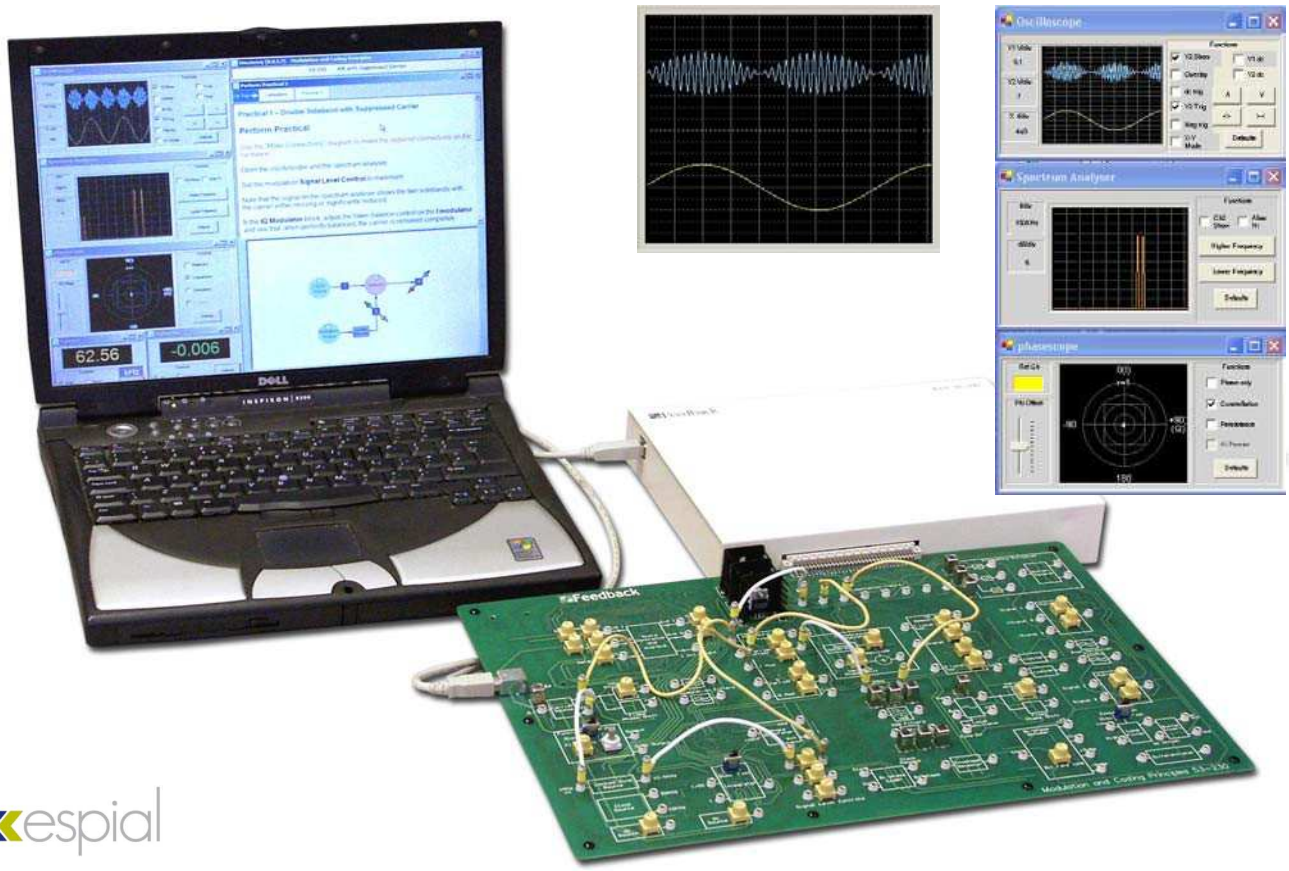
Modulation and Coding Principles 53-230



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Description

Modulation and Coding Principles Trainer comprises a workboard that covers the principles and practice of many of the modulation and demodulation formats used in modern analogue and digital communication systems.

