



NATIONAL INFORMATION TECHNOLOGY DEVELOPMENT AGENCY
(NITDA)

UNITY BOARD AI/IOT

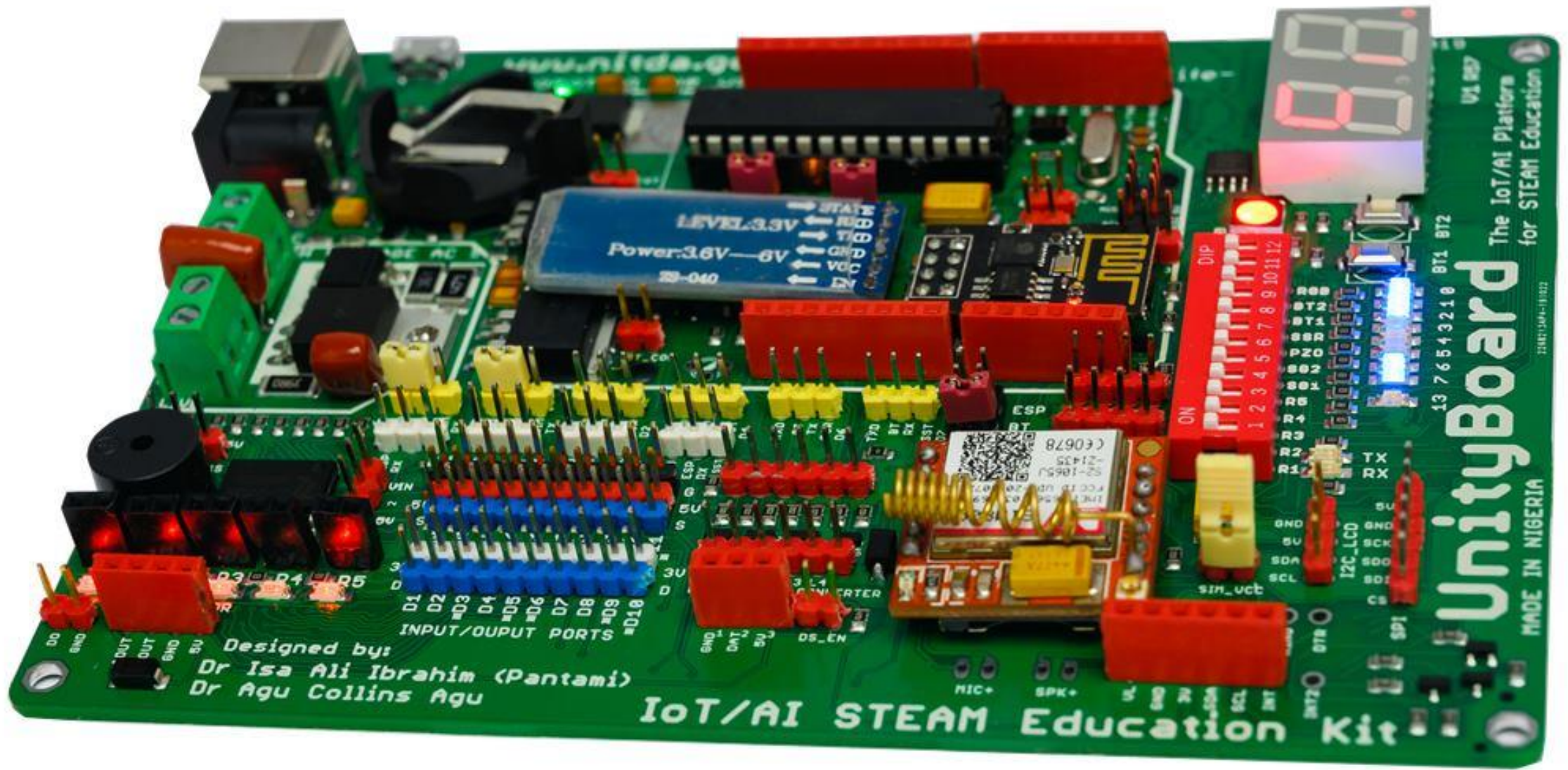
MADE-IN-NIGERIA EDUCATIONAL TECHNOLOGY
PLATFORM FOR STEAM EDUCATION

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Trends and Challenges

- ▶ COVID-19 Coronavirus global pandemic is creating a global learning crisis in addition to a global health crisis with 82% of the world's learners no longer in traditional schooling or education
- ▶ The fourth industrial revolution characterized by the fusion of the digital, biological and physical worlds is the current and developing environment in which disruptive technologies and trends such as the Internet of Things (IoT), artificial intelligence (AI), robotics, virtual reality (VR), cloud computing and 3D printing etc are changing the way we live and work.
- ▶ Whilst technological advancements are undoubtedly increasing productivity, concerns over job losses due to automation are rife. The World Economic Forum predicts net job growth overall, with as many as four new roles emerging for each role lost.

