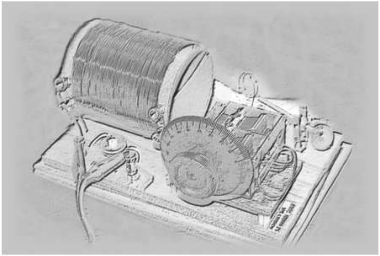
KEVIN'S WEBSURFER HANDBOOK I
FOR CRYSTAL RADIO

A CATALOG OF CRYSTAL HOOK-UPS



Kevin Smith
2009
rev 2015

Printing / Binding Instructions

1. Choose “fit to page” in print menu
2. Print document double sided on letter size paper
3. Cut the entire printed document in half
4. Fold over making sure the page numbering is continuous
5. For the cover: Print just the first page on card stock paper
   Cut the cover in half as well
6. Assemble the covers on the document
7. Punch the left side for a binding, spiral or comb as desired

http://www.lessmiths.com/~kjsmith/crystal/catalog.shtml

KJ Smith

Notes:

Notes:

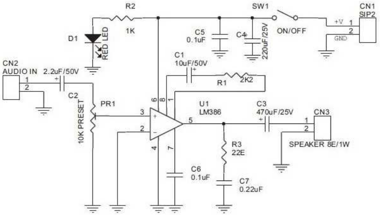
Hookup	Page	coil	cap	features
Schmarder #11	30	3 S	2	TC VM
MRL #15	31	3 S	2	VC
Sleeper #18 DeForest	32	2 S	1	VC TC
MRL #35	33	3 S	3	TC VC
Secor, 1920	34	4 S	0	VM
StayTuned #76	35	3 W	0	LC TC
KJS Bremer-Tully	36	2 D	1	LC
MRL #10	37	2 L	1	TC
DP Galenatron	38	3 S	2	VC TC
XSS #59	39	3 D	2	LD TC
MRL #24	40	3 D	2	LD TC
MRL #43	41	2 D	2	Counterwound
McCall	42	2 S	1	VC
MRL #3	43	2 S	2	VC TC
MRL #30	44	3 D	2 G	LC LWT
Sleeper #16	45	2 S	0	LC SL
Sleeper #17	46	2 S	1	LC SL
KJS Teflon	47	2 S	3G	LC
Tuggle L17	48	2 W	3 G	LC TG IWT
Tuggle ML17	49	2 W	3 G	LC Mossfet
Poole #5	50	2 S	2	TC LC
XSS #58	51	2 S	2	TC LC
Polk Symmetry	52	2 S	3 G	TG 4SL
Poole off the shelf	53	2 S	3 G	TC LC
KJS Hammarlund	54	2 S	3 G	TG SEC
XSS #54	55	3 S	3	LC WT
KJS ID #3	56	2 S	3 G	TG TC
Dejan	57	2 S	4 G	LC TG IWT
M Hampton, BRG 2009	58	2 S	5 G	TG LC
W Thelen, BRG 2006	59	2 W	5	TG LC
Sleeper #19	60	4 S	1	LC SL LD
Kinzie 47b	61	3 S	3	LD LC
RTVE p129	62	2 SW	2	FW

XSS www.midnightscience.com/index.html
Crystal Set Society, (M Peebles)
Newsletter #

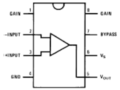
References:

BBCS	Boys Book of Crystal Sets W J May 1954
Babani	Crystal Set Construction BB Babani,
BCRG	Birmingham Crystal Radio Group http://www.crystalradio.us/
GE Ham	GE Ham News, V10, n6
Gollum	home.snafu.de/wumpus/gollum/
Kinzie	in XSS newsletter #47
Klase	www.skywaves.ar88.net/xtal/xtal.htm
MRL	Modern Radio Labs HB 17, 25 Elmer G Osterhoudt
Poole	bellsouthpwp2.net/w/u/wuggy/
Schmarder	www.schmarder.com/radios/crystal
Sleeper	Radio Hook-Ups Milton B Sleeper 1920
Solomon	Solomonmusic.net/Radios.html
Stay Tuned	www.crystalradio.net/crystalplans

AF Audio Amplifier



C1	10 uF
C2	2.2 uF
C3	470 uF
C4	220 uF
C5-6	0.1 uF
C7	0.22 uF
D1	LED 3mm
R1	2.2 k Ohm (short R1 to get max gain = 200)
R2	1k Ohm
R3	22 E Ohm
R4	10 k Ohm variable
SW	switch
IC	LM 386



Introduction:

The following catalog features circuit diagrams hand-drafted by myself from various sources (as indicated on each page, see catalog reference). When I first entered the crystal radio hobby, I was amazed and more than a bit intimidated by the sheer variety of circuit possibilities. I began to make my own circuit drawings in order to get a handle on this in addition to finding interesting circuits to construct myself.

To organize the circuits from fairly easy to rather complicated, I put together a simple classification based on the number of Inductors and Tuning Capacitors in each circuit and a few of their main distinguishing features, but this does not always feel right. Sets are arranged broadly by groups, single-tuned, variometers, double-tuned, etc. Better classifications may exist, but this works well enough for my purpose. A legend follows so anyone may break the code.

I provide only minimal information about each circuit. Although an experienced builder may make the calculations to build a radio from the data provided, I mostly intend this for information only. I highly recommend if you wish build a set to consult the original reference.

Please note that this compilation represents only a small fraction of the circuit possibilities in the world of crystal radio. Competition sets in particular can get very complex. I have tried to find a wide range of styles and ideas with examples from many circuit families. The reader is encouraged to pursue more on the web or via whatever sources are available.

Kevin Smith

Legend:

Coil

- 1, 2, 3+ number of coils
- S = single winding selenoid
- W = spiderweb, other non-selenoid
- D = dual windings on one form
- M = multiple windings on one form
- C = co-wound, bifiliar
- L = layered windings

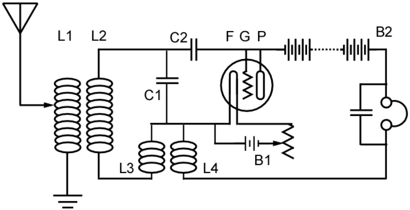
Capacitor

- 1, 2, 3+ number of capacitors
- G = ganged

Features

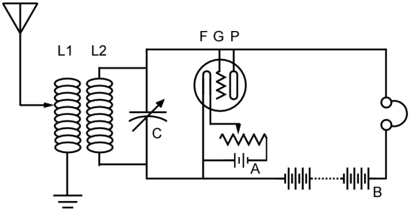
- VM = variometer
- VC = variocoupler
- LC = loose coupler
- FW = full wave receiver
- LD = loading coils
- CK = rf choke
- CT = capacitively tuned
- TG = tuggle tuning
- TF = telefunken variation
- SL = slider tuned
- TC = tapped coils
- LK = link coupling
- LWT = linked wave trap
- IWT = wave trap inductively coupled
- MW = Medium Wave
- LW = Long Wave
- SEC = Selectivity Enhancement Circuit
- B = Benny circuit

Armstrong Regenerative 12-1914



L1-2	coupled tuning circuit	
L3-4	feedback circuit (transformer)	
C1	tuning capacitor	
C2	circuit choke	
B1	A-battery	filament current
B2	B-battery	plate potential
Single triode vacuum (Audion) tube		
F	Filament	supplies electron current
G	Grid	control space charge around filament
P	Plate (Wing)	rectifier / oscillator

Armstrong Circuit
Audion Valve



Single Audion tube rectifies signal and provides amplification.

L1-2	Coupling coils
C	Tuning capacitor
A	Filament current
B	Supply of plate potential

Vacuum Tube elements

F	Filament	supplies electron current
G	Grid	control space charge around filament
P	Plate (Wing)	rectifier / oscillator

Unit prefix's

m	milli	10^-3
u	micro	10^-6
n	nano	10^-9
p	pico	10^-12

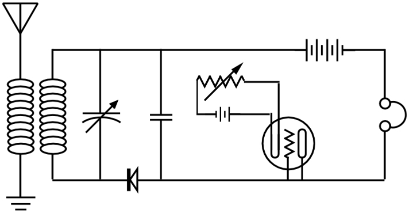
Old radio text notation

1 cm	= 1 nH
1 mmf	= 1 pF

Poole's Quick Fix's
Add a loading coil for short antennas
Add series capacitance for long antennas
Add coupling coil in front of tank
Tap antenna down on coil
Tap diode down on tank coil

To consider:
Add a Benny, even without matching transformer
Add SEC to unload diode
Add Bias to the detector

Pratt 1915   IRE v3, n2



Combined crystal detector and Audion amplifier circuit to test amplification on distant signals.

Fleming Valve

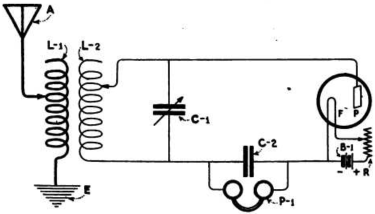


Figure 20a
Simple circuit for the two-electrode vacuum tube as an oscillation detector in radio telegraphy.

Rectification of signal with diode tube

L1-2	Coupled coils
C1	Tuning capacitor
C2	Shunt capacitor
R	Variable resistor to adjust temperature on filament
B1	Battery for heater (filament current)
V	Vacuum diode (Fleming Valve) rectifier

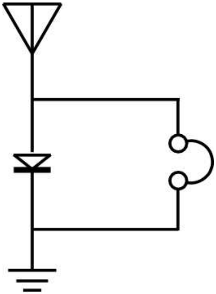
P35: 1918_Bucher Vacuum tubes in wireless communication

CHAPTER 1

BROADCAST BAND HOOK-UPS

Sleeper #1

0 0 Untuned

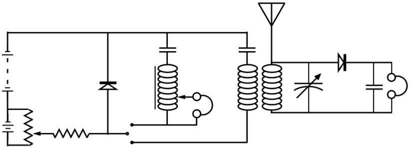


Detector of radio waves

Untuned circuit, all frequencies, especially those close to the natural resonance of the antenna itself will pass.

Diode shown in parallel with the phoned, may also be placed in series, but will have lower sensitivity.

