

tims

**Telecommunications
Signals & Systems
Lab Equipment**

EMONA Information Sheet

**EXPERIMENTS COVERING
THE PRINCIPLES BEHIND:**

3G, 4G

LTE

Wideband-CDMA

HSDPA

CDMA2000®

EDGE

cdmaOne (IS-95)

GSM

Wi-Fi

WiMAX

Cordless Telephone

ZigBee™

DECT

Bluetooth®

**Near Field
Communications**

UWB

RFID

Digital Radio DAB

Satellite Modems

Satellite Links

Deep Space Telemetry

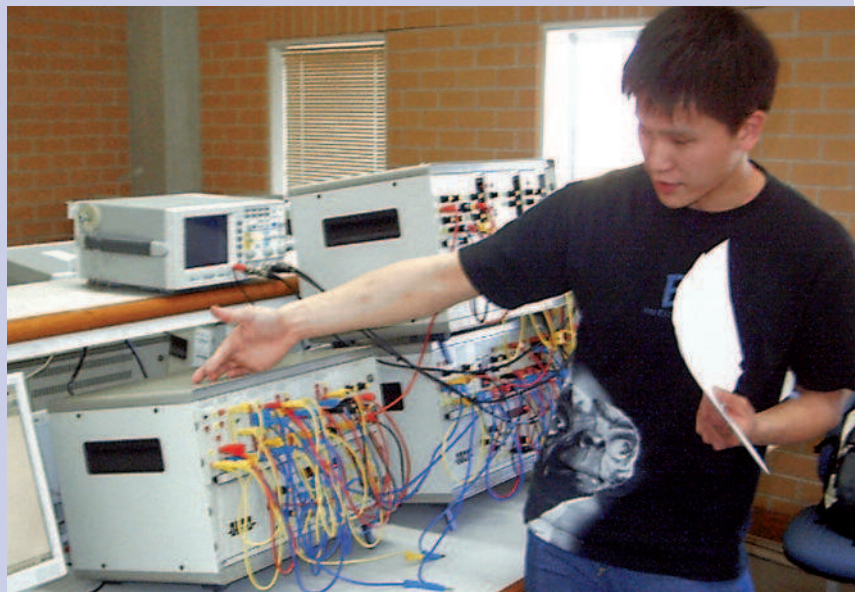
GPS

OFDM (DVB-T, ADSL, WLAN)

Turbo Coding

Software Defined Radio

and much more . . .



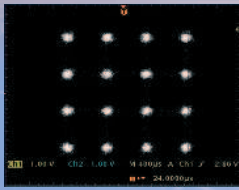
University Level Experiments in

- **Wireless Communications**
- **Signals & Systems**
- **DSP and SDR**
- **Fiber Optics**
- **Student Projects**

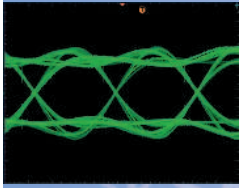
EMONA
INSTRUMENTS

www.emona-tims.com

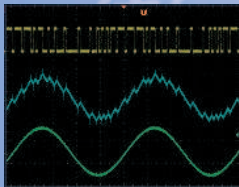
ACTUAL TIMS WAVEFORMS



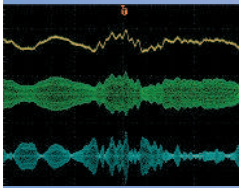
16-QAM



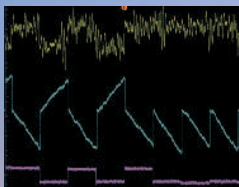
Eye Patterns



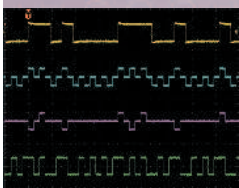
Delta Modulation



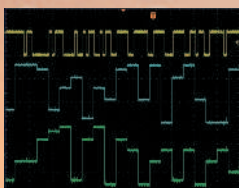
Speech AM & DSB



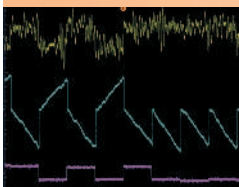
Integrate & Dump



Line Code Encodes

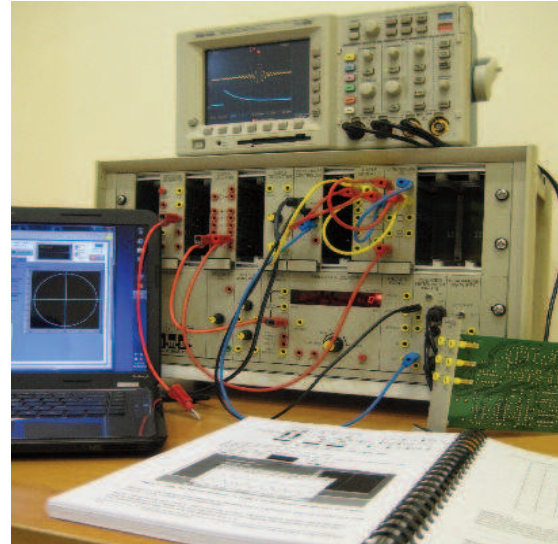


Multi-Level I & Q Signals



Matched Filter

TIMS is laboratory hardware & software for experiments in wireless theory, communications systems and signals & systems theory.