- ▶ Without bold reforms in education through the introduction of Education Technology and clear policies to guide us through, many people will lack the necessary skills to fill these new positions in the future economies and societies that are anticipated to be fundamentally different.
- ▶ In educating for the 4th Industrial Revolution in the current environment; the educational tools, techniques and curriculum that we have been using for decades may no longer be fit for this purpose. Hence the need for:
 - ▶ 1. Periodic curriculum reviews to mitigate the increasingly rapid rates at which knowledge becomes obsolete.
 - ▶ 2. Development, adoption and diffusion of Indigenous Education Technology Solutions nationwide for sustainability.
 - ▶ 3. Problem solving capability through creative thinking and problem-based learning methods, especially at the early age.
- ▶ Digital Inclusion



Unity Board - IoT / AI STEAM Education Kit

Teaching Science, Technology, Engineering, Math by ART



Unity Board is a creative medium for advancing teaching and learning, designed specifically as hands-on learning tools to help today's students build skills for the creative and digital economy through critical thinking, collaboration, communication, curiosity, problem solving and invention.

It teaches Physical Computing combining hardware and software by focusing on teaching of computer science and computational thinking creating a perfect way to introduce schools to physical computing that opens up a world of opportunities in the fields of AI, Robotics, Internet of Things (IoT) etc.

Aims to embed problem solving capability through creative thinking and problem-based learning methods, especially at the early age.

