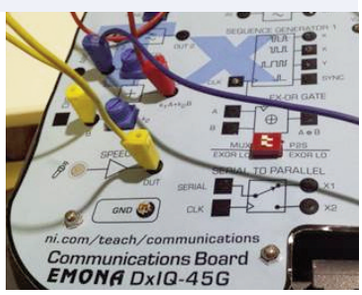
Emona Telecoms Experimenter DxIQ-45G

Multi-Experiment Single Board Telecommunications Experimenter for the popular NI ELVIS™ III Platform



The Emona Communications Device DxIQ-45G is an add-on application board that replaces the default prototyping board on the NI ELVIS III.

The DxIQ-45G provides educators with all the components, systems, and lab resources needed to conduct project-based experiments in digital and analog telecommunications as well as introductory signals and systems. Using this device, educators can improve understanding, increase student satisfaction, and enable faster application of communications theory to project work.

Teach Principles of Communications

The Emona Communications Board for NI ELVIS III provides hands-on experiments that develop a comprehensive understanding of advanced analog and digital telecommunication principles.

Teaching resource topics range from introductory signals theory, basic analog modulation such as AM and FM, fundamental digital modulation, ASK, FSK, and QPSK, though to OFDM and SDR.

The teaching methodology behind the "block diagram approach"

The Emona Communications board draws on a well established experimental methodology that brings to life the "universal language" of telecommunications, the BLOCK DIAGRAM. This modeling approach is used by thousands of students around the world, to implement practically any form of modulation or coding.

Block Diagrams

Block diagrams are used to explain the principle of operation of electronic systems (like a radio transmitter for example) without worrying about how the circuit works. Each block represents a part of the circuit that performs a separate task and is named according to what it does. Examples of common blocks in communications equipment include the adder, multiplier, oscillator, and so on.

DATEx-IQ Hardware Blocks Provided:

100kHz BANDPASS FILTER
ADDER and TRIPLE ADDER
ANALOG and DIGITAL I/O – NI ELVIS III Function
COMPARATOR
DIODE, DIODE+RC LPF and RC LPF
EX-OR GATE
HEADPHONE AMPLIFIER
INTEGRATE & DUMP
LIMITER
MASTER SIGNALS
MULTIPLIER #1, #2, #3 and #4
PARALLEL-TO-SERIAL
PHASE SHIFTER
RECONSTRUCTION FILTER
RRC FILTERS 1 & 2 and 3 & 4
SAMPLE & HOLD
SEQUENCE GENERATOR #1 and #2
SERIAL-TO-PARALLEL and MUX
SPEECH
TUNEABLE LPF
VCO

FUNCTIONAL BLOCKS PROVIDED THROUGH THE NI ELVIS III DAC and FUNCTION GENERATOR

- NOISE GENERATOR
- VARIABLE DCV
- AUDIO OSCILLATOR
- PULSE GENERATOR
- SDR IQ SIGNALS

Comprehensive Documentation

The lab manual includes comprehensive and detailed experiments which are integrated with NI's web-based ThinkScape experiment delivery platform.

DxIQ-45G LAB MANUAL -

(22 Chapters, 406 pages)

- Lab 1: Introduction to the EMONA Communications Board
- Lab 2: Modeling equations
- Lab 3: FFT and Spectra
- Lab 4: Amplitude Modulation
- Lab 5: Amplitude Demodulation
- Lab 6: DSBSC Modulation and Demodulation
- Lab 7: SSB Modulation and Demodulation
- Lab 8: FM Modulation
- Lab 9: FM Demodulation
- Lab 10: FSK
- Lab 11: BPSK
- Lab 12: QPSK
- Lab 13: Introduction to DSSS
- Lab 14: SNR and BER measurements
- Lab 15: Principles of OFDM
- Lab 16: Sampling, PAM and Nyquist
- Lab 17: Carrier regeneration with Costas Loop
- Lab 18: ASK Modulation and Demodulation
- Lab 19: Principles of Superheterodyne

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