TIMS, Telecommunications Instructional Modeling System, is laboratory teaching equipment for EE and EET students in wireless, telecommunications and signal processing courses.

TIMS is a hardware engineering modelling system that can implement **practically any form of modulation or coding** - keeping pace with the rapid development of telecommunications theory.

• OPEN ENDED & EXPANDABLE ARCHITECTURE

TIMS can implement from the most basic communications systems theory, through to the very latest in coding and modulation - OFDM, Turbo Coding and more.

• SELF CONTAINED

TIMS is self contained requiring only an additional oscilloscope for waveform display and PC for detailed spectrum display and measurements.

• PC-INTERFACE - INSTRUMENTATION, LabVIEW™ & MATLAB™

As well, TIMS can interface to a PC providing data acquisition and spectrum analysis facilities and a range of supporting math applications.

• STUDENT PROJECTS

TIMS is the ideal system to allow students to conveniently develop, built and analyse the performance of their thesis projects.

TIMS is a 'hands-on' lab system where engineering students learn mathematics "by-doing" through practical experience.



TIMS is a True Engineering Modeling System more than just a "trainer"

START WITH MATH OR THEORY

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

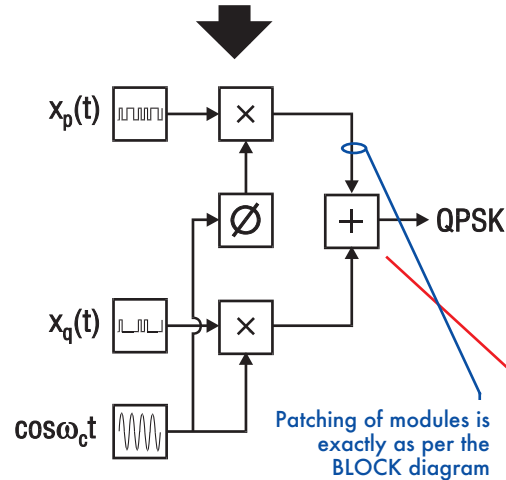
$$x_p(t) \cdot \cos \omega_c t + x_q(t) \cdot \sin \omega_c t = QPSK$$

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



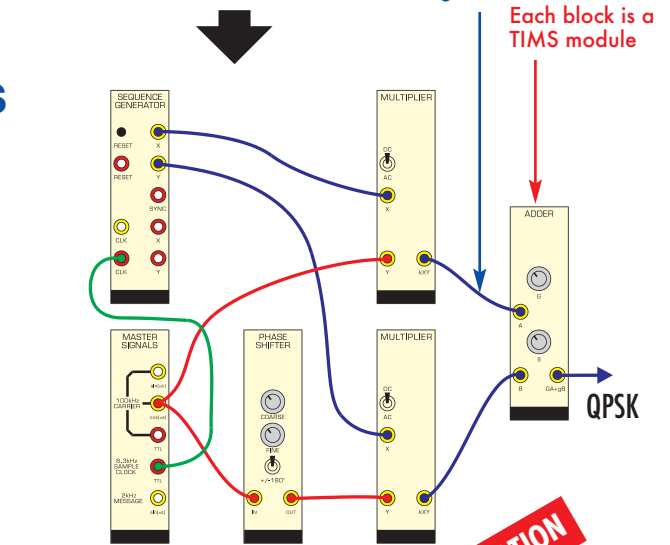
REPRESENT IT AS A BLOCK DIAGRAM

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

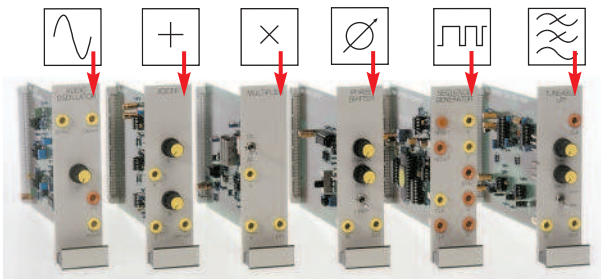


STUDENTS BUILD IT USING TIMS MODULES

Students patch the BLOCK DIAGRAMS based on communications theory - then view and measure real-time signals.