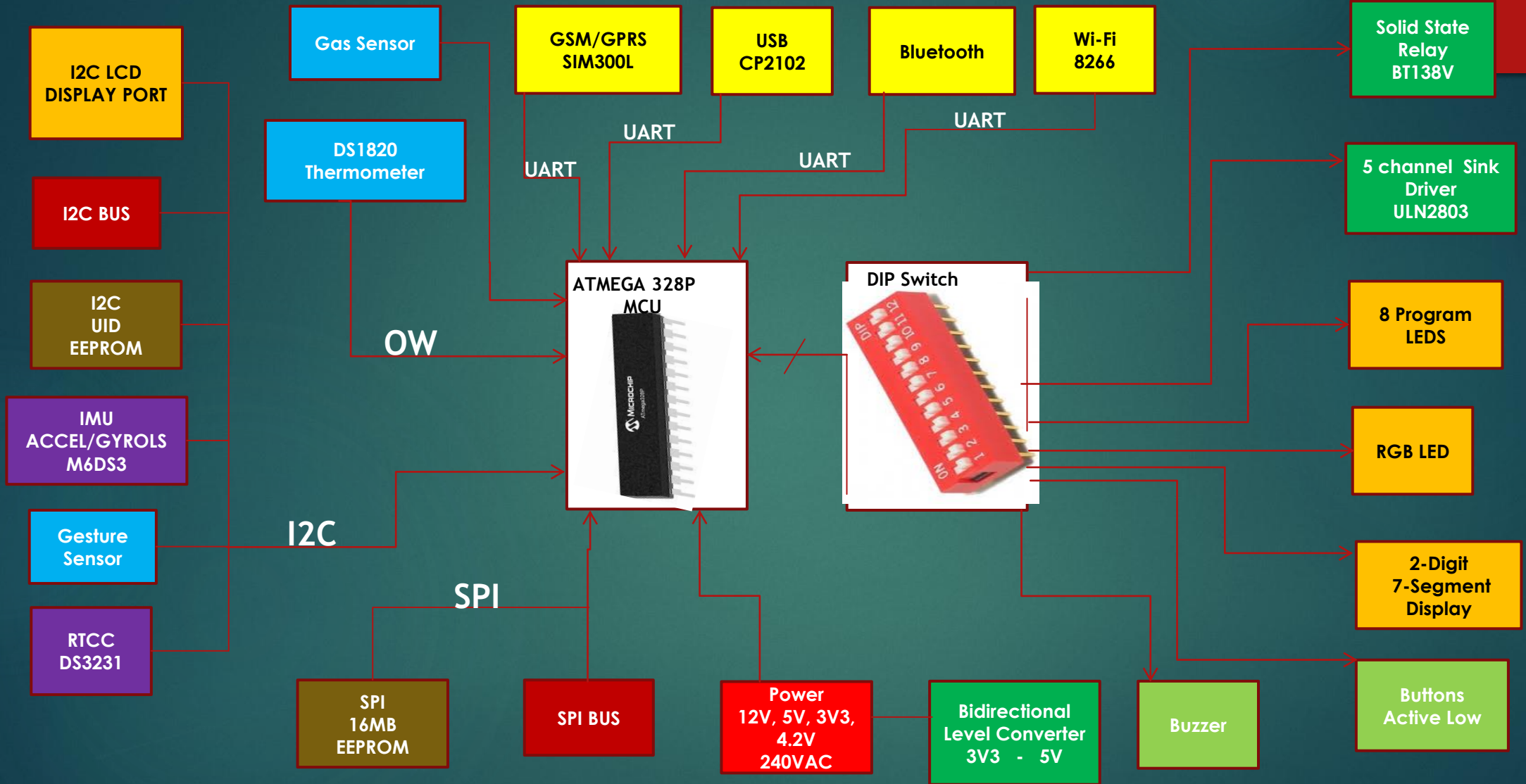
Early Spark Program

A shift from analytical thinking to creative thinking

SAGE, MAITAMA PARK, ABUJA



BLOCK DIAGRAM OF UNITY BOARD



Unity Board will spark the spirit of innovation in learners, and ignite great things.



- ▶ *When students are free to invent and create, they begin to see technology as a means for solving real-world problems and taking their learning to the next level.*
- ▶ By introducing the Internet of Things (IoT) in education via Unity Board and allowing Internet based communications to happen between physical objects, sensors and controllers, will change educational institutions massively.

IoT is of the foundation stones of Industry 4.0



- ▶ By embedding sensors in objects and integrating cloud computing, augmented reality, wearable technologies and big data in this platform, different parameters of the educational environment can be measured and analysed to provide useful information
- ▶ The Internet of Things (IoT) is a technological revolution that enables pervasive interaction between objects, people and environments. Data will be gathered by embedded sensors and actuators, which are then sent to specialised applications to create actionable information

Field Applications:

It is maker friendly and fully compatible with Arduino and peripheral modules making it programmable via Arduino IDE and compatible with all the example codes and libraries for Arduino. It is also compatible with Graphical Programming Environment such as XOD, ArduBlock, Scratch for Arduino (S4A), Minibloq, Modkit, Visuino, Embrio, GraspIO etc

Further Applications:

Learning embedded programming, developing and testing firmware

Smart Technology

Tracking Systems & Fleet Management

Data Acquisition Systems

Grid/Infrastructure Monitoring, Environment Monitoring, etc)

Unity Board Applications Video

<https://www.youtube.com/watch?v=CNofLYH1Gfc>

<https://www.youtube.com/watch?v=xTc6Nq0ozmQ&list=PLWtmW6LmNv1mVTQfJzfw-aZZVNMw09M0t>

Specifications and Features of UnityBoard:



- ▶ Microcontroller: ATmega 328@16MHz; Flash Memory 32 KB; SRAM 2 KB; EEPROM 1KB
- ▶ Storage: 2MBit I2C Serial EEPROM;
- ▶ Storage: 128MBit SPI Serial EEPROM;
- ▶ On-board Modules: Real Time Clock & Calendar (RTCC) with battery backup;
- ▶ 6-Degree-of-Freedom Inertia Measurement Unit (3-Axis Accelerometer, 3-Axis Gyroscope);
- ▶ Bidirectional 3V3 to 5V level converter;
- ▶ Arduino Compatible pins
- ▶ Communication Interface: USB; GSM/GPRS Module; WiFi (ESP8266); BlueTooth; I2C Bus; SPI; UART
- ▶ Audio-Visual: Piezo buzzer; RGB LED; Programmable 8 LEDs; I2C LCD Display; 2-Digit 7-Segment Display; Microphone; Speaker; Programmable Push Buttons.
- ▶ Input Voltage: 5VDC (via USB), 7-12VDC (via adapter); 110-400VAC
- ▶ Output Voltages: 3.3VDC, 5VDC, 110-400VAC
- ▶ Commutation/Switching: On-board 4KW@380VAC-Solid State Relay with Opto-coupler & Snubber;
- ▶ 5-Port Sink Driver I/O @50Vmax for Servo, Stepper Motors, External Relays; Solenoids etc
- ▶ Gas Sensor
- ▶ Digital thermometer

