Analog Cellular Receive Adapter

This is a simple trick using an old VCR, TV, or CATV tuner module to receive analog AMPS cellular phone transmissions, or any narrowband FM transmission for that matter.

The tuner in your TV/VCR or cable box is really just a wideband RF receiver. It takes an incoming signal, either over–the–air or from a coaxial cable, and mixes it down to a new Intermediate Frequency (IF) of 45.75 MHz. This IF frequency is then amplified, filtered, and demodulated to get the actual video & audio information.

If you where to take the 45.75 MHz IF output and run that into a regular communications receiver, like a cheap Radio Shack scanner, it will then become a very wideband RF downconverter – with no gaps. It can now essentially tune into any transmission from 50 MHz to around 960 MHz. This is good for intercepting "banned" frequencies between 825–850 MHz and 870–895 MHz. It can also receive the elusive 520–780 MHz band missing from some Radio Shack scanners.

The key is finding older tuner modules which are *Voltage Tuned* (VT). These where very popular in the 1980s and early 1990s. Look for old VCRs that had lots of little tweaking pots or wheels needed for fine tuning the reception. Newer tuner modules are all digitally tuned – which will work, but you'll need to hack them quite a bit. A drawback is the older tuner modules often stopped tuning above 810 MHz. A trick to overcome this is to run the voltage tune line at 40 volts instead of 30 volts.

The tuner's RF input should be feed with good 800 MHz cellular antenna and low loss coax. A low–noise receive pre–amplifier will also help improve the reception range, but isn't necessary.

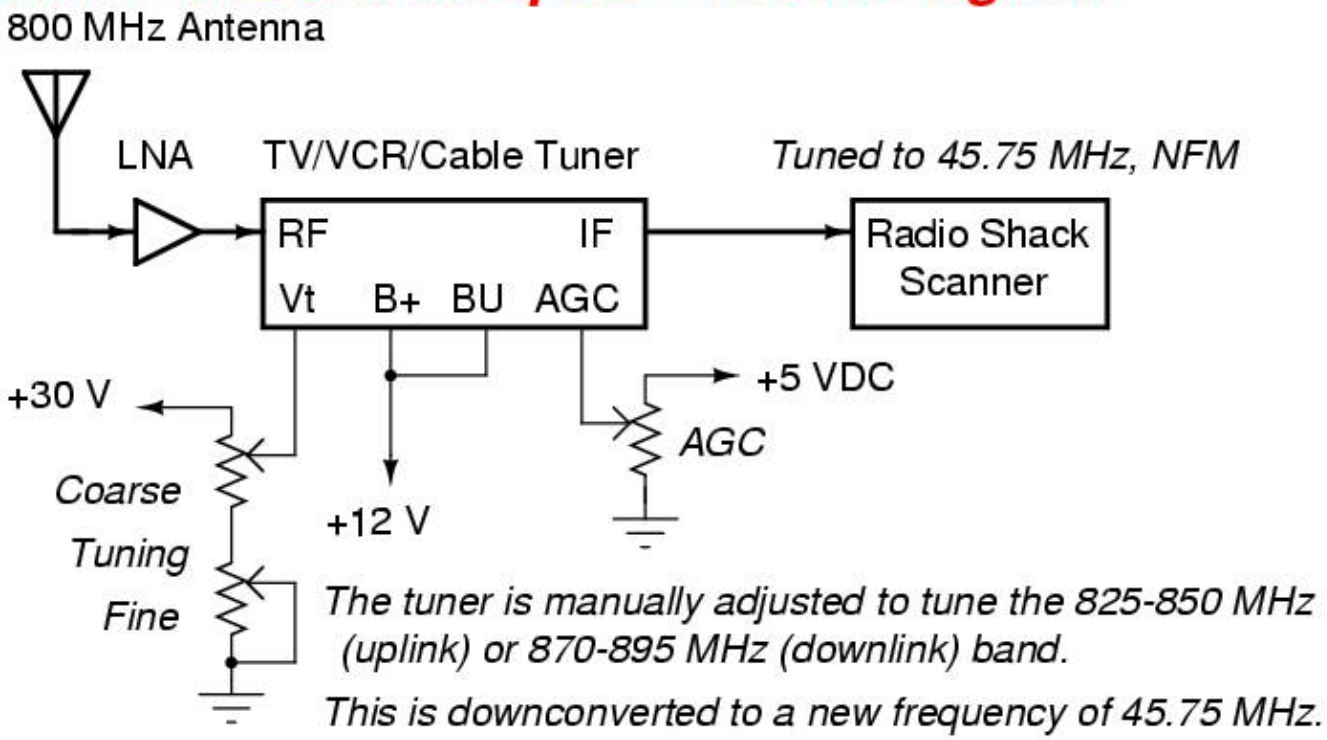
Unfortunately, almost every tuner module is different in some way. Your best bet is to search for Toshiba VCRs, if you can. Toshiba actually *marks* the pins on their tuner's and VCR circuit boards – what a concept.

