

GARC Regenerative Radio Project

Aim

This is a simple, yet high performance regen radio that can be built with parts that are readily available, mostly from Jaycar and at a modest cost. It is not intended to be one project for everyone, participants are encouraged to experiment with different components and layouts. I will individually advise people if they want to go this way.

I hope many people will find a different design to build, so feel free to build whatever you like.

Description

This design is taken from an article in Electronics Australia ---- 1988. I encourage people to read the original article and decide how they want to house the finished receiver. This description and construction is based around the addition of a feedback control and how to easily get the parts nowadays.

Tuning capacitor: This is often the hardest part to find. The best option is to use an old one that you have, or find one at a Hamfest. As an alternative Jaycar have a small unit that can be used, although it does not have enough capacitance range to cover the entire broadcast band with practical levels of inductance and stray capacitance.

Germanium Diode These can be salvaged from many old pieces of equipment.

1 and 4.7mH RFC Available from Altronics.

How it works

The basic operation of this receiver is a high gain RF amplifier with an Emitter follower to give a low output impedance. This circuit is made regenerative, so it can be called a "Q Multiplier" This provides a low impedance output to the detector diode, The audio that is recovered is then amplified with the same two transistors used for the RF stage, only this time the second transistor functions as a Common Emitter amplifier. From here the signal is sent to the audio power amplifier through a volume control in the usual manner to drive a speaker.

Basically it is a Crystal set with a RF and AF amplifier.

Construction

You can choose how you want to build this radio. The traditional way is on a board with possibly a front panel of either wood or metal. You could build it on a old style metal open chassis, or enclose it in box or "Zippy Box"

I do recommend some metal, as it helps with stability and reduces hand capacitance effects. If you mount the regen pot on an insulated panel be sure to earth it to the common (-) terminal.

The unit will pick up local stations without an external aerial, if you want to have more stations you can simply wrap a few turns of wire around the ferrite rod, or the box if it is plastic and connect the ends to an aerial and earth. For best results it is better to connect the ground to the common terminal and have some form of adjustable coupling to the coil. This is a good area to experiment with.

If you use a metal box and a ferrite rod you will need to place a gap at some point around the box and not use metal ends if you want the receiver to work without an external aerial.

"Champ" AF amp

You should leave the trimpot off the board and install a 10k resistor to the input connector with a 0.0022uF (2n2) capacitor to ground on the board. This forms a low pass filter to keep RF out of the audio stage. You can leave out the 1k feedback resistor if you require more gain.

PARTSLIST FOR GARC REGEN RX 2013

Based on EA88/Reflex regen RX, with Pot regen + AF output
Modified by VK3QM

Part	Value	Device	Jaycar number	Description
C1,3	0.01uF	Ceramic cap		CAPACITOR,
C2	10uF	Electro cap		ELECTROLYTIC CAPACITOR
C4	0.47uF			CAPACITOR
C5	415pF	Prefer Old, Alt	VR 5728 (220pf)	TUNING CAPACITOR
C6	0.0047	Ceramic cap		CAPACITOR
C8	Gimmick	Twists of wire		CAPACITOR
C9	0.0022uF			CAPACITOR
C10	1000uF			ELECTROLYTIC CAPACITOR,
D1	OA91	OA91		DIODE
L1	55t	#		ON 9MM FERRITE ROD
L2	6t	##		ON ABOVE
FR1		Ferrite rod	LF 1010(100mm)*	
ALT		Ferrite rod	LF 1012(180mm)*	
L3	4.7mH	RFC (Altronics)		RF CHOKE
L4	1mH	RFC (Altronics)	RF CHOKE (Optional)	Not Required
Q1,2	BC549	BC549	ZT 21256	NPN Transistor
R1	18k			RESISTOR
R2	3k9			RESISTOR
R3	680R			RESISTOR
R4,8	10k		RV 57238	Rotary Pot
R5	10k			Trim Pot
R6	10k			RESISTOR
R7	470R			RESISTOR
S1		Power Switch		TOGGLE SWITCH (Or on pot)
AF1		"Champ" AF Amp	KC 5152	Modify during assy,
TS1		8 Way Tagstrip*	HM 3308	TAGSTRIP
VB1		Veroboard*	HP 9540	VEROBOARD
BS1		Battery snap		
J1		3.5 MM Jack	PS 0122	Optional
S1		Speaker		To suit your needs

* Choose part depending on your construction preference.

