EMF EXPLORER

YOUR COMPANION GUIDE TO THE ELECTROMAGNETIC UNIVERSE

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THERE'S AN INVISIBLE WORLD AROUND YOU

THE INVISIBLE WORLD AROUND YOU

SOMETHING SURROUNDS YOU

Something you can't see, touch, or even feel surrounds you, every day, and everywhere you go. It is odorless and tasteless. Without it, the world you know could not exist.

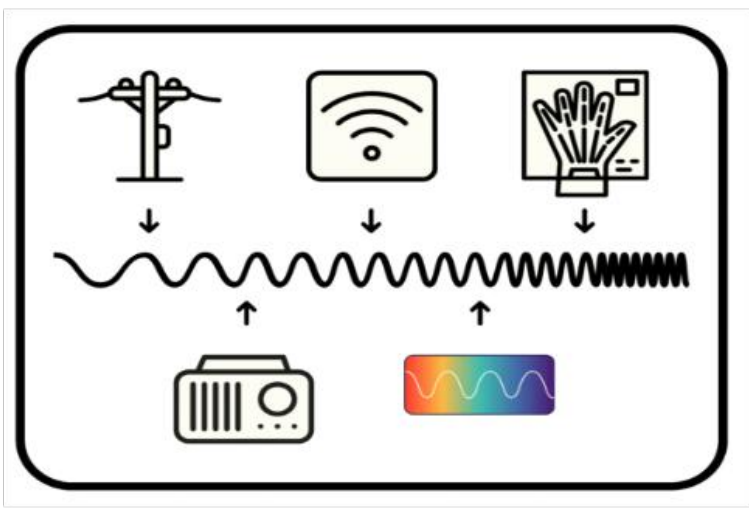
What is it?

You use it every day. Your wireless headphones, television, computer, text messages, microwave oven - all depend on waves within the electromagnetic spectrum.

ELECTROMAGNETIC WAVES

We live immersed in a sea of EMF (**E**lectro**M**agnetic **F**requencies). Right now, as you read this, there is a chaos of waves from all across the spectrum passing through your room! Radio waves from nearby stations, microwaves carrying cell phone calls, waves from WiFi connections, GPS signals from passing cars.

YOUR EMF EXPLORER BADGE IS YOUR WINDOW INTO THIS INVISIBLE UNIVERSE



MEET YOUR EMF DETECTIVE

The electromagnetic spectrum is HUGE, and your EMF Explorer focuses on a special range:

20Hz — 20kHz

The frequencies you can hear with your ears!

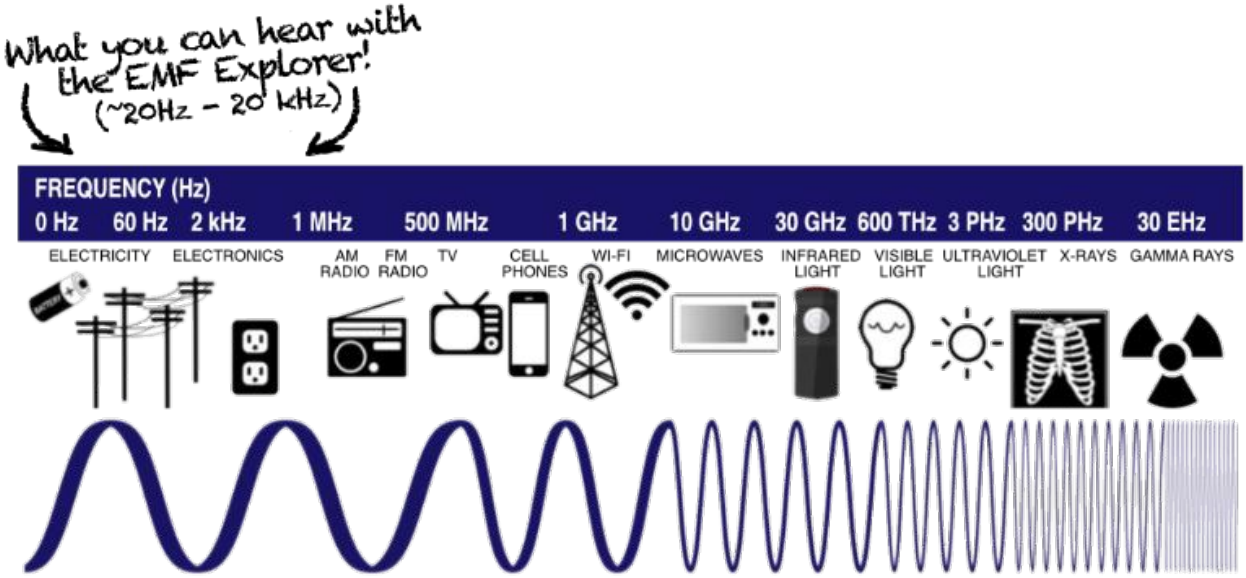
THE SECRET: Most electronic devices create EMF "noise" in this exact same range! Your badge converts these invisible electromagnetic waves into audible sound.

