



evive
learn | build | debug



the ultimate embedded platform to
learn better, build easier and debug smarter!

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1. Brief Introduction

1.1 Background & Motivation

Technology - the magical word transforming our world every minute, attracts curiosity and lures everyone to be a part of the revolution. Making stuff is surely fun, but it needs a brave heart to ride along. It takes too much time to develop the relevant skills, too much of hard work to actually realise a project and when it faces a glitch, God bless the maker! It sure requires good amount of patience to debug and make it up and working. But, what if there existed another way, a way to learn quickly and effortlessly. What if you no more have to use extensively complex circuits to build the simplest of prototypes. What if there were alternatives available for effortless analysing and debugging.

Wait no more, bring evive to the team! It will take care of everything from cradle to grave. All you need to do is bring your ideas together. Join the revolution and make the world a better place!

1.2 Product Introduction

Introducing evive, an open source embedded platform for novitiates, amateurs and veterans alike to help them learn better, build easier and debug smarter. The name evive derives its meaning from a combination of 'e' and 'vive'. With evive, your electronics can vive!

Compatible with Arduino Mega, evive is equipped with various modes and controls for interacting and learning with hardware. Hardware, which can easily be connected to the plug & play interface and can be controlled using the interaction module. Accurate sensing, plotting and data logging capabilities are provided on this Internet of Things ready platform. It also supports collaborative project development with various other platforms like Raspberry Pi, BeagleBone, Odroid etc. And best of all, it is modular, compact, portable and weighs lesser than an iPad mini.

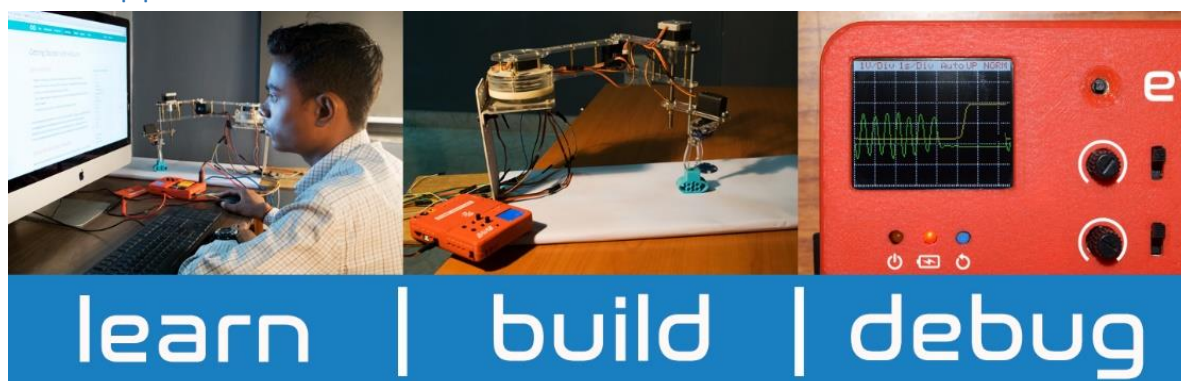
1.3 Product Brief

evive is packed with tons of useful features for everyone. We've categorized them into power module, plug & play hardware interface, hardware interaction module, communication module, data acquisition & logging module and building module.

The power module allows a variety of ways to power evive- internal battery, external power source and USB. It also gives several static and a variable power output. Plug & play hardware module allows commonly used hardware to be plugged into the device without complex wiring. Hardware interaction module includes a visual interface and a joystick to choose among various functions. Several switches, potentiometers, buzzers etc. are also provided to interact with your projects better. Communication module allows the board to communicate with external devices via Wi-Fi, Bluetooth or XBee. Data acquisition & logging module consists of accurate voltage & current sensing capabilities. It also allows plotting the data on provided screen and logging it on SD Card with time stamps using a Real Time Clock. Building module allows user to build more, it has a mini breadboard, space for Arduino shields, a provision to connect more breadboards with evive and mounts to attach it your robot.