Adjust turns to suit tuning capacitor. 55 is OK for 220pF cap but will not cover the low end of the band. (Below 600KHz.) For 415pF cap use around 50 turns. Alternatively you can use an air wound coil. Aim for around 220µH.

You can experiment with the number of turns. This is a good starting point if you change the number of turns on L1 keep the ratio similar.

Many parts can be found in the "Junk Box" The list of Jaycar parts is aimed at those who want to go down the new parts road. Items like the tuning capacitor, ferrite rod, tagstrip and case are likely to come from other sources.

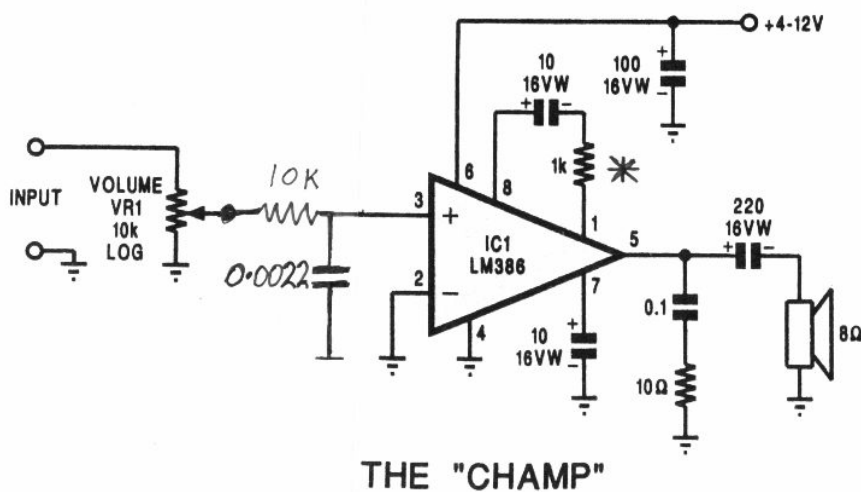
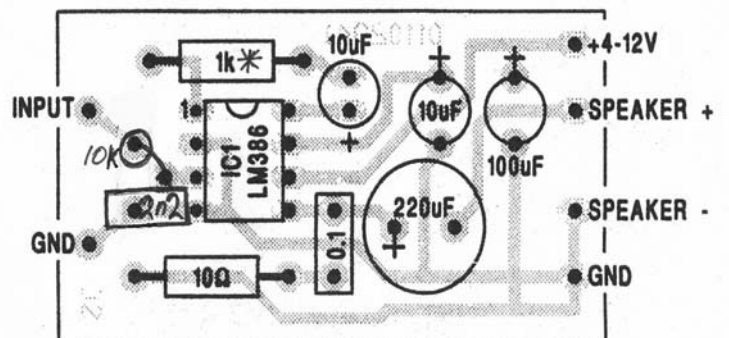
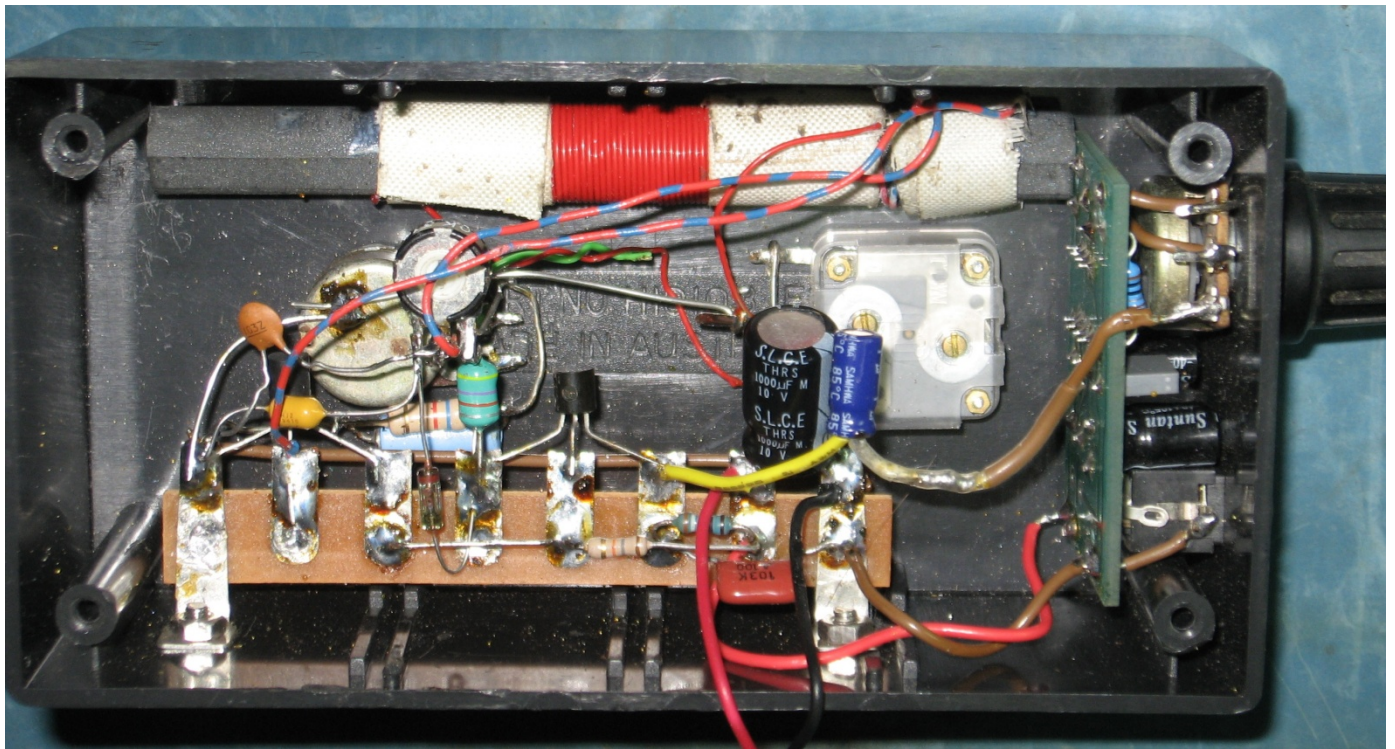
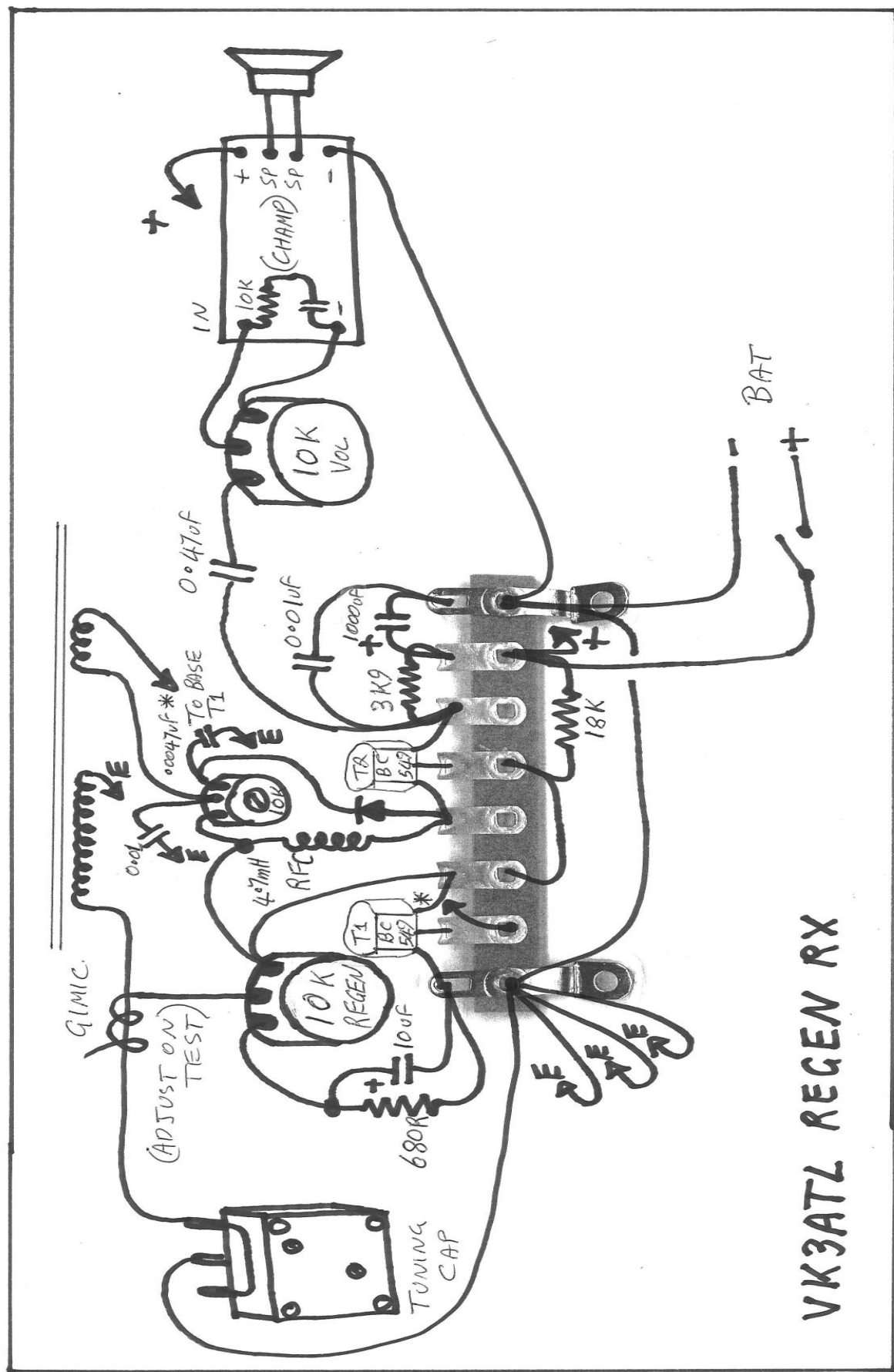