The workboard is connected to a PC via a USB Real-time Access Terminal (92-203 RAT). The Terminal also provides all the necessary power supplies for the workboard to operate. The Espial Software Package (93-420) is supplied extra and required for use with the 53-230 and comprises full student instruction for performing the many assignments and practical activities together with relevant background and theoretical information combined with editing tools. The software also provides the instrumentation required for the monitoring and measurement of the workboard signals. Additional software is also available for adding multimedia materials, ESPIAL Course Manager (93-410).

Features

- Suitable for both technician and undergraduate teaching
- Comprehensive set of Laboratory Assignments
- Covers modern modulation principles and practice
- Integrated hardware and software environment
- On-screen background, theory and practical instructions
- Software provides embedded instrumentation including a Constellation meter
- No costly additional instrumentation required

Curriculum Coverage

A wide range of practical assignment work can be covered using this workboard. This includes seventeen assignments, each with up to four sub-practicals.

Signals in the Time and Frequency domains
Spectra of sine, triangle and square waves; filtering; noise signals

Sampling and Time Division Multiplexing
Sampling; A/D and D/A conversion; aliasing; TDM

Amplitude Modulation
Modulation and demodulation of double sideband AM with full carrier; modulation index; bandwidth; envelope detector; filtering; product detection

AM with Suppressed Carrier
DSBSC; modulation; demodulation; SSBSC; generation and demodulation

SSB Generation with an IQ Modulator

Amplitude Shift Keying (ASK)
Generating ASK; Multi-level ASK; Demodulating ASK

Frequency Modulation
Concepts of FM; generation by direct oscillator frequency shift; deviation; spectrum; bandwidth; Bessel functions; Carson's Rule; PLL demodulation

Frequency Modulation with an IQ Modulator

Frequency Shift Keying (FSK)
Generating and demodulating FSK using a PLL; minimum shift keying; multi-level FSK

Phase Modulation
Generating phase modulation using an IQ modulator; demodulation using residual carrier reference; demodulation using a frequency demodulator

Phase Shift Keying (FSK)
Generating binary phase shift keying (BPSK); demodulation of BPSK using residual carrier; demodulation using a Costas Loop and by frequency multipliers

Multi-state Phase Shift Keying
Generation and characteristics of 4-PSK (QPSK) and 8-PSK; generating BPSK & QPSK using IQ modulator; demodulation of QPSK using Double Costas Loop; carrier recovery

Quadrature Amplitude Modulation (QAM)
Generation and characteristics of QAM; QAM constellations; effect of amplitude and phase noise on QAM; demodulation of QAM

Uncoded Binary Data Formats
NRZ and RZ in bipolar and unipolar forms

Bi-phase Data Format
Generating and decoding bi-phase data

Alternate Mark Inversion
AMI coding and its generation

Word Synchronisation
Synchronisation; sync word inserting

Specification

The instruments provided are:

- 2-channel oscilloscope
- Spectrum Analyser
- Phase scope with phasor (vector) display
- Constellation display
- Frequency meter
- Voltmeter

Dimensions & Weight

Dimensions: 410 mm x 270 mm x 60 mm
Weight: 1 kg

Tender Specification

[1] A self-contained, open-based telecommunications trainer.
[2] To be used for teaching the principles of modulation and coding principles.
[3] The board to operate with a Real Time Access Terminal (RAT) enabling connection to a PC via a USB.
[4] To be supplied with interactive software which includes teaching curricula and PC-based instrumentation
[5] The PC-based instruments to be allowed to be opened all at the same time in a Windows environment.
[6] PC-based instruments to include all of the following: Oscilloscope, Spectrum Analysers, Frequency Meter, Voltmeter, Phase Meter and Gain Phase Meter.
[7] The Phase Meter can be used as a constellation meter in 16, 64 and 256 QAM experiments.
[8] Curriculum to cover analogue and digital modulation.
[9] 17 assignments to be provided, each with up to 4 sub-practicals.
[10] Workboard to have dimensions approx. 410mm x 270mm x 60mm and weight approx. 1kg.
[11] To be supplied with an experimental manual.
[12] To be supplied by a company offering a 2 year parts and labour warranty.

Ordering Information

Modulation and Coding Principles	53-230
USB Rapid Access Terminal (RAT) - essential	92-203
ESPIAL Software Package – essential	93-420
ESPIAL Course Manager – optional	93-410

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Feedback

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