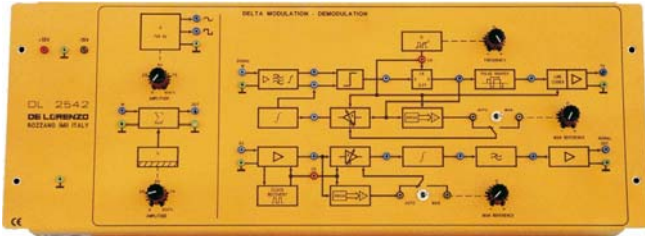




### Delta Modulation



DL 2542

#### Examples of performable exercises

- delta modulation and demodulation procedure
- relationship between sampling frequency and transmission quality
- phenomenon of “power overload” and correction methods
- quantization error, delta-adaptive modulation

The board allows the analysis and the study of DELTA modulation that, as it is known, is a recent and promising descent from the numeric coding PCM modulation.

#### Technical features

The board includes the necessary elements to show how in the modulator the sampling procedure is performed, the comparison of each sample with the previous one and the 1-bit coding of the difference. In the receiving section the signal is decoded and given back to the original form.

The modulator and the demodulator can be configured to experiment quantization schemes with manual or automatic self-adapting control. Besides, the board includes auxiliary circuits for easily performing the exercises: testing tone generators, noise generator and sampling frequency generator.

Transmitted band: from 340 to 3400 Hz

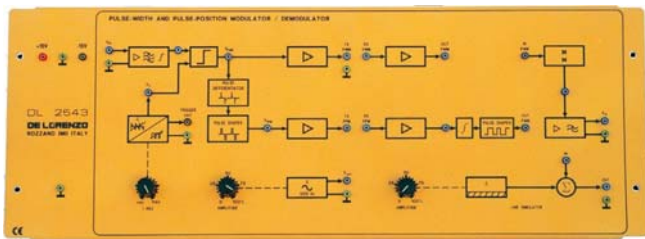
Square wave and sinusoidal tone generators: adjustable from 0 to 5 Vpp

Sampling frequency: continuously variable around 32 kHz

Manual or automatic variation of the integration step amplitude

Power supply:  $\pm 15$  Vdc, 50 mA

### PWM-PPM Modulation



DL 2543

#### Examples of performable exercises

- PWM and PPM modulation and demodulation procedure
- performance of PWM and PPM systems with respect to the transmission quality in presence of disturbances, attenuation, noise
- relationship between transmitted signal band and sampling frequency; considerations on the band occupied by the modulated signal

The board consists of a complete Modulator / Transmitter / Receiver / Demodulator chain, programmable to operate with pulse width modulation or pulse position modulation.

#### Technical features

The board includes the signal and timing generator and a testing tone generator, so that it is possible to perform even complex exercises with a minimal help from external equipment.

Sampling frequency variable with continuity around 8 kHz.

Band of the input analogue signal: from 340 to 3400 Hz.

Power supply:  $\pm 15$  Vdc, 100 mA