YOUR BADGE = YOUR EARS

WHY THIS WORKS

Electronic circuits switch on and off millions of times per second, creating electromagnetic "chatter" in the audio frequency range. Your badge picks up these signals and lets you hear the digital world!

START HERE: Hold your badge near devices you use daily - phones, computers, chargers. They're surprisingly loud!



WHAT YOU CAN HEAR

PHONE SOUNDS
Data bursts of digital communication, cameras, speakers, and the buzzing of digital processors.
Try: *Send a text message. Hear those data packets!*

POWER GRID
The 60Hz hum and harmonics from outlets and wall wiring.
Try: *Hold near any wall outlet. That's the power grid singing!*

LIGHTS AND LEDS
Dimmer circuits and LEDs change with brightness settings.
Try: *Find a dimmer switch. Turn the knob and hear the frequency sweep! Can you hear the changes in LED patterns?*

WIFI AND BLUETOOTH
Data transmissions, and connection sounds.
Try: *Listen to your router or bluetooth headphones during device connections and data transfers.*

MOTORS, STEPPERS, AND SERVOS
Variable frequency drives, motor pulses, and servo signals.
Try: *Find a 3D printer, drone, or paper printer in action!*

REMOTE CONTROLS
IR emitters and remote-control carrier frequencies.
Try: *Press buttons near your badge - hear the carrier signal!*

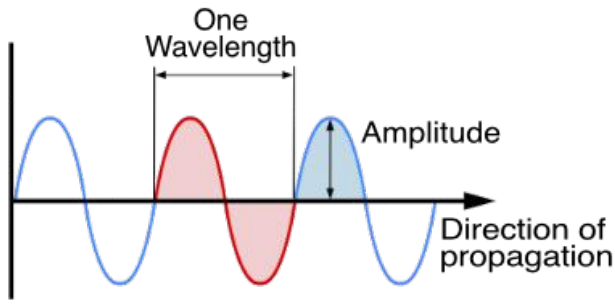
GO EXPLORING!
There's a whole world of strange frequencies being emitted by the electronics around you. Listen to everything, you'll be surprised at what you hear!

WHAT YOU CAN'T HEAR
Any frequency above 20 kHz is going to be too high pitched for us to hear. If we could hear "all" of the electromagnetic waves around us, imagine how noisy that would be!