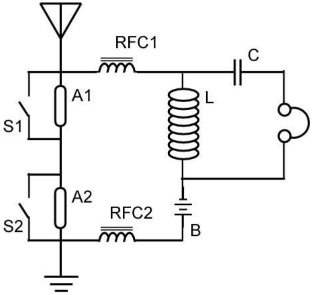
Anderson XSS #53



Heterodyne Circuit

DeForest – Smythe 1902

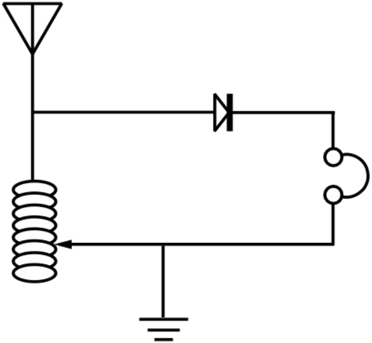
“Receptor”



A1-2	Anti-Coherers
RFC1-2	Choke coils
C	Tuning condenser
L	Inductor
B	Battery
S1-2	switches

Sleeper #2

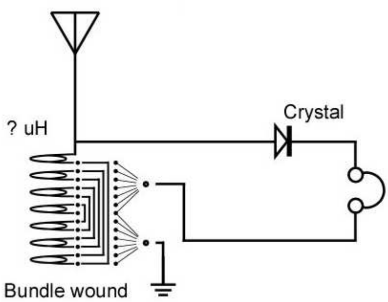
1S 0 Basic



Variable inductance circuit with tapped or slider-tuned coil.

American Radio Stores Inc.

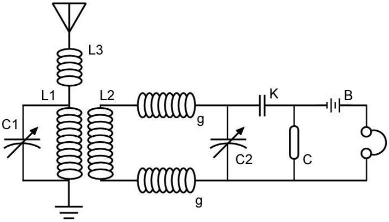
1B 0 TC



Variable inductance circuit with 2 sets of taps, Units and Multiples

The fascination of this radio is its tapped, bundle-wound coil. Taps are formed to wind into the main bundle.

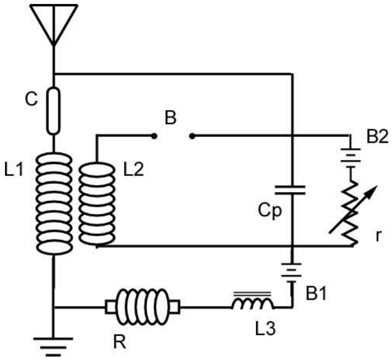
Marconi 1900



L1-2	Coupling inductors
L3	Ant loading coil
g	Loading inductor
C1-2	Tuning condensers
C	Coherer
K	“Stopping“ condenser
B	Battery

Coherer and telephone circuits as per Lodge Patent

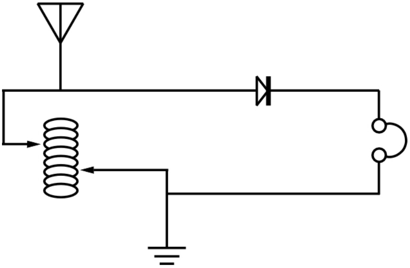
Tesla 1899



L1	Secondary inductor
L2	Primary inductor
L3	RF Choke
Cp	Condenser 500 pF
C	Coherer
B	Interrupter "Break"
B1-2	Batteries
r	resistor
R	Relay (sounder or headphones)

Sleeper #9

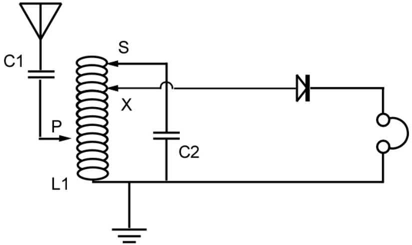
1S 0 TC



Variable inductance circuit with double switch to taps on coil, coarse and fine spacing switches separate.

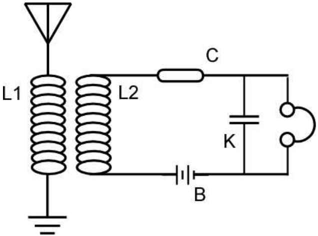
MRL #12

1S 0 **2SL**



Form	2” x 4 ½”	
L1	120t,	22 awg
C1-2	Fixed mica, 150 pF	
P	primary slider	
S	secondary slider	
X	crystal slider	

Lodge 1898

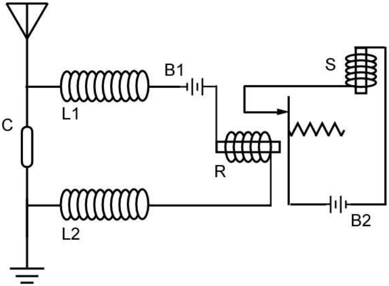


L1	Variable antenna inductor
L2	Coupling coil to detector circuit
C	Coherer
B	Battery, current triggered through coherer
K	Condenser of large capacity

This detects radio energy impulses, damped waves ala Morse.
Secondary coil aperiodic, tuning un-necessary.
First receiving circuit to place detector circuit away from antenna circuit thus reducing load resistance and allowing antenna to be tuned.

Marconi 1896

Untuned receiver

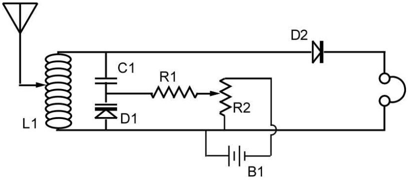


L1-2	Choke coils
C	Coherer
B1-2	Batteries
R	Relay
S	Morse sounder

Coherer tapper not shown

Wagner: XSS v10, n4

1S 0 Veractor

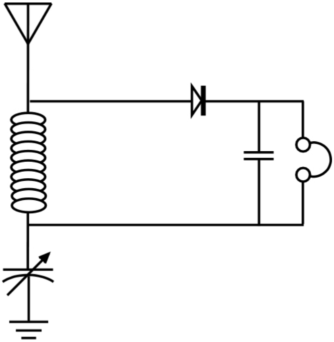


L1	260 uH, tapped
C1	1000 – 5000 pF
D1	MV1662 veractor
D2	1N34A
R1	100k ohm
R2	5-10Meg Pot
B1	9 – 15V DC

Tuning of set via variable capacitance diode (veractor) rather than traditional Vcap.
Crystal Set Sociery, 2000, v10, n4.

Sleeper #5

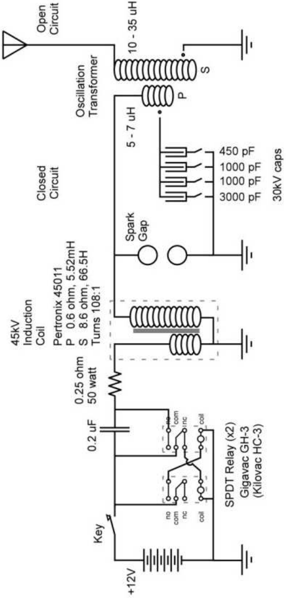
1S 1 Series



Series tuning capacitor

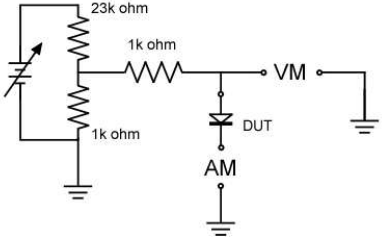
The lower the capacity used, the shorter the wavelength, (higher frequency) tuned.
Adding series capacitance lowers overall capacitance and thus "shortens" the antenna.

KJS Spark Gap Transmitter



Diode Test

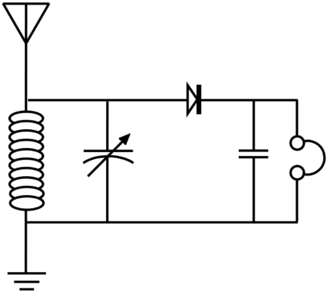
Petersen (modified)



R1-2	1k ohm
R3	23k ohm
B	Variable power supply (18 – 24V max)
VM	Volt meter (digital)
AM	Amp meter (digital)
DUT	Diode Under Test

Sleeper #6

1S 1 Parallel

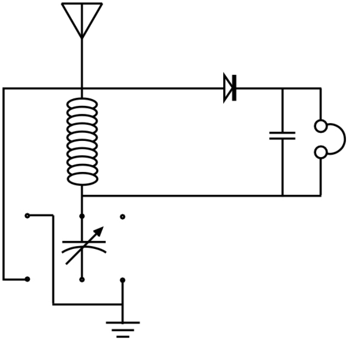


Parallel tuning capacitor

The lower the capacity used, the greater the wavelength, (lower frequency) tuned.
Adding capacitance in parallel increases overall capacitance thus “lengthening” the antenna.

Sleeper #7

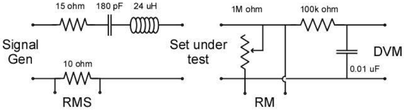
1S 1 SP switched



Series / Parallel switched tuning capacitor

DPDT switch to choose between the two prior circuits in a single set.

Performance Test
C Lauter



Artificial antenna Measurement load

Artificial Antenna
L1 = 20 uH
R1 = 15 ohm
R2 = 10 ohm
C1 = 200 pF

Measurement Load
R1 = 1M ohm pot
R2 = 100k ohm
C2 = 0.01 uF

Hookup to measure crystal set performance. Connect dummy antenna between Signal generator and set, use load between set and DVM. Follow protocol of Lauter: http://www.oldradioworld.de/gollum/testing.htm

Note**:** Modification of the Load (pot) made to determine impedance match at output. kjs

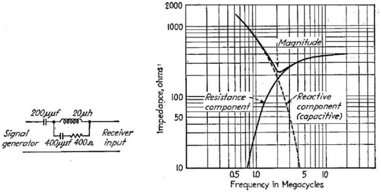
Dummy Antenna

MEASUREMENTS ON RADIO RECEIVERS

35. Receiver Characteristics and Their Determination.[1]—Radio receivers are tested by employing an artificial signal from a standard signal generator to provide a voltage corresponding to that induced in the receiving antenna. This voltage is ordinarily applied to the receiver through a network, termed a dummy antenna, having characteristics such that the receiver views substantially the same impedance as it would in normal operation with an actual antenna. The receiver output is then observed by replacing the loud-speaker or telephone receivers by a suitable resistance load, with which is associated a power indicator.

