विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY
सत्यमेव जयते

SAMGNYA TECHNOLOGIES FOUNDATION
National Hub for Quantum Communication

National Quantum Mission

QCOMM FOUNDATION PROGRAM

The First Step into **Quantum Communication**

LEARN | BUILD | EXPERIMENT | COMMUNICATE

NATIONAL QUANTUM MISSION | SAMGNYA TECHNOLOGIES FOUNDATION

QCOMM Foundation is a hands-on educational kit designed to help students take their first steps into the exciting world of quantum communication.

Through a carefully curated set of foundational experiments, students learn how light can be generated, measured, controlled and used to transmit information — the very building blocks of advanced quantum technologies.



Why QCOMM Foundation?

Hands-On Learning
Practical experiments that make concepts real and engaging.

Foundational Approach
Start with the basics and build a strong understanding.

Secure & Future Ready
Understand secure communication & the need for quantum-secure solutions.

Curriculum Aligned
Ideal for laboratories, mini projects, clubs, workshops and training programs.

Build the Next Generation
Empowering students to become quantum-ready innovators.

THE LEARNING PATHWAY

MEASURE
The Light

CONTROL
The Source

BUILD
The Hardware

TRANSMIT
The Message

SECURE
The Communication

COMMUNICATE
Audio & Data

UNDERSTAND
Secure Cryptography

NEXT STEP
Quantum Communication

"Before students learn Quantum communication, they need to learn how to make light communicate."

Let's Build The Foundation For a Quantum Future!

IDEAL FOR

- Engineering Colleges & Universities
- ECE / EEE / CSE / Physics / Instrumentation Departments
- Quantum Technology Clubs & Innovation Centers
- Undergraduate Labs, Mini Projects & Hackathons
- Faculty Development & Student Training Programs

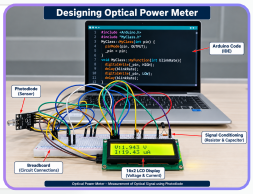
8 FOUNDATIONAL EXPERIMENTS. ENDLESS POSSIBILITIES.

A progressive journey from QCOMM Starter to QCOMM Expert

1

DESIGNING POWER METER

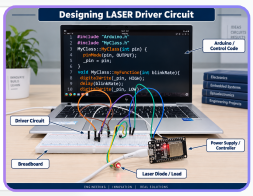
Design a circuit that measures optical power from a light source and displays the measured value on a 2-line LCD.



2

DESIGNING LASER DRIVER

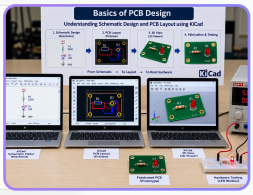
Design a Voltage Controlled Current Source circuit to source the controlled constant current to the LASER.



3

BASICS OF PCB DESIGN

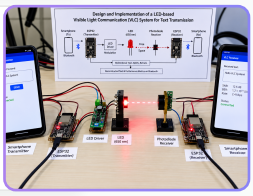
Understanding schematic design and PCB layout using KiCad.



4

LED-BASED VLC FOR TEXT TRANSMISSION

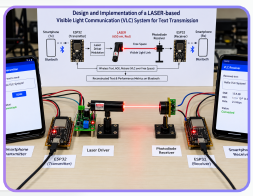
Transmit text from smartphone via Bluetooth, Modulate LED (650 nm), receive using photodiode and analyze SNR, NEP and losses. Data and metrics are sent to another smartphone via Bluetooth.



5

LASER-BASED VLC FOR TEXT TRANSMISSION

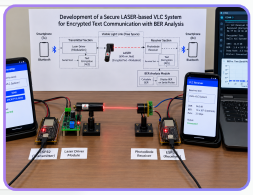
Text data is transmitted using a 650 nm laser through free space, received using photodiode, and performance metrics are analyzed and sent to another smartphone.



6

LASER-BASED VLC FOR ENCRYPTION & DECRYPTION

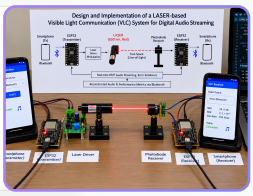
Secure laser-based VLC system demonstrating key sharing, encryption, optical transmission, decryption and Bit Error Rate (BER) analysis.



7

LASER-BASED VLC FOR DIGITAL AUDIO STREAMING

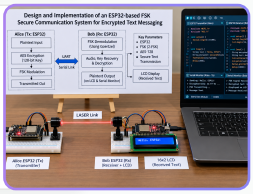
Transmit audio from smartphone through laser modulation, receive and reconstruct the audio at the receiver. Analyze losses and noise performance.



8

RSA KEY GENERATION & ENCRYPTION/DECRYPTION DEMO

Implement RSA key generation, encryption and decryption between two Arduino-connected systems and display the recovered message on a 16x2 LCD.



These experiments build the foundation for advanced Quantum communication technologies such as:

- Quantum Key Distribution (QKD)
- Quantum Networks
- Single Photon Detection
- Quantum Cryptography
- Quantum Safe Communication

"QCOMM Foundation doesn't teach quantum communication in a single kit. It makes students ready to learn it."

START SMALL. DREAM QUANTUM.

CONTACT US & LEARN MORE

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TOGETHER, LET'S BUILD THE FOUNDATION FOR A QUANTUM FUTURE!

SCAN TO VISIT OUR WEBSITE

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