



ANTU ROY

Embedded Systems & Power Electronics Engineer

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[Portfolio Website](#)

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PROFILE

Passionate and Dedicated Embedded Systems & Power Electronics Engineer Specializing in Firmware Development and MCU Peripheral Integration for Real-Time Control of Power Electronic Converters and Motor Drives. Experienced in Programming TI C2000 Microcontrollers Such as TMS320F28379D for [PWM Generation](#), [ADC Integration](#), [SCI/UART](#) and [CAN Communication](#). Skilled in Implementing Advanced Digital Control Techniques Including PI/PR Controllers, [FOC](#), [SPWM](#), [SVPWM](#) and PLL Synchronization for Renewable Energy and Motor Control Applications. Proficient in Designing and Testing Single-Phase and Three-Phase Inverter Hardware, With Expertise in Gate Driver Circuits, PCB Design and System-Level Integration. Skilled in MATLAB/Simulink, Embedded C, Code Composer Studio (CCS), [Altium Designer](#), LTspice, PSIM and Proteus, With Practical Experience in Real-Time Debugging, Hardware-in-Loop (HIL) Testing and Prototype Validation. Dedicated to Bridging Embedded Firmware and Power Electronics Hardware to Deliver Innovative, Reliable, Efficient, Scalable, Sustainable & Robust Engineering Solutions.

TECHNICAL STRENGTHS

Programming & Tools:	Embedded C, CCS, MATLAB/Simulink, Model-Based Code Generation (MBD) and Git
Embedded Platforms:	TI C2000 (TMS320F28379D), Arduino (Including ESP32 & ESP8266 Microcontrollers)
Peripherals:	ePWM, ADC (12 & 16-Bit), DAC, SCI/UART, CAN and Real-Time ISR Development
Control & Modeling:	PI and PR Controllers and D-Q Control, SOGI-PLL and MPPT Algorithms Techniques
Circuit Design:	LTspice, PLECS, PSpice, TINA-TI, SIMetrix, PSIM and Proteus Simulation Platforms
PCB Design:	Altium Designer, 2-Layer/4-Layer PCB, High-End PCB Design and Schematic Capture
Components Selection:	MOSFETs and IGBTs, Diodes, Gate Drivers , Snubber Circuits and Magnetic Components
Hardware & Testing:	HIL (Hardware-in-Loop), Oscilloscopes, Power Analyzers, Debugging and Fault Analysis
Domains:	Inverters and Converters, Motor Drives, PV Systems and Grid Integration Focus Areas
Document Creation:	MS Word and MS Excel, MS Visio, LaTeX, Google Docs, Overleaf and Adobe Photoshop

EDUCATION

National Institute of Technology Calicut, Kozhikode, Kerala	2023-2025
Master of Technology in Power Electronics	CGPA: 7.77
Regent Education and Research Foundation, Barrackpore, West Bengal	2016-2020
Bachelor of Technology in Electrical Engineering	CGPA: 7.58
Asannagar High School (H.S), Krishnagar, Nadia, West Bengal	2014-2016
West Bengal Council of Higher Secondary Education	Percentage: 71.20
Asannagar High School (H.S), Krishnagar, Nadia, West Bengal	2012-2014
West Bengal Board of Secondary Education	Percentage: 80.14

HARDWARE EXPERIENCE

Advanced Power Electronics

- Designed and Developed Buck, Boost & Buck-Boost Converters for Reliable High-Efficiency Power Conversion
- Developed 1-Phase and 3-Phase Inverters Using SPWM Technique to Voltage Control and Output Performance

Digital Control and Embedded Systems

- Embedded Firmware: ISR Design, Fixed-Point Math, Lookup Tables, Calibration, Logging Over UART/UART
- MCU Peripherals: ADC Trigger Chains, ePWM Sync, Deadtime, Complementary Outputs, DAC and GPIO

NOTABLE HARDWARE PROJECTS

M.Tech Projects

Design & Control of Single-Stage Grid-Connected Inverter for 1- φ PV System | CCS Monsoon 2025

- *Designed and Simulated Single-Stage Inverter in PLECS/MATLAB with MPPT and Grid Sync on TI C2000*
- *Optimized Control on TI C2000 for High Efficiency and Validated Performance Across Diverse Grid Scenarios*

Field-Oriented Control of Three-Phase Induction Motor Using SVPWM Technique | CCS Winter 2025

- *Built and Simulated FOC-Based Control for 3- φ ACIM in MATLAB/Simulink Using SVPWM on TI C2000*
- *Optimized Control on TI C2000 for Exact Speed, High Efficiency & Stable Dynamics Across Load Conditions*

Design & Analysis of 3- φ Inverter Using Sinusoidal ePWM Modulation Technique | CCS Winter 2024

- *Designed and Simulated Open-Loop 3- φ Inverter in PLECS/MATLAB & Implemented Hardware on TI C2000*
- *Optimized ePWM Control on TI C2000 for Efficient Sinusoidal Output and Evaluated Inverter Performance*

Control of DC Motor Using ePWM on the TMS320F28379D Microcontroller | CCS Monsoon 2023

- *Designed and Optimized PWM Control Algorithms for Precise Motor Speed Control and Efficient Performance*
- *TMS320F28379D is Utilized to Implement Precise Control by Modulating the Duty Cycle of the PWM Signals*

Integration of SOC and SOH Estimation for Li-ion Battery Management | Proteus Monsoon 2023

- *Implemented Estimation Algorithm in Hardware for Accurate Assessment of SOC, SOH and DOD Parameters*
- *Integrated the Estimation Techniques Into Hardware Systems Enables for Real-Time Monitoring and Analysis*

B.Tech Projects

Optimal Operational Scheduling of a Grid Connected System Based on DSM | MATLAB Winter 2020

- *Solved the Demand Side Management Problem by Considering of a Grid Connected Network by Load Shifting*
- *Reduced the Supply Side's Cost and Increased the Demand Side's Revenue in a Grid Using the DE Algorithm*

Overload Protection, Monitoring and Load Shifting of a 3-Phase Transformer | Proteus Spring 2019

- *Implemented Real-Time Monitoring to Track Voltage and Current Levels of the Transformer's Performance*
- *Optimized Efficiency and Load Balance Throughout Transformer Phases by Using Load Shifting Techniques*

AREAS OF INTEREST

- *Design and Control of Inverters for Photovoltaic (PV) Systems, PLL Grid Integration, and MPPT Algorithms*
- *Design and Control of DC-DC Converters, Advanced Control Techniques, and Power Converter Optimization*
- *Embedded Systems for Power Electronics Projects, Including TMS320F28379D Microcontroller Programming*
- *Electric Vehicle Powertrain Management, Battery Systems, Charging Infrastructure, and Energy Efficiency*

TRAINING AND CERTIFICATES

Vocational Training Program

West Bengal State Electricity Transmission Company Limited (WBSETCL) Winter 2020

- *Trainee was Acquainted with the Electrical Operation & Maintenance and Functioning of Different Equipment Like Power Transformer, Current Transformer, Potential Transformer, Circuit Breaker, Lightning Arrestor Productive Relays, Conductors, Isolators, Transmission Towers, Electrical Safety Procedure & Devices, etc.*

West Bengal State Electricity Distribution Company Limited (WBSEDCL) Winter 2020

- *Electrical Operation & Maintenance Activities of Distribution Line & Sub Station Upto 33 kV of WBSEDCL*