The dummy antenna recommended for use in testing broadcast receivers is given in Fig. 78.[2] The impedance of this network in the frequency range 540 to 1,600 kc approximates that of the typical open-wire antenna resonant at about 2,500 kc, and having a capacity of the order of 200 μμf. At higher frequencies the network approaches a constant impedance of 400 ohms, and so resembles a nonresonant transmission line of corresponding impedance.

[2] Where tests are to be made only in the standard broadcast frequency range, an alternative network consisting of a capacity of 200 μμf, resistance of 25 ohms, and an inductance of 20 μh, all connected in series, is commonly used. Such a dummy antenna has practically the same impedance as the recommended network in this frequency range.



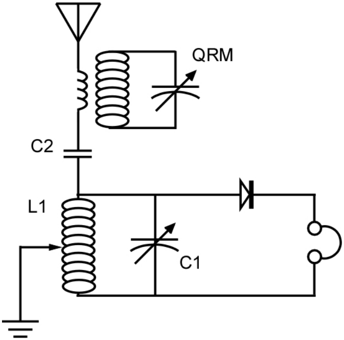
(a) Circuit (b) Impedance characteristics

Fig. 78.—Standard dummy antenna used for testing broadcast receivers, together with its impedance characteristic.

From Terman's Radio Engineer's Handbook, first edition, 1943, pp 973 and 974.

MRL #1

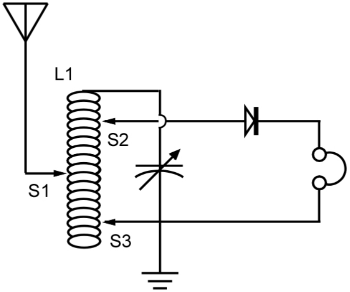
1S 1 LWT



Form	2” x 4 ½”		
L1	75t,	22 dcc	~175 uH
	Taps: 3, 6, 9, 12, 15, 20, 25, 30, 35, 40, 45 50		
C1	365 pF		
C2	fixed, 15 – 100 pF depending on antenna (or just make it variable)		

MRL #17

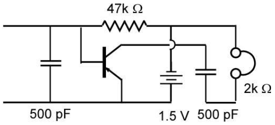
1S 1 **TC**

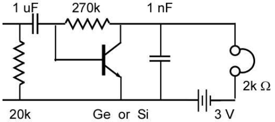


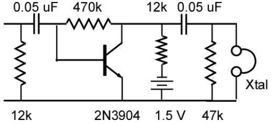
Form 2” x 4 ½”
L1 111t, 24 dcc ~340 uH
Taps: 20, 36, 46, 51, 56, 66, 76/83, 89, 96, 111

S1 and S2 to taps 20, 36, 46, 51, 56, 66, 76
S3 to taps 83, 89, 96, 111

Simple Amplification for your Phones

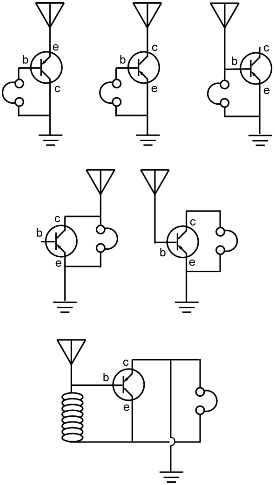






A few extra components can add up to 10 dB of volume to your phones. This may offset some of the lost sensitivity when used with highly selective sets..

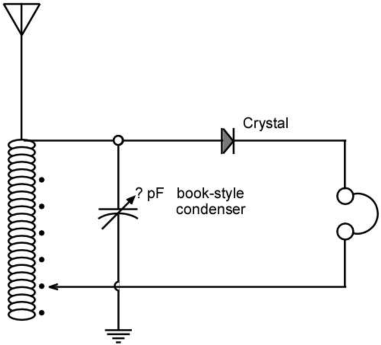
Simple circuits with Transistor Detectors
http://www.noniandjim.com/Jim/RadioProjects/UsingElectronics/UsingElectronics.html



Transistors may be substituted for diode detectors to make interesting configurations while remaining un-powered. These form a starting point, see what works.

Steinite

1W 1 **TC**



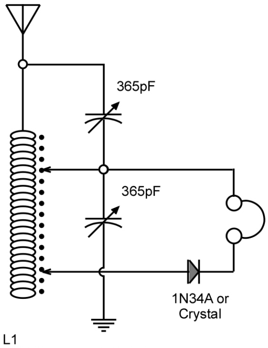
Basic radio from 1920's

Spiderweb coil
ID OD
45t, 22 dcc, 6 taps

C1	mica book-style	~250 uH

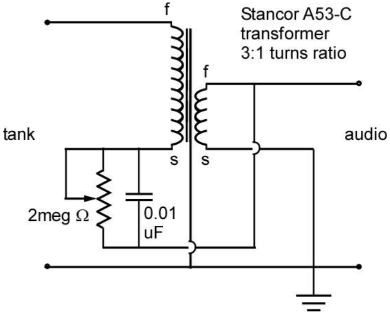
Borden Radio Dunwoody

1S 2 TC



Form	2” dia	
L1	100t,	22 awg
C1-2	365 pF	

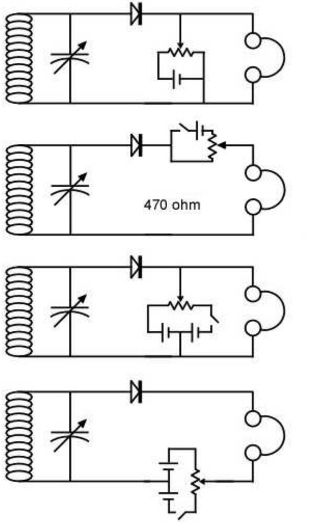
Impedance Matching Transformer



I have generally avoided including schematics and info concerning impedance matching transformers as I do not have much experience with them. The above general schematic I take from Ben Tongue’s article 01. Note that he includes a benny as a standard part of the transformer circuit.

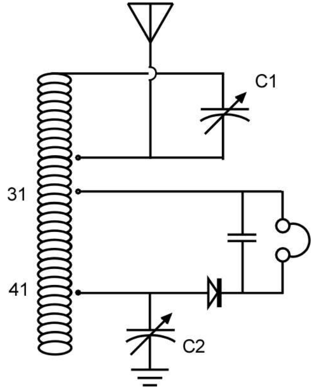
The transformer provides a 16:1 transformation ratio between the typical 12k ohm phones and a tank Rd of around 192k ohms.

Detector Bias Circuits



Babani Long Distance

1S 2 TC

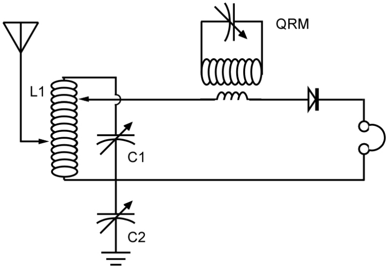


Form 2 ½" x 3"

L1	51t, 24 swg	~170 uH
	Taps 2, 4, 6, 8, 10, 12, 14, 16, 31, 41	
C1-2	365 pF	

MRL #13

1S 2 SL, LWT

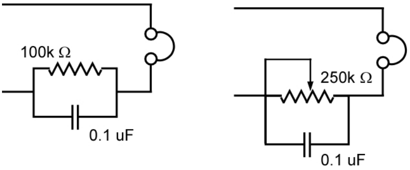


2-Slider with QRM

Form 2 ½ x 4 ¼"
L1 120t, 22 awg ~460 uH
C1-2 365 pF not ganged

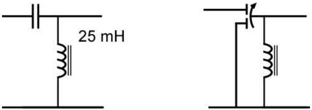
Benny

A Benny serves to equalize the DC load resistance on the diode to the AC audio load.



Examples of Benny circuits, with or without variable resistance.

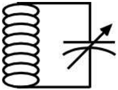
Selectivity Enhancement Circuit



Example of a circuit to include for selectivity enhancement. Simple cap, small trimmer, or differential cap (shown on left). Cap ~ 20pF, choke 25+- mH.

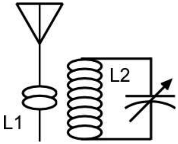
Wave Traps

Inductively coupled:



Coil should have same diameter as set tuning coils, placed in-line to couple.

Directly coupled:

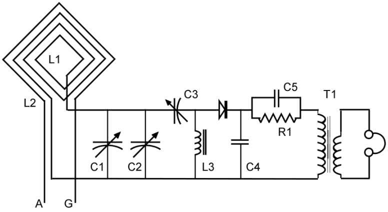


Form 1” x 1 ½”

L1	110t, 30 awg on base layer
L2	15t, 22 awg space wound on top
C1	410 pF

Schmarder #30

1L 3 RFC B

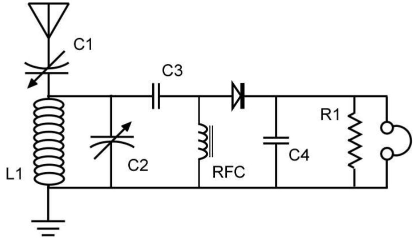


L1	Loop 30x36“, holes spaced 3/8“ 13t, 660/46 litz
L2	2t, 40/38 litz coupling winding
L3	2.5 mH RFC
C1-2	365 pF (ganged?)
C3	3-30 pF trimmer
C4	500 pF
C5	0.1 uF
R1	100 k

C3-L2 is the Selectivity Enhancement Circuit.
C5-R1 is the Benny

Schmarder #43

1W 3 CK



L1	spider, 1“ ID, 54t, 165/46 L
C1-2	365 pF (ganged?)
C3	10 pF trimmer (or 5-50 var)
C4	180 pF
R1	47 k (w/crystal earphones only)
RFC	27 uH

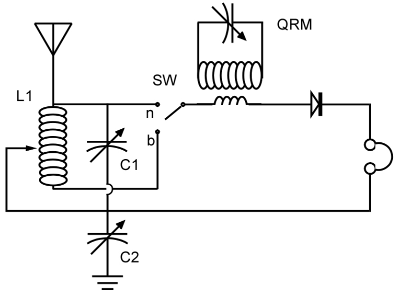
C3-RFC is the Selectivity Enhancement Circuit.

