Karunya INSTITUTE OF TECHNOLOGY AND SCIENCES

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Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India.

DIVISION OF ELECTRONICS AND COMMUNICATION ENGINEERING

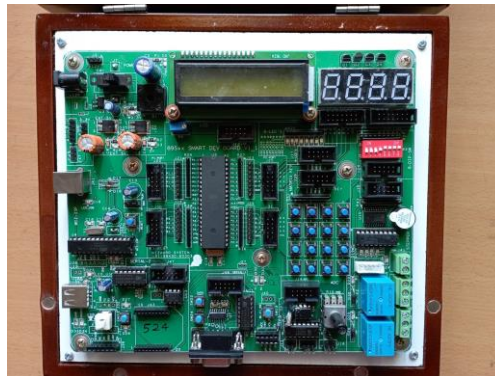# MICROPROCESSOR LABORATORY

1. <u>NI MYRIO KIT</u>

Make	National Instruments
Model	1900
Features	FPGA Processor Type -Xilinx-Z -7010 Processor Speed - 667MHz Processor Cores - 2 Non-volatile Memory - 256 MB DDR3 Memory - 533 MHz WLAN - 2.4 GHz, 802.11 b,g,n Channel Width - 20 MHz

Applications

- Autonomous Mobile Robot Navigation
- Robotic arm control
- Real-Time Data Acquisition and Analysis for Industrial Control Systems
- Environmental Monitoring
- FPGA-based Digital Signal Processing for Audio or Image Processing
- Smart Home Automation

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2. AT89S52 Smart Development Board

Make	WIZAARD
Model/ Type	AT89S52
Features	8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry

Applications

This microcontroller finds its applications from domestic devices to the industrial level to **provide digital control to embedded systems**. The Microcontroller also has Operating mode, Idle Mode, and Power-down mode which makes it suitable for battery-operated applications.

- Relay Controller
- Bluetooth and WiFi Module Interface
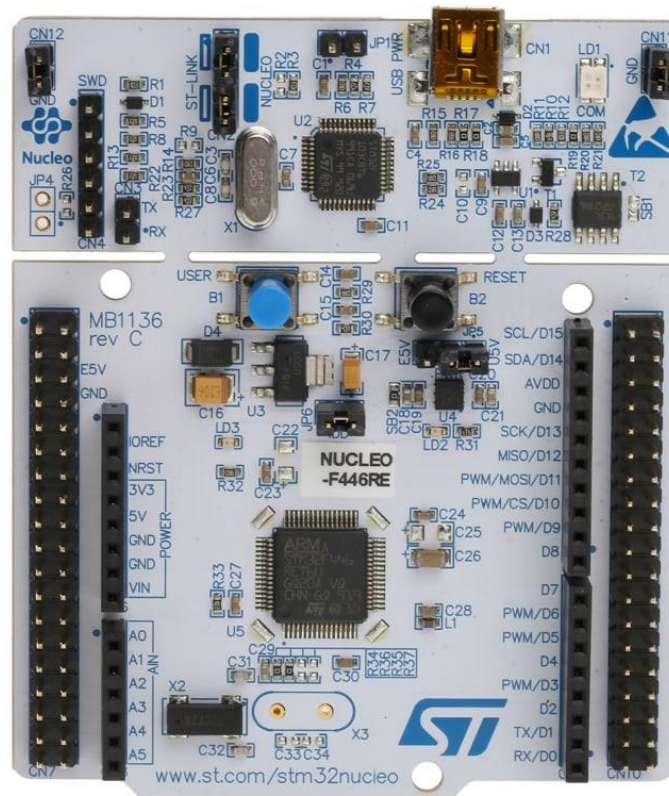- Motor Interface
- ADC and DAC

3. <u>Arduino UNO</u>

Make	Arduino
Type	UNO
Features	- Microcontroller: ATmega328 - Operating Voltage: 5V - Input Voltage (recommended): 7-12V - Input Voltage (limits): 6-20V - Digital I/O Pins: 14 (of which 6 provide PWM output) - Analog Input Pins: 6 - DC Current per I/O Pin: 40 mA - DC Current for 3.3V Pin: 50 mA - Flash Memory: 32 KB of which 0.5 KB used by bootloader - SRAM: 2 KB (ATmega328) - EEPROM: 1 KB (ATmega328) - Clock Speed: 16 MHz

Applications

- Weighing Machines.
- Traffic Light Count Down Timer.
- Parking Lot Counter.
- Home Automation.
- Industrial Automation.
- Health care monitoring system
- Arduino-based Weather Station
- Smart Door Lock Security System
- Biometric Attendance System using Arduino