Existing Solutions

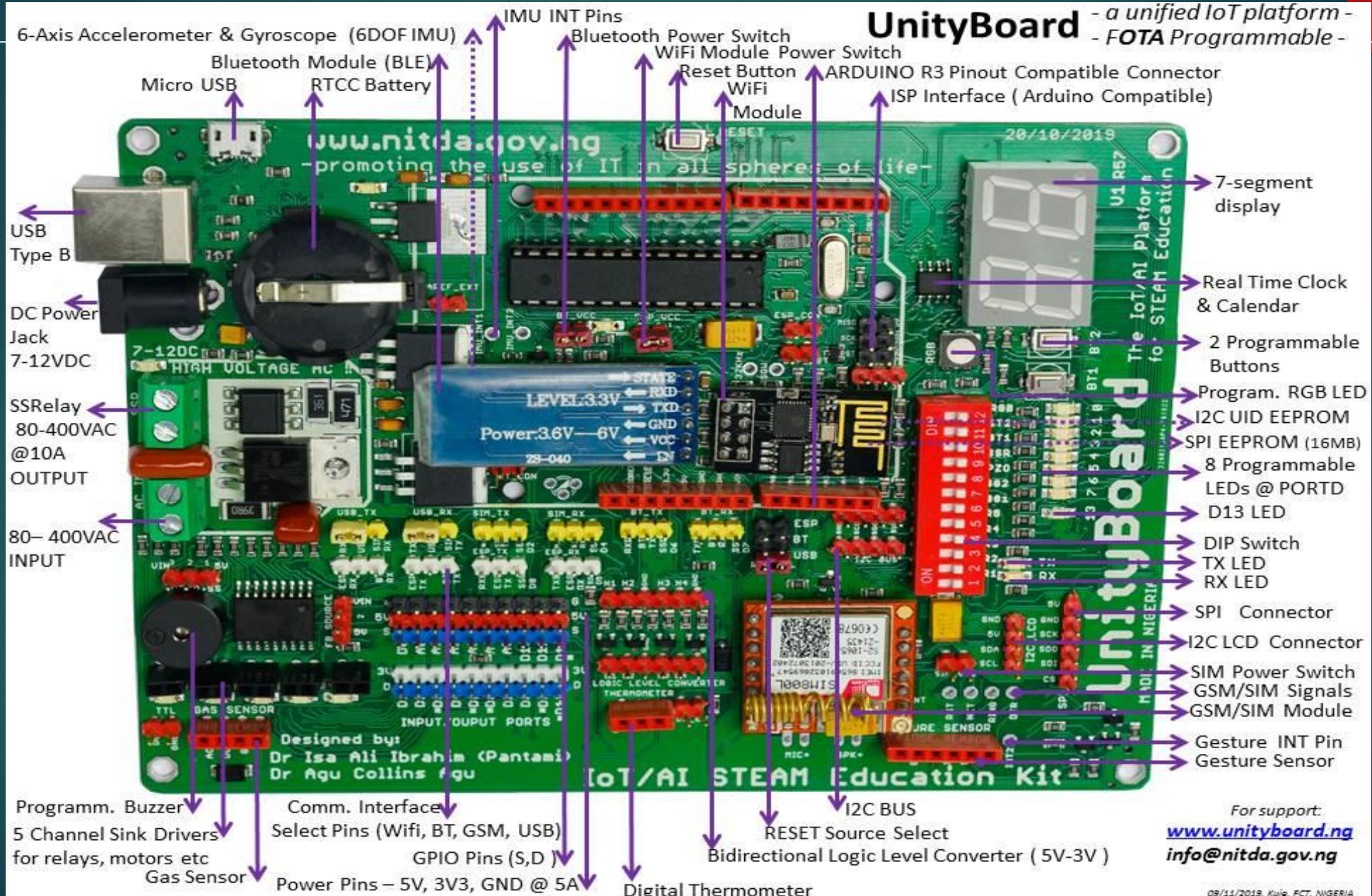


ARDUINO UNO

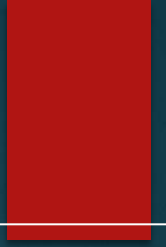


RASPBERRY PI 3

Board Layout



Competitive matrix



Adoption Strategy - NCCDE



At the National Council on Communications and Digital Economy held in December 2019 at Gombe, Gombe State the following resolutions were reached:

- i) Utilization of the indigenous education technology platform (Unity Board) as the basis for preparing the Nigerian workforce towards the 4IR through capacity development in emerging technologies
- ii) collaboration with Ministry of Education, UBEC, FMST, TETFUND, FMC&DE, MoD, CBN, NCC, USPF, Private Sector , Makers community towards the adoption and deployment of the Unity Board nationwide with pervasive benefits from its use
- iii) Development of curriculum, establishment and promotion of train-the-trainer programs with subsequent relevant indigenous certifications issued
- iv) Creation of mentorship programs and upscaling of the manufacturing facility of the Unity Board to drive technology transfer and entrepreneurship.
- v) Creation of a Technical Working Group.....

Target Organizations: Defence, NITDA, NCC, FMC, UBEC, FMST, TETFUND, FME, NUC, Ministry of Labour, ACADEMIA, Research Institutions, Hubs etc

Q&A

▶ Thanks for listening!!

▶ ***Enquiries:***

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