CHAPTER 3

M I S C E L L A N E O U S

MRL #2

1S 2G LWT



Form 2"
L1 90t, 22 dcc ~220 uH
taps, 5, 10, 16, 23, 31, 40, 50, 61, 73, 90

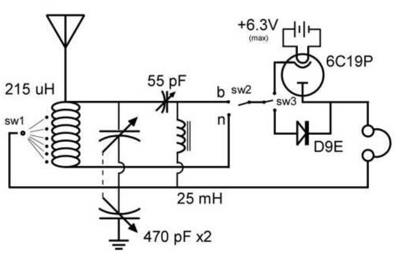
C1, C2, 365 pF, may be ganged
Switch broad / narrow tuning

QRM may be placed in tank as well to cut out strong locals.

This set "looks" a lot like May's BBCS#6 set without the choke, (p 20).

KJS Fleming

1S 2G Valve



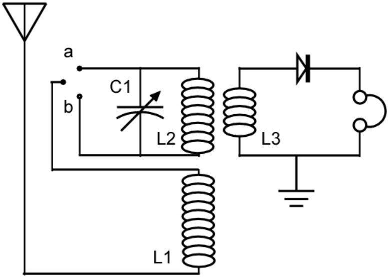
Valve Detector of Professor Fleming
Patented 1904

Form 3.54”
L1 49t, 18awg, taps 0,8,12,17,24,34

C1a-b 470 pF ganged

This is MRL #2 with Selectivity Enhancement Add, superficially resembling BBCS #6, p21.

3D 1 TF SW



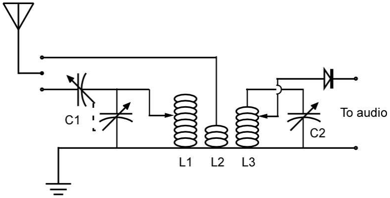
Form 2 3/8” x 2 ½”
L1 20t, 22 awg, close wound
Space 1/2” dual winding
L2 13t, 20 awg
L3 6t, 22 awg, bifilar with L2

C1 15 – 250 pF

The antenna may be connected directly to post A or B bypassing the coil L1.

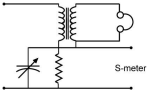
Al Klase SW

3S 3G LC, LD



L1	2”, 18t, 14 bare awg, clip to tap
L2	2”, 2t, 14 bare awg
L3	2”, 8t, 14 bare awg, clip to tap, ~4.3 uH

C1	100 pF 2 gang
C2	365 pF
C3	fixed 0.5 uF

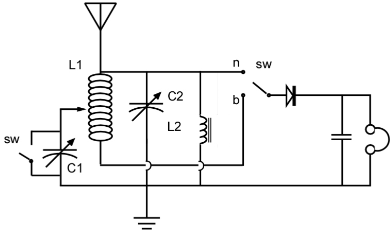


R1	100 k
T1	100 – 600 k

Back end to audio transformer and S-meter

WJ May   BBCS #6

2S 2 TC, LWT



Forms 2” x 4”

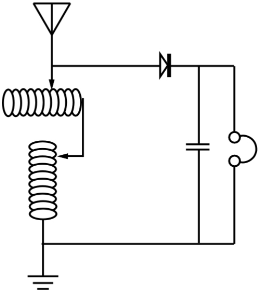
L1	90t, 22 dcc ~230 uH
	Taps 5, 10, 15, 25, 30, 40, 50, 60, 70, 80
L2	choke 110t, 38 dcc right angle to L1

C1-2	500 pF

This set looks similar to MRL #2 (p19),
See also MRL #8 on p67 and MRL #23 on p78.

Sleeper #11

2S 0 LD, SL

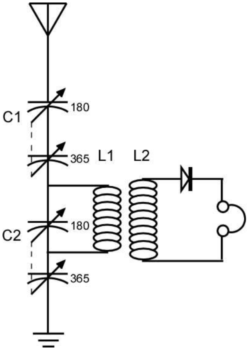


Slider tuned radio with loading coil in front end
Coils in series

Loading coil increases the wavelength tuned.

H Lash SW

2S 4G LC

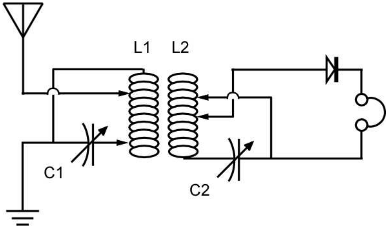


Shortwave

L1	2”, 9 1/2t, 22 awg
L2	2 1/8”, 30t, 22 awg on top layer
C1-2	365 pF – 180 pF 2-gang

XSS #56 SW

2S 2 TC



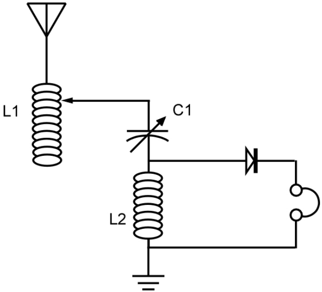
Shortwave Set

Forms 3 ½" x 3 ½"
L1-2 space wound, 6-8 tpi, 14 awg, ~38 uH

C1-2 100 pF

MRL #11

2S 1 TC

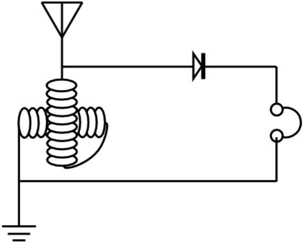


Form 2 ½ x 4 ¼"
L1 132t, 24 dcc Loading, ~625 uH
12 taps, spaced each 11 turns
L2 40t, 20 dcc 2" space wound ~80 uH
Coils at right angles, not coupled

C1 350 pF

BBC Commemorative (Prac Wireless Sep 1972)
AKA Sleeper #12

2W 0 VM

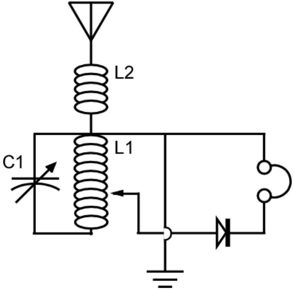


Variometer
Pancake-style with 2 spiderweb coils

Tuning accomplished by varying the mutual inductance between two coils connected in series.

Owen Poole SW

2S 1 LC

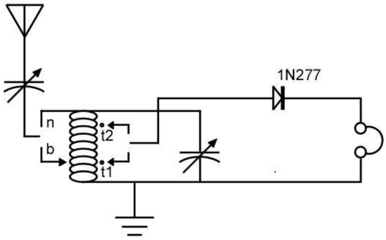


Form 1 5/8”

L1	14t, 24 awg hookup wire ~12.4 uH
L2	5t, 24 awg hookup 1/8” from first coil
C1	10 – 60 pF

KJS Global DX

1W 2 TC



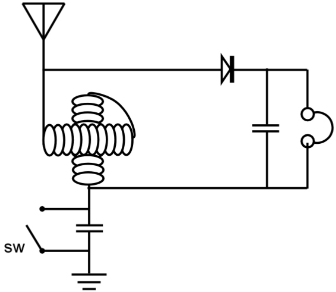
Spiderweb Form ID 0.6“, OD 2.0“

L1	9t, 18 awg 7.6 uH	
	Tap 3	3.8 uH
	Tap 8	5.8 uH
C1-2	10 - 115 pF (tunes ~ 6 – 18 MHz)	

Set based on Gollum SW Set

Sleeper #12, 13

2S 0 VM

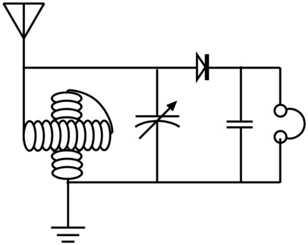


Variometer

Optional capacitor in series to ground
to tune upper BC band

Sleeper #14

2S 1 VM



Variometer
Parallel tuned circuit

Variable condenser to tune wavelengths greater than the circuit with variometer alone.

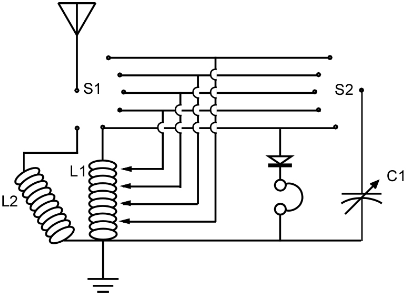
CHAPTER 2

SHORTWAVE HOOK-UPS

120 M	2.3	2.5 MHz	
90	3.2	3.4	
60	4.75	5.06	
49	5.9	6.2	active
41	7.3	7.35	
31	9.4	9.9	active
25	11.6	12.1	active
22	13.5	13.9	acrive
19	15.1	15.8	active
16	17.5	17.9	
15	18.9	19.0	

MRL #22

2S 1 VC, TC

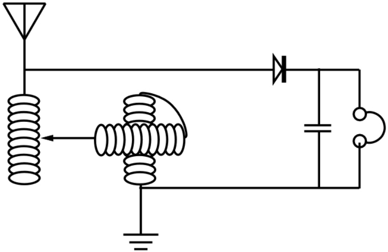


Variometer, coils in series

L1 stator	2“ 54t, 22 dcc
	Taps : 14, 27, 39, 48, 54
L2 rotor	1 1/2", 11t, 22dcc
C1	365 + Pf
S1-2	Roraty switches

Sleeper #15

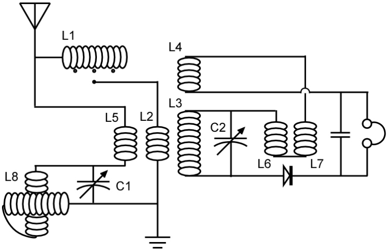
3S 0 VM, TC



Variometer
With tapped loading coil in series with the variometer. Tap separation equal to the inductance range of the variometer.

