Electronics_List.md

R.E.A.C.H. Generic Electronics Part List

All costs are as of 19:00, 19th July, 2017 IST.

All costs are exclusive of taxes and delivery charges unless otherwise noted.

This list in non-exhaustive, i.e., it doesn't contain every single item that may be used in the project.

This list is generic, i.e., it doesn't discriminate between the electronic requirements of all REACH projects as of 19th July, 201

Command & Control

S No	Name	Cost	Quantity	Notes
1	Raspberry Pi 3 Model B	$39.95	1	Required; Used as a "master" computer for performing calculations and controls other electronics
2	Arduino Uno Rev3	$24.95	1 - 2	Required; Used as a "slave" microcontroller for transmitting data to and from various components and to the ground station

Motion Sensing

The onboard electronics include a 9-Axis Inertial Measurement Unit (IMU) for sensing various motion data.

S No	Name	Cost	Quantity	Notes
1	9-DOF Absolute Orientation IMU Fusion Breakout		1	-
2	Arduino 9 Axis Motion Shield	$26.29	1	-

Note: Either module can be used; Essentially, both devices are the same, except for physical dimensions and elcetronic interfacing.

GPS Tracking

The onboard electronics include a GPS Receiver for accurate position plotting (used as a back-up against the IMU).

S No	Name	Cost	Quantity	Notes
1	SparkFun Venus GPS Logger	$59.95	1	Capable of data-logging
2	NavSpark-GL	$59.95	1	Essentially a developement board with a GPS receiver
3	Dexter Industries Arduino GPS Shield	Unknown	1	Accurate; Can't log data out-of-the-box (On-chip software has to be modified)

S No	Name	Cost	Quantity	Notes
4	Adafruit Ultimate GPS Logger Shield	$44.95	1	Capable of data-logging; Available on Amazon for 7,339 INR (Inclusive of taxes and delivery charges)
5	USGlobalSat EM-506 (48 Channel)	$39.95	1	Accurate; Can't log data out-of-the-box (Unknown if on-chip software can be modified to enable this)

Note: Any module can be used; Preference is given to data-logging capable modules

Camera

The onboard electronics include a camera for taking "breath-taking" pictures.

S No	Name	Cost	Quantity	Notes
1	Raspberry Pi Camera Module v2	1500+ INR	1	8MP Camera; Various reseller list different prices; There is a No IR variant also Available for night photography

Communications Systems

The on-board electronics include a wireless communications system to transfer real-time telemetry data to the ground station.

S No	Name	Cost	Quantity	Notes
1	Satellite Communications Unit	Unknown	1	Tentatively supplied by the ISRO/DRDO due to high costs of such modules
2	Proprietary RF/Microwave Communications Unit	Unknown	2	Tentatively supplied by the ISRO/DRDO due to high costs of such modules; 1 Unit for the Rocket, 1 for the Ground Station
3	XBee Sub 1GHz RF Communications Unit	Varies	2	Cost varies for different modules; Certain long-range modules require additional hardware; Certain modules can be used with Arduino Wireless SD Shield

Note: Any of the above mentioned modules may be used.

Power

S No	Name	Cost	Quantity	Notes
1	Vacuum Insensitive Rechargable Battery Pack	Unkown	1 - 2	A module has yet to be identified; Quantity can vary depending on the battery's power

Other Parts

S No	Name	Cost	Quantity	Notes

1	Raspberry Pi to Arduino Bridge	Unknown	1	Since the RAspberry Pi and the Arduino don't operate similarly, a bridge is require to connect them without damaging their circuits
2	Voltage & Logic Level Shifters	$3.00 - $10.00	0 - 3	Since most external modules work on 3.3V, but the Arduino works on 5V, a Voltage & Logic Level Shifter is required; A module is yet to be identified; Quantity can vary depending on number and type of modules used
3	Stacking Headers	Unknown	0 - 3	Used to connect multiple Arduino Shields (ICs containing modules for specific tasks) to the same Arduino