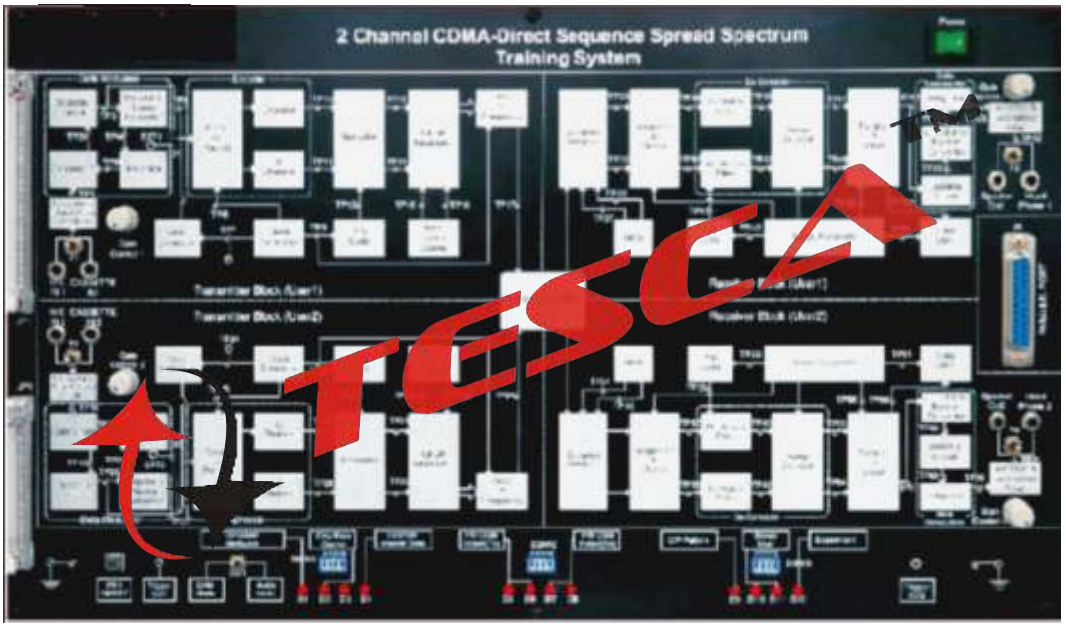
Order Code - 40546
2 Channel CDMA - Direct Sequence Spread Spectrum Training System



Code Division Multiple Access (CDMA) is a form of Multiplexing and a method of Multiple Access that divides up a radio channel not by time (as in Time division Multiple Access), nor by frequency (as in Frequency Division Multiple Access), but instead by using different pseudo-random code sequences for each user. CDMA has been used in many communications and navigation systems, including the global positioning system and in the OMNI Tracks Satellite system for transportation logistics.

Many CDMA based Communication products nowadays on Market, and new products are continually being developed. It's important to note that CDMA will become the major form of communication in the future.

The 2 Channel CDMA Direct Sequence Spread Spectrum Training System is developed to educate the trainee to understand the basic principles of digital and spread spectrum communication System. It served as the basis for CDMA Digital mobile communication system and make CDMA learning simple and efficient.

It offers Theory, Simulations, Practical, Real Time Software related to different blocks of CDMA as a single terminal,Training system is expected hopefully to make contributions not only in educating engineer of CDMA system currently being in service but also in bringing up engineers for the development of future mobile System.

Features :

- 2 Channel CDMA-DSSS System
- Audio, External, Internal Data
- Study of Delta Modulator & Demodulator
- User Selectable 8 / 16 bit Data
- User Selectable 4 types of PN-Code
- User Selectable Crystal Frequency (8 MHz & 50 MHz) for good understanding.
- Digitally Synthesized Sine & Cosine Wave of Maximum 480 KHz.
- External Trigger Out
- User Selectable Bit Clock, Symbol Clock & Chip Clock.
- More than 70 Test Points
- Effect of Sampling Rate can be Studied.
- User Selectable Hardware / Real-Time Software Mode
- Simulation Software for complete concept study.
- Operational Manual for Theory, Procedure & Reference Results.
- Illustrative Chart for 2-Channel CDMA-DSSS Description & Results.

Note: Specifications are subject to change.

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Technical Specifications :

Audio Section:

- Input Impedance : 600 Ohms(Microphone Socket)
- Input Impedance : 100 KOhms (Tape Socket)
- Voltage Gain : +1 to 107 (approx.)
- Low pass Filter : 4th Order (3.4 KHz Cutoff)
- Output impedance : 47 K Ohms (Headphone Socket)
- Output Volume : Adjustable
- Speakers Sockets : 2.5", 8 Ohms, 0.3 W

2 Channel CDMA-DSSS Transmitter Section:

- Clock : Bit Clock, Symbol Clock, and PN Clock: 34.34 KHz, 68.6 KHz, 240 KHz, 480 KHz, etc. - Delta Modulator : Comparator, Integrator, Unipolar to Bipolar converter, Bistable, Variable Sampling clock etc.
- Bit Rate : 68.6 KHz, 34.34 KHz, 17.17 KHz, 8.6 KHz
- Symbol Rate : 34.34 KHz, 17.17 KHz, 8.6 KHz, 4.3 KHz
- PN-Code : 7 bit with select (1001110 / 0111001/ 1110010 / 0100111)
- Carrier : Sine & Cosine Wave : 480 KHz, 240 KHz, 120 KHz,
- Modulation : QPSK Modulation
- Multiple Access Section for Audio, Internal data and External Data mode.