Barkett, Radio World 1924, (st #20)

8W 2 LD LC VM



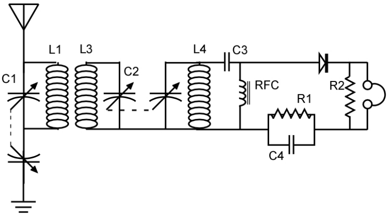
The Ultimate Coil Fantasyland:

Coils L1-L5 basket weave
Coils 6-7 honeycomb

L1	3" loading, 50t, 20 awg, taps	~175 uH
L2	4", 25t, 20 awg	~ 90 uH
L3	3", 60t	~230 uH
L4	4", 30t	~125 uH
L5	3", 30t	~ 80 uH
L6-7	25t	
L8	variometer	
C1-2	365 pF	

Petersen XSS 107-8

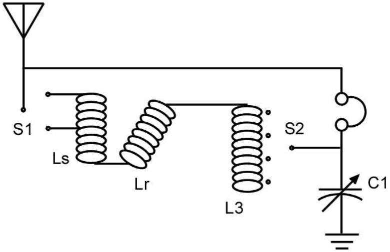
5S 4G LK CK



L1	4 x 3“, 44t, #26 hookup, stator		~250 uH
L2	1 ¾ x 3“, 15t gap 15t, rotor		
C1	365 pF 2-gang		
L3-4	3 ¼”, 68t, 20 awg, right angles		~300 uH
C2	365 pF 2-gang		
C3	10 pF	C3/RFC SEC circuit	
RFC	2.5 uH	to lightly load detector	
C4	0.1 uF	C4/R1 is a Benny	
R1	22 k		
R2	120 k	for high-impedence phones	

MRL #29

3S 1 VC, TC



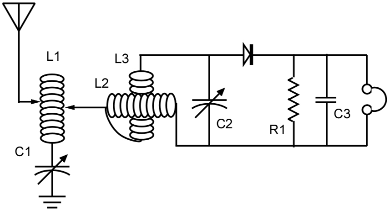
Variometer

Form 2“ x 4 ½“

Ls	3 ½“ x 2 ½”, 60t, 24 dcc, gap ~360 uH
	Tap at 30
Lr	2 ½“ x 2”, 64t, 28 dcc, gap ~300 uH
L3	loading, 2“ x 4 ½“, 100t, 24 awg
	Tap each 25t
	~300 uH
C1	365 pF

Schmarder #11

3D 2 TC VM

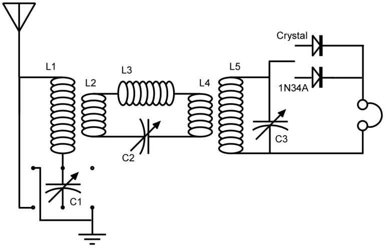


L1	3 1/8”, 50t, tap each 10t
L2	stator, 3 1/8“, 40t, 40/44 L
	L1-2 dual wound on same form, 1/8” apart
L3	rotor, 2 1/8“, 48t, 40/44 L
C1-2	500 pF
C3	220 pF
R1	33k (w/crystal earphones only)

Coupling between antenna coil and stator.

KJS Minstrel Boy

5T 3 LK



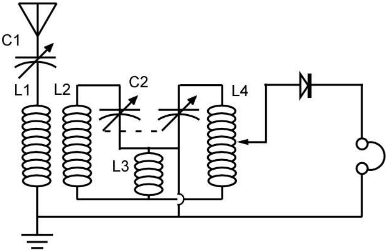
Link coupled Triple tuned set

L1-L5	180 uH Air-core torroids (Magnavox)
L2-L4	35 uH coupling coils within above
L3	110 uH Honeycomb,
C1,2,3	540 pF each

Series/Parallel switch on antenna circuit cap

Radio Craft ST #31

4S 3G **Band Selection**



L1	4“, 80t, 28awg, stator	~840 uH
L2	2“, 80t, 28awg, rotor	~300 uH
L3	1”, 48t, 28 awg	~ 50 uH
L4	3”, 90t, 24 awg	~515 uH

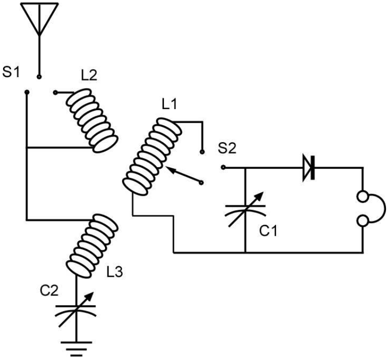
C1	365 pF
C2	365 pF 2-gang

turns on L3 controls degree of band selection

How does this work? How to “select” band?
Make L3 variable?

MRL #15

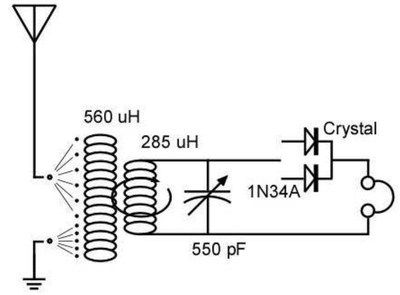
3S 2 VC



L1	3“ x 4”, 24t, 20 dcc, ½“ gap, 45t, 22 dcc Tap at 30
L2-3	2” x 2”, 60t, 24 awg
C1-2	? 365 pF

KJS DeForest (aka Sleeper #18)

2S 1 LC, TC



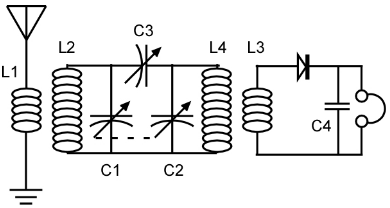
Basic Variocoupler

L1	Primary: stator	560 uH
	tapped fine / coarse switches	
L2	Secondary: rotor	285 uH
	Variocoupler NOS De Forest Co	
C1	550 pF to tune secondary circuit	
	Used, Windham Co	

Note: The radio doesn't couple well and tunes broad as a barn. Pity…

Ford, Pop Mech 1945, (st #111)

4L 3G LK



Form 1" x 2 ½"

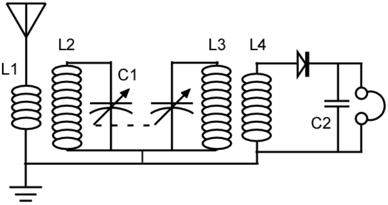
L1/L3	30t, 30 awg, top layer		~ 28 uH
L2/L4	140t, 30 awg, base layer		~235 uH
C1-2	365 pF	2-gang	
C3	3-30 pF trim		
C4	0.001 uF		

Coils at right angles

Option to connect all three circuits to ground to increase sensitivity.

XSS #63

4S 4 LK

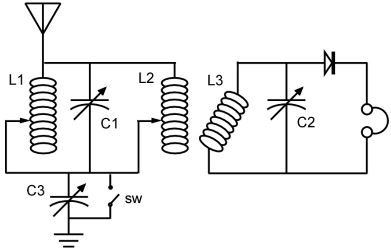


Link coupled variocoupler

L1 rotor	1 1/16”x 7/8”, 16t, 28 awg, gap in coil	
L2 stator	1 7/8”x 2 3/8”, 72t, 28 awg	~230 uH
L3	1 7/8”, 70t, 28 awg,	~220 uH
L4	1 7/8”, 35t, 28 awg,	~75 uH
C1	365 pF, 2-gang with trimmers	
C2	0.001 uF	

MRL #35

3S 3 TC, VC

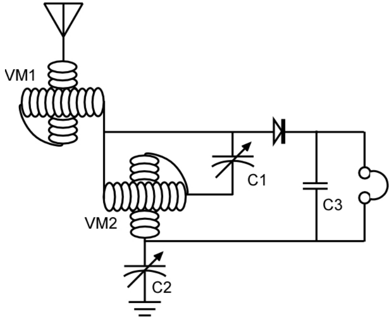


Forms 2” x 4 ½”

L1	100t, 24 dcc Tap every 10t	~300 uH
L2	stator	100t, 24 dcc, tap every 10t
L3	rotor,	1 ½“ x 1 ½“, 35t, 32 awg
C1-3	365 pF	

Secor, 1920

4S 0 VM

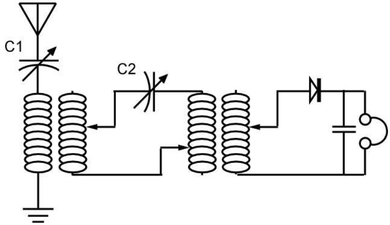


Double variometer

VM1	loading
VM2	tuning
C1-2	365pF
C3	0.001 uF

Hogan 1922

4S 2 LK, TC

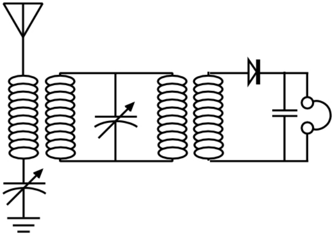


Link coupled variation with sliders or taps

C1	365 pF
C2	500 pF or higher

Sleeper #20

4S 2 LK

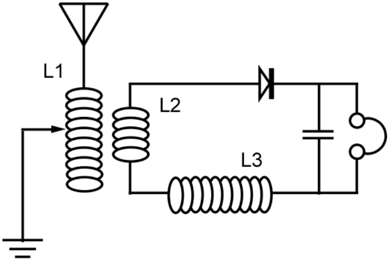


Link coupled set with loose coupling

Primary and intermediate circuits tuned with variable condensers while secondary circuit is untuned, (aperiodic).

Stay Tuned #76 (ref not known)

3W 0 LC, TC



Tapped Spiderweb Rig

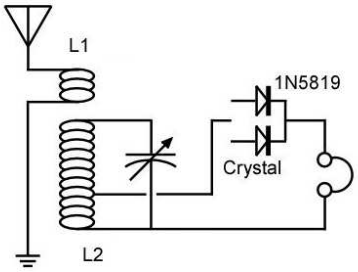
Coils ID 1 ¾"

L1	50t, 22 dcc, over 1 under 2, 20 spokes Tap every second turn
L2	12t, 22 dcc, over 2 under 2, 19 spokes
L3	50t, 22 dcc, over 2 under 2, 19 spokes

Visit Darryl Boyd's excellent website to see the plans for this set. It is a visually interesting set that will please you.

KJS Bremer Tully Set

2D 1 LC



Basic tuner with co-wound antenna coupling coil

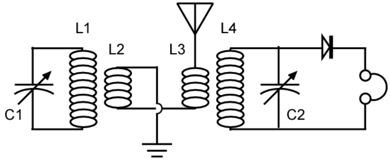
Dual wound primary and secondary on open form

L1	20 uH
L2	370 uH
C1	10 - 270pF

This set features a lovely bank-would coil with separate primary and secondary. The high primary inductance necessitated a low-value variable cap with as low a minimum as possible.