ONE MODULE FOR EACH BLOCK



60+ FUNCTIONAL BLOCKS TO CHOOSE FROM

FOR MORE INFORMATION

Watch Real time Demo Videos on YouTube CHANNEL

www.youtube.com/EmonaTIMS

EMONA TIMS GUARANTEE OF SATISFACTION

- WELL ESTABLISHED

Used daily in hundreds of universities* for over 25 years. Modules and experiments added every year. TIMS is always up to date.

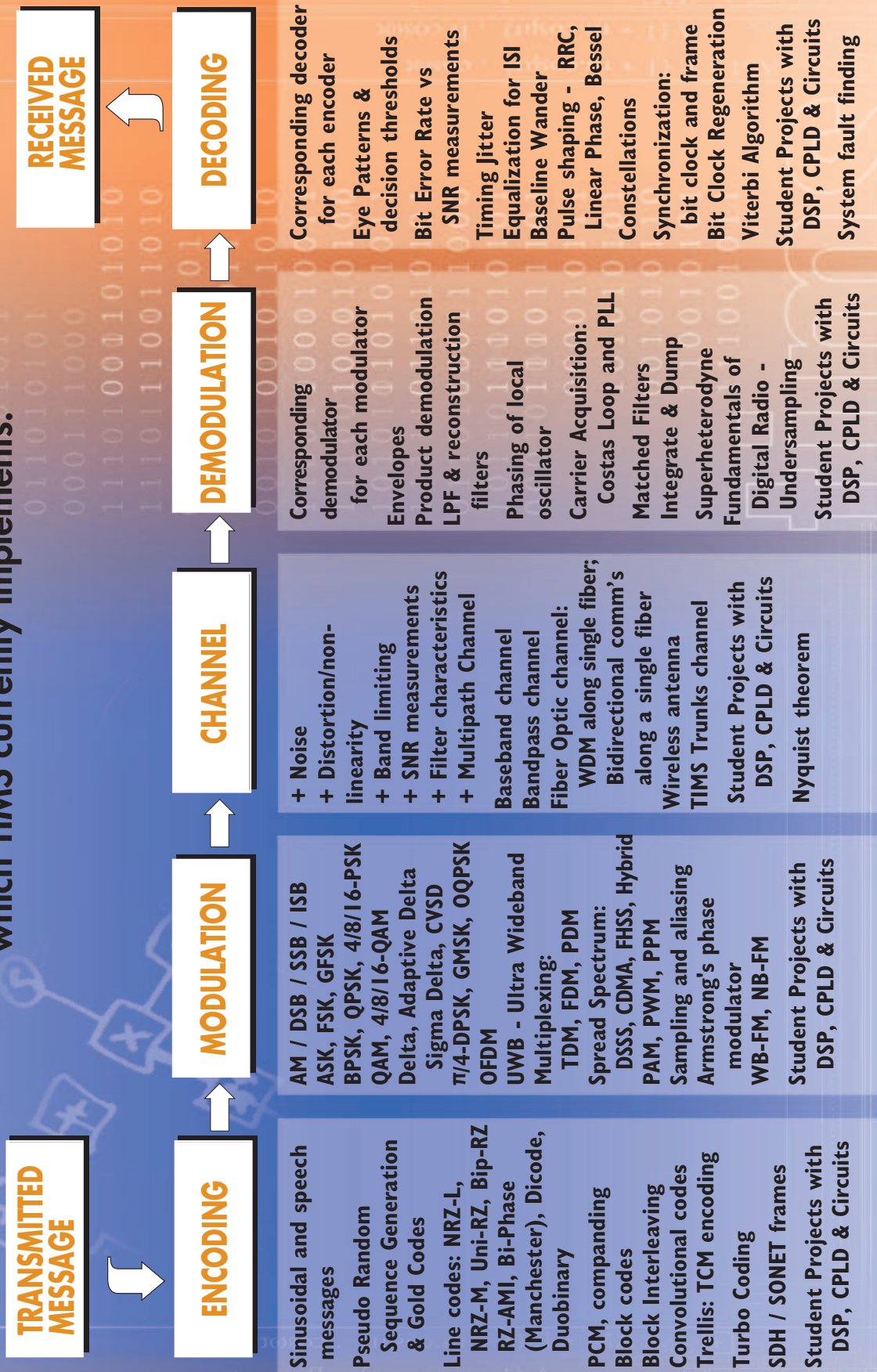
* Contact Emona for user lists near you.

- HIGH RELIABILITY

TIMS plug-in modules are hot-swappable & TIMS is covered by a 24 month warranty with a proven history of lifetime customer support.

TIMS EXPERIMENTS AND THE TRANSMISSION MODEL

This diagram is a summary of the schemes which TIMS currently implements.



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