Control Section:

- Bit Clock, Symbol Clock, PN clock,
- PN-code transmitter, PN-code receive
- Carrier Clock
- Pattern Length
- Software or Hardware Mode
- Experiment Select
- External or Internal Mode
- Mic or Cassette Mode

Power supply : 220 V ± 10% 50 Hz / 60 Hz
Power Consumption : 2.8 VA (approx.)
Weight : 1.7 Kg (approx.)
Dimension (mm) : W 435 x D 260 x H 95

Generation Section:

- Digitally Synthesized Sine & Cosine Wave Generator with frequency select 480 Khz, 240 KHz, 120 KHz, 60 Khz.

- Digital data / pattern generator with frequency (68.6 KHz, 34.34 KHz, 17.17 KHz,8.6 KHz) & type (8 or 16 bit) select.

- Clock Generator with frequency select 34.34 Khz, 68.6 KHz, 240 KHz, 480 KHz, etc.

2 Channel CDMA-DSSS Receiver Section:

- Clock : Bit Clock, Symbol Clock, and PNClock: 34.34 KHz, 68.6 KHz, 240 KHz, 480 KHz, etc.
- NCO : Sine & Cosine Wave.
- Complex Multiplier : I & Q Channel
- Integrator : I & Q Channel
- Matched Filter & Correlator : I & Q Channel.
- Power Detector : I & Q Channel
- Symbol Decoder : 34.34 KHz, 17.17 KHz,…
- Recovered Data : 68.6 KHz, 34.34 KHz,……
- Delta-Demodulator : Variable clock, Unipolar to Bipolar Converter, Integrator,Low pass Filter, etc.

Software Section:

Real-time Software Section-

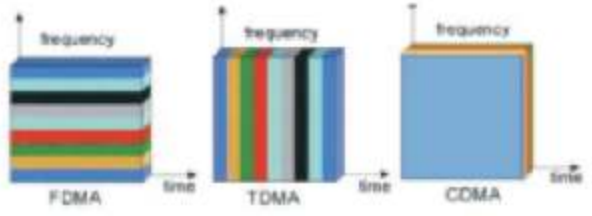
- Customized Graphical User Interface for specific experiment.
- Digital Signal Analysis
- Analog Signal Analysis
- Mixed Signal Analysis
- XY Mode Analysis

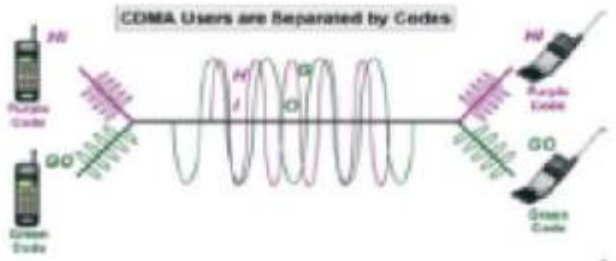
Simulation Software Section

- CDMA : Direct Sequence Spread Spectrum Transmitter Simulation
- CDMA : Direct Sequence Spread Spectrum Receiver Simulation.

CDMA Technical Document

- Complete technical document of CDMA : Direct Sequence Spread Spectrum transmitter & receiver.