It also helps to tap the tuner's Local Oscillator (LO) signal and feed that to a frequency counter. This will help to verify the reception range. The LO signal will be 45.75 MHz *higher* than the frequency you are trying to receive. Example: You want to receive 880 MHz. Tune the tuner module until the LO frequency is reading 925.75 MHz. Your signal will be received at the IF frequency of 45.75 MHz.

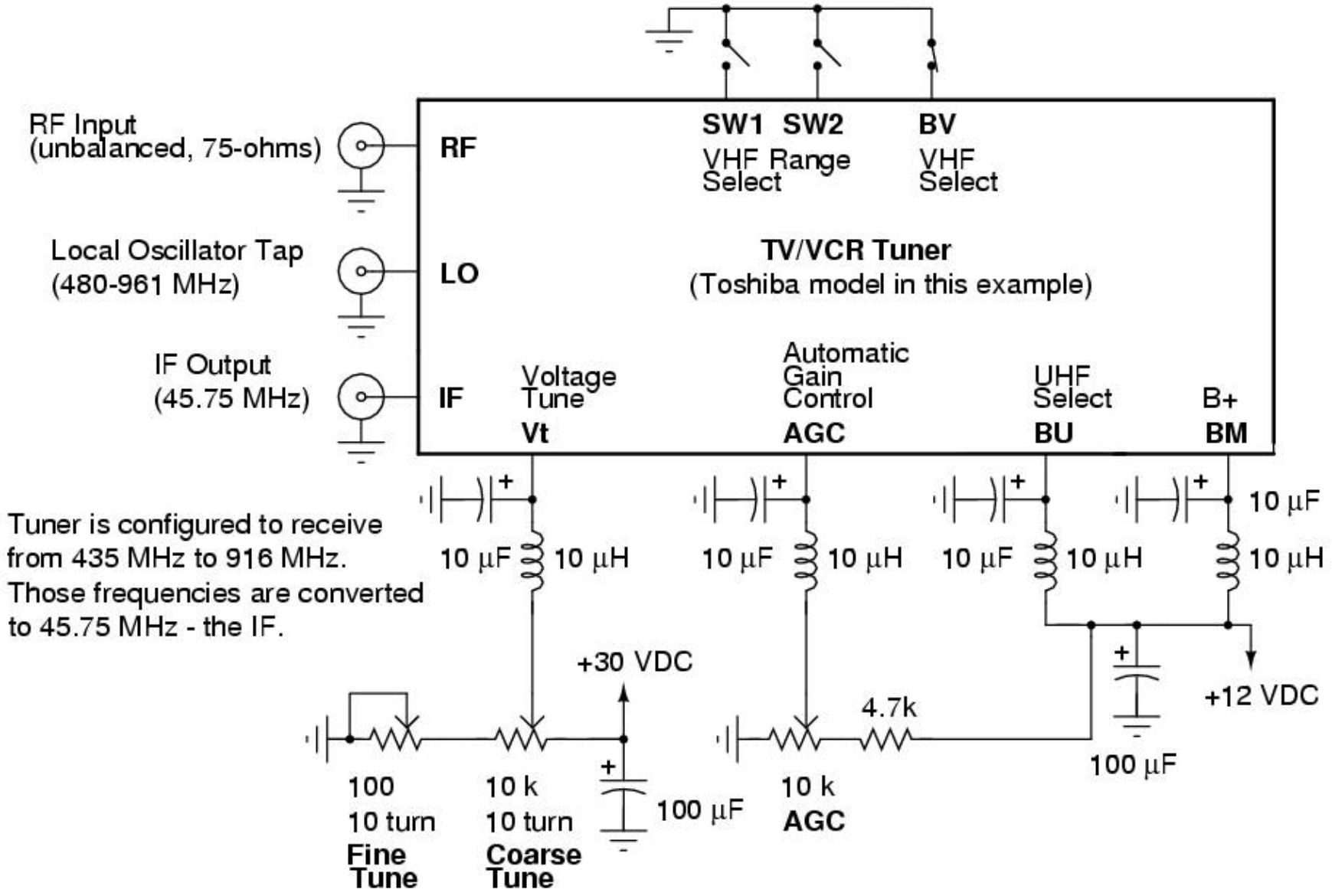
The Automatic Gain Control (AGC) pin is used to adjust the receive gain of the tuner's incoming RF amplifier. Adjust this for maximum gain (minimum noise on the signal). If the tuner has a Automatic Frequency Control (AFC) pin, ground it.

Strings of series 9 or 12 volt batteries can be used in place of a 30 volt power supply.

Cellular Receive Adapter - Block Diagram



Cellular Phone Receive Converter - Schematic



Tuner is configured to receive from 435 MHz to 916 MHz. Those frequencies are converted to 45.75 MHz - the IF.