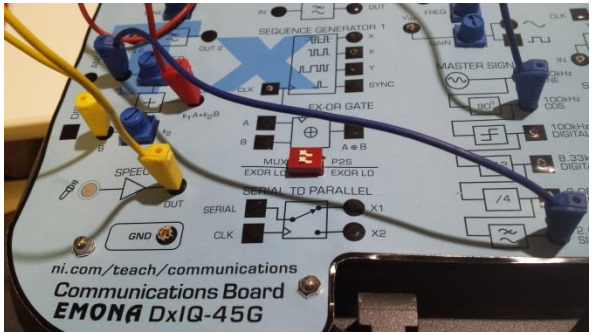
Emona Communications Board – DxIQ-45G



Close-up of the DxIQ-45G board

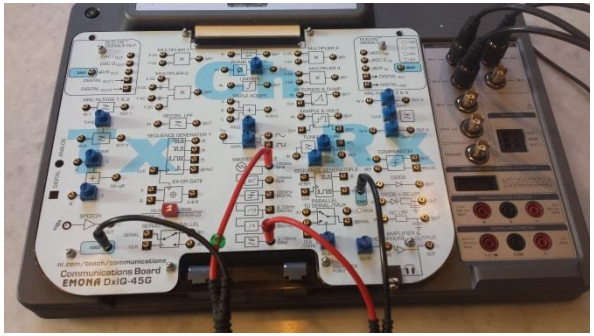


Illustration of DxIQ-45G mated with NI ELVIS

PRODUCT APPLICATION:

To provide a cost effective top-board for NI ELVIS™ III, covering the core topics in a university-level communications systems (transmission theory) lab program.

IMPLEMENTATION:

- A single panel PCB, which plugs into the NI ELVIS III.
- Many experiments implemented on ONE panel, replacing 6 or more experiment panels implemented by other “trainer” manufacturers.
- Student patches together each experiment, using Emona’s well established BLOCK DIAGRAM approach.
- DxIQ-45G will be supplied as a complete package, with all required accessories.
- Comprehensive lab manual with detailed experiments.
- Integration with NI’s web-based ThinkScape experiment delivery platform.

EXPERIMENT COVERAGE:

DxIQ-45G EMONA COMMUNICATIONS BOARD Lab Manual -

CH1 – Introduction to the DxIQ-45G EMONA COMMUNICATIONS BOARD

CH2 – Modeling Equations

CH3 - FFT & Spectra

CH4 – AM Modulation

CH5 – AM Demodulation

CH6 – Double Sideband Modulation and Demodulation (DSBSC)

CH7 – SSB Modulation and Demodulation

CH8 – FM Modulation

CH9 – FM Demodulation

CH10 – FSK Modulation and Demodulation

CH11 – Binary Phase Shift Keying (BPSK)

CH12 – QPSK Modulation and Demodulation

CH13 – Introduction to DSSS (Spread Spectrum)

CH14 – SNR and BER Measurements

CH15 – Principles of OFDM

CH16 – Sampling and Reconstruction, PAM

CH17 – Carrier Regeneration with the COSTAS LOOP

CH18 – ASK Modulation and Demodulation

CH19 – Principles of SUPERHETERODYNE

CH20 - AM and FM via SDR using IQ Signals

CH21 – BPSK, DPSK & QPSK via SDR using IQ Signals

CH22 – OFDM via SDR using IQ Signals

BLOCKS PROVIDED:

These are independent functional blocks, conceptually analogous to “LEGO™ building blocks”, used by the student to build the experiments listed here.

DATEx-IQ HARDWARE BLOCKS:

- 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 NI ELVIS III DAC and FUNCTION GENERATOR

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