Complete Platform to Teach Telecommunications Concepts Using a Block Diagram Approach

NI ELVIS/Emona DATEx Telecommunications Bundle *NEW!*

NI Educational Laboratory Virtual Instrumentation Suite (NI ELVIS)

- Design and prototyping platform for circuits, control, instrumentation, communication, and embedded experiments
- USB plug-and-play interface
- Oscilloscope, digital multimeter, function generator, variable power supply, Bode analyzer, arbitrary waveform generator, dynamic signal analyzer, voltage/current analyzer with NI LabVIEW source code
- Open and customizable in LabVIEW
- Integrated with Emona DATEx Telecoms-Trainer 202 (ETT-202)

Emona DATEx Telecommunications Trainer

- Hands-on experiment system featuring block diagram approach to building
- Wide variety of modern communications topics in one compact trainer
- Local and remote control via the ETT-202 Soft Front Panel VI on LabVIEW

Workstation

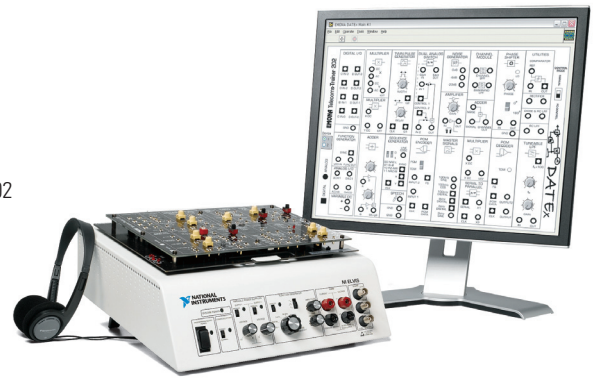
- Short-circuit and high-voltage protection with resettable fuse board
- Variable power supplies with manual or programmatic control
- Function generator with manual or programmatic control
- ±15 and +5 V supply available
- Detachable, customizable prototyping board
- Affordable for student ownership
- Fits in a 2- or 3-ring binder

Hardware (included)

- NI ELVIS platform
- Emona DATEx Telecoms-Trainer 202 (ETT-202)

Software (included)

- LabVIEW
- LabVIEW SignalExpress



Overview

The NI ELVIS/Emona DATEx Telecommunications Bundle is a leading platform for teaching telecommunications system concepts using the widely accepted block diagram approach. With its integrated suite including the 12 most commonly used instruments in a compact, rugged, laboratory friendly form factor; an available USB interface; and basic telecommunications concept curriculum, the bundle delivers a complete design and prototyping platform that you can use across all classes and labs to help students learn telecommunications concepts in a hands-on manner.

DATEx Block Diagram Approach

Today's telecommunications texts use the block diagram as the standard notation to describe the implementation of math equations and modulation and coding schemes. The Emona Digital Analog Telecommunications EXperimenter (DATEx) is composed of basic single-function building blocks. There is a one-to-one relationship between the DATEx functional blocks and the block diagram, as illustrated in Figure 1.

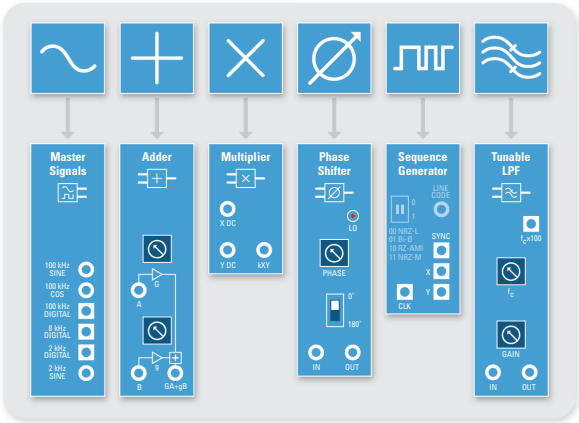


Figure 1. Examples of DATEx Functional Blocks

Students and researchers can build experiments by patching together DATEx hardware blocks according to telecommunications block diagrams and using NI ELVIS instruments to supply the stimulus and measure the response. Consider the following example, which implements an innovative block diagram approach to teach telecommunications concepts.

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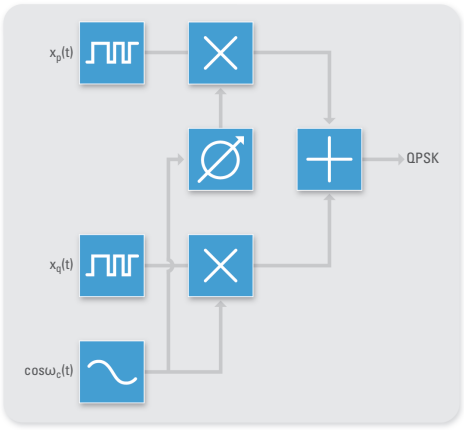
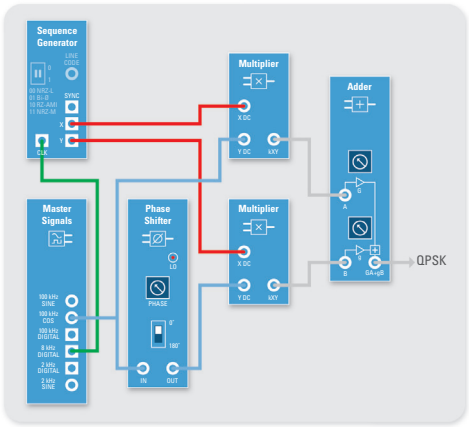
Complete Platform to Teach Telecommunications Concepts Using a Block Diagram Approach

1. Start with math or theory.
   QPSK = $x_p(t).\cos(\omega t).\cos(_q(t).\sin(\omega t)$.
   Where $x_p(t)$ and $x_q(t)$ are alternate elements of a digital sequence

2. Represent it as a block diagram.



3. Build it using DATEx modules on NI ELVIS.



LabVIEW Accessibility

The new NI ELVIS/Emona DATEx Telecommunications Bundle, which is now accessible from LabVIEW measurement, control, and design software, includes VIs, or functions, that provide for the individual blocks on the DATEx to make building customizable labs very easy. You can also use NI ELVIS with LabVIEW SignalExpress to design quick measurement setups for viewing system response.