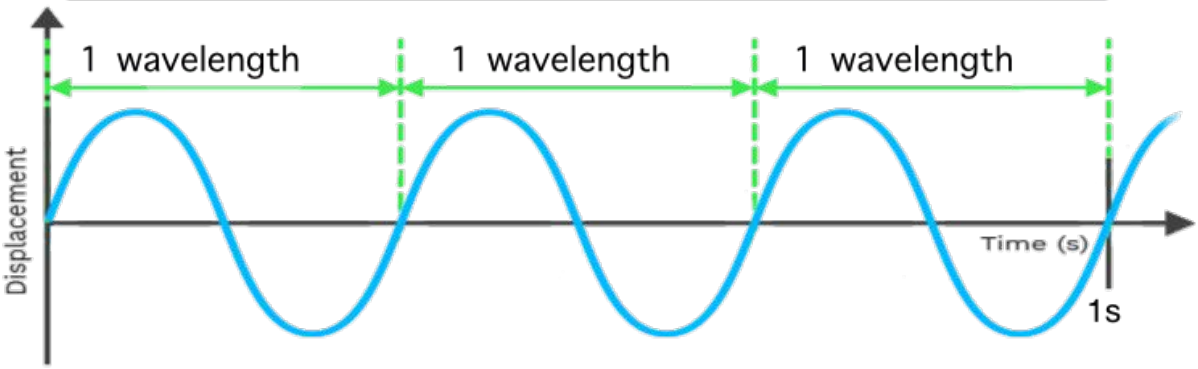
THE ANATOMY OF A WAVE

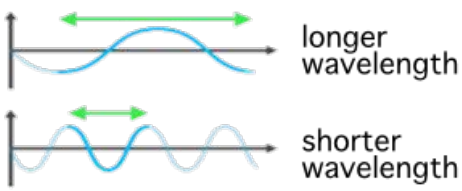
- **Wavelength Determines Type of Electromagnetic Radiation:** Radio waves are very long, visible light are medium length, and X-rays are very short
- **Frequency Determines Energy:** Higher frequencies (shorter wavelengths) require higher energy, while lower frequencies (longer wavelengths) require lower energy.
- **Amplitude Determines Intensity:** Larger amplitude = Brighter light or stronger signal. Smaller amplitude = Dimmer light or weaker signal (amplitude does NOT change the frequency or type of electromagnetic radiation)

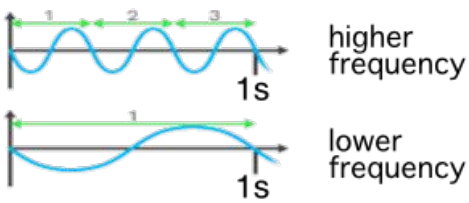
- One wavelength is the distance between one complete cycle
- Amplitude is how "loud" the signal is.
- Amplitude drops off the further you move away from the source, so you might not be able to hear if you are too far away.



How a wave is measured: The number of wavelengths in one second represents the frequency in Hz. So in the image below, three wavelengths in one second equals 3 Hz.







Remember, our ears can hear between 20Hz and 20kHz!

Number of waves per second	Frequency units	Frequency unit value
1	Hertz (Hz)	10^0 Hz
1,000	Kilohertz (kHz)	10^3 Hz
1,000,000	Megahertz (MHz)	10^6 Hz
1,000,000,000	Gigahertz (GHz)	10^9 Hz
1,000,000,000,000	Terahertz (GHz)	10^{12} Hz

READY TO BUILD YOUR KIT?

We have a detailed assembly guide with text, photo, and video assembly instructions! New to soldering? We have a guide for that too!

Detailed assembly guide here!

