DETAIL PRINT FILE

by
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NUMBER 3

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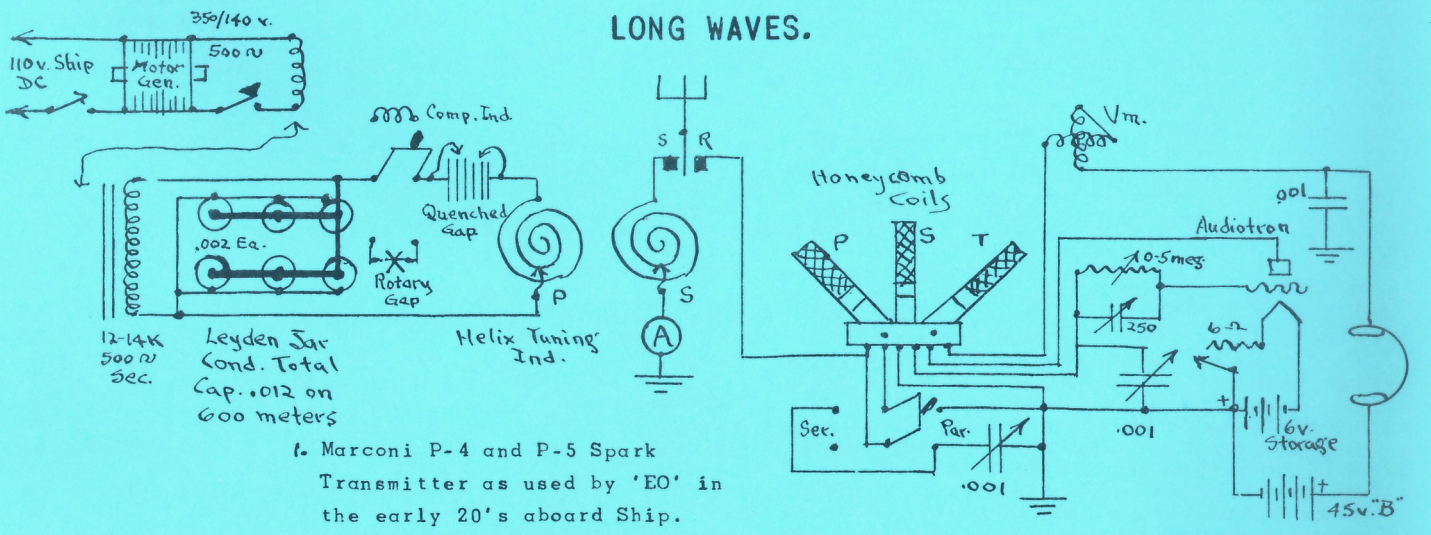
CROSS INDEX DP#

LONG WAVES.



1. Marconi P-4 and P-5 Spark Transmitter as used by 'EO' in the early 20's aboard Ship.

Ye Olde Timers will drool at this old Marconi spark Xmtr., vintage 1917-23. We have left out various units as spark gap protectors, MG controls, automatic starter, overload relay (fuse), 300-450-800 m. LC units, etc.

Altho ship operation came under medium freq. 100-1000 m. or (300-3000 kc.) which spectrum includes 1500-550 kc. (200-546 m.) BC band. Ship calling and SOS wave is still 500 kc. or 600 m. When traffic is shifted (QSW) to SW bands. Radio compass stations used to work on 800 m. but discontinued as ships take their own bearings on BC stations, etc. The gov't stations used to work pt-to-pt on wavelengths from 200 to 15,000 meters. On lo-F you could find them anywhere. But the big arc stations were on the Very Low freq. of 12-15K meters.

HOW IT WORKS. Ship's 110 DC is fed into the motor-generator, (MG) that comes out 350/140 volts at 500 cycles per sec. 140 is the voltage at load when you press

the key. Old Ops will remember how the old MG used to groan at hi-pwr. I had an MG bearing dry up off Peru because I had overhauled it and forgot to set my setscrews, so oil rings didn't supply oil to bearings. Not a pleasurable job in the Tropics at 100 degrees. Hi.

The power trans. (in liquid grease) jumps it to 12-14K volts at 500 cy. On 600 m. the Leyden jar condensers and helix circuit discharge the jars at about 1000 times per sec. for each wave train. These jars used to blow in the middle of a MSG. These wave trains jump the spark gaps, which is induced into the Aerial helix to Aerial. You could use rotary, on shaft of MG, or the quenched gap as being best.

RCA shipboard receiver was a 106, which was a glorified loose coupler in about an 18" cabinet. But most of us carried our own regen. sets to get LW press and work farther and easier. The 106 had a Perikon detecor of about 3 crystals and adjusted under a heavy pressure with a small battery in series. They worked good on a 75' Ant. of 4 wires 300' in length. But it wouldn't get cw. for press, etc.

I used a 3-HC coil tuner with coils from 25-15,000 turn plug-ins. A series-parallel switch helped in all the work. I used an old Audiotron tube I got from my YMCA Radio school teacher for $5. It had 4 leads - P-G-6 v. F. and an extra fil. lead. Was very sensitive and controlled by a 6 ohm rheostat. It would light up the cabin at nite and almost run a storage batt. down in no time. Believe I used a 50 watt lamp in series with Ship's 110 DC to charge it up at nite.

The secret of my DX work was a Chelsea variable grid leak, I paid $3.25 for. All it was - was a strip of India-inked paper run to about 10 switch pts. and ran from 0-5 megs. but I could get weaker code with a hiss. The important grid condenser was about 17 plate. Tuning cond. were big .001 43 plates. I used to draw sparks off the A-G cond. when we had static from snow, hail, wind and ship's whistle!

Regeneration was obtained by regulating the large tickler HC coils back and forth. Variometer helped in fine adjustments of regeneration. Other Ops. often asked for my circuit - but it wasn't much different than one they used, but its the little things that count in DX work. Various types of regeneration, but mostly Hartley or Colpitts, etc. and tickler for HC coils. Older cir. (DP-35 lower right) wasn't very efficient.

Partly shorting the change-over switch put A-G circuit of Xmtr. in parallel with my receiver and helped boost 600 m. The same idea as used in our QRM coil booster circuit.

Spark Xmtrs. were not used in the ultra-low freq. as it took too much power. Arcs and Alexanderson alternators were used. Massive Aerial and ground systems - some ran for miles. As an example - a ½ wave Aerial could be 5 miles long. However, longer Aerials are better - at least in the neighborhood of 100 ft. Some stations had separate transformer and condenser rooms. Gigantic water-cooled tubes are now used.

The arc put out undamped waves instead of damped sparks. They couldn't break the arc during a transmission - but the tuning coils were tapped so you had a back wave when key was up. The higher freq. you use - the more "kick" your rig has - as you'll notice on lower end of BC set. So "peanut" stations usually are on HF end so they reach out.

As you may know, the gov't put Hams on 200 m. after WW1 but it was soon found they did better. On ship I'd plug in my 25-35 HC coils and get Amateurs all over. Also included the Catalina-Long Beach phone. Capt. would come in about 8 pm. and take over to get the latest scandal. With the big Aerial system we had - you could play anything you could tune in.

Amateurs used to tune the LW in their shacks. We'd wind large coils on 2" cardboard and some ran to the ceiling. They'd be tapped at 1000-200-50, etc. and mostly DCC wire. One never knew where he'd find a station. Now they use ferrous cores, like the loopsticks and bank wind coils in a small space. We don't see how they can be as efficient as our old ones that used to decorate our shacks. Weak signals are now built up with amplifiers.

Some longwavers you may hear from 10-510 KC:

	KC	KW	
FUB	17	---	Paris.
GBR	16	300	Rugby, England.
NAA	17.8	2K	Cutler, Me. CW USN
NBA	18	36	Balboa, CZ. USN.
NPG or			Jim Creek, Wn. USN
NLK	18.6	250	CW. Keyed, fm. S.F.
NPM	19.8	100	Lealualei, Hawaii. CW. USNavy.
NSS	21.4	100	Annapolis, CW. USN
WWVL	20	1	Ft. Collins, Colo. time/freq. signals
285-315 KC			Plane/ship beacons
200-415 KC			FAA weather. 24 hr 15 & 45 min. time.

Foreign BC stations.
500 KC ship calling and SOS.

See MRL RBs for more data on Beacons, etc. Above are subject to change at any time.

2. This may be used on any set to boost incoming signals. Any duo-diode tube, or two singles are OK. A 1J6 or 19, 2 v. tubes may be used but no cathode cond. or resistors are needed. Another idea to boost LW signals is to use one or more RF chokes in series with Ant. and set. This puts A-G circuit out of range of your BC set.