Multidisciplinary Teaching Platform

With the introduction of the NI ELVIS/Emona DATEx telecommunications bundle, NI ELVIS now provides a complete multidisciplinary teaching platform for hands-on learning in different areas such as measurements, circuits, control, communication, and microprocessor and embedded design. NI ELVIS is now supported by several industry and education leaders in these areas. Emona Instruments has created the DATEx telecommunications trainer specifically to work with NI ELVIS to teach telecommunications concepts. Quanser provides boards compatible with NI ELVIS for controls. Freescale has a microprocessor board for education that can be used with NI ELVIS. And Analog Devices offers the NI ELVIS connector on its BF537 EZ-KIT Lite to conduct closed-loop learning experiments.

Ordering Information

NI ELVIS/Emona DATEx Telecommunications Bundle
With NI USB-6251 777448-77
With NI PCI-6251 777448-76

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to **ni.com/academic**.

Specifications

Analyzers

Oscilloscope

Channels	2
Data storage, cursors, auto scaling	
Max input bandwidth	50 kHz[1]
Max sampling rate	500 kHz/channel[1]
Range	±10 V
Input resolution	12, 16, or 18 bits[1]

Bode Analyzer

Frequency and phase plots
Frequency range and step control
Logarithmic or linear frequency spacing
Data storage, cursors, auto scaling

Frequency range	5 Hz to 35 kHz[1]

Dynamic Signal Analyzer

Input range	±10 V
Input resolution	12, 16, or 18 bits[1]

Impedance Analyzer

Measurement frequency range	5 Hz to 35 kHz

2-Wire Current Voltage Analyzer

Voltage range	±10 V
Current range	±10 mA

3-Wire Current Voltage Analyzer

NPN BJT transistor only
Data storage, cursors, auto scaling

Maximum collector voltage	10 V
Base current resolution	1 µA (16-bit analog output) 15 µA (12-bit analog output)

Digital Multimeter

Resistance

Accuracy	1%
Range	5 Ω to 3 MΩ

DC Voltage

Accuracy	0.3%
Range	±20 V
Input impedance	1 MΩ

AC Voltage

Accuracy	0.3%
Range	±14 V_{rms}

Current

DC accuracy	0.25% ±3 mA[2]
AC accuracy	0.25% ±3 mA[2]
Range	±250 mA
Shunt resistance	0.5 Ω
Maximum common mode voltage	±20 V
Common mode rejection	70 dB

Capacitance

Accuracy	2%
Range	50 pF to 500 µF
Test voltage range	1 V_{pp}

Continuity

Resistance threshold	15 Ω max

Inductance

Accuracy	1%
Range	100 µH to 100 mH
Test frequency	950 Hz
Test frequency voltage	1 V_{pp}

Digital I/O

Digital input resolution	8 bits
Digital output resolution	8 bits
Digital addressing	4 bits

Source

Function Generator

Manual or software control
Sine, triangle, square waveforms
Frequency sweep
TTL sync pulse out

AM, FM Modulation

Frequency range	5 Hz to 250 kHz
Frequency accuracy	3%
Output amplitude	±2.5 V
Software amplitude resolution	8 bits
Offset range	±5 V
AM voltage	10 V max
Amplitude modulation	Up to 100%
FM voltage	10 V max

Amplitude Flatness

To 50 kHz	0.5 dB
To 250 kHz	3 dB

Arbitrary Waveform Generator

Two channels
One-shot or continuous generation
Waveform editor

Amplitude	±10 V
Frequency range	DC to 100 kHz[1]
Output drive current	25 mA max
Output impedance	1
Slew rate	1.5 V/µs

Power Supplies

+15 V Supply

Output current	Self-resetting circuitry, not to shut down at or below 500 mA
Output voltage	15 V at ±5% no load
Line regulation	0.5% max
Load regulation	1% typ, 5% max 0 to full load[2]
Ripple and noise	1%

-15 V Supply

Output current	Self-resetting circuitry, not to shut down at or below 500 mA[2]
Output voltage	-15 V at ±5% no load
Line regulation	0.5% max
Load regulation	1% typ, 5% max 0 to full load[2]
Ripple and noise	1%

+5 V Supply

Output current	Self-resetting circuitry, not to shut down at or below 2 A
Output voltage	+5 V at ±5% no load
Line regulation	0.50% max
Load regulation	22% typ, 30% max 0 to full load[2]
Ripple and noise	1%

Variable Power Supplies

0 to +12 V and -12 V

Ripple and noise	0.25%
Software resolution	7 bits
Current limiting	0.5 V at 130 mA, 5 V at 275 mA, 12 V at 450 mA

[1]Specification depends on data acquisition device functionality.

[2]Proper null correction at the common mode voltage can reduce ±3 mA error to 200 µA noise.

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