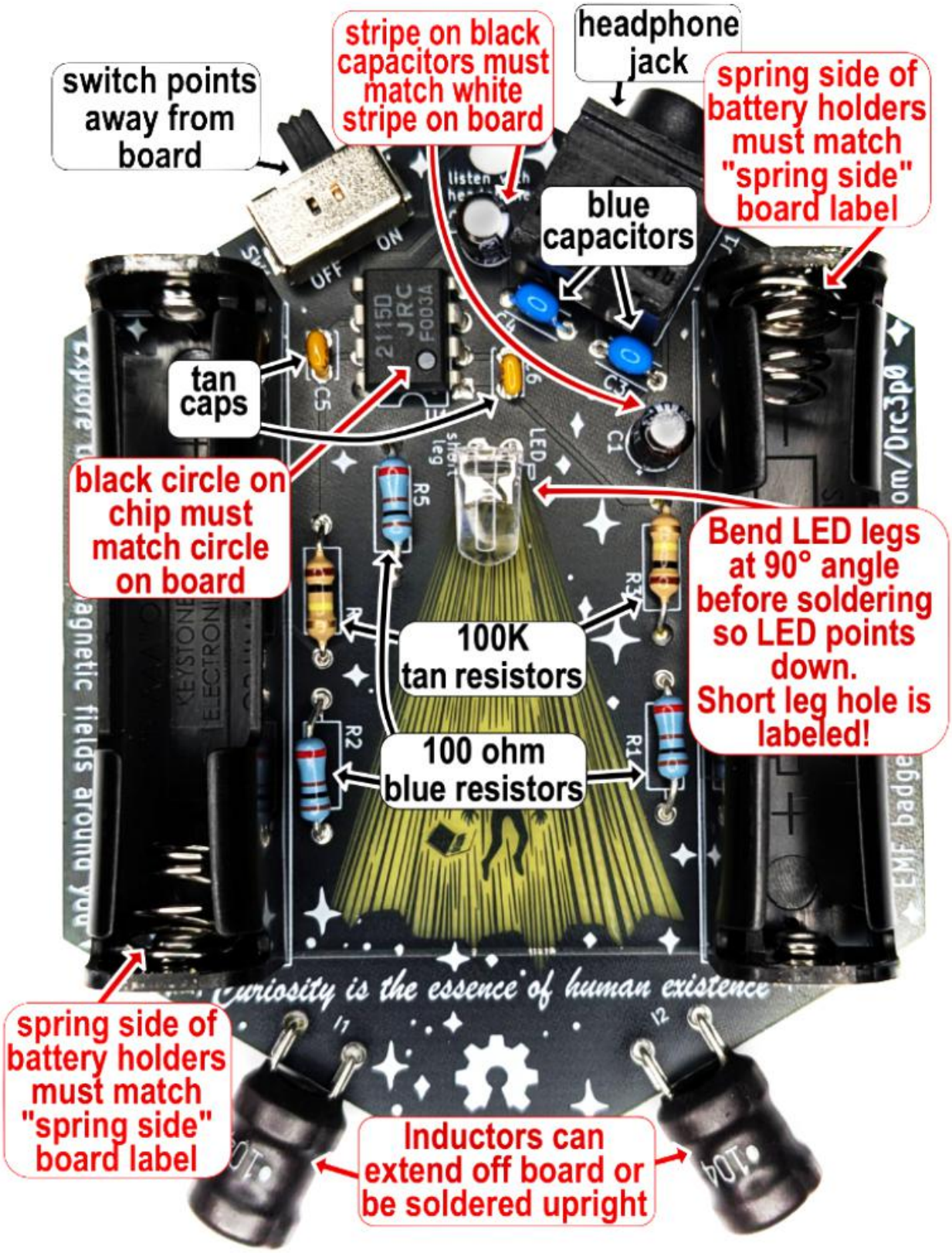
If you're ready to dive into assembling your kit, this photo guide tells you everything you need to know about component placement on your EMF Explorer! —>

⚠ SAFETY FIRST! ⚠
WORK AROUND GOOD VENTILATION, PROTECT YOUR EYES, AND WASH HANDS AFTER SOLDERING

LEVEL UP YOUR EMF ADVENTURES!

- Different headphones reveal different details
- Record EMF sounds for music sampling (your EMF Explorer sounds are in stereo!)
- Compare EMF during different device activities
- Wear your badge at night for an awesome bling effect

All components go on this side of board. Read description for each part before soldering.



After your board is completed, put on your headphones and go exploring! How many hidden frequencies can you discover around you?

DIVE DEEPER

Check out these resources. Stay curious!

NASA EMF Guide
Complete electromagnetic spectrum exploration

GitHub Repo
Schematics, code, and community projects

Explore how Energy Flows
Veritasium video that explores how energy "flows" around wires

Interactive WebSDR
Listen to radio waves from around the world

READY TO EXPLORE THE INVISIBLE WORLD?

Join the community of EMF Explorers and start detecting!

Get your EMF Explorer kit at SporkLogic.com