Some have good luck substituting RF chokes in series for LW coils, but we prefer single layer or bank-wound types. But with a big Aerial you can really work wonders in Radio reception.

A Diode crystal won't detect c/w, so some c/w stations use ICW interrupted c/w so they can receive it. Exception is where a Transistor is used with regeneration when c/w may be received. So, we prefer a regenerative tube circuit for LW. We prefer DP-36 BC circuit as you can add any kind of coil for regeneration to make it oscillate anywhere.

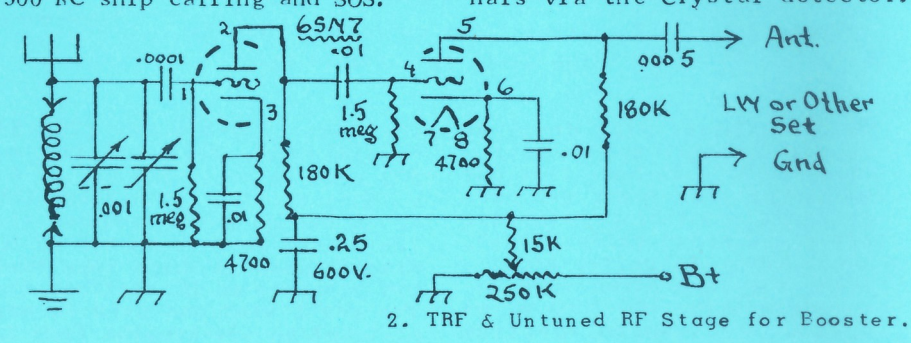
LW bands have very little fading and QRN so are very dependable. They are used to work submarines all over the World, and for continuous pt-to-pt.

Our old reliable PX (press) cw station was NPL, San Diego, at 2 a.m. Was aimed at Asiatic fleet and every word sent twice. (I used to renege on cold a.m.s!)

NPG, Yerba Buena Island then, was a steady station that worked NPM, Hawaii. NSS, Annapolis c/w was always good and steady. NBA, Panama, was good on PX. When 1200 west of him, he'd fade out at sunrise, and I'd tune over to NPN, Guam, and get the rest of the PX. KET, Bolinas, and KIE, Hawaii, were real good RCA alternator stations.

Some European BC stations operate on 151-540 KC, but doubt if they could be received in the U.S. In a 1960 call book we find W. Germany at 151 KC. Then Russians (of course!), Norway, Finland, Romania, etc. down to Cuba and Canada on 541 KC. Some 120 stations were listed then.

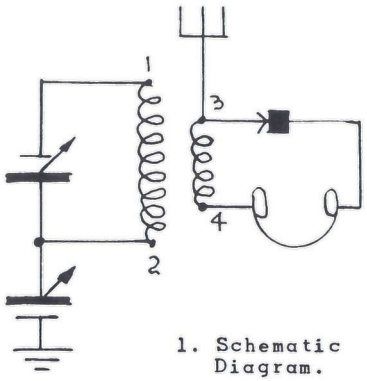
In early Wireless days, choppers or slipping contact breakers were used. Could be a cog-wheel with contact and put in series with Ant. Breaking up the c/w would let you receive signals via the Crystal detector.



2. TRF & Untuned RF Stage for Booster.

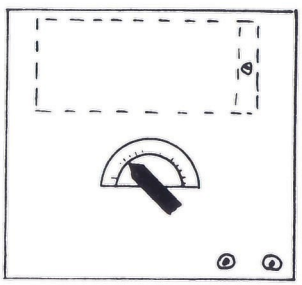
MRL No. 39 - SELECTIVE CRYSTAL SET

DP 6 MRL

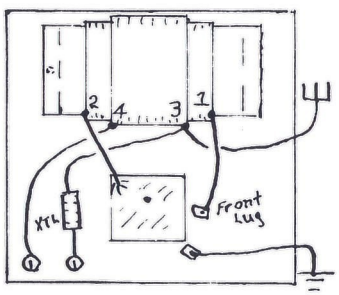


1. Schematic Diagram.

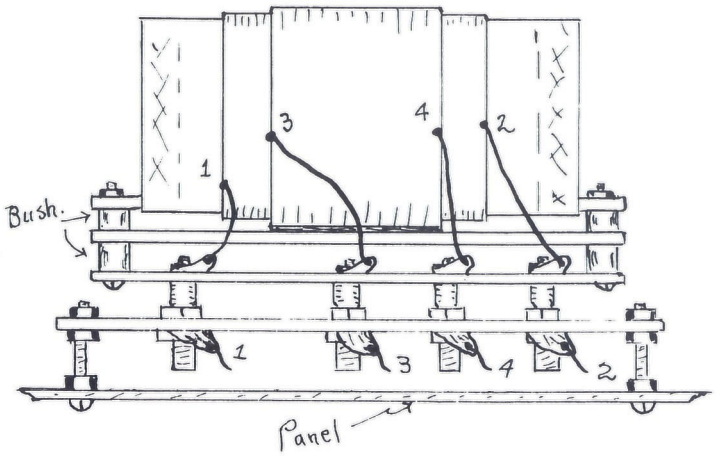
A Detail Print by Modern Radio Labs.



Scale ¼" = 1"



2. Panel and Rear Wiring View.



3. Plug-in Coil and Socket. Scale ½" - 1"

PARTS LIST for original set.

1 Compo. panel 1/8 x 5½ x 6.
1 2-gang .00035 var. cond.
1 1¼" Bar knob and scale.
2 Phone tip jacks.
1 Crystal diode or other.
1 MRL #39 Crystal coil.
1 6-32 x 1¼" BH Machine Screw
3 6-32 nuts for mtg. coil.
2 Fahnstock clips for A-G.
Hookup wire, solder, etc.

More details, on this set, are found in MRL Handbook No. 17. It is a very simple set to build - and you'll be amazed at reception on such a simple receiver. It is easy enough for any novice to build - but he'll be assured of good results when finished.

We have drawn the rear wiring plan also - as it will help in assembling and wiring. Be sure all your connections are good and tight for perfect joints. Mostly on #2 coil tap to condenser frame. After soldering, with a real hot iron - give it a yank to be sure it's solid.

BC COIL. You may use our regular 2XM Celluloid form (2x4½" long) for broadcast band. It is 80 turns #22 DCC. Secure ends by running a piece of tape under next to last turn. Over this, cement a piece of wrapping paper 2½x9" long. Over this paper, put 40 turns #20 DCC and secure.

The Diode crystal may be a 1N34, or other type if desired. If you wish, you may use an adjustable crystal stand and Xtal, as there is lots of room on the panel. Others may prefer a SPDT switch so either stand or Diode may be brought into circuit. This will give you a chance to try out other crystals you may have.

PARTS FOR PLUG-IN COIL VARIATION

Use larger Compo. panel 5½x7.

Coil Socket:
1 Compo. base 1x6½" long. (Text)
4 Banana jacks, nuts, lugs.
2 6-32 x 1" BH machine screws.
6 6-32 nuts for mounting socket.

For Each Coil:
1 2XM Cello. form 2x4½ long. (BC)
P2XM Cello. forms for SW (2x2")
3 Compo. strips ½x5½" long. Text.
4 Banana plugs, nuts, lugs.
4 ¼" long metal or fibre bushings
2 6-32 x 1" BH machine screws.
2 6-32 nuts.
Lockwashers for nuts and lugs.

Mention is made of the smaller coils to be used in this set. Taps don't work right on this coil. You'll have to make smaller coils if you want short waves.

Here we have drawn a low-loss plug-in coil arrangement which isn't too hard to make, and it will be worth your while.

Use banana plugs and jacks for it. You may use Compo. strips, or better still, one of the plastics as Bakelite, Plexiglas, Lucite, etc. which are lower loss.

Metal, or fibre bushings are used to shore up the strips as shown. Also, you'll note that 3 of the plugs are in a group, and one separated. This is so you always get them in right.

For the shorter BC, and Police bands, wind on a P2XM Celluloid form (2x2" long) and fasten the same as BC coil. Wind about 40 turns #22 DCC for the primary and 20 #20 DCC for secondary.

Another smaller coil may be wound, on the same type of form, but with 20 turns #20 DCC on the primary and 10 #20 DCC on the secondary. Smaller ones may be made up as desired as well as smaller diameters. You can experiment with different sizes and turns of wire on the secondary to see which matches the Xtl better. Coils are easy to remove with this set-up, to alter them.

When fastening the banana plugs down make the holes a little large. Insert all plugs into the jacks and tighten up on each nut with an open end wrench to make them all fit good.

