

OddMix CRYSTAL DETECTOR RADIO NOTES

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Solar Powered One Transistor Amplified Audio Crystal Detector Radio Receiver Set

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This solar powered crystal detector set allows higher volume radio reception even in areas without power. It has a simple solar cell as its power supply. Even a single cell of almost any capacity (size) is sufficient to operate the single transistor amplifier. An ideal solar cell can be salvaged from a no longer functional decorative solar powered outside lamp see **Figure 1**. These LED (Light Emitting Diode) lamps usually contain two Ni-Cd (Nickel Cadmium) or NiMH (Nickel Metal Hydrid) rechargeable cells.

The one on Figure 1 had two [AA 1.5 Volt](#) secondary cells. If the cells are serviceable they can be left in the housing and used to power the radio at night. Rechargeable cells don't usually fail abruptly, instead they loose capacity gradually. A one ampere-hour rechargeable cell, even if it degraded to half of its capacity and not able to power the LED light through the night, is still excellent to power this one transistor radio receiver.



Figure 1. Solar Power Collector Cell

The germanium, point contact [diode](#) D1 and a germanium, or silicon high gain, small signal, low frequency [transistor](#) are in a direct DC coupled arrangement. This type of amplifier uses all available power to operate the headset or a small speaker. If a speaker is used an output transformer is required. The higher resistance primary winding takes the place of the headset in the schematic and the low resistance secondary winding is connected to the small speaker. This detector radio produces a louder, amplified audio signal than the usual audio output produced by simpler, diode only crystal sets.

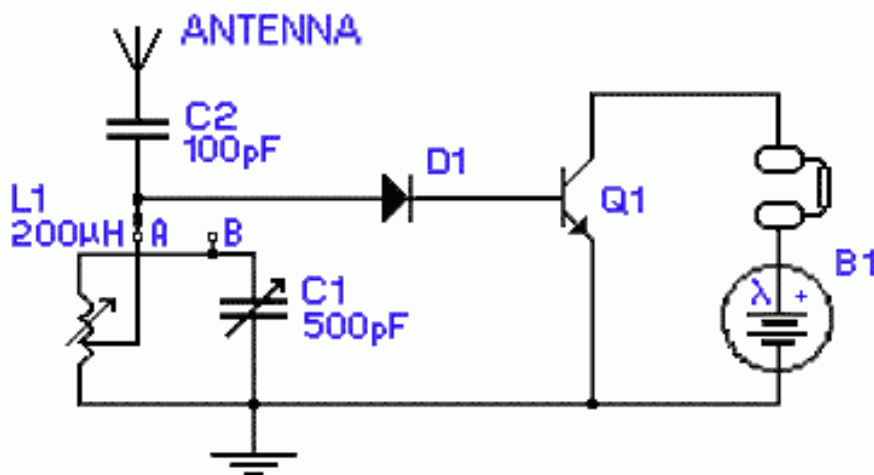


Figure 2. Solar Powered One Transistor Crystal Detector Radio

The single transistor audio stage amplifies the input signal by at least a factor of ten. The exact amount of amplification or signal gain is mostly dependent of the available input signal and the transistor gain. The best amplifier is a good antenna! The gain is also dependent to a smaller degree on the available power supply voltage but it is also a function of the type of headphone set being used. **This set must have a 1,000 - 2,000 ohm, high impedance magnetic headphone**; in fact it does not even works with a crystal one. So remember that when trying it out.

Figure 2 shows the schematic diagram for the basic crystal detector radio. This set uses a 200 uH coil on a 1/4-inch coil form with a tunable ferrite screw in it. Ferrite has higher magnetizing losses than air, but an air core coil would

use a lot longer wire with a higher resistance. Therefore the ferrite coil will increase the overall receiver efficiency. C1 is a good quality, air dielectric rotary capacitor.

Parts list for this one transistor crystal detector radio:

L1 - Coil 1 - 200 uH - taps at 1/3 and 2/3 turns

C1 - Rotary Capacitor 500 pF

C2 - Antenna [Capacitor](#), 200 VAC or better - 100 pF

D1 - [Diode](#) - Germanium, point contact

Q1 - [Transistor](#) - high gain small signal

B1 - Solar cell almost any kind - See Figure 1

Magnetic headphone, or a [speaker](#) with an output transformer

Use a long wire, at least 25-30 feet or preferably longer high antenna. Tune in a station and set a tap to position "B" to produce a stronger sound. If another strong station is interfering, use tap A. This radio is environmentally friendly and at the same time it still produces adequate volume when strong local stations are nearby.

[Previous Page](#)



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