COSTS CHECKLIST

The Costs to Develop, Scale, and Manufacture Your New Electronic Hardware Product

HARDWARE ACADEMY

Part 1 - Development Costs

Electronics Design	
Design of schematic diagram + BOM	*Electronics "blueprint" design*
Printed Circuit Board (PCB) layout	*Design of the PCB*
Eval/debug/revisions	*Every design requires some revisions*

Electronics Prototypes	
Production of Printed Circuit Boards	*Bare PCB production*
Assembly of Printed Circuit Boards	*Soldering the electronic components onto the PCB*
Cost of electronic components	*Components price for small quantities only*

Software Development	
Firmware development + testing	*Programming the microcontroller + testing*
Mobile app development	*Android and iOS apps*

Enclosure/Mechanical Development	
Design of 3D model	*3D computer model is required*
Photorealistic 3D model	*Mainly for use in early presentations*
3D printed prototypes	*Cost of the enclosure prototypes*
Revisions	*Revisions will almost always be required*

Retail Package Design	
Graphic design of insert card or box	*Quality graphic design is critical for retail sales*
3D modeling of custom plastic	*Any custom shaped plastic requires a 3D model*
Instruction manual design/copy	*Most products require an instruction manual*

Retail Package Prototypes	
Insert card or box printing	*Retail packaging can be quite expensive*
Instruction manual printing	*Most products require a user's manual*

Part 2 - Scaling Costs

Certifications	
FCC certification	*Required for all electrical products sold in USA*
UL / CSA certification	*Required for some electrical products in USA/CAN*
CE certification	*Required for products sold in Europe*
RoHS certification	*Required for electrical products sold in EU &* California

Manufacturing Setup	
Low-volume production molds	*Soft molds for < 10k units (USA)*
Mid-volume production molds	*Hard, single cavity molds for >10k units (Asia)*
High-volume production molds	*Hard, multi-cavity molds for > 100k (Asia)*
Injection molds for package	*Single mold for retail package*
Assembly fixtures	*Fixtures are used to assist in efficient assembly*

Miscellaneous Costs	
Patents, trademarks, copyrights	*Most of this cost is for a utility patent*
Product liability insurance	*Paid annually*
Wireless tuning	*Depends on number of antennas*
Bluetooth SIG membership	*Required if your product uses Bluetooth*

Part 3 - Production Unit Cost

PCB Production	*Bare Printed Circuit Board (PCB)*
PCB Assembly	*Soldering of electronics components onto PCB*
Molded plastic pieces	*Custom injection molded plastic*
Stamped metal pieces	*Custom stamped metal*
Electronic components	*IC's, modules, connectors, batteries, sensors, etc.*
Retail Package	*Retail box + Master shipping carton*
Final product assembly	*Putting the final product together*
Testing	*Testing of the electronics*
Scrap rate	*Defective units (no process is perfect)*
Returns	*You will have customer returns*
Freight	*From Asia to your market*
Warehousing	*You will need to keep stock*
Duties	*Export/import taxes*