## **Wiki**

Ground-penetrating radar:

Limitations

1. high-conductivity (clay soils and soils that are salt contaminated).
2. Performance is limited by signal scattering in heterogeneous conditions (e.g. rocky soils).

\*\*\*\*so what if we worked to putting rocks in sand to mess with it\*\*\*

3) High power consumption

**Build-your-own GPR:**

Idea from one project:

<http://minibnzreprap.blogspot.com/2012/09/ground-penetrating-radar.html>

From this site, to achieve the frequency needed…

*‘’looking at Element14.com i am not seeing a easy way for me to be generating 1.2Ghz clock for the counter. I have located*

*8bit Counter MC100E137FNG @ $20au each. its rated to 2.2Ghz :)’’*

With list below, ~$500 if we use school supplies we may get it to ~250-ish

Part 1:

<https://hackaday.io/project/4440/instructions>

<https://hackaday.io/project/4440/components>

1. **GSa/s Mixed Signal Oscilloscope ($240)**

Calls for a GSa/s Mixed Signal Oscilloscope but may be able to use schools or acquire from mechanical shop on 1st floor

**2) Baofeng vhf/uhf HT Radio**

<https://www.amazon.com/BaoFeng-BF-F8HP-Two-Way-136-174MHz-400-520MHz/dp/B00MAULSOK/ref=sr_1_1?ie=UTF8&qid=1507253406&sr=8-1&keywords=Baofeng+vhf%2Fuhf+HT+Radio>

Signal generator, again, may be able to use school’s or get one from mech shop

**3) HMC784MS8GE (DIGIKEY, $140 EVAL BOARD)**

<https://www.amazon.com/ANALOG-DEVICES-HMC784MS8GE-SWITCH-HMSOP-8/dp/B011NE56W8/ref=sr_1_2?s=industrial&ie=UTF8&qid=1507253589&sr=1-2&keywords=HMC784MS8GE>

Antenna T/R switch

SPDT relay provided from blog for switch between rx/tx….much cheaper

**4) Raspberry pi**

**5) 4N25 OPTO-ISOLATOR**

<https://www.amazon.com/Quickbuying-optocoupler-isolator-optoelectronic-coupling/dp/B073YDR24T/ref=sr_1_1?s=industrial&ie=UTF8&qid=1507253754&sr=8-1&keywords=4N25+OPTO-ISOLATOR>

Radio controller

**6) SN74HC04N (or similar) hex inverter**

<https://www.amazon.com/Texas-Instruments-SN74HC04N-Inverters-Pack/dp/B00BZQ60HU/ref=sr_1_1?s=industrial&ie=UTF8&qid=1507253848&sr=1-1&keywords=SN74HC04N+inverter>

T/R switch controller

**7) GPS (if it sends NMEA serial data,it should work)**

**6) WIFI DONGLE (any that work on the pi)**

**7) VHF/UHF ANTENNA**

2M/70cm Wideband Yagi Beam antenna; or build own

**8) Cables/connectors**

**Silica info**

Silica - silicon dioxide (SiO2)

https://www.azom.com/article.aspx?ArticleID=1114

**Financial Resources**

Check out local RF companies, i.e LGS innovations

**Innovation Ideas**

Research acoustic applications