Watch Design

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EVC Engineering 18
Professor Entekhabi
Fall 2015

Modern Watches Today

Apple Watch

Samsung Gear

Modern Watches Today

Razer Nabu Smartband

Notable Watches

Common Problems with “Smart” Watches

- Short Battery Life:

  -Apple Watch ~18hrs depending on use.

  -Samsung Gear ~25hrs depending on use.

- Recharge Time:
  -Apple Watch ~Overnight Charge

Common Problems with “Smart” Watches

- Cost & Price:

  -Apple Watch: 349+
  -Samsung Galaxy Gear: $150

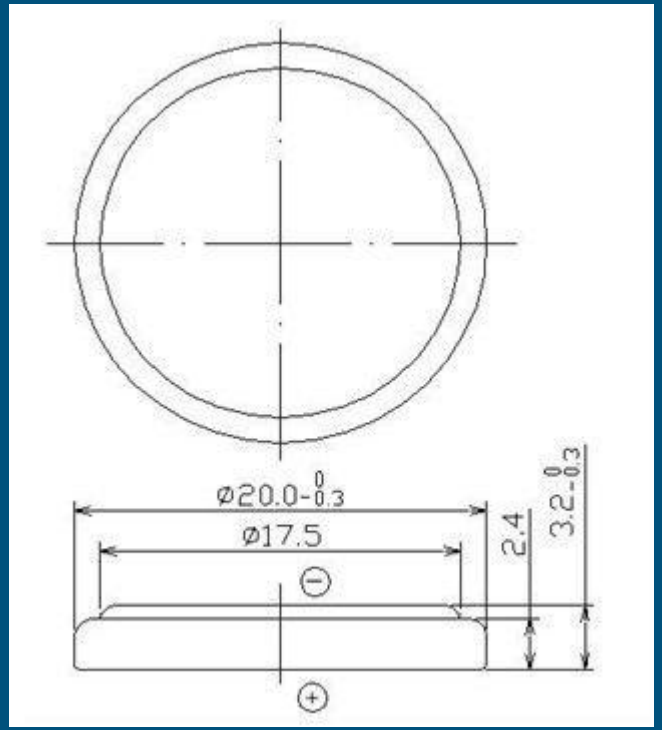
- Serviceability: being able to be repaired easily & replaceable components

- Durability

Target Objectives: Watch Design

- Simplicity in terms of Functionality
- Flexible Design
- Based on a Smaller Budget
- Put the “smart” into the watch not make “smartwatch”
- Extend Battery Life & Reduce Rechargeability
- Reliability and Serviceability(Repairability, fewer components.)
- Durability

The “CR2032” Lithium Battery



Power Source:

Standard Watch battery @3.0V

The first letter identifies the chemical composition of the battery, which also implies a nominal voltage:

Letter code	Common name	Positive electrode	Electrolyte	Negative electrode	Nominal voltage	End-point voltage
L	Alkaline	Manganese dioxide	Alkali	Zinc	1.5	1.0
S	Silver	Silver oxide	Alkali	Zinc	1.55	1.2
P	Zinc-air	Oxygen	Alkali	Zinc	1.4	1.2
C	Lithium	Manganese dioxide	Organic	Lithium	3	2.0
B		Carbon monofluoride	Organic	Lithium	3	2.0
G		Copper oxide	Organic	Lithium	1.5	1.2
M,N(withdrawn)	Mercury	Mercuric oxide	Alkaline	Zinc	1.35/1.40	1.1

Design Choice: Polished Aluminum Chassis

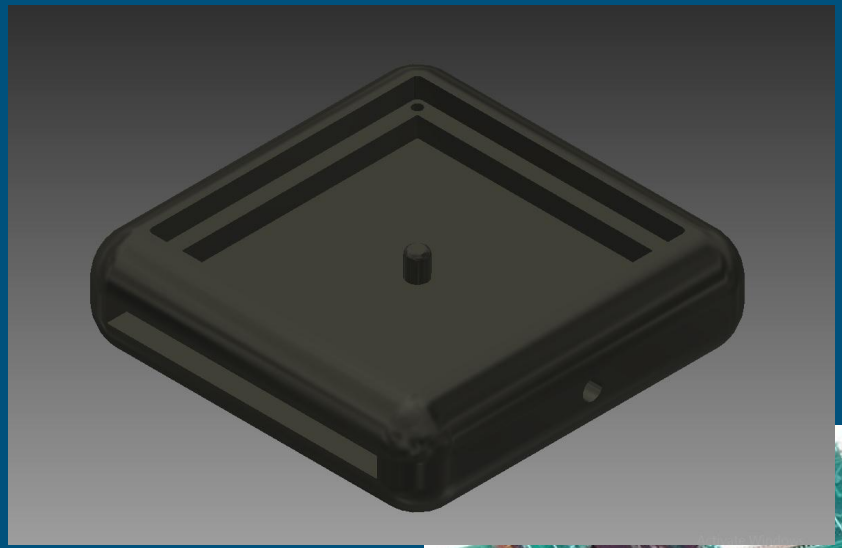
- Aluminum is:

  -lightweight

  -durable

  -resistive to corrosion

  -sealed, embedded logic board



Design Choice: Analog vs. Digital

- LCD-Liquid Crystal Display:

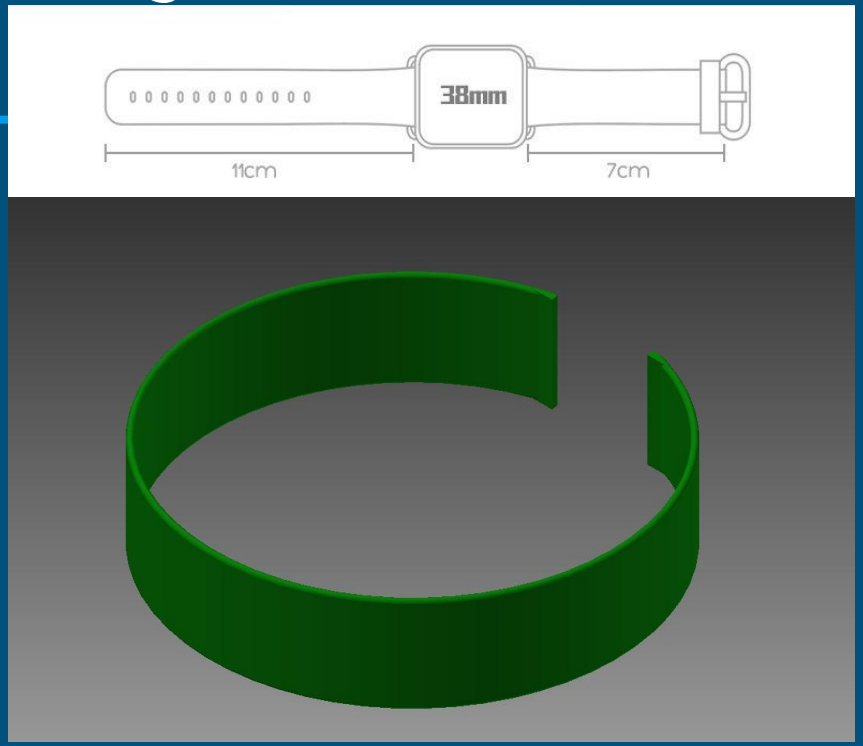
  -vulnerable to being cracked

  -can get dead spots

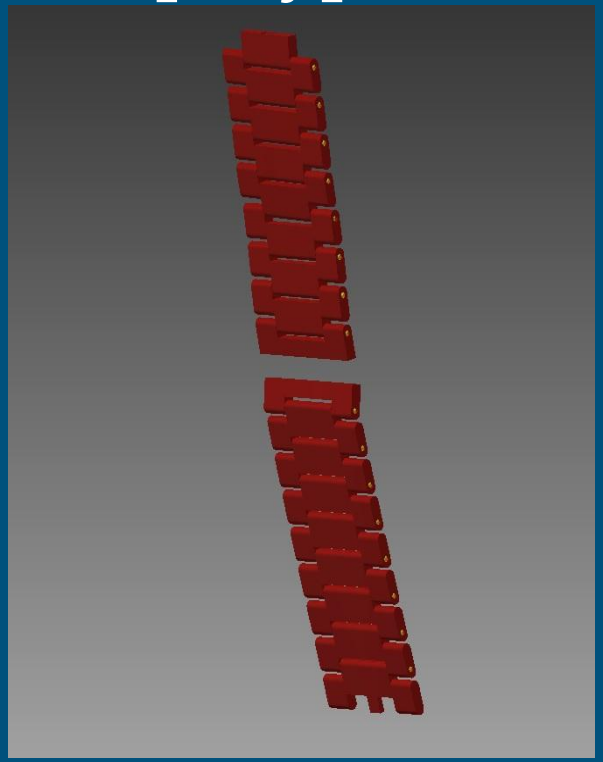
  -expensive to repair

  -toxic liquids

Design Choice: Wristband Strap Types



Silicone Rubber

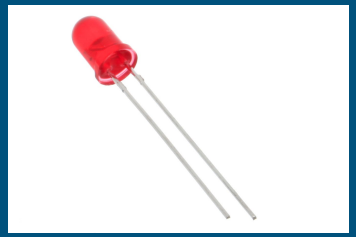


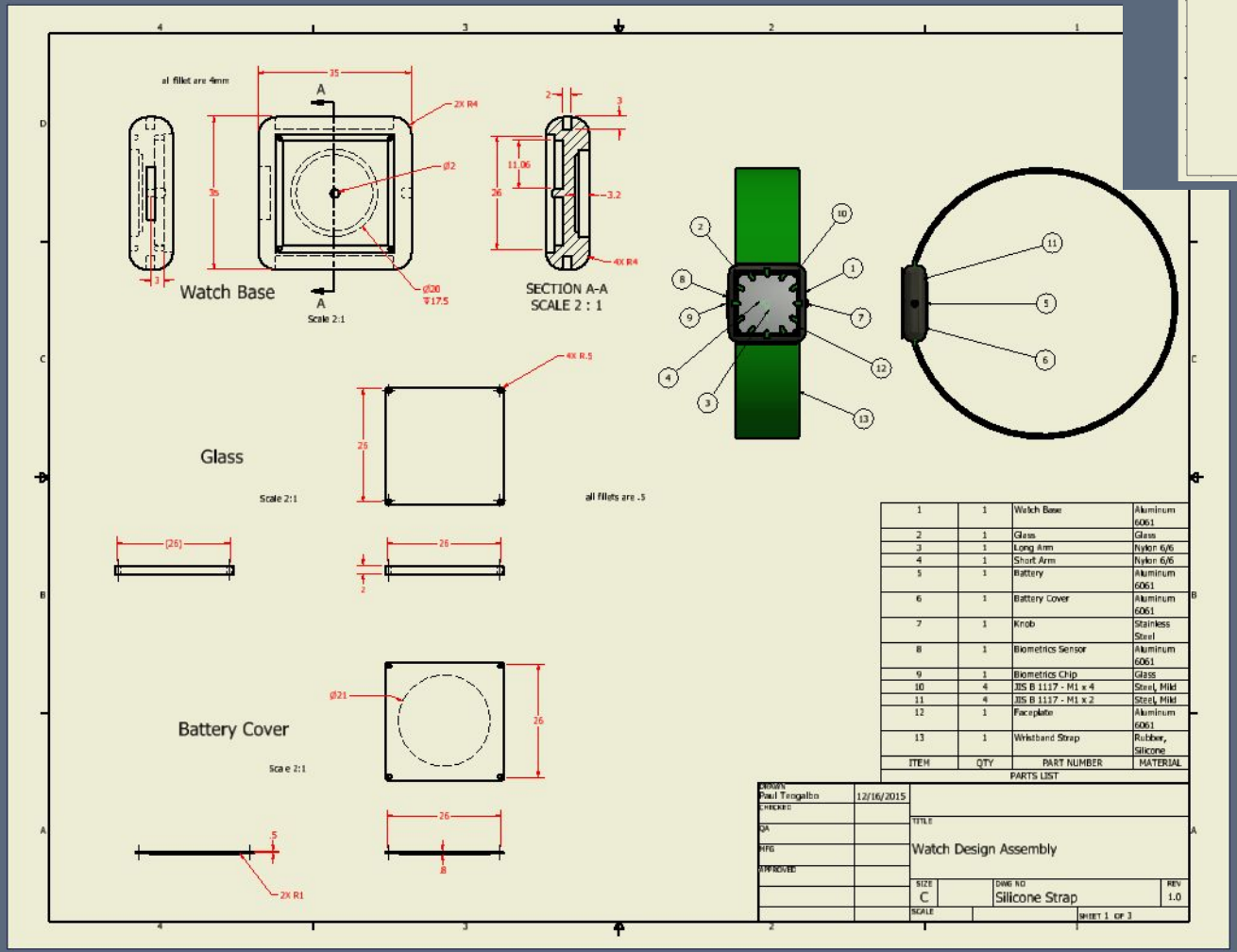
Plastic TPU- Thermoplastic Urethane

Design Choice: “Smart” watch

- Biometrics Sensor
- BPM Readings
- Compass Function

- *LED? For flashlight?*
  Light Emitting Diode





ITEM	QTY	PART NUMBER	MATERIAL
1	1	Watch Base	Aluminum 6061
2	1	Glass	Glass
3	1	Long Arm	Nylon 6/6
4	1	Short Arm	Nylon 6/6
5	1	Battery	Aluminum 6061
6	1	Battery Cover	Aluminum 6061
7	1	Knob	Stainless Steel
8	1	Biometrics Sensor	Aluminum 6061
9	1	Biometrics Chip	Glass
10	4	JIS B 1117 - M1 x 4	Steel, Mild
11	4	JIS B 1117 - M1 x 2	Steel, Mild
12	1	Faceplate	Aluminum 6061
13	1	Wristband Strap	Rubber, Silicone

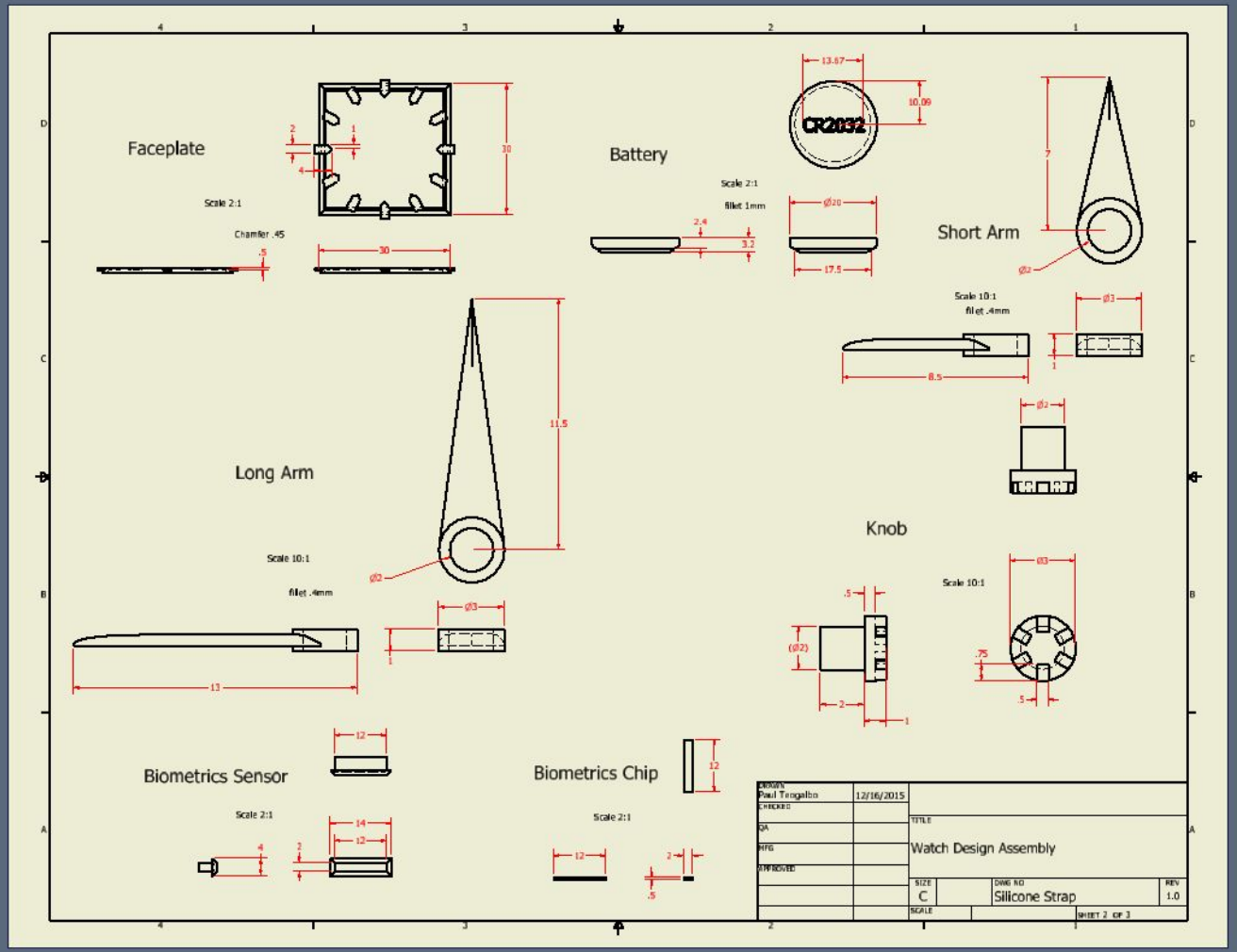
PARTS LIST

DRAWN: Paul Tengatko	12/16/2015	
CHECKED		
QA		
MFG		
APPROVED		

TITLE: Watch Design Assembly

SIZE	DWG NO	REV
C	Silicone Strap	1.0

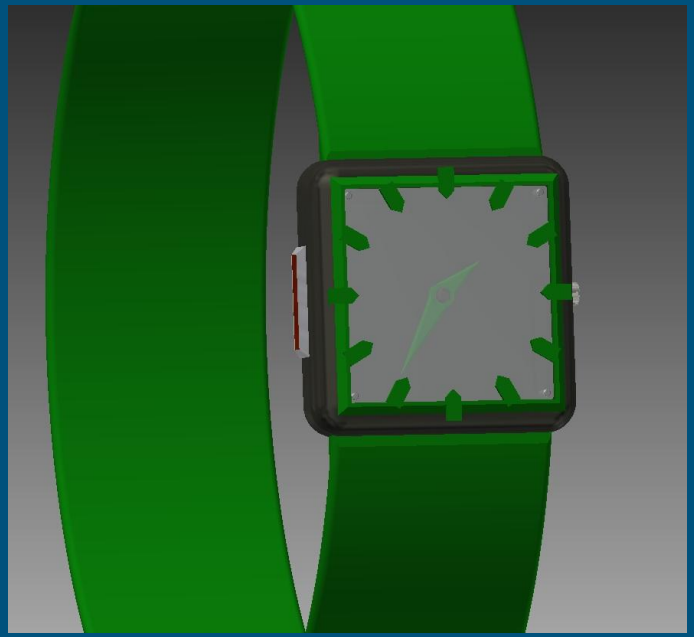
SCALE | SHEET 1 OF 3


Faceplate
Scale 2:1
Chamfer .45
Battery
Scale 2:1
fillet 1mm
CR2032
Short Arm
Scale 10:1
fillet .4mm
Long Arm
Scale 10:1
fillet .4mm
Knob
Scale 10:1
Biometrics Sensor
Scale 2:1
Biometrics Chip
Scale 2:1
Paul Tregalbo
12/16/2015
Watch Design Assembly
Silicone Strap
C
1.0
SHEET 2 OF 3

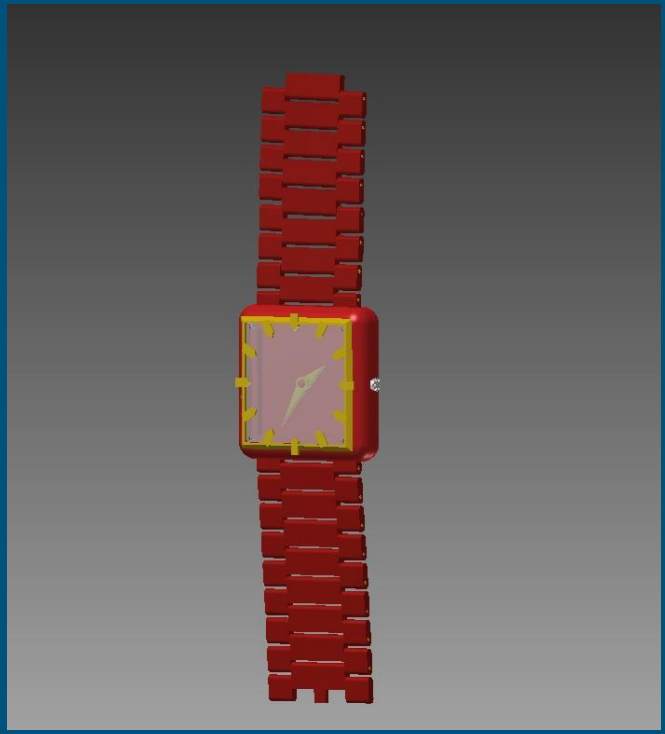
Watch Design: Assembly Animation

https://youtu.be/lj4VuGYizu4

Final Product: Wrist Straps Design

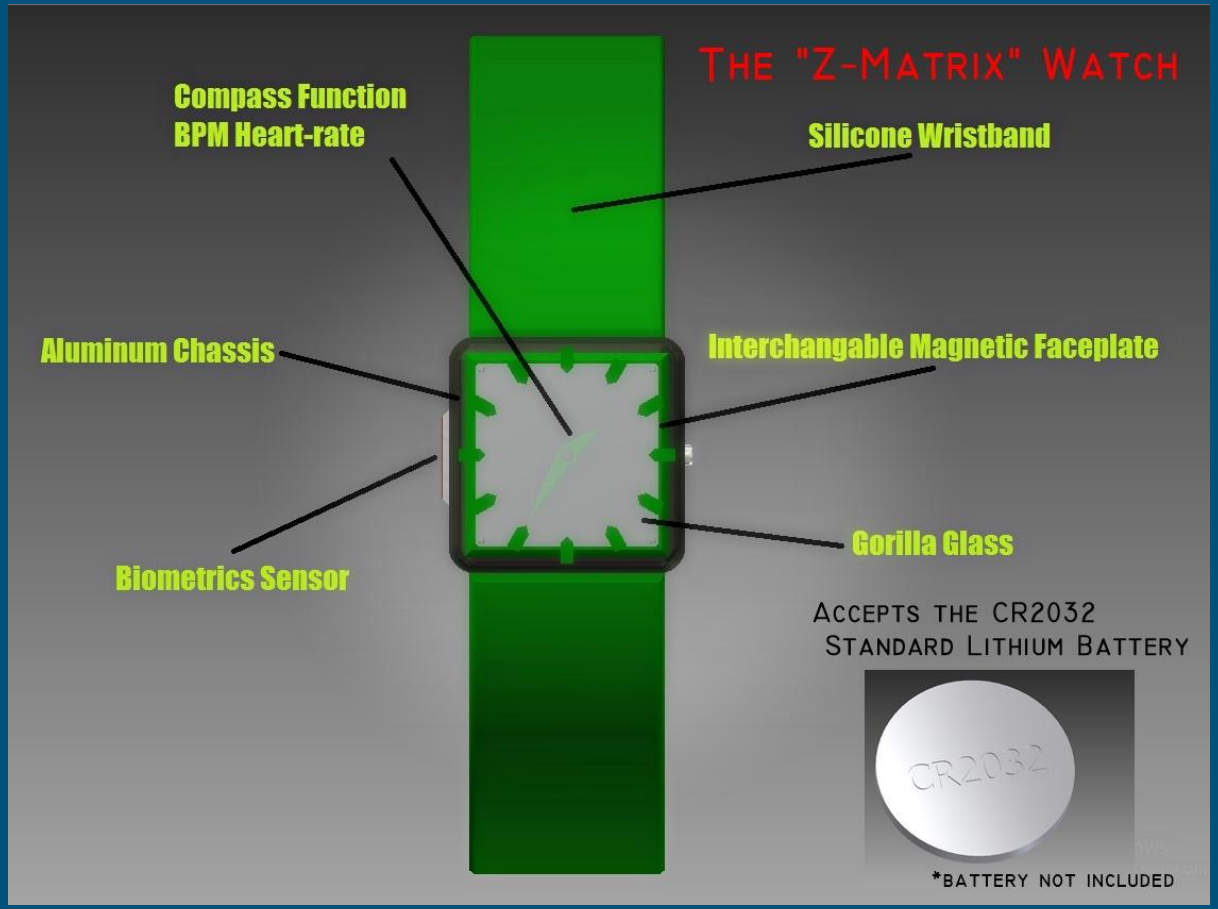


Single Band Wrist Strap



TPU Connector Links Wrist Strap

Final Product: Watch Design



Suggestions for Future Designs:

- Sustainable Green Design:
  -Solar Panels
  -Sustainable Materials:
  Biodegradable Plastics
  -“Battery-less”