Fig.1: the circuit is based on IC1, an LM386 audio amplifier IC. The gain of the amplifier is controlled by the 1kΩ resistor on pin 1.

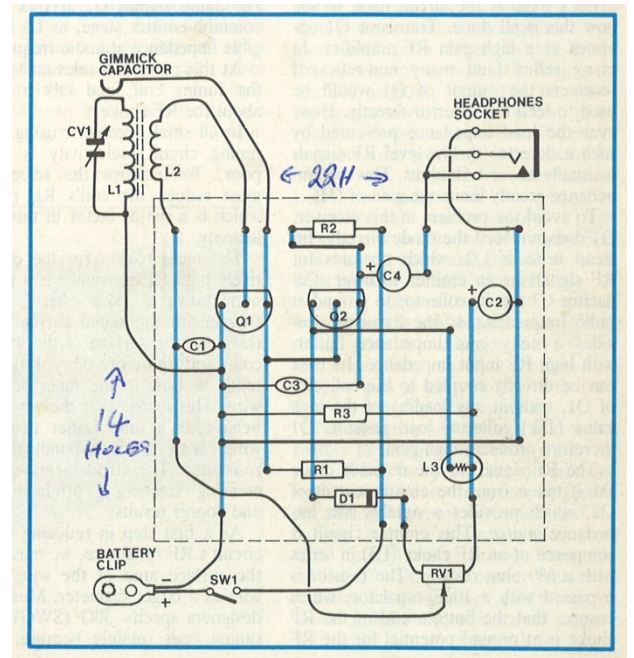
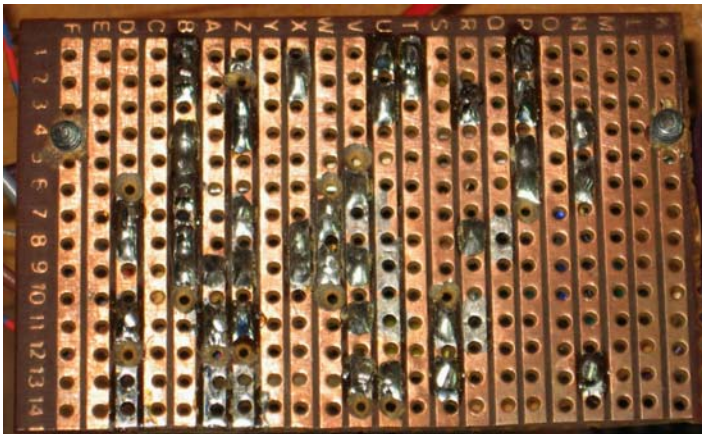
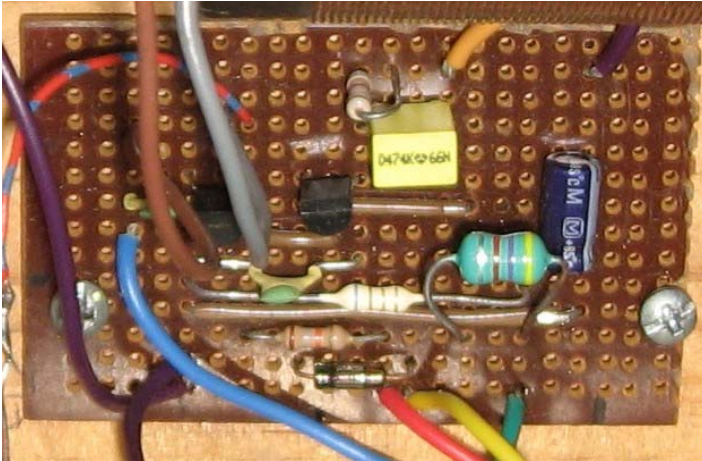