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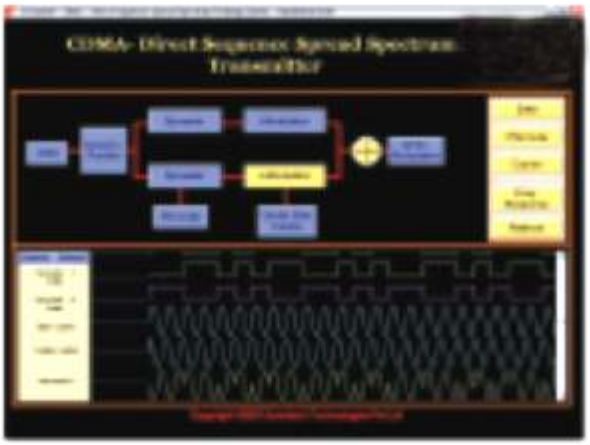
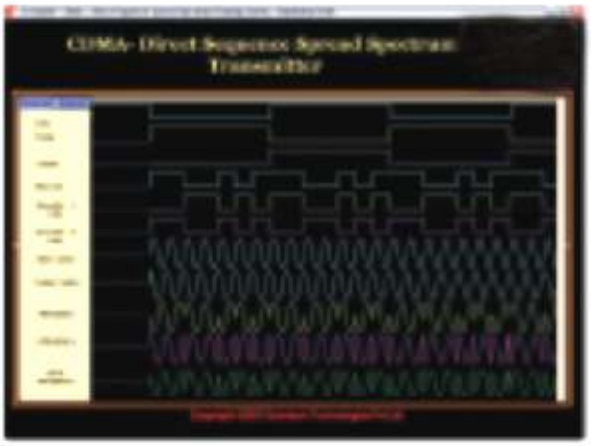
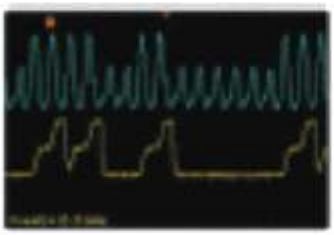
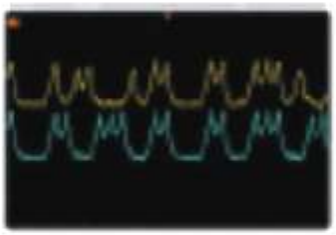
Simulation Mode Results :

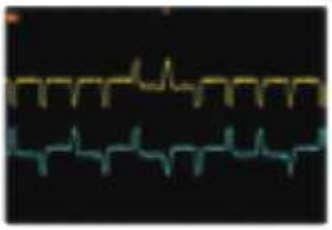


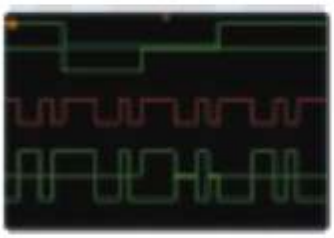


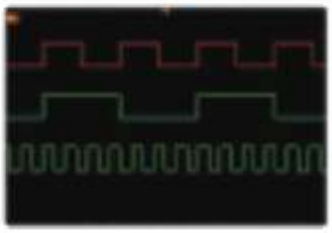
Hardware Mode Results :



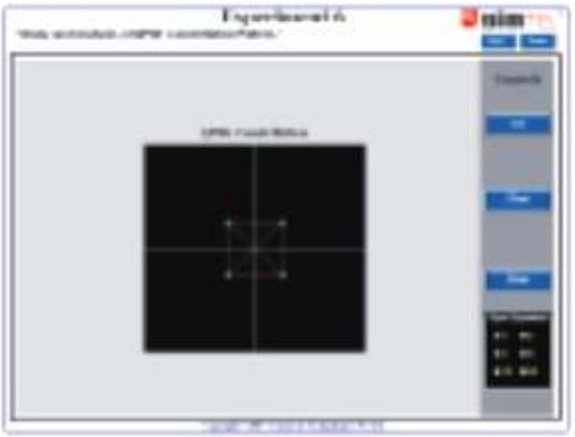








Software Mode Results :



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List of Experiments that can be performed:

- Study, analysis & Measurement of Data Pattern with Clock
- Study, Analysis & Measurement of Symbol with respect to clock and data.
- Study, Analysis & Measurement of PN-code generation with clock.
- Study, Analysis & Measurement of Spreading Data with respect to clock and Symbol data.
- Study, Analysis & Measurement of QPSK Modulation with respect to I & Q channel Data.
- Study of processing gain.
- Study & Analysis of QPSK Constellation.
- Study, Analysis & Measurement of CDMA-Direct Sequence Spread Spectrum - Spreading & Despreading.
- Study, Analysis & Measurement of Receiver Complex Multiplier.
- Study Analysis & Measurement of Integrator & Dump Filter.
- Study, Analysis & Measurement of Matched Filter.
- Study, Analysis & Measurement of Receiver De-spreader.
- Study Analysis & Measurement of Symbol Decoder with respect to clock & decoded data.
- Multiplexing User 1(Transmitte) with User 1(Receiver) (Audio & Data Mode)
- Multiplexing User 1(Transmitte) with User 2(Receiver) (Audio & Data Mode)
- Multiplexing User 2(Transmitte) with User 1(Receiver) (Audio & Data Mode)
- Multiplexing User 2(Transmitte) with User 2(Receiver) (Audio & Data Mode)
- Multiplexing Complete 2 Channel CDMA-DSSS System with controls.
- Study, Analysis & Measurement of Delta Modulation & Demodulation.

List of Accessories

- Real Time Software CD
- Parallel Port Cable with two 25 pin Dtype Connectors.
- Operating Manual.
- Carrying briefcase (Optional)
- Illustrative chart of Results

System Requirement :

- Software runs on Windows XP / 2000 / NT
- Parallel Port Mode : Standard Port Type.

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