

SDR Communication Kit

RENZYM

SCK enables true software radio development directly from Matlab/LabView class room simulations. It is a USB powered device specifically designed to provide hands on development experience in labs and organizations involved in study and research of communication systems.



Applications

- Software defined radios
- Training equipment for analog and digital communication courses
- Rapid prototyping of wireless communication systems.
- Receiver algorithm design and verification SDR platform

Features

- Real-time communication from Matlab/ Simulink, LabView ,GNU Radio
- USB powered, plug and play device
- Time division duplexing (TDD)
- Configurable by a software application on the host computer

Technical Specifications

- Frequency Range: 3-30 MHz
- Transmission Bandwidth: 20 KHz
- Output Power: 100 mW
- Interfaces: USB 2.0
- Antenna Type: Whip

Related Product:

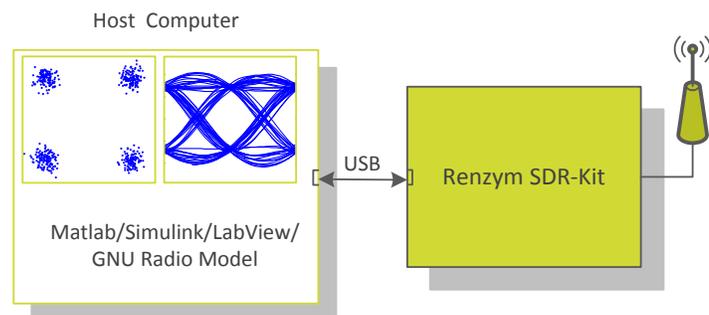
Renzym SDR Framework (RSF)

RSF is a digital modem software with more than 15 built-in PSK, QAM and FSK wave-forms and C/Python APIs for development and rapid prototyping of SDRs. It can be used with HST, SCK or other front end hardware to readily build a real-time communication system. For further information please visit our website:

<http://www.renzym.com/RSF.html>

Product Overview

SDR Communication Kit (SCK) is designed for undergraduate/graduate communication labs and organizations involved in study, research and development of communication systems especially software defined radios (SDR). It can be used to readily build transceivers by directly applying the concepts learnt from theory without requiring any hardware expertise. One of its main advantages is that it provides direct interface via USB port to very powerful simulation and analysis tools like Matlab/Simulink, Lab-View and GNU Radio. Computational and visualization capabilities offered by these tools can be used to design and analyze real-time communication systems directly from simulations. This blending of theory and practice makes SCK an ideal candidate for analog/digital communication labs because this aspect is generally missing from most of the communication courses. Theoretical performance of various techniques can now be quickly compared with their performance in a real-world environment. Furthermore it provides a unique opportunity to the researchers working on receiver design to verify their algorithms in various practical scenarios with a minimum of implementation effort.



Functional Description

SCK is a plug-and-play device powered and configured through USB interface. It has time division duplexed (TDD) transceiver functionality and two SCK kits are required to set-up a communication link between two host computers. It is connected to host computer through USB interface. Software tools like Matlab/Simulink, LabView, GNU Radio can be used to directly send/receive communication signals from the host computer. SCK can also be interfaced with [Renzym SDR framework \(RSF\)](#) for prototyping communication systems and software radios.

SCK comprises two subsystems namely frequency generation unit (FGU) and transceiver (TR) board. FGU functions as a stable low noise frequency source for TR board. TR board is TDD transceiver which performs frequency mixing, amplification and filtering.

About Renzym

Renzym is a technology company which provides high end, system-level engineering and software solutions. We deal in the design and development of communication and embedded systems. We also provides technical consultancy, design and development services and on demand professional trainings to organizations and individuals.

Consultancy and Design Services

Embedded System Design

- FPGA, DSP, Microprocessor and Micro-controller based design
- System level C/C++ programming
- High speed digital processing and data acquisition board design
- Driver and firmware development

SDR Waveform Design

- Long range HF radios for secure voice and data transmission
- VHF/UHF combat net radios for hand-held and manpack operations
- High definition video transmission
- TDM receivers and demultiplexers for satellite and terrestrial links

FPGA Based Hardware Design

- Module/IP Core development
- Design, implementation and verification of high-speed RTL designs
- Optimization of the FPGA resources and timing
- Communication, image processing, radar and multi-processor systems implementation

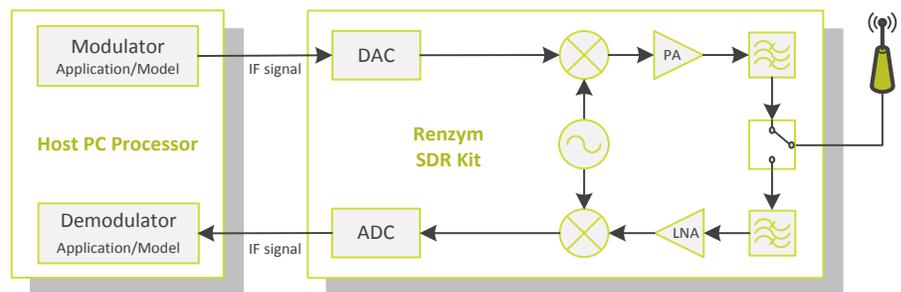
Renzym Trainings

- Wireless QAM Modem Design
- Hardware Design for FPGAs

For sales and technical assistance please visit our website: www.renzym.com

Transmitter Operation

For the transmitter operation, communication waveforms are generated by the software tools running on the host computer at a low intermediate frequency (IF) of 12 KHz. SCK connects to USB port and appears as a Sound Card to host computer. Generated waveforms are sent to SCK in analog form via SCK's digital to analog converter (DAC). SCK takes this IF signal and performs frequency up-conversion to the desired carrier frequency. This signal is further amplified, filtered and then transmitted by the antenna. SCK is configurable from the host computer through USB interface and user can control transmission parameters from the host.



Receiver Operation

At the receiver end SCK receives the incoming RF signal through its antenna and performs a series of receiver operations like filtering, low noise amplification and frequency down-conversion from RF to IF. This IF signal is sampled by SCK's ADC and processed by the software application on the host computer. Users can either develop their own Matlab/Simulink etc models or they can also use Renzym Digital Down Conversion (DDC) application for performing receive filtering, quadrature down-conversion and sampling rate reduction to produce complex baseband (in-phase and quadrature) signal. This baseband signal is further processed for receiver tasks like synchronization, equalization and error correction coding etc. [Renzym SDR Framework \(RSF\)](#) can also be used to perform these receiver tasks for a wide range of modulation schemes.

Technical Specifications

Specification	Details
Frequency range	3-30 MHz
Intermediate frequency (IF)	12 kHz
Mode of operation	Time division duplexed (TDD)
Transmission Bandwidth	20 KHz
Output power	100 mW
RF I/O Impedance	50 ohms
Antenna	Whip (Adjustable length)
Configuration Interface	USB
Data Interface	USB
Power Supply	USB powered
Application Interface	Matlab/Simulink, Lab-View, GNU Radio, Octave, Python, C/C++
Operating System	Windows, Linux