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4. <u>STM32-NUCLEO-F446RE</u>

Make	ST NUCLEO
Model / Type	STM32
Features	- Common features - STM32 microcontroller in an LQFP64 or LQFP48 package - Board connectors - ARDUINO® Uno V3 expansion connector - ST morpho extension pin headers for full access to all STM32 I/Os - Flexible power-supply options: ST-LINK USB VBUS or external sources - On-board ST-LINK debugger/programmer with USB re-enumeration capability: mass storage, Virtual COM port, and debug port - Comprehensive free software libraries and examples available with the STM32Cube MCU Package - Support of a wide choice of Integrated Development Environments (IDEs) including IAR Embedded Workbench®, MDK-ARM, and STM32CubeIDE - Board-specific features - External SMPS to generate Vcore logic supply 24 MHz or 48 MHz HSE - User USB Device full speed - Board connectors: - External SMPS experimentation dedicated connector

	o USB Type-C®, Micro-B, or Mini-B connector for the ST-LINK o USB Type-C® user connector o MIPI® debug connector

The highly affordable STM32 Nucleo boards allow anyone to try out new ideas and to create prototypes quickly with any STM32 MCU. The STM32 Nucleo boards integrate an STLINK debugger/programmer, eliminating the need for a separate probe.
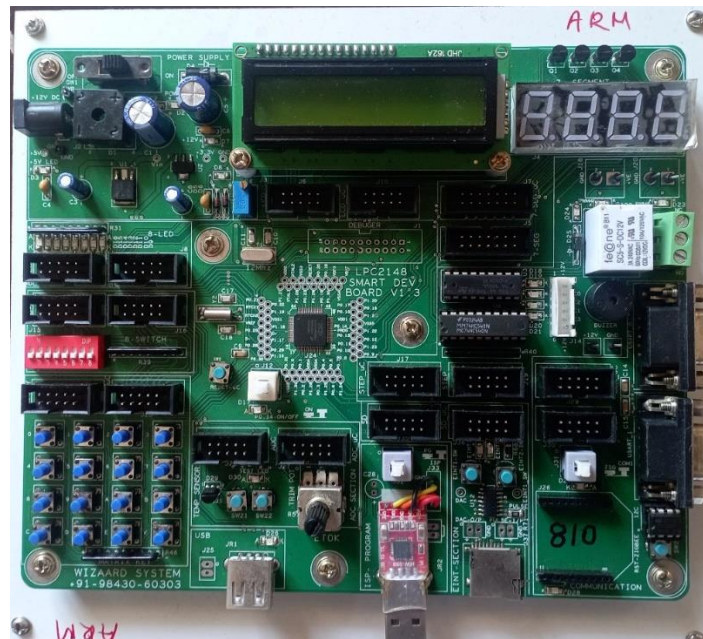
Provided with the STM32 Nucleo boards, the STM32Cube software packages come with several examples and seamlessly work with a wide range of development environments including IAR EWARM, Keil® MDK-ARM, Mbed™ and GCC/LLVM-based IDEs.

All STM32 Nucleo users have free access to the Mbed online resources (compiler, C/C++ SDK, and developer community) at www.mbed.org for building a complete application in only a few minutes.

Applications:

- Smart Farming
- Interface Audio sensor to STM32 board using ADC
- Quadcopter Flight Controller
- Smart Wearable Device for Health Monitoring
- Detection of optimal range for plant growth
- Motor Control
- Advanced Robotics Control System
- GPS Tracking System for Vehicles or Assets

5. **LPC2148 Smart Development Board**

Make	WIZAARD
Model/ Type	LPC2148
Features	The ARM7 is a 16/31 – Bit bus.
	The static Ram is 40 kb.
	On-chip flash programmable memory is 512kb.
	It is a high-speed controller 60 MHz operation.
	Two 10-bit ADC converters provide a total of 14 analog inputs.
	One 10- bit D/A converter.
	Two 32-bit timers/counters.
	The LPC2148 microcontroller offers a host of advantages, including reduced code size, low power consumption, versatile memory interface, support for PWM and timers/counters, internal RAM and ROM, RTC functionality, and power saving modes.

Applications

This feature enables precise control of signals, making it suitable for applications such as motor speed control, LED dimming, and audio modulation, automotive braking systems, mobile phones, and other embedded systems.

- LCD Interface
- Temperature monitoring using sensor
- Relay control using password
- Motor Interface