2. Applications



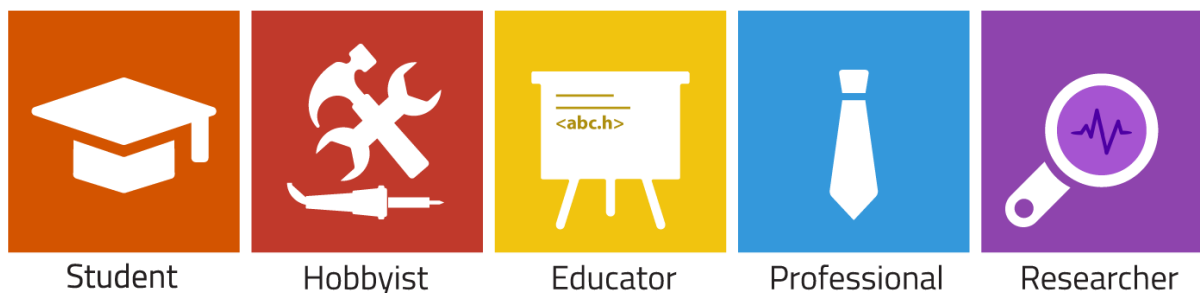
evive has a wide spectrum of applications. It can be used for learning, teaching, building projects & experimental setups, research, testing, debugging and what not.

For students, evive makes learning easy and fun! It provides a complete interface with sensory inputs, actuator controls, communication capabilities and audio-visual feedback, making it easier for them to learn robotics, programming and embedded systems. The all-in-one platform makes tangled-up wires in your circuits a thing of the past. It also helps reduce the cost involved in sourcing new hardware every time you want to try something.

Hobbyists can say goodbye to clunky and expensive Data Acquisition modules with evive's highly accurate sensing, logging and graphing capabilities. Ever find yourself obsessed with a small idea that you quickly want to hammer out and test, only to find out you're missing a necessary component and end up wasting your time bringing things into place? It happened to us many times, but with evive, you've got all you need in this self-powered portable unit! The huge array of features in it will certainly reduce the cost involved in procuring expensive shields for exploring new possibilities. It's all there, in evive!

If you're an educator or a parent, evive makes teaching easy and effective, giving you loads of teaching modules in one small unit. evive makes your life simple, with the visual and auditory feedback capabilities allowing easy debugging of your students' projects. It is compatible with graphical programming environments like Scratch, transforming learning into an art.

For researchers and professionals, evive is a bridge between exhaustive equipment like DAQs, oscilloscopes and elementary devices like DMM. Save your time and resources by doing all your beta testing and data logging with evive using its convenient LabVIEW and Python interface. The portability and wireless capability aid in controlling your device and measuring sensor response.

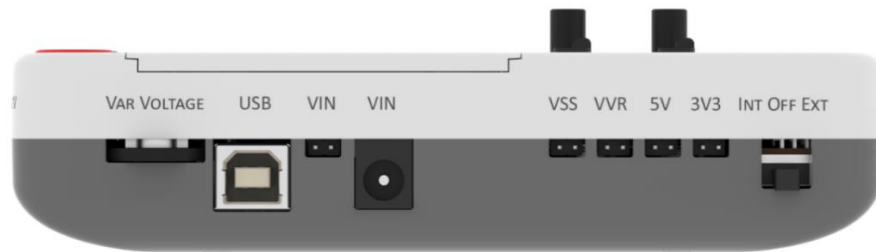


3. Features

3.1 Micro Controller

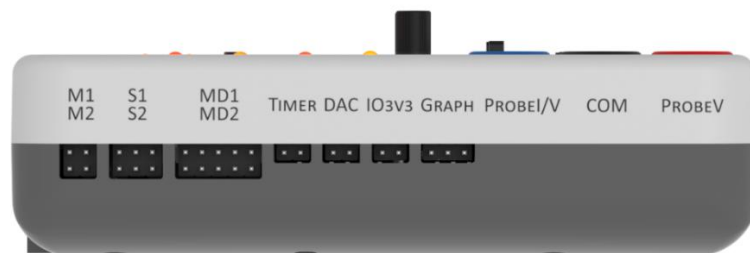
evive has an Arduino MEGA 2560 at its heart. Though several pinouts have been consumed by the device's internal hardware, Arduino UNO like pinout is provided for connecting shields.