Lockwashers should be used under all lugs and nuts.

Mount the coil socket on the panel as shown. Run the leads, by numbers, as shown on the various diagrams.

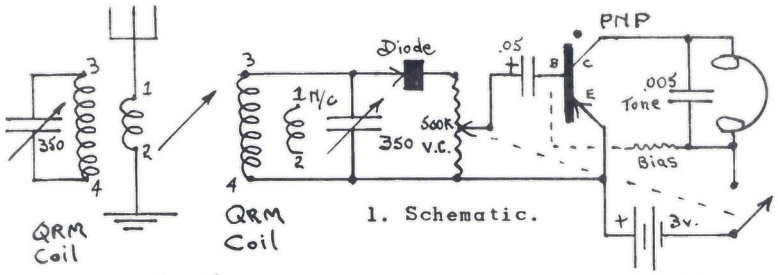
In Australia, a similar circuit used a 15" whip Antenna hooked where Ant. is now shown. If you are near stations this will work good.

Polarity of crystal seems to make little difference. If you use a fixed Diode detector, you will find that it tunes broader than an adjustable Steel galena, which is due to internal impedance of the minerals used. It is good to try different crystals on the weaker stations as it is impossible to notice the difference when tuning loud locals. If you would like to check output, for a certain station, hook a 0-50 micro-ammeter in place of the phones and you can get an accurate comparison.

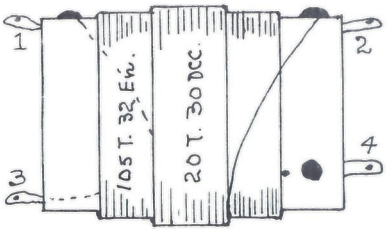
A good pair of phones, say 24K impedance, is very good for Xtal set work. Why use poor phones while you're trying to get efficiency out of a circuit? Divide impedance of phones by 5 and you will get the DC resistance. You can check your phones for impedance if you have an ohmmeter.

Give this set a try. You may also make a miniature by using our QRM Coil instead of this one - by using large winding for the primary; small for secondary.

MRL QRM COIL TRANSISTOR SET.



1. Schematic.



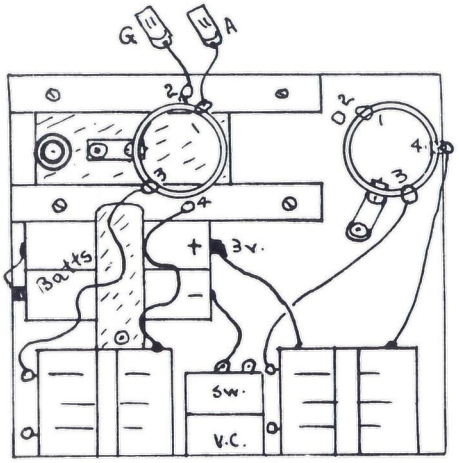
PARTS FOR MRL QRM COIL.

1 Fibre form 1" dia. x 1-9/16".
4 C-eyelet lugs or fasteners.
30 ft. #32 enameled wire.
6 ft. #30 DCC wire.
Light coil cement.

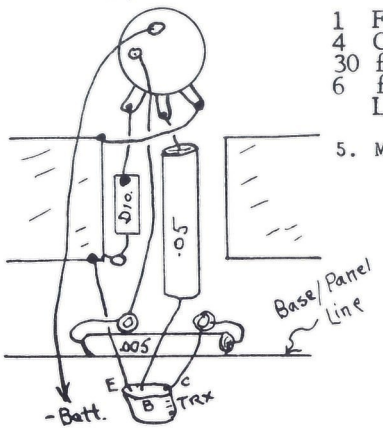
5. MRL QRM Coil. Full size.

DP 18 MRL

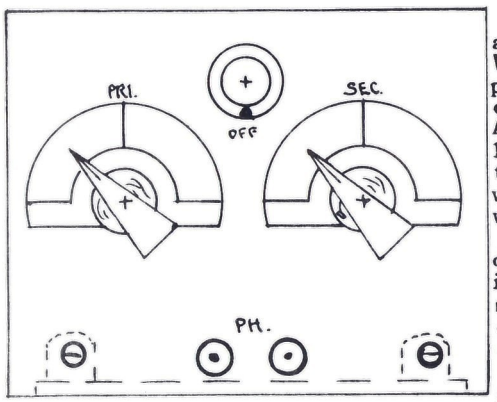
A Detail Print by MRL



2. Base & RF Connections.



4. Cutaway showing Rear Panel Wiring of the Small parts.



3. Panel. ½" - 1".

PARTS LIST

2 .00035 variable condensers.
1 .05 x 200; .005 mica cond.
2 MRL QRM Coils, or make.
1 Crystal Diode; PNP Transistor.
1 500K volume control and switch
2 Phone tip jacks; 2 Fahnstocks.
2 1¼" bar knobs & scales; Knob.
1 Compo. panel 4x5; base 4x4½.
2 ½x½ and (2) 2XM brackets.
2 Pen cells and clip holder.
1 Mounting for Antenna coil.
1 Bias resistor, if needed.
1 Ft. loop wire for Ant-cond.
Hardware, wire, etc.

Without a doubt, this is one of the most selective Xtal sets we ever rigged up. By pulling out the Antenna coil and bringing up the TRX volume - you can pick up almost any local station without QRM from another. Around here (24 stations) we hooked stations we never heard on any Xtal set before. Good tone, too.

This is an old principle - but we haven't seen it used for many years. It does require an Aerial and ground, or good substitutes. We get locals when Ant. coil is pulled clear away from secondary coil. If in the far country, the Ant. and ground may be hooked to 1-2 on the secondary coil. Due to its construction, it should work well in the city or country with any size of Aerial.

Due to limited space, we have drawn most details for building it. You can fashion the slide mountings from strips of wood or cigar box. In our kits, we will dado a wooden strip in one pc.

Almost any Diode or PNP Transistor will work. If using an NPN - reverse battery. It will work on one pencell, but figured 2 would be better, as they last a long time. For lower tone - increase size of the .005.

Some TRX require bias voltage. Put a 5K resistor in series with a 500K vol. control. Adjust to best volume and measure - then substitute fixed resistor. Bias with our TRX seemed to make it tune broader - but we don't know why this happens. Try it out.

This set should last for years - just replace the batts. now and then. You'll be amazed at it.

Fasten eyelet lugs at end as shown. Wind on 105 Ts. 32 enamel and paint with coil cement. Over this, wind 20 Ts. 30 DCC and run to lugs, and paint. We find fibre tubing easier to work and it also works better when tuning a series trap, for some reason.

Fig. 6 shows many uses for QRM coil. (A-B-E) are series traps. Tune each coil to unwanted station and leave it. Then go ahead and tune balance of set. It will cut them down or out. One or more may be hooked in series.

(C) is a booster for pushing in a station and damping out the other unwanted stations.

(D) is QRM used as TRF Antenna coil for RF stage. The big primary gives lots of gain.

(F) is a coupling, or detector coil from RF. The big primary gives more impedance to plate.

(G) is for adding regeneration to any set detector. Helps make set more sensitive with more DX. Higher cap. - more regeneration.

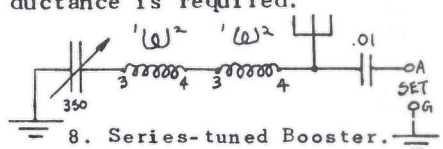
(H) is a tuned plate booster as often used in transmitters.

We have sold hundreds of these coils. Operation is almost uncanny at times.

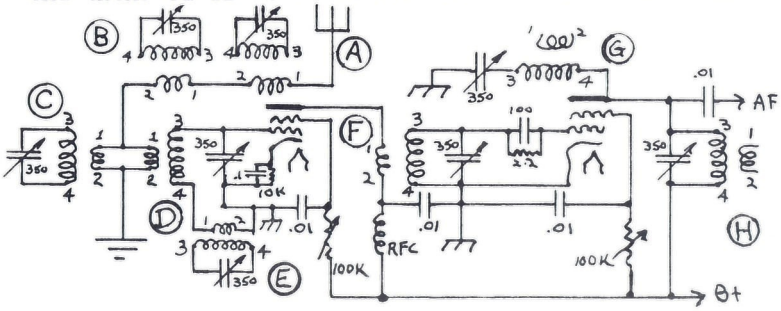
Fig. 7 shows use as wavemeter. Hold it close to incoming signal and note reading on scale.

Fig. 8 is a series-tuned circuit that helps to "push" in the signals. Should be about right 4 the broadcast band.

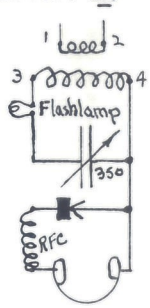
In fact, the MRL QRM Coil may be used anywhere a BC band inductance is required.



8. Series-tuned Booster.



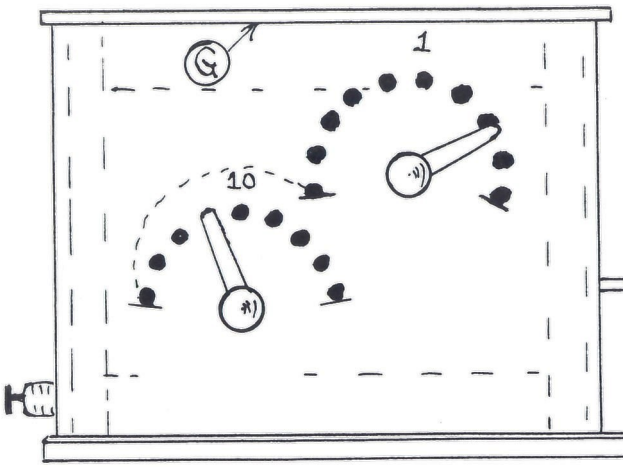
6. Many Uses for QRM Coil.



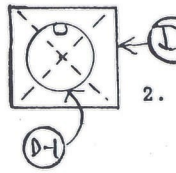
7. As a Wavemeter.

NAVY TYPE LOOSE COUPLER

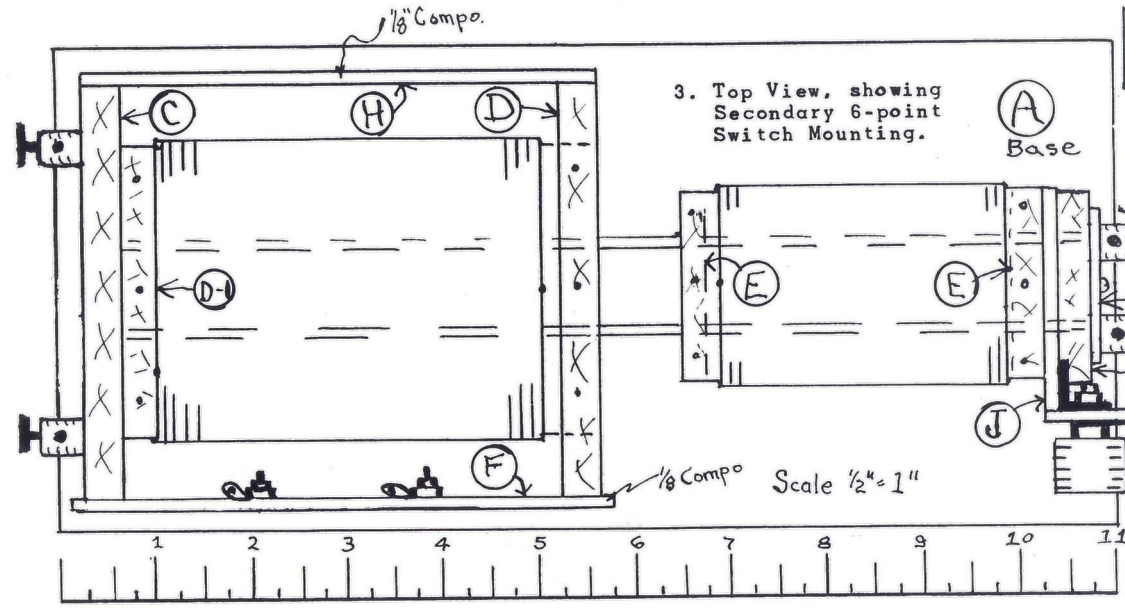
DP 19



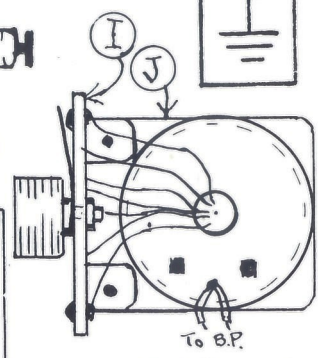
1. Front View, Less Secondary. (Scale ½" = 1"). Below.



2. Open End Primary Cabinet. Use Center Circle for Mounting the Primary.

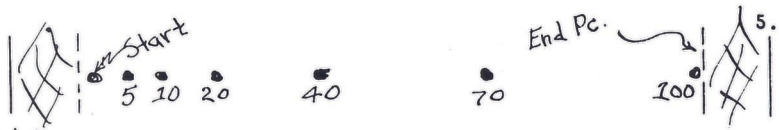


3. Top View, showing Secondary 6-point Switch Mounting.

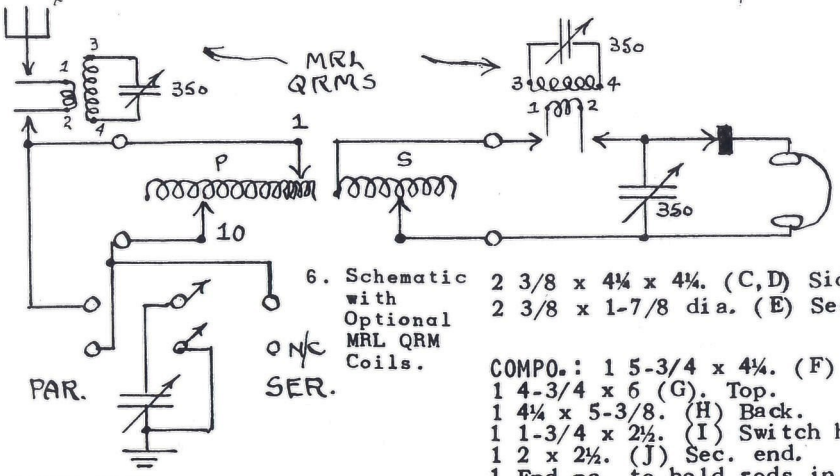


4. End View of Secondary.

A Detail Print by Modern Radio Laboratories



5. Full Size Holes for Secondary Taps.



6. Schematic with Optional MRL QRM Coils.

PARTS LIST.

PRIMARY:
1 Bak. tubing 3x5" long.
100 ft. #20 DCC magnet wire.
7 ft. #22 str. plastic hookup.

SECONDARY: 1 Bak. tubing 2x4"
50 ft. #24 DCC magnet wire.
4 ft. loop wire (taps, leads).

PLYWOOD: 1 1/4 x 5 x 11. (A).
1 3/8 x 2 x 2. (B) Sec. upright
2 3/8 x 4¼ x 4¼. (C,D) Sides.
2 3/8 x 1-7/8 dia. (E) Sec. ends

COMPO.: 1 5-3/4 x 4¼. (F) Front.
1 4-3/4 x 6 (G). Top.
1 4¼ x 5-3/8. (H) Back.
1 1-3/4 x 2½. (I) Switch holder
1 2 x 2½. (J) Sec. end.
1 End pc. to hold rods in. (K)
2 1/8 x 10¼" steel (weld. rods)
3 1" switch levers.
25 Sw. pts., nuts; 6 stops.
1 Sec. knob & fittings.
4 Binding posts.
2 ½ x ½ angle brackets.
36 2 x ½ FH wood screws

ACCESSORIES: 2 MRL QRM Coils.
4 .00035 var. cond.(knobs/scales)
1 DPDT knife switch.
1 Steel galena or Diode.

We believe sufficient details are shown for the average Radio mechanic to assemble. Due to so much material being supplied, we decided to make this plan in two parts (19 and 19-A).

Drawings (1-3-4) are drawn ½" scale. Use dividers on the measured scale to find any dimension desired.

(Fig. 2) shows how to lay out the primary end pieces by cross-marking to get centers. Scribe 3" circle on (D) and drill hole for coping saw. Save this piece (D-1) to be used inside primary coil on left. Dress down to fit snugly inside 3" coil form. Nail brad thru center of (D-1) and in to (C) side to center it, and nail down.

For secondary ends (E) scribe 11/16" radius and cut out with a coping saw. Grind down to fit secondary ends snugly.

Drill (2) 1/8" holes for rods by piling up (D-1), and 2 (E) pieces and (J). Be sure to get them to set level.

PRIMARY. Start winding on the right ½" in, and anchor by two holes. Wind 110 turns #20 DCC and tap every turn for 10 turns. Run ½" strip of light cardboard under taps. This goes to the unit switch. Then, continue tapping every 10 turns. Coil dope ends and close to the taps.

Continued on DP 19-A.

Sandpaper taps and tin with an iron. It can then be mounted and set flat on the bench to get the screws in right position. Drill 3 holes in each end for the 2 by ½" FH wood screws. Countersink with larger drill.

SWITCH LEADS. It is a good idea to solder all switch leads to the points first. Run screwdriver between each point, after soldering to make a hi-resistant path for RF. Front panel can now be mounted with levers, etc. Note starting turn goes to #10 on the unit switch. Also, 10th turn also goes to #1 on the ten switch. Continue with balance of taps. Each primary binding post goes to one lever. Primary cabinet may now be fastened to the base with wood screws or nails, as desired.

SECONDARY. This is a little harder to make. Wind the form before inserting end pieces (E). We have layed out a strip (Fig. 5) full size, to show where to drill tap holes with #4 drill. This coil totals 100 turns #24 DCC, tapped as shown on strip. Starting lead will come out to binding post. Start tapping at 5 turns. Use Cello. tape to hold wire down while you scrape off cotton and pull loop wire lead thru hole and solder on. Then, start winding to the 10th turn, and do the same. Leave tap leads plenty long. Coil dope ends and taps of winding. When wound, you can mount the right end piece (E) and (J) - making taps come on the bottom so they don't show too much. Next is to mount the switch holder (I) onto (J) with brackets. 5th turn goes to #1 tap. You can nail a couple of lugs inside (E) to hook pigtail leads onto - to go to binding posts on upright piece (B). Level the rods and drill holes in the upright (B) so rods stick thru. Mount small compo. end piece (K) to hold rods in. Any time you want to dismantle the rig - just remove (K).

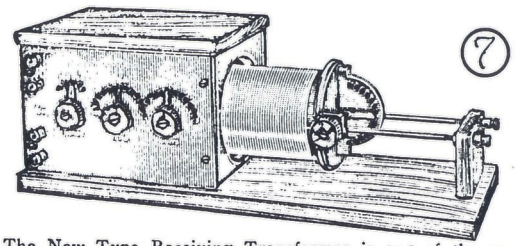
Diagram shows coupler at (P & S) in (Fig. 6). We have shown a DPDT switch that puts condenser in series or parallel for better tuning. If you have a long Aerial - series tuning is best. Contrariwise - if you are in an apartment, with a small Aerial, parallel is better.

Due to the large amount of primary pickup, it may be necessary to use an MRL QRM Coil and condenser as a trap in the Aerial, or secondary, or both. Tune QRM condensers to unwanted stations and leave them set while tuning balance of set. The Ant. QRM may be set on one bad station and the secondary QRM on a second one.

This large primary gives more volume than you ever heard on a crystal set. It is a good suggestion for apartment house Fans to rig up large 3" coils for the primary pickup from inside Ant.

Navy Type Receiving Transformer

Improved Model—Improved Secondary Switch—Improved Primary Switch—Improved Mounting of Binding Posts.

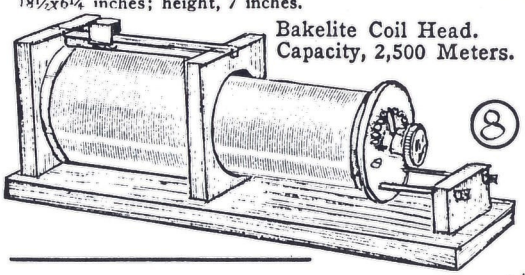


(7)

The New Type Receiving Transformer is one of the most popular instruments we offer and is of special interest to schools, experimental stations and wide awake amateurs.

The panel is of grade "M" grained finish formica, as is also the secondary switch. Binding posts and switch points are marked by engraved characters. Very high grade nickel plated and polished finish is used on all metal parts with the exception of the tops of the contacts. These contacts have a small shank and are driven into the panel. After driving in, the tops are surfaced on a disc grinder. This makes perfect switch action and eliminates all clicking in the receivers due to poor contact, as is the case when tops are nickel plated and polished. The windings are of green silk covered wire on non-shrinkable tubes. Woodwork is of fine hand rubbed mahogany finish.

The wave length range of our Navy Type Receiving Transformer is up to about 4,000 meters when used in connection with an ordinary amateur aerial. The single turn variation of the entire primary is obtainable by means of our special double control switch. The small 2-point switch to the left of the instrument is used for dead-ending the primary past 1,000 meters. The secondary switch has 12 points, which allows a considerable overlap even when used with a very small variable condenser. This instrument is very suitable for receiving all wave lengths between 200 meters and 3,500 meters, which includes all amateur stations, the 600-meter commercial stations and the large Government time stations. Size of base, 18½x6¼ inches; height, 7 inches.



Bakelite Coil Head. Capacity, 2,500 Meters.

(8)

Due to BC stations being located so close together on your dial - you can get 4-5 stations just by sliding the secondary in and out. You will note that the sliding of secondary (changing coupling) will change setting on the secondary condenser dial. Find the best spot for primary, secondary and coupling and log them down for each station. If you wish, you may rig up a scale on the base - showing setting of coupling - so you can also log this reading down.

For anyone wanting a tickler coil for regeneration on a tube, or Transistor set - just wind 10 turns over the secondary coil. Reverse leads if it doesn't oscillate at first.

If you want more band coverage - you can use a 2-gang .00035, with sections in parallel, for both primary and secondary condensers. This will get you up in to the long wave bands. It will also give sharper tuning.

We suggest spraying cabinet wood and Compo. parts with gloss enamel or lacquer- usually black is preferred. Not enough lamp black is in solution to cause leakage between switch points.

A Detail Print by Modern Radio Laboratories

From a Sears, Roebuck Catalog (about 1920), we have the two Couplers at left.

(7) Navy Type.

(8) Slider Coil Type.

NAVY TYPE. (7) Note this tuned to 4000 m. (75 kc.), as so much long wave work was done then. Note dead-end switch at left, which cuts out unused turns when working under 1000 m., or 300 kc. When a large number of unused turns are connected in series with a tuning circuit - it causes a deadening effect. This is an advantage of plug-in coils - where no dead-end effect is had. Note Amateur stations were around 200 meters - and they thought they had gotten rid of the Hams at 200 meters! Hi.

Note coils are made of green silk covered wire. This is no longer used as it is animal matter that deteriorates. Cotton, Nylon or enamel are better.

Note the panel was Bakelite. Points are "driven" into panel and ground off flush. (Don't you like MRL type points better?)

Also the 600 m. (500 kc.) ship stations are mentioned - but except for calling and SOS bands - all ships use shortwaves now.

SLIDING COIL TYPE. (8). this was a much cheaper model. When building this model - leave the secondary leads long enough so you can solder to switch points. Then push end in and secure with the FH wood screws.

In both models, we prefer to use pigtails for secondary leads as shown in our model - to be more sure of secondary contacts as coil slides in and out.

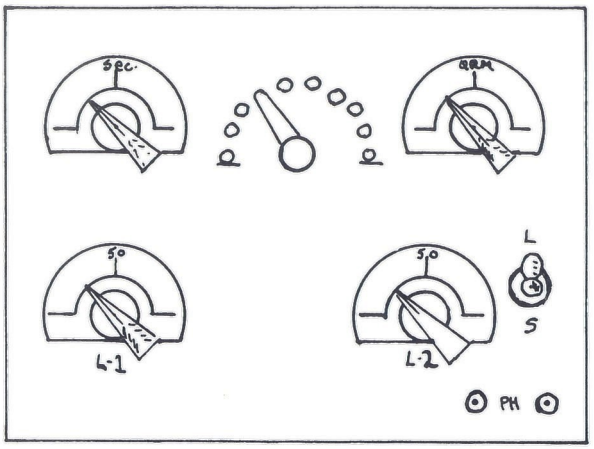
Note they called it a Transformer - or coupling transformer as it transforms energy from the primary to secondary.

A loose coupler is a very good way to learn some of the established laws of Radio. By varying pri. and sec. values- along with degrees of coupling - many good combinations can be had. The series/parallel switch also tends to cut down dead-end effects.

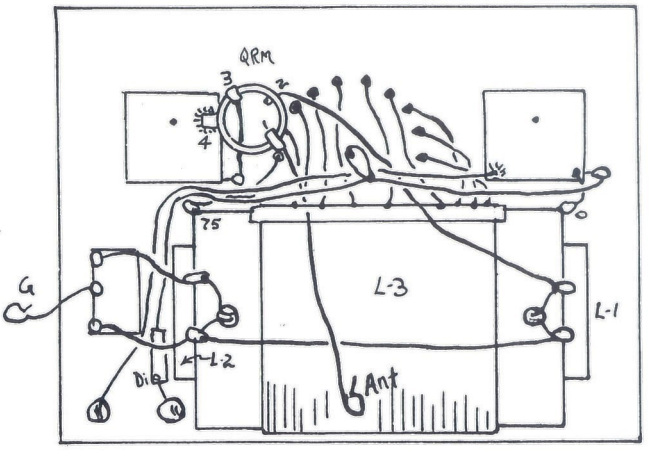
A regenerative detector and an audio amplifier can really give you lots of pleasure in tuning, especially on weak, or DX stations where slight variations are most noticeable. This should bring you lots of pleasure over the years.

MRL Nº 15 CRYSTAL SET.

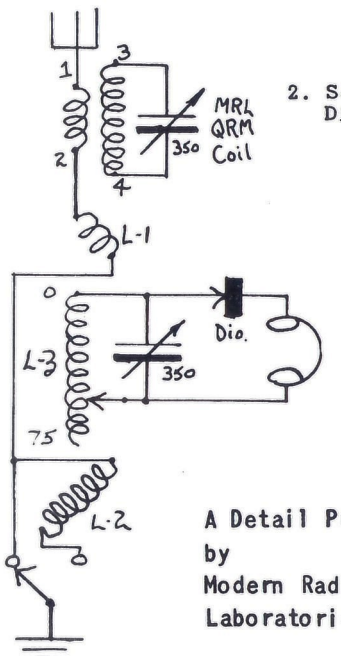
DP 27



1. Front Panel. 3/8" - 1"

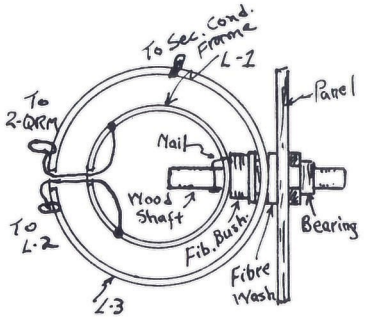


3. Rear Panel Layout & Wiring.



2. Schematic Diagram.

A Detail Print by Modern Radio Laboratories



4. End Section of Rotors.

PARTS LIST.

1 Compo. panel 6x8.
4 1¼" bar knobs and scales.
10 Switch points; 2 stops.
1 Switch lever.
1 SPDT toggle switch.
2 Phone tip jacks.
2 .00035 single var. condensers.
1 MRL QRM Coil.
1 Crystal diode.
1 MRL #15 coil, or make:
1 3" Bak. tubing 5" long.
1 2" " " 1" long.
1 2" " " 1-3/4' long.
2 Bearings.
2 Sets fibre bushings.
60 ft. #20 DCC magnet wire.
10 ft. #20 enameled " .
40 ft. #24 " " .
2 ¼" x 2" wooden shafts.
Hardware, hookup wire, etc.

Our original #15 set was taken from "Uncle Al's Crystal Set." - sold for a long time in Oakland, Calif., for around $12. However, Radio conditions have changed from a few stations to over 25 around the Bay. So, a different approach to tuning of the primary is required now.

The original set used fixed Antenna coils - placed at about 45 degree angles from the base. The secondary swung in between. Now, we use a stationary secondary and rotate the primaries.

Fig. (1) shows a good layout - 3/8" to 1" scale. A crystal stand may be used if desired. Because we regulate the selectivity - a broad-tuning Diode is OK. Centers of the rotors have been raised so set remains upright.

COIL L-3 secondary is a Bakelite tube 3" in dia. by 5" long. Space 3/8" holes for bearings around 4" between centers for panel and secondary form. Mount lugs at (0) and (75), Fig. 3, for start and finish of winding. Behind the 3/8 bearing holes, drill 3/16" holes for pigtails. In 3/4", start winding 75 turns #20 DCC, and tapping at 3-7-12-18-25-33-42-63-75. Winding space is 3-3/8". Run taps over strip.

ROTOR L-1 is the SW coil. Use 2" Bak. tubing 1" long and make lugs for start and finish. Drill ¼" hole for shaft and 3/16" hole for back leads. Wind on 15 turns #20 wire - and cement down. Put half on each side of shaft.

ROTOR L-2 is the LW coil. Wind 60 turns #24 enamel with 30 on each side of shaft and cement. Drill same holes as L-1.

For both rotors, make 4 wires from flexible loop wire and wrap and tin each end. For the shaft, use ¼" wooden dowel. Drive tiny nail thru shaft and bend it thru tiny hole in form. This will prevent slipping on the shaft. Put bushings between rotor and L-3, to center it.

QRM COIL. On 1" fibre tubing, 1-9/16" long, wind 110 turns #32 enamel, and over this 20 turns #30 DCC closewound - to lugs.

When mounting the knobs for the rotors, place a felt washer between knob and panel to keep the rotors from drifting around. Line up rotors so they are at right angles, up and down, to the secondary, and set dials at 50. This will give you a variation from side to side for a looser coupling. Station will go clear out at 50. Often, the reversing of the rotor connections may aid in tuning and selectivity.

TUNING. Switch throws the SW primary (L-1) in, or both primaries for more volume on the low frequency stations. Then, if you have an interfering station, set the QRM condenser on it until it goes clear out, or nearly out. Leave it there - and tune the balance of the set. By adjustment of L-1, 2 and QRM Coil, you can knock out any station at will. For more volume on those weaker stations - use a Transistor amplifier.

A considerable bit of Radio knowledge may be acquired by operating this set. By varying the rotors, you can observe the effects of tight or loose coupling -both on volume and selectivity. By adding the 60 turn rotor to the Aerial circuit, you can see how added inductance increases volume but reduces selectivity.

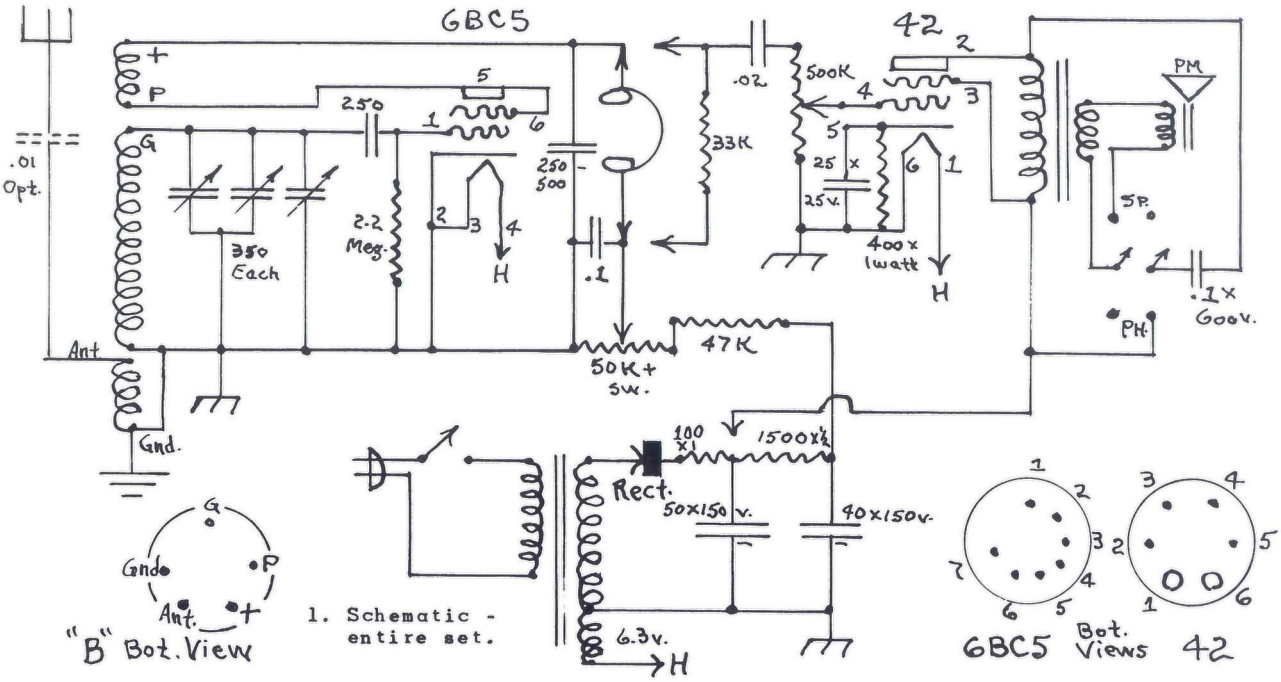
The QRM coil wave trap is uncanny in operation. Note how it reduces the volume on unwanted loud stations.

In the country, away from the strong stations, the number of turns on L-1 may be increased, with more volume on DX stations. We suggest up to 25 turns.

The large wire on L-3 helps DX stations. We could hear a station 100 miles away tho next to a strong local. Set looks good.

MRL 2-TUBE LONG WAVE RECEIVER

DP 35



1. Schematic - entire set.

"B" Bot. View

6BC5 Bot. Views 42

A Detail Print by Modern Radio Labs.

PARTS LIST

1 2-gang .00035 var. condenser.
1 .00035 variable condenser.
2 1¼" bar knobs and scales.
2 .00025 mica or ceramic cond.
1 .01 x 600 (Antenna optional).
1 .02 x 600 v. bypass cond.
2 .1 x 600
1 25 mfd. x 25 v. bypass cond.
2 40 or 50 mfd. x 150 v. filters.
1 50K reg. control with switch.
1 500K vol. control - no switch.
2 Small pointer knobs.
1 ½ w. 1500, 33K, 47K, 2.2 meg.
1 100 ohm x 1 watt resistor.
1 400 " same.
1 Isolation pwr. transformer.
1 110 cord and plug.
1 8K imp. Output transformer.
1 3 or 4" PM speaker.
1 Compo. panel 5 x 11.
1 Compo. base 5 x 10.
2 ½ x ½ angle brackets.
1 Plywood back strip 1¼ x 10.
1 Tin shield 5 x 6.
1 75 ma. Selenium or Silicon dio.
1 5 prong wafer socket.
1 7 prong miniature wafer socket
1 6 prong wafer socket.
1 DPDT toggle switch.
2 Phone tip jacks.
1 6BC5 tube; 1 42 tube.
1 MRL Type B Long wave, or make. Hardware, etc.

As this is not a critical set to build or operate - we'll use more space for coils.

For our Type B Long wave coil, use a celluloid, or Bak. form, 1-3/8" in dia. x 3½" long. Up from "GND" pin make 2 tiny holes 1/8" up and 3/8" up. Then one at ½" up from "ANT" pin. The other holes at end of windings. All 3 windings are close-wound.

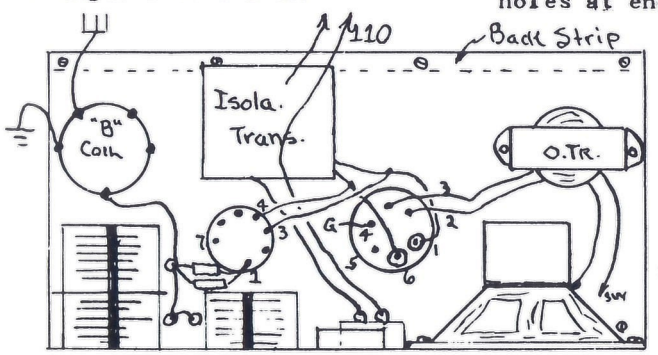
For Pri. wind 25 Ts #32 enamel from 1/8" up. Unsolder "GND" pin again and start secondary at same pin. Wind on 350 Ts #34 En. and anchor to "G" pin. Wind the tickler of 60 Ts #32 as shown.

This coil takes you up to 100 KC. with all plates in (1100 to 1200 mfd.) You may find Ship land stations, beacons, Navy pt-to-pt. (NPG, Jim Creek, Wash. is here), and others.

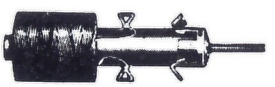
Using 2" dia. forms 1" long - you can scramble wind #34 enamel for 600, 1000, 1500 Ts. to cover to about 10 KC. Fig. 5 shows the Miller adjustable width control ferrite coil. Their #6315, of 4-30 mhy. goes 40-100 KC. Their #6319, of 15-60 mhy. covers 20-50 KC. Their #6330, of 42-215 mhy. covers 10-20 KC. Winding a lot of turns on BC loopsticks will accomplish the same results but you'll have to experiment. RF chokes of 15-80-150 mhy. may also be used.

For ticklers - another coil must be mounted alongside the secondary. Also the primary may be mounted likewise, or inside. Regulate pri. size for best operation. Mount coil assemblies on 5-prong tube bases as shown.

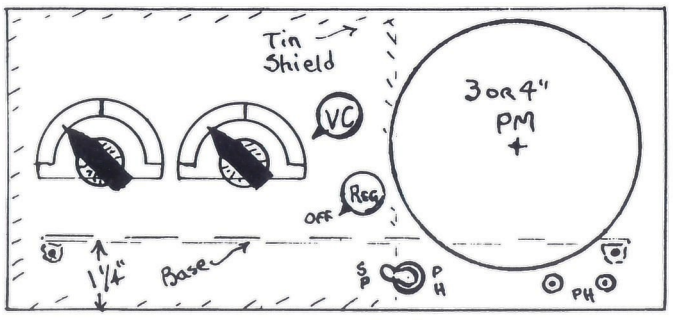
Set will also play BC if the primary is small. See DP-36 for further info. on long waves.



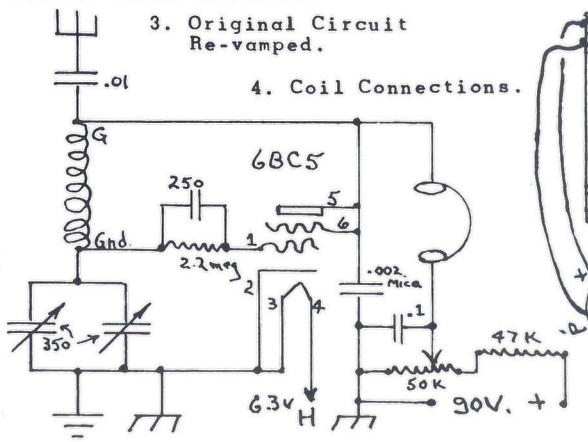
2. Panel & Base Plans. Scale 5/16" - 1"



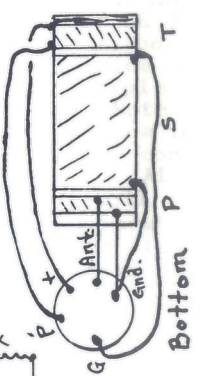
5. Miller Width Controls.



3. Original Circuit Re-vamped.

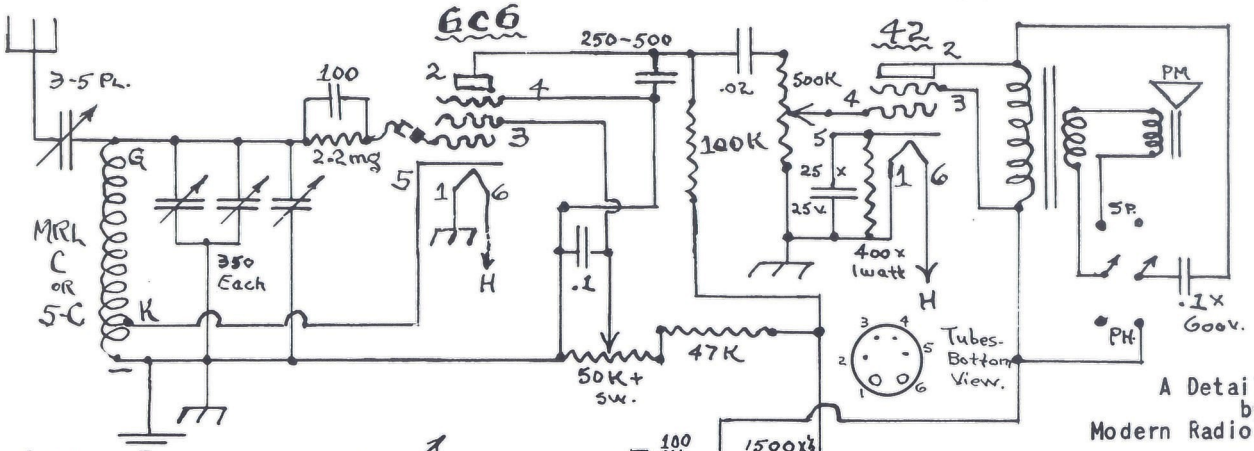


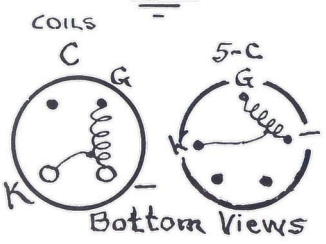
4. Coil Connections.

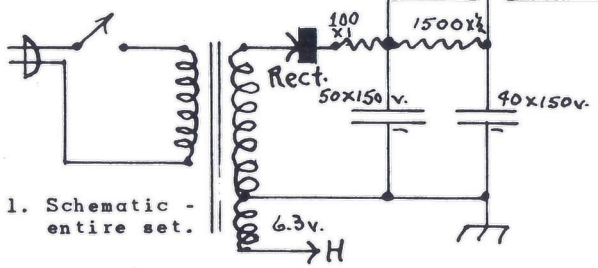


MRL 2-TUBE "EC" LONG WAVE RECEIVER

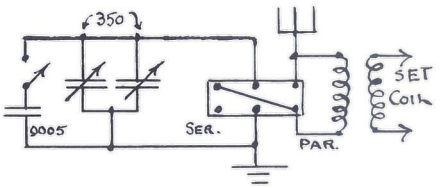
DP 36







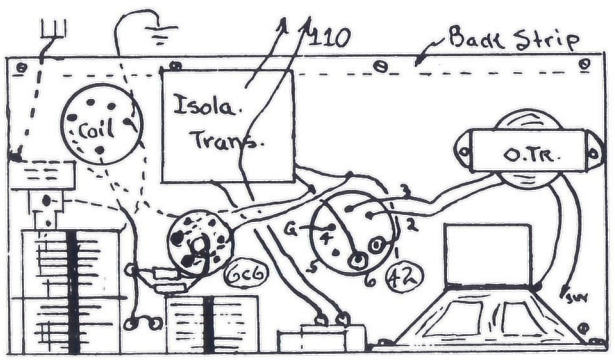
1. Schematic - entire set.



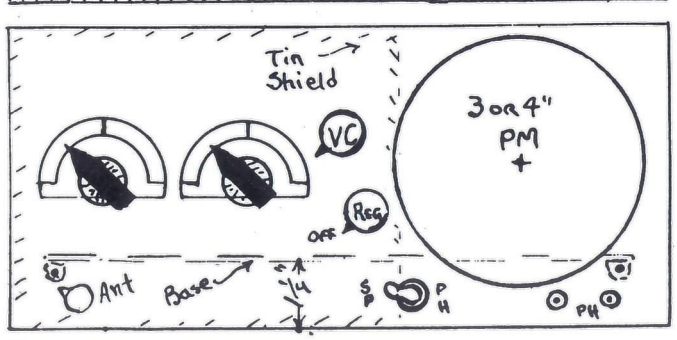
3. Antenna Tuner for Long Waver

PARTS LIST

1 3 or 5 plate midget var. cond.
1 Bracket, wood shaft, coupling, for above condenser.
1 .00035 variable condenser.
1 2-gang .00035 var. condenser.
1 .0001 mica; 1 .00025 mica con.
1 .02 x 600 v. bypass condenser.
2 .1 x 600 same.
1 25 mfd. x 25 v. bypass cond.
2 40 or 50 mfd. x 150 v. filters
1 ½ w. each 1500, 47K, 100K, 2.2 meg. resistors.
1 1 w. each 100, 400 ohm. res..
1 50K reg. control with switch.
1 500K vol. control, no switch.
2 1¼" bar knobs & scales.
3 Small pointer knobs.
1 Isolation power transformer.
1 8K imp. Output transformer.
1 3 or 4" PM speaker & grill.
1 110 cord and plug.
1 Compo. panel 5 x 11.
1 Compo. base 5 x 10.
1 Plywood back strip 1¼ x 10.
1 Tin shield 5 x 6.
2 ½ x ½ angle brackets.
1 4 or 5 prong wafer coil sock.
2 6 pr. wafer tube sockets.
1 DPDT toggle switch.
2 Phone tip jacks.
1 MRL C or 5- C Long wave coil, or make.
1 75 ma. Selenium or Silicon diode
1 6C6; 1 42 tube.
1 Grid cap for 6C6
Hardware, etc.



2. Panel & Base Plans. Scale 5/16" - 1"



This circuit uses Electron coupling (EC) for regeneration. Instead of tickler coil - it uses a few turns of coil coupled by electron emission inside the tube. A very good stable method of regeneration.

It is not hard to build, but this layout is best. Our new scale idea is used for finding measurements by use of dividers.

COIL. On MRL Long form, 1-3/8" in dia. by 3½" lg. drill a hole ½" up for grid lead. Put 340 turns #34 en. and bring to tap as shown. Add 10 more for tickler and ground it.

One reason for putting tap at top of winding - is to make it easier to change if necessary. If oscillation isn't good enough - add a couple of turns to the coil - over other turns is Ok. This coil, with (3) .00035 in parallel, will tune to about 100 KC (3000 m.) NPG, Jim Creek, Wn. comes in about 115 kc.

Original DP used Honeycomb coils - but almost impossible to get them now. For larger coils, make wooden spools with 1" dia. and glue and nail some heavy cardboard ends on them. Scramble wind 600, 1000, or 1500 turns of #30 to #34 wire on them. Make the tap in proportion- say about 25-30 turns from ground end. These may then be mounted on tube bases to fit socket.

For Antenna condenser - use a 3 to 5 plate midget, with wooden shaft coupled to it. Mount cond. under baseboard. Mount it close to coil and condenser. You may try a larger one if your Aerial is short.

If you want to use this rig for regular BC and shortwaves, substitute the (3) tuning cond. with a .00014. Also change Ant. condenser to a 2-3 plate.

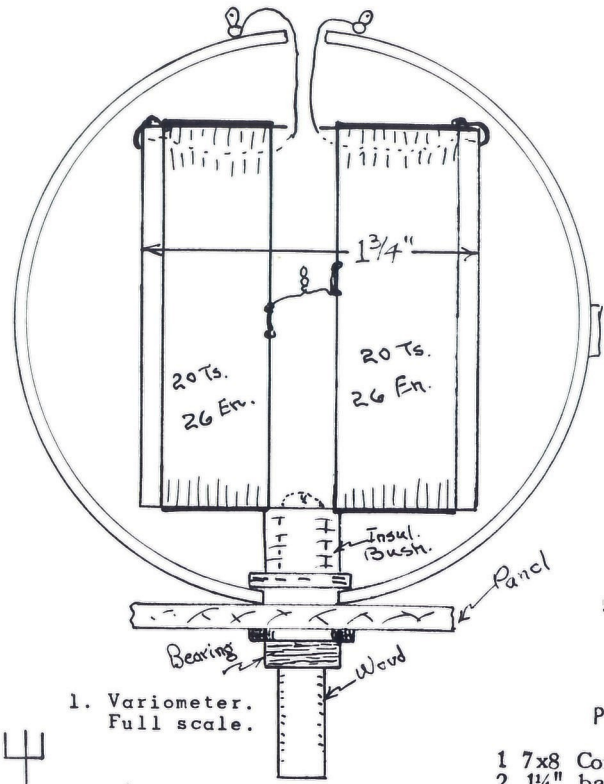
(Fig. 3) shows a good Antenna-tuner. It is rigged up for Long waves - but principle is OK for BC or SW. Mount parts on board so coil can be set alongside set coil. This is same principle as our DP-18 selective set. Note we use a switch and .0005 mica instead of the extra .00035 cond. Other cond. may be tried. Also, that DPDT switch puts coil and condenser in series or parallel at will. The old HC sets always tuned their big primaries. This arrangement works fine.

Long waves take in 10 KC down to BC band. Tune slowly as some beacons, and others are not on continuously. Calling waves are 500 for ships and 143 for LW. So tune slowly and log them down.

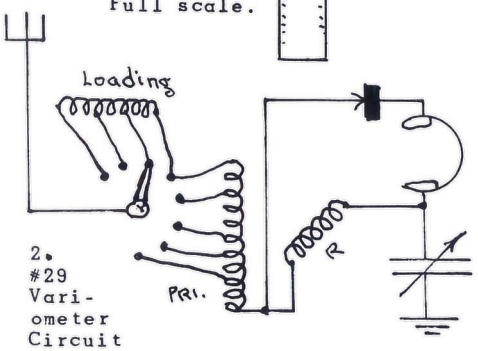
See DP-35 for more LW data.

MRL No.29 - VARIOMETER CRYSTAL SET.

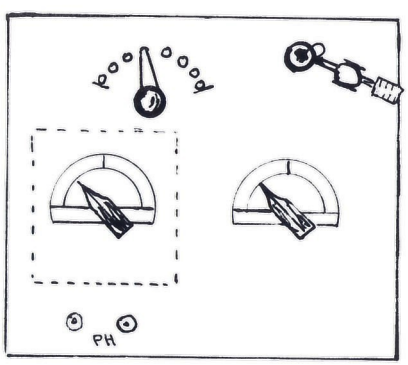
DP 44