Coupled trap

4S 2 IWT



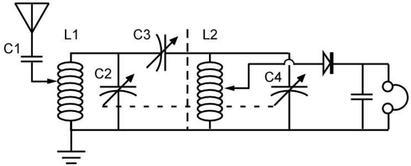
Coupling coil circuit with trap

L1-L4	1.5” form, 90t 28 awg, 220 uH
L2-L3	1.5” form, 45t 28 awg, 85 uH
C1-C2	365+ pF

(Reference unknown, clipped from an old magazine)

BBCS #11

2S 3G TC



Forms 2 ½" x 2"

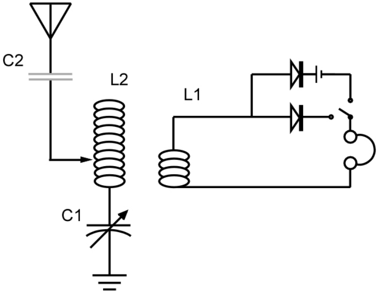
L1-2	50t, 28 swg (~25 awg)	~180 uH
C1	100 pF	
C2 C4	500 pF 2-gang	
C3	50 pF trimmer	

Band Pass Circuit
Grounded screen between coils to prevent coupling

Capacitively coupled

MRL #10

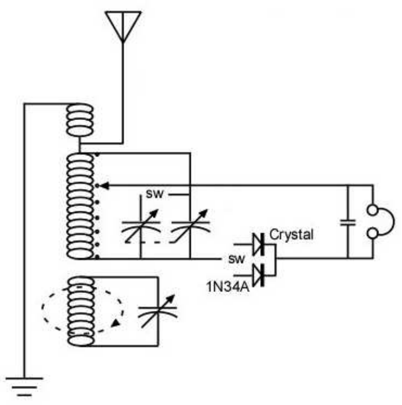
2L 1 TC



Form 2 x 4 ¼"
L1 40t, 20 dcc start 1/8" from end ~95 uH
L2 160t, 28 dcc on top layer loading ~1100 uH
Taps 5, 10, 20, 60, 100, 160
C1 365 pF
C2 150 pF optional
Coils not coupled.

Dan Petersen Galenatron

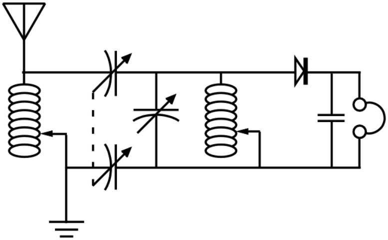
3S 2 VC, TC



L1	3.15”, 50t, 22 awg	~230 uH
L2	3.15”, 10t, 22 awg	
L3	2.15”x2”, 50t, 22 awg, gap in coil	
C1-2	400 pF	

Sleeper #21

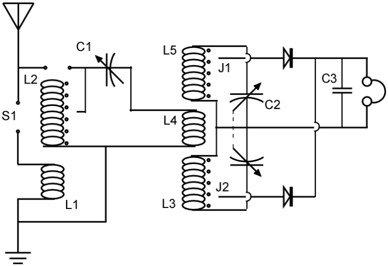
2S 3G SL, CT



Primary and secondary circuits tuned by varying the coil inductance with sliders while coupling between primary and secondary is varied capacitively, (ganged capacitors)

XSS #62

5M 3G FW, TD



Fullwave Receiver (variation on Pop Mech, P72)

Form 1 7/8” x 2”

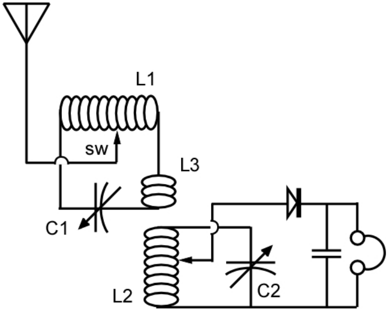
L1	72t, 28 awg,
	Taps 0, 16, 30, 44, 58, 72
L2	17t, 28 awg

Form 1 7/8” x 3 ½“

L3,5	72t, 28 awg,
	Taps 0, 18, 36, 54, 72
L4	17t, 28 awg
S1	6-position switch

XSS #59

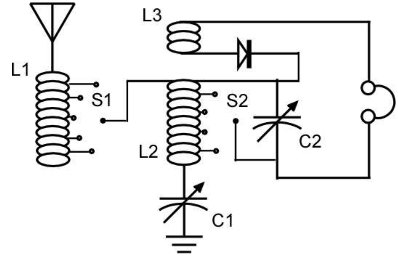
3D 2 LD, TC



L1	2 ¾”x 3”, 42t, 22 awg	~130 uH
L2	2 ¾”x 4”, 67t, 22 awg	~255 uH
L3	2 ¾”x 4”, 15t, 22 awg 1/8” from L2, same form	~ 25 uH
C1-2	365 pF	
Sw	4-6 position switch	

MRL #24

3D 2 LD, TC



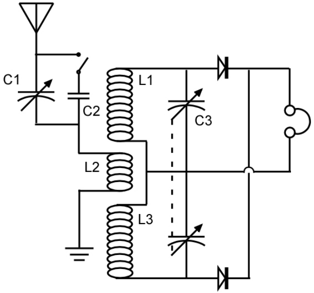
Forms 2” x 4½”

L1	100t, 24 dcc, loading coil	~300 uH
	Taps 0, 25, 50, 75, 100	
L2	90t, 24 dcc,	~260 uH
	Taps 5, 25, 50, 90	
L3	25t, 24 dcc 1/8” from L2, same form	
		~ 40 uH

C1-2	365 pF

Popular Mechanics (Dec-1950): **BBCS #4**

3M 3G FW



Full wave receiver

Form 1” x 4”

L1	43t, 32 awg	~ 60 uH
L2-3	120t, 32 awg	~270 uH

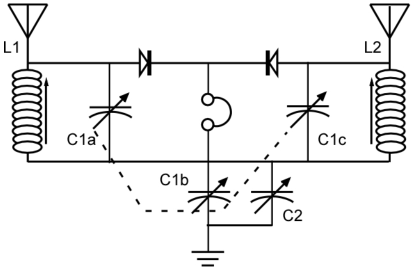
1/8“ between windings

C1	365 pF ?
C2	fixed, ? pF
C3	365 pF 2-gang with trimmers

This set is a fun candidate to make with a 5726 dual Diode vacuum tube.

EL Anderson, (GE Ham News, 1955, v10, n6)

2L 4G FW DA

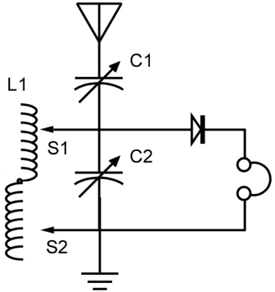


Twin-Crystal Set

L1, L2	Variable Loopstick Coil
C1	15-400 pF 3-gang
C2	15-400 pF To trim balance between antennae

MRL #43

2D 2 Counterwound

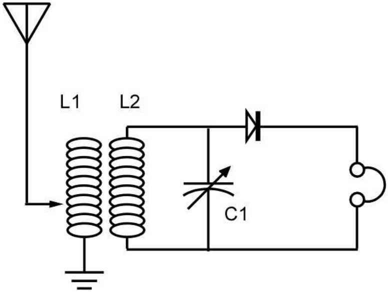


Form 2” x 4 ½”

L1	Use 27 awg ~375 uH each section Wind 100t, anchor then reverse wind 100t Taps every 10t on each section
C1-2	365 pF (not ganged ?)

Gordon McCall

2S 1 VC

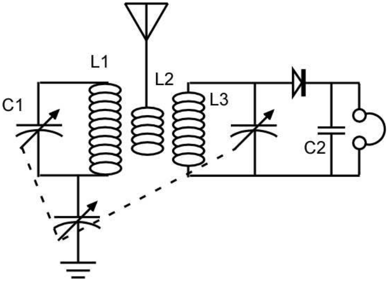


Variocoupler

L1	4”, 57t with gap, #22 awg
L2	3”, 57t with gap, #22 awg
C1	? 365 pF

Solomon Almighty

3C 3G TF



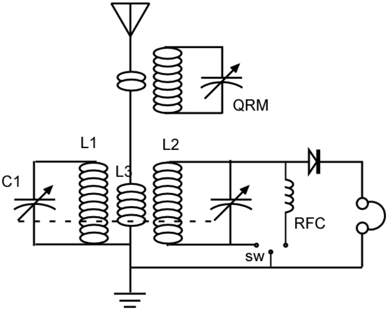
Telefunken Style

Form 3“

L1	50t, 24 awg, base layer
L2	15t, 24 awg, top layer
L3	25t, 24 awg, bifilar with L1
C1	500 pF, 3-gang
C2	0.001 uF

MRL #23

3L 2G TF, CK, QRM



Telefunken Style with RFC and QRM
See also MRL #8 on page 67.
With family resemblance to sets on pages 19-21.

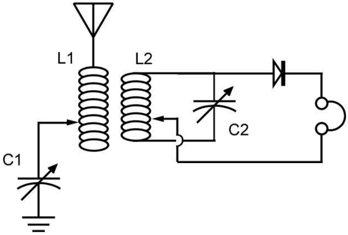
Form 2“ x 4 ½“

L1	75t, 22 dcc, base layer	~175 uH
L2	75t, 22 dcc, middle layer	~190 uH
L3	15t, 22 dcc top layer	~ 19 uH

C1	365 pF, 2-gang
RF choke	85 mH

MRL #3

2S 2 VC, TC



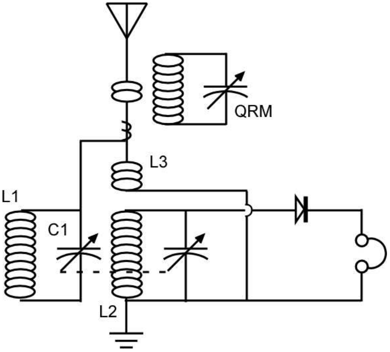
Variocoupler

L1	3“, 100t, 24 dcc, 4 taps	stator	~590 uH
L2	2“, 75t, 24 dcc, 4 taps	rotor	~205 uH

C1-2 365 pF

MRL #30

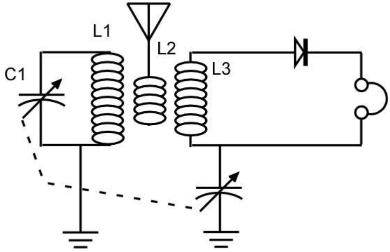
3D 2G LC, LWT



QRM	1"x 1½", 110t, 30 awg, 15t, 24 dcc space
Forms 2" x 4½",	
L1-2	75t, 22 dcc, couple to ant ~175 uH
L3	8t, 22 awg 1/8" from L2, same form ~5-6 uH
C1	365 pF, 2-gang