3.2 Power Module



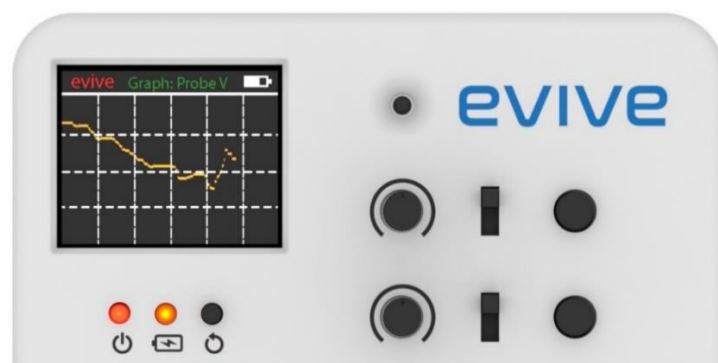
evive can take 5V - 30V external DC input and is protected against reverse polarity, over voltage & over current. It is also equipped with a 2400 mAh, 3.7V rechargeable internal battery capable of giving up to 1A discharge current. It is protected against low voltage and overcharging via auto-cuts. The device has power supply with stabilized output equal to input voltage, a controllable variable output with up to 3A current limit, a 5V output up to 3A and a 3.3 V output up to 800mA. Power & charging indicators, accurate variable voltage sensing is also provided.

3.3 Plug & Play Hardware Interface



Allows the user to plug hardware into evive and control it directly from the on-screen user interface. It has two independent DC motor output channels with up to 1A output per channel, protected against overcurrent and overheating. These channels can also be used to plug a stepper motor, pneumatic actuators, solenoid valves, relays etc. Two independent servo motor output terminals and two motor driver connection terminals are also provided along with direction indication LEDs.

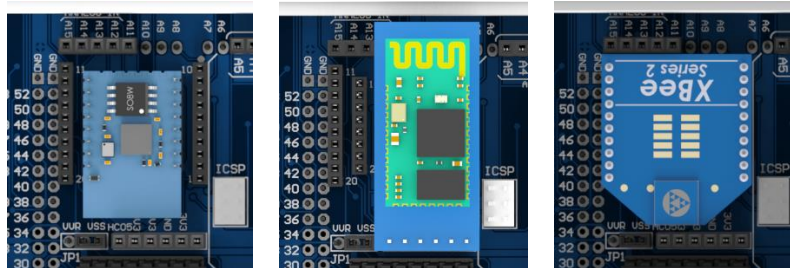
3.4 Hardware Interaction Module



This module is meant to allow user to interact with evive and all the devices connected with it using on-board switches, potentiometers and the on-screen interface. A 160*128 coloured TFT is provided

for displaying all the control modes, graphs, data etc. The on-screen menu can be browsed using the joystick. There are two potentiometers, two 3-position SPDT slide switches, two general purpose tactile switches to control plug & play devices, scaling on-screen graphs and more. A buzzer is provided for audio and feedback. Being open source, evive also allows the user to use the hardware for any application she wants to.

3.5 Communication Module



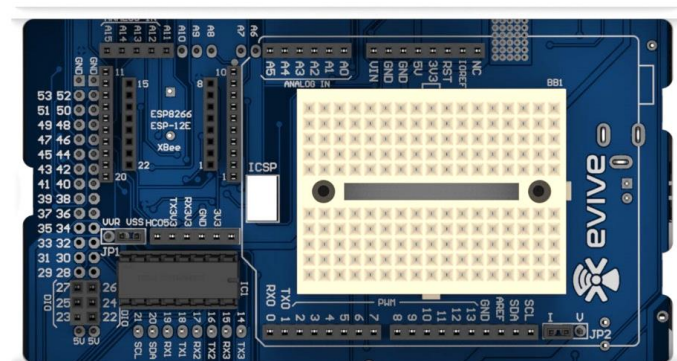
The communication module allows evive to connect with all your devices for sharing data, plots and other things. It is Internet of Things ready and allows the user to choose from an ESP8266-01 Wi-Fi module, an HC-05 Bluetooth module and good old XBee.

3.6 Data Acquisition & Logging Module



This module provides evive its sensing, storing and plotting capabilities for advanced users. It can sense voltages in $\pm 30V$ range with a precision of 10mV and currents up to 3A with a precision of 3mA. The current sensing channel can also be used to sense voltages in $\pm 5V$ range with a precision of 3mV. Two data acquisition channels are provided, one each for voltage & current sensing. With these, user can read and plot data on the TFT screen or PC or a smartphone. Two 24-bit isolated Analog to Digital converters are behind all the precision. An SD card slot compatible with up to 32GB is also provide to store all your data.

3.7 Magic Lid



Present at the centre of evive, allows you to access more features within the evive. It boasts of an Arduino MEGA at heart and a space for mounting UNO/MEGA shields as per need. It has jumpers to toggle between V-I and V-V sensing and to help you choose voltage outputs to plug & play hardware module. It houses the communication module, a mini breadboard to help you connect more sensors, actuators etc. with evive. It also provide access all Arduino MEGA communication pins like IIC, SPI and Serial.