VK3ATL REGEN RX

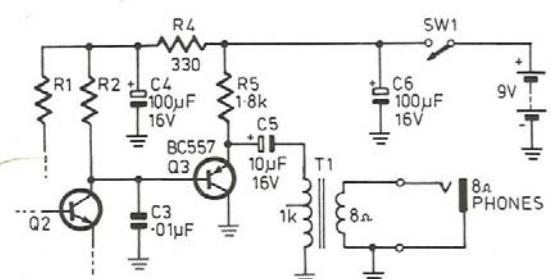
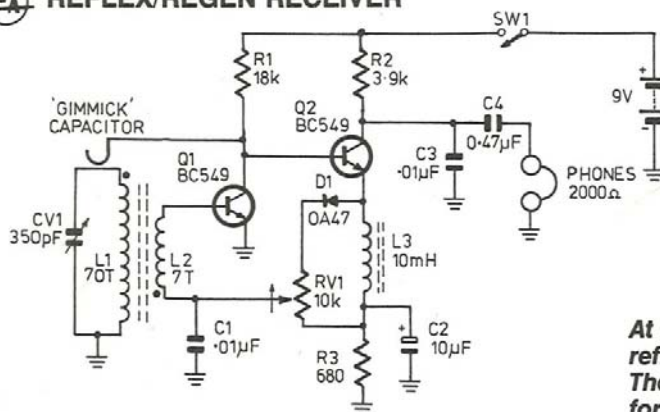
GARC Reflex Regen, Alternative Design

An alternative feedback and construction. Please read in addition to main article.

This description shows how to build the RX on Veroboard as in the original EA article. The regeneration is controlled by a variable capacitor, that is difficult to obtain. Bu looking at the design with a pot for regen it is easy to combine this feature on Veroboard. You could also leave this out completely as in the original design.



REFLEX/REGEN RECEIVER



At left is the circuit for the basic receiver, which uses reflexing to make two transistors do the work of four. The diagram above shows how to add a third transistor for driving low impedance headphones.

Possible modifications.

