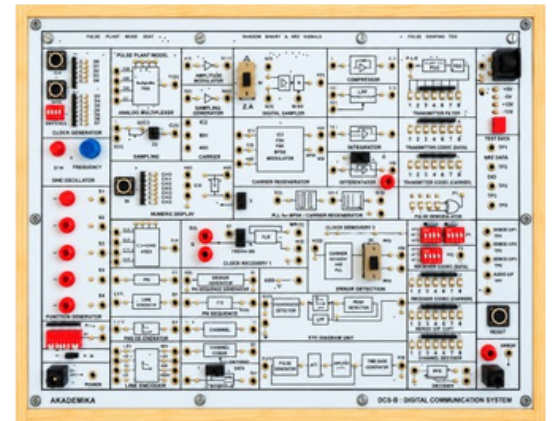


DCS-B

Basic Digital Communication Training System



FEATURES

- Single board system based on VLSI technology for the study of basic digital communication techniques
- Covers sampling, modulation, coding, multiplexing and voice communication techniques.
- Switch faults are provided for deeper study of the circuit involved
- Mobile based interactive e-manual

SPECIFICATIONS

Clock and signal generation section

Sine wave

- **Fixed frequency** : 250Hz, 500Hz, 1 KHz, 2 KHz
- **Variable frequency** : 1Hz ~ 30Hz

Sampling clock

- **Frequency** : 2 KHz, 4 KHz, 8 KHz, 16 KHz, 32 KHz, 64 KHz, 128 KHz
- **Duty cycle** : 10 ~ 90% Selectable in steps of 10%
- **DC signal (DC1 & DC2)** : 0 ~ 3.3 V
- **Transmitter clock frequency** : 240 KHz fast modes
- **Transmitter frame frequency** : 8 KHz
- **Carrier sine wave** : 500 KHz(0°), 1MHz(0°), 1MHz(180°)
- **Data pattern** : 8-bit NRZ-L pattern and 14-bit PRBS data

Transmitter section

- Analog signal sampling (sample & hold, natural, flat-top)
- 4 channel analog time division multiplexing
- Odd, even parity and hamming code generator, PCM
- ASK, FSK, PSK modulation
- Data encoding NRZ (L), NRZ (M), NRZ(S), Bi-phase (Manchester/Mark/Space), URZ, alternate mark inversion (AMI), uni-polar to bipolar and bipolar to uni-polar
- Advanced Modulation: Delta, Adaptive Delta, Sigma Delta, CVSD, PAM, PPM, PWM and signal compression.
- Audio preamplifier with microphone interface

Receiver section

- 2nd order and 4th order low pass butterworth filters
- 4 channel time division de-multiplexing
- PLL clock recovery

- Pulse code demodulation & Signal expander
- Data decoding NRZ(L), NRZ(M), NRZ(S), Bi-phase (Manchester/Mark/Space), URZ, AMI
- ASK, FSK, PSK, PAM / PPM / PWM demodulation
- Delta / adaptive delta / sigma delta / CVSD demodulation
- Audio amplifier with headphone with mic interface

EXPERIMENTS

Study of sampling techniques Sample & hold, natural, flat-top sampling

- Effect of various sampling frequencies and duty cycles
- Effect of sampling frequency, Effect of duty cycle

Study of TDM with different receiver synchronization techniques

- Using the direct synchronization technique
- Clock recovery through PLL / threshold detector

Study of pulse code modulation and demodulation

- Direct, Bit and Frame synchronization technique

Effects of parities and hamming code on PCM data

- None, Even, Odd Parity, Hamming code
- Study of PRBS

Study of various data encoding and decoding techniques

- NRZ- L, NRZ- M, NRZ- S, BIO-L, BIO-M, BIO-S, URZ
- AMI encoding and decoding
- Unipolar to bipolar
- Bipolar to unipolar

Study of various carrier mod and demod techniques

- ASK, FSK, PSK modulation and demodulation
- Study of delta modulation and demodulation
- Study of slope overload and increased integrator gain
- Study of adaptive & Sigma delta modulation and demodulation
- Study of continuously variable slope detector modulation and demodulation.
- Study of companding system
- Study of PWM & PPM modulation and demodulation.
- Switch faults
- Voice communication