3.8 More...

In addition to everything above, evive has more to offer. It has a 16 Bit Timer, a Real Time Clock, a 3.3V I/O channel, four Serial channel, a 12 bit IIC controlled Digital to Analog Converter and a provision to connect more and more breadboards with evive when you've complicated circuits to test. Plus, evive comes with an injection moulded plastic case. evive comes with an easy to use LabVIEW interface for all data acquisition, logging, controlling and communication needs. It is also compatible with Arduino IDE, Python, ROS, Scratch, LabVIEW, MATLAB, eclipse and many more. Lots of lessons, tutorials and project examples will also be made available for learners.

4. evive's Story

evive was conceived as a user innovation. The idea of having an all in one debugging kit took form while we were juggling with a student robotics competition. It surely brings immense satisfaction to the maker when they see their robots work. But suddenly, if things don't go as planned and something goes berserk making your robot mad, it takes days to figure out the problem let alone sort it. Separate testing circuits were required to test different components, and multiple components were tested to figure out which one is faulty. This made the entire process very time consuming and frustrating at times, which was a great setback for the love of making.

So we started working on simplifying the debugging process by developing a testing kit which could test many of the most commonly used hardware. The idea matured and more features were gradually added to it. An aim of integrating everything from learning robotics and embedded systems to building and debugging projects on one platform was set. Our hostel rooms were transformed into laboratories. And after almost nine months of iterations and multiple prototypes, an all-in-one embedded platform for hobbyists, researchers, professionals and learners was introduced on National Technology Day, May 11th 2016.

To our ultimate contentment, evive was born.

5. Where to buy

evive will soon be available on Indiegogo, a global crowdfunding platform. You can support us to bring this product to life. Visit bit.ly/evive1 to sign up for the launch.

6. Acknowledgements

Agilo Technologies is grateful to Indian Institute of Technology, Kanpur for providing access to various prototyping facilities during development and testing phases. A product is nothing but a fruit of the endless endearing efforts by the people linked to it. In this case they range from various esteemed faculty members and laboratories who supported us and agreed to beta test the product (a special thanks to people at 4i Laboratory, Tinkering Lab and SMSS Lab) to the student Science & Technology community for their valuable feedback on the product.

7. Company and the People

Based out of Kanpur, Agilo Technologies was founded in Aug 2015 by a group of robotics enthusiasts at Indian Institute of Technology, Kanpur. The team has been friends for long and they usually spent their time working with robots and embedded systems. All of them have worked for IIT Kanpur's ROBOCON team. During its initial days, Agilo worked on several robotics & automation projects. One of which was working on mechanical design, control systems and software for a Catalyst Unloading Robot for Reliance Industries Limited. The company also developed an innovative trash compaction

device which is currently 'patent pending'. evive is the first product introduced by Agilo Technologies on Technology Day 2016 held at IIT Kanpur.

Co-founders

Agilo Technologies was founded by four friends at Indian Institute of Technology Kanpur, one of the most reputed engineering institutes in India.



Abhishek Sharma
talk business to him



Dhrupal R Shah
technology guy



Akshat Agarwal
builds electronics & code



Pankaj K Verma
the product designer

Abhishek Sharma handles executive, business, finance, legal and marketing aspects of the company. He is enrolled in a BT-MT Dual Degree program in Mechanical Engineering and has experience of working with General Electric as an intern. He has been an avid maker and a part of several projects & competitions. Besides all managerial responsibilities, he contributes to mechanical engineering, design and manufacturing aspects. Outside Agilo, he loves Poker and Volleyball.

Dhrupal R Shah leads the technological development of the company and also handles executive and operational roles. He is enrolled in a BT-MT Dual Degree program in Mechanical Engineering. He has worked with Indian Space Research Organization as an intern and Boeing as an extern. He is an expert at bringing new technologies to the company. Besides technology, he contributes to procurement, fabrication and sales for the company. Besides work, he loves cycling and marathons!

Akshat Agarwal is a junior undergraduate in Electrical Engineering and is working on Artificial Intelligence with Interaction Lab, University of Southern California as an intern. He is responsible for electronics, coding and web development for Agilo. He stays updated with all the technological advances around the globe, loves watching movies, reading and hiking.

Pankaj K Verma is a junior undergraduate in Mechanical Engineering and handles product design and mechanical engineering aspects for the company. He is also responsible for prototyping and manufacturing. Being an explorer, he loves trying new manufacturing techniques, he is team's 3D Printing lord and loves cricket.

8. Contact Information



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