Solomon Crazy +

3C 2G TF

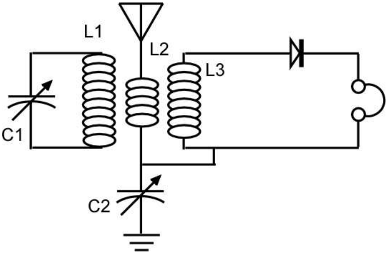


Telefunken Style

Form 2.5"	
L1	45t, 24 awg
L2	15t, 26 awg on top layer
L3	25t, 30 awg, bifilar with L1
C1	500 pF

Solomon Mystery +

3C 2 TF



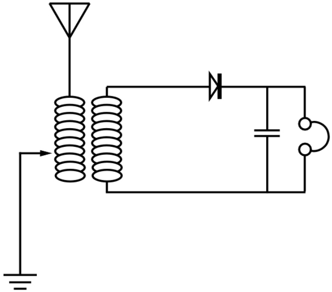
Telefunken Style

Forms 2.76”

L1	45t, 22 awg
L2	15t, 22 awg on top layer
L3	25t, 30 awg, bifilar with L1
C1-2	350 pF not ganged

Sleeper #16

2S 0 LC, SL

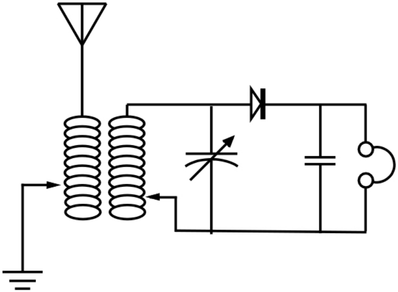


Loose coupler

Aperiodic secondary, responds to any wavelength with which the Primary coil may be tuned.

Sleeper #17

2S 1 LC, SL

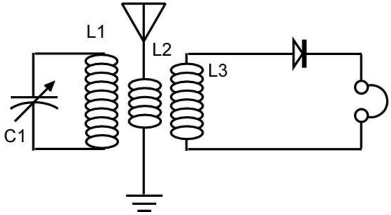


Loose coupler with tuned secondary

Both Primary and secondary circuits may be tuned to resonance giving high efficiency of energy transfer. Changing coupling between the two coils can vary the degree of selectivity attainable, at the expense of sensitivity.

MRL #4

3L 1 TF

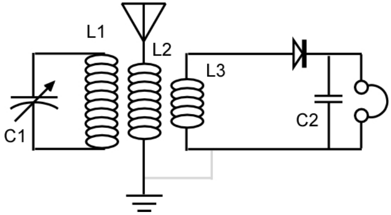


Basic Telefunken Set

Form ?		
L1	75t, 22 dcc, base layer	~175 uH
L2	20t, 22 dcc, middle layer	
L3	10t, 22 dcc top layer	
C1	365 pF	

Proton Mystery +

3C 1 TF



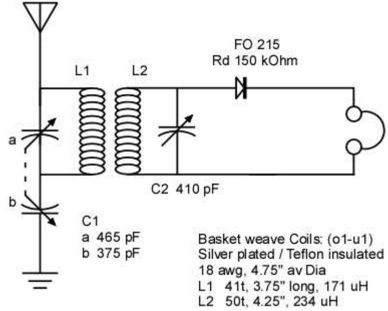
Telefunken Style

Form 3“

L1	45t, 23 awg, base layer
L2	15t, 23 awg, top layer
L3	25t, 29 awg, bifilar with L1
C1	365 pF
C2	0.001 uF

KJS Teflon

2S 3G LC



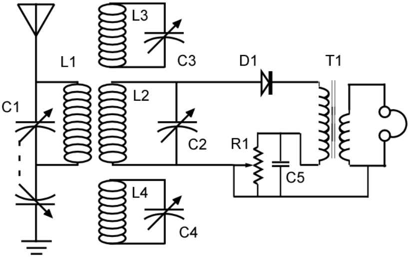
Simplicity in a double-tuned rig.

Silver-plated, Teflon-insulated Coils, over 1 / under 1
18 awg, 4.75” av diameter

L1	41t, 3.75” long, 171 uH
L2	50t, 4.25” long, 234 uH
C1a	465 pF
C1b	375 pF
C2	433 pF

Mike Tuggle Lyonodyne 17

2W 3G LC, TG, 2WT



L1	51t ferrite	147 uH
L2	36t basket	185 uH
L3	36t basket	185 uH
L4	42t basket	187 uH

C1	15 – 470 pF, 2-gang
C2, C3, C4	15 – 497 pF
C5	0.02 uF

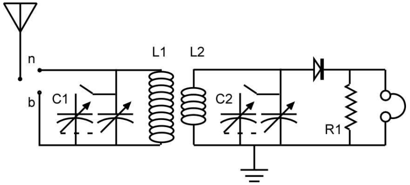
R1 500 kΩ

T1 UTC A-27

D1 RS 12101 3RT

Gollum Mystery

2C 4G TF



Telefunken Style

Form 3.15”

L1	48t, 26 awg	~250 uH
L2	28t, 22 awg, bifilar with L1	

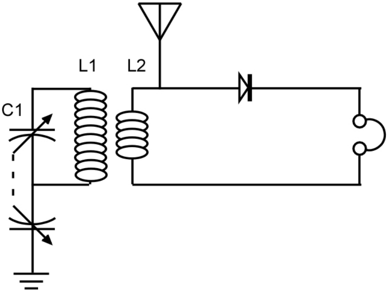
C1-2 ?365 pF, 2-gang

R1 68 kohm

Capacitor gangs switchable in parallel to add capacitance.

MRL #39

2L 2G TF, TG



Telefunken Style

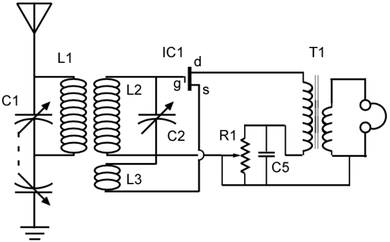
Form 2” x 4 ½”

L1	80t, 22 dcc primary on bottom layer	190uH
L2	40t, 20 dcc secondary on top layer	~ 70uH

C1	pF 2-gang

Mike Tuggle Lyonodyne Mod

2W 3G LC, TG, MOSFET



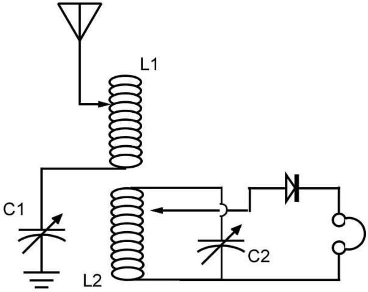
L1	51t ferrite	147 uH
L2	36t basket	185 uH
L3	8t basket	

Outboard traps not shown

C1	15 – 470 pF, 2-gang
C2	15 – 497 pF
C5	0.02 uF
R1	500 kΩ
IC 1	ALD 110900 APA MOSFET
T1	UTC LS-12

Owen Poole Project Crystal Radio #5

2S 2 TC, LC



Antenna tuner w/secondary

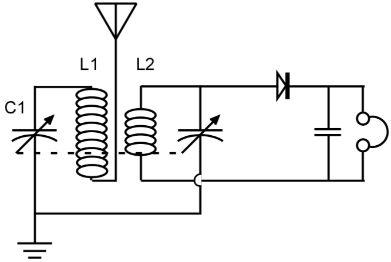
Form 1 ¾"

L1-2	152t, 24 awg Tap each 10 turns	~390 uH
C1-2	? 365 pF	

(essentially the same as MRL #3)

Solomon Double gang

2C 2G TF



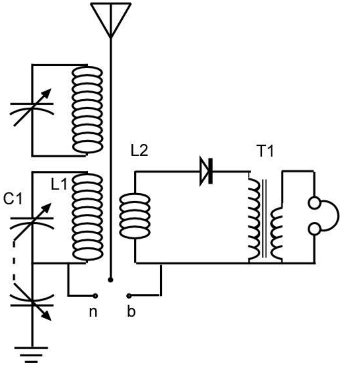
Telefunken Style

Form 6 cm (3.275")

L1	50t, 24 awg primary
L2	25t, 24 awg secondary co-wound
C1	500 pF 2-gang

Mike Tuggle Mystery

2C 2G TF, TG

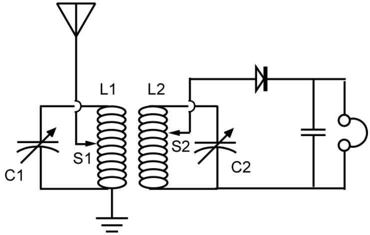


Telefunken Style w/QRM

L1	36t, 660/46 litz 5 inch basket weave
L2	18t, 420/46 litz
C1	500 pF 2-gang
T1	UTC LS-12

XSS #58

2S 2 TC, LC

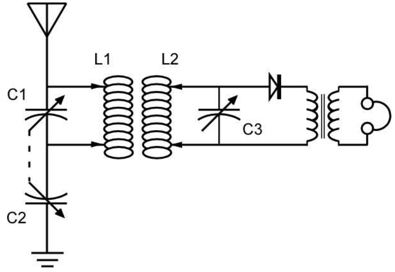


Double loose coupler Navy Style

L1	3 ½”x3 ½”, 48t, 22 awg
	Taps 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 44 48
L2	2 3/8” x 3 ¾”, 72t, 22 awg
	Taps 0, 6, 12, 18, … 72
C1-2	365 pF

Tom Polk Simply Symmetry

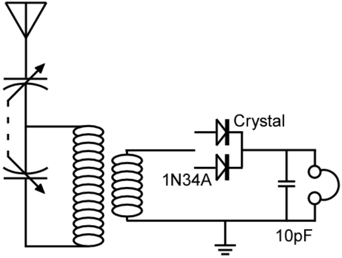
2S 3G TG, 4SL



Form 2” x 5 ½”
L1-2 125t, 18 awg ~240 uH
C1-2 365 pF 2-gang
C3 365 pF
Radio Shack 70v Line Transformer
Sliders