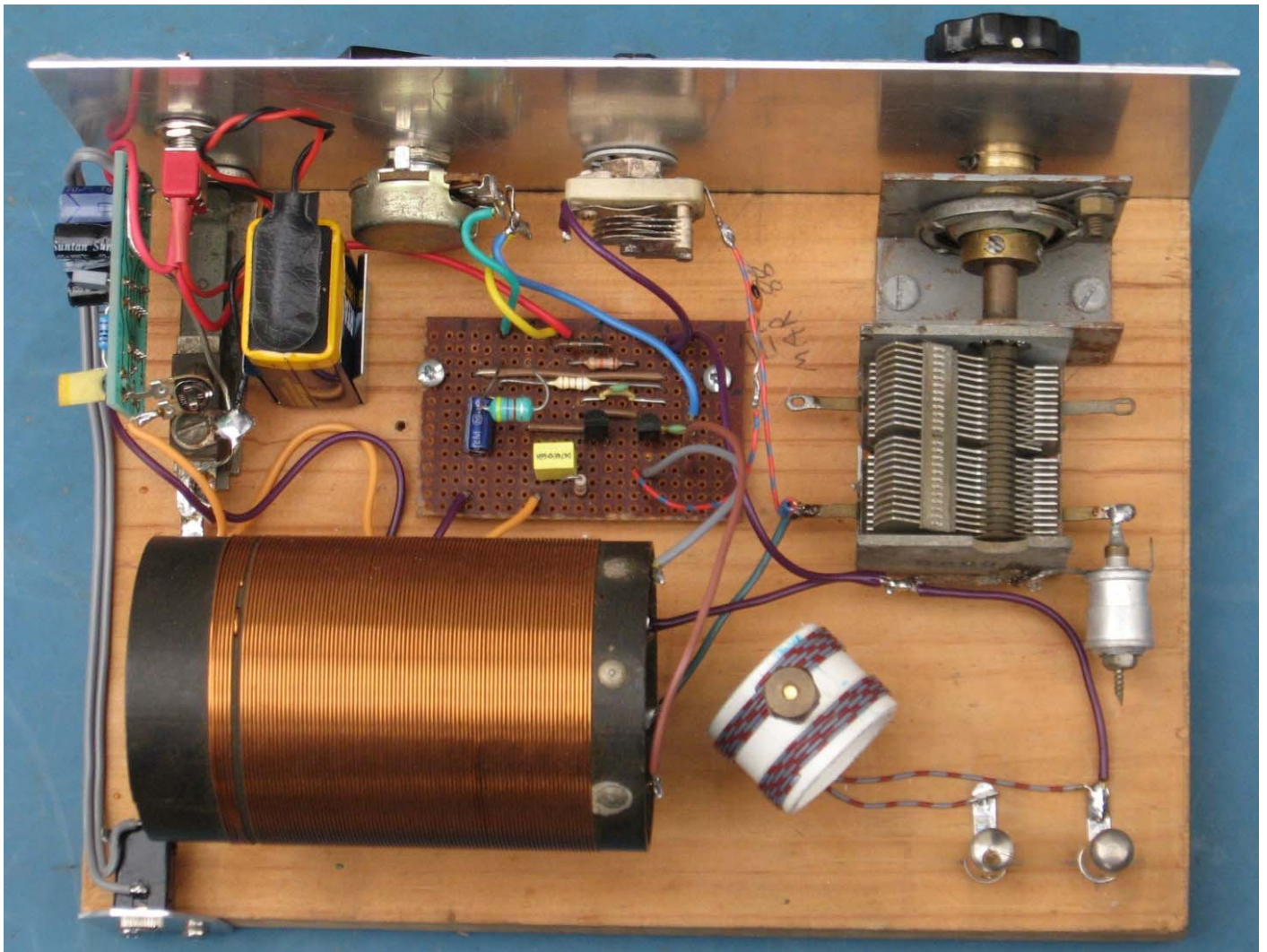
You can use a ferrite rod, or conventional coil.

Antenna coupling can be by any suitable means. Ferrite rod only, Coupling link on coil, or Variometer.

AF amplifier, or headphones only.

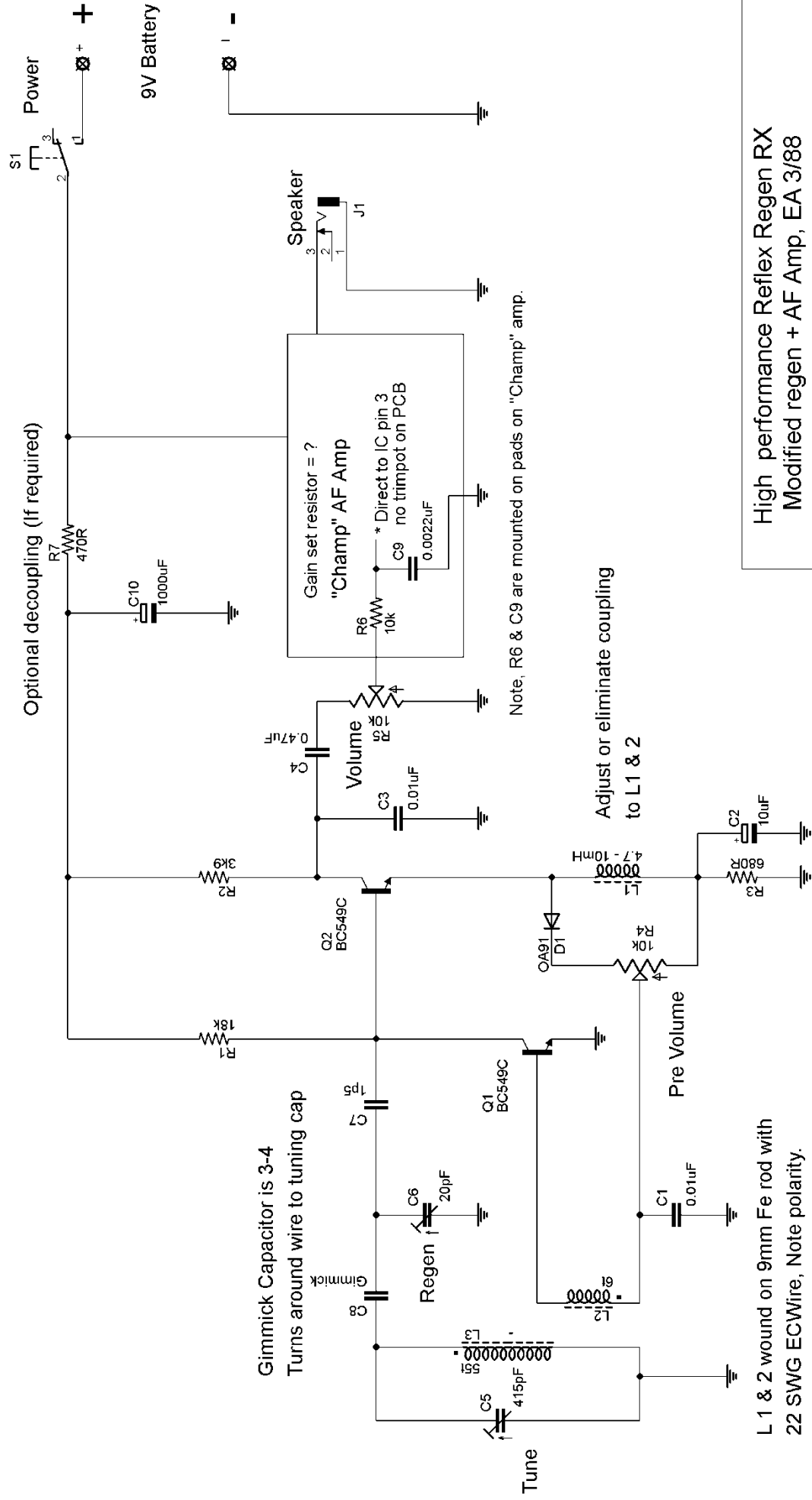
Variable regeneration or preset

Housing is left up to the constructor. If you want to use a metal box you will have to provide some form of antenna coupling, or have a small break in the case at some point so it forms an electrostatic shield, and not a shorted turn.



Note how the RFC is mounted on long leads and bent towards the coil. This is to adjust the inductive coupling, and may help to make the regen control position more constant across the band. As a starting point I suggest that it be mounted at right angles to the coil.

The front panel is earthed by the wire to the regen capacitor. I prefer a metal panel as it reduces hand capacitance effects and makes all adjustments easier. It is important that the body and shaft on the volume pot be earthed if you do not have a metal front panel.



High performance Reflex Regen RX
Modified regen + AF Amp, EA 3/88

TITLE: Reflex regen + AF EA88

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