIMS - Basic	TutorTIMS - FreeWare
User License	Unlimited	1/5/15/30	Unlimited	Unlimited	
4 minute training animation on CD-ROM	•	•	•	•	
SIMULATOR FEATURES					
Continuous, free running simulation	•	•	•	•	•
Simple INSERT/DELETE modules	•	•	•	•	•
Smart patching wires	•	•	•	•	•
Number of slots for modules	12	12	12	12	5
LOAD & SAVE experiment files	•	•	•	•	
Screen GRAB save to JPEG	•	•	•	•	•
On-screen HELP	•	•	•	•	•
MEASURING INSTRUMENTS					
OSCILLOSCOPE - 2 channels	•	•	•	•	•
ACCUMULATE - 2 channels	•	•	•	•	•
XY display	•	•	•	•	
User selectable display resolution	•	•	•	•	
FFT (spectrum) - 2 channels	•	•	•	•	
FREQUENCY COUNTER	•	•	•	•	
TRMS VOLTMETER	•	•	•	•	
USER SUPPORT					
On-screen USER MANUALS	•	•	•	•	
On-screen EXPERIMENT MANUALS	•	•	•	•	
TIMS MODULES					
TIMS System Unit modules: includes MASTER SIGNALS, BUFFERS, VAR DC V	•	•	•	•	•
TIMS HEADPHONE AMPLIFIER module	•	•			
TIMS BASIC module set: 12 modules (TIMS-100 series) and Quadrature Utilities	•	•	•	•	9 modules
TIMS SPEECH module	•	•	•	•	
Additional TIMS ADVANCED modules (TIMS-400 series)	•	•			
Signals & Systems modules	•	•	•		
Expert module set	•	•			
STUDENT FRIENDLY TutorTIMS CONVENTIONS					
Same module appearance, inputs, outputs, control knobs and switches as TIMS hardware	•	•	•	•	•
Same module functionality and specifications as TIMS hardware	•	•	•	•	•
Analog hardware style knobs control all variable parameters, same as TIMS hardware	•	•	•	•	•
Toggle and rotary hardware-style switches same as TIMS hardware	•	•	•	•	•
Easy integration with TIMS-301 hardware and net*TIMS experiments	•	•	•	•	

Available from:

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