KJS Mystery

2C 2G TF, TG



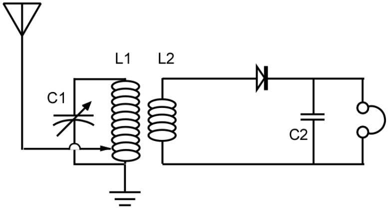
Telefunken Style

Form 8 cm (3.275”)
L1 46t, 18 awg primary
L2 24t, 18 awg secondary co-wound

C1 495 pF 2-gang

Peebles XSS #9

2L 1 TF



Telefunken Style

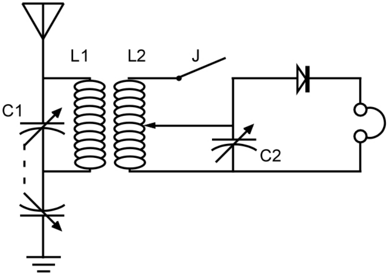
Form 1 ¼“ x 1 5/8“

L1	110t, 28 awg, base layer	~205 uH
L2	30t, 28 awg, top layer	~ 34 uH
C1	365 pF	
C2	0.001 uF	

Long antenna tap at 10t from ground

Owen Poole Off the Shelf

2S 3G TC, LC

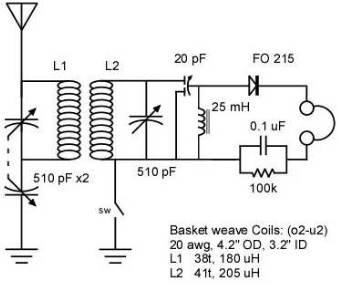


Form 4“ x 4”

L1-2	60t, 20 awg hookup wire
	Tap at 20
C1	365 pF 2-gang
C2	365 pF
J	optional jumper

KJS Hammarlund

2B 3G TG, SEC, B

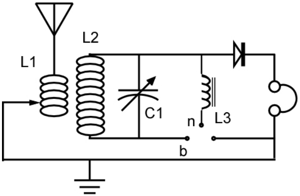


Basketweave coil 4.2” OD – 3.2” ID

	Over 2 – under 2		
L1	38t	20 awg	180 uH
L2	41t	20 awg	205 uH
C1-3	510 pF		C1-C2 are ganged
C4	20 pF differential		
C5	0.1 uF		
RFC	Choke: 25 mH		
R1	100k ohm		
D1	ITT FO-215 germanium		

MRL #8

2L 1 TF, CK

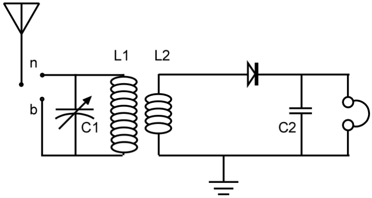


Telefunken Style
See also MRL #23 on page 78.
With family resemblance to sets on pages 19-21.

Form	2” ?
L2 75t, 22 dcc bottom layer	
L1 20t, 20 dcc space wound 2 ½” on top layer	
	Taps 4, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20
L3	BC band RF Choke, ~ 50ohm DC
	Single or 3-section ok
C1	? 365 pF

Proton Mystery

2C 1 TF



Telefunken Style

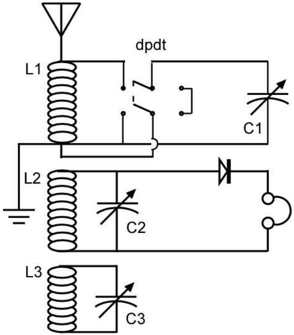
Form 3”

L1	50t, 23 awg primary
L2	25t, 29 awg secondary co-wound
C1	500 pF
C2	0.001 uF

Helps to add Loading coil in series with antenna.

XSS #54

3S 3 LC, WT



Forms 3 ½”x 3 ¾”

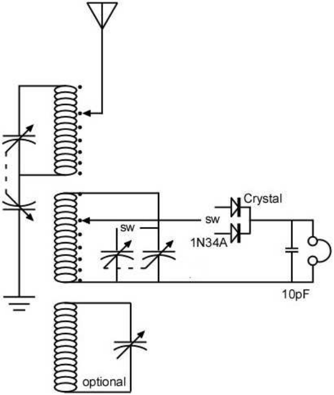
L1,2,3	55t, 20 awg, no taps	~250 uH
C1,2,3	500 pF	

Series / parallel DPDT switch over L1

Diode on top of tank, why? Candidate for SEC?

KJS ID #3

2S 3G TG, TC

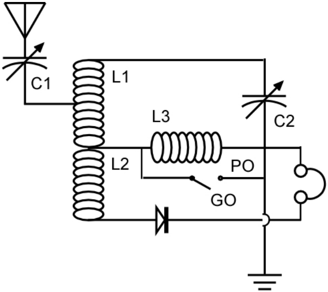


Forms 3.15”

L1	62t, 18 awg
	Tap 11, 16, 22, 31, 43, 62
L2	62t, 18 awg
C1-2	450 pF, 2-gang

Professeur Jacquemard

3S 2 MWLW

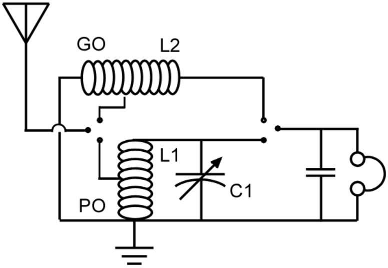


Medium Wave / Long Wave Receiver

L1	25mm x 68mm, 170t 4/10 wire (~28awg) ~ 220 uH
L2	Honeycomb ID 25mm, OD 35mm, W 8mm #turns ?, In-line with L1
L3	Honeycomb ID 20mm, OD 34mm, W 6mm #turns ?. Coil for LW
C1-2	450 pF

Boursin Selective 1939

2S 1 MW LW



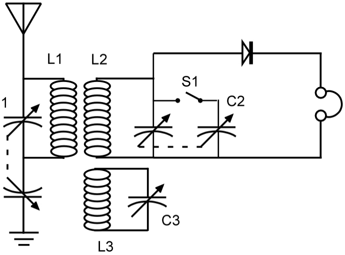
Medium Wave / Long Wave Set

L1 MW 30mm, 90t, tap at 45. ~220 uH
L2 LW ID 10-15mm, OD 20-25mm, W ?
280t, tap at 140
C1 500 pF
DPDT switch between LW-MW

GO = Grandes Ondes = LongWave
PO = Petits Ondes = Medium Wave

Dejan's contest rig

2S 4G LC, WT, TG



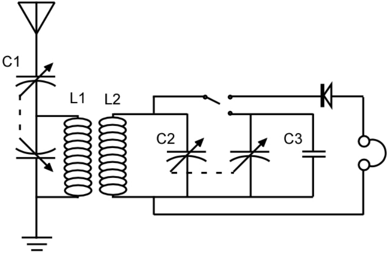
(Shown without audio transformer)

Contest Rig

L1	ferrite core
L2	basket weave
L3	spiderweb
C1-3	?

M Hampton, BRG 2009

2S 5G TG LC

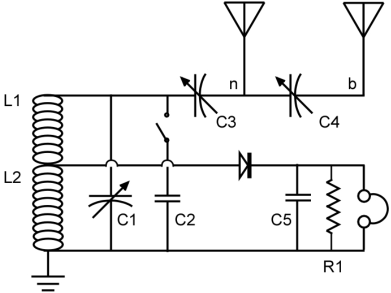


Audio transformer not shown

Form 3“

Schmarder #1

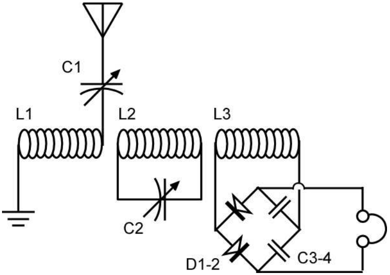
2W 4



L1-2	spider, 1.5“ ID, 3.5“ OD	
	L1 15t, 40/44 L	~16 uH
	L2 33t	~80 uH
C1	356 pF	
C2-4	270 pF	
C5	.001 pF	
R1	33k (w/crystal earphones only)	
n	narrow tuning	
b	broad tuning	

RTV Electronics p129 George P Pearce

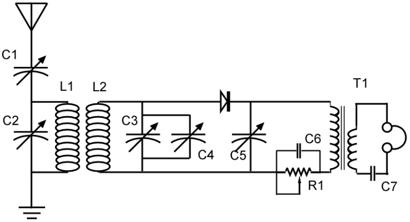
2SW 2 FW



L1, L3	Solenoid
	2" od, 1.2" l, 63t, 27 awg, ~150 uH
L2	Basket o1,u1
	2.25" od, 1.25" l, 80t, 21 awg, ~350 uH
	Coils spaced about 1" apart
C1, C2	380 pF
C3, C4	1000 pF
D1, D2	1N35

W Thelen BRG 2006

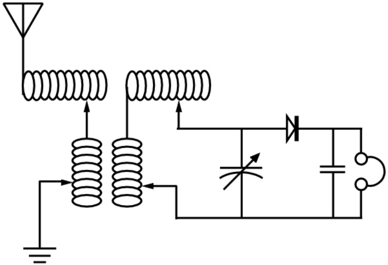
2W 5 TG LC



L1	spider, OD 5.7", 9-point, 36 ½t, 660/46
	L ~160 uH
L2	spider, OD 5.85 », 9-p, 37 ½ t, L~171 uH
C1	450 pF
C2	435 pF
C3	500 pF
C4-5	50 pF trimmers
C6	0.1 uF
C7	0.47 uF
R1	500 kΩ
T1	Vintage RCA

Sleeper #19

4S 1 LC, SL, LD

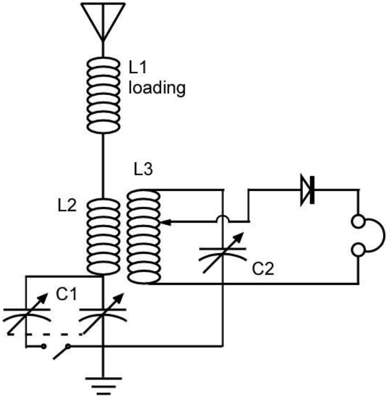


Loose coupler with loading coils

Primary and secondary circuits each have separate loading coils in order for the secondary circuit to be tuned as well.
Loading coils at right angles to tuning coils.
In secondary circuit, condenser placed across both tuning AND loading coil.

Kinzie 47b

3S 3 LD, LC



Double tuned set with loading coil