## EC/Matic





Wireless

Wirelessly connected knee sleeve sensor array for sound leg

**Receiver-tied motor control** 

system for prosthesis

Brought to you by: Brass Monkey Prosthetics (Team 16) and Clemson University With EC/Matic lead-follow control, amputees are in charge of their mobility.

Need: **Gait Confidence**  Amputees have difficulty navigating certain terrain •Over 500,000 people in the US are transfemoral amputees [1] Study showed that even a high end C-Leg still caused 1 fall per 90 days [2]

Solution: EC/Matic **Gait Mirroring control** system designed for integration into current prosthetics Explicitly and completely controlled by the patient •A simple and affordable solution to gait inconfidence



Sleeve size: 19" upper circumference, 17" knee center, 18" lower/ Array housing: 8" x 18" with patellar window 3.5" x 4"/ Available for sizes S to XL (12"-20") and can be customized to person Angle encoder and accelerometer collect data essential to recording gait

XBee modules provide reliable and low energy wireless communication

Arduino nano processes data to accurately mirror gait

Angle encoder provides D.5 degree accuracy Useful temperature range: -20°C to +85°C Suitable for children and adults **Xbee3 chip: 10 bit ADC resolution Arduino Uno: 8 bit resolution Battery: 2X CR2032 coin cells** 

## 02 Matic 04 03 At the gym In the rain While driving **On** stairs With a bicycle On soft terrain

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[1] A. Esquenazi and S. K. Yoo, "Lower limb amputations – Epidemiology and assessment – PM&R KnowledgeNow," PM&R, 2016. [Online]. Available: https://now.aapmr.org/lower-limbamputations-epidemiology-and-assessment/. [Accessed: 19-Nov-2019]. [2] S. Blumentritt, T. Schmalz, and R. Jarasch, "The Safety of C-Leg: Biomechanical Tests," JPO Journal of Prosthetics and Orthotics, vol. 21, no. 1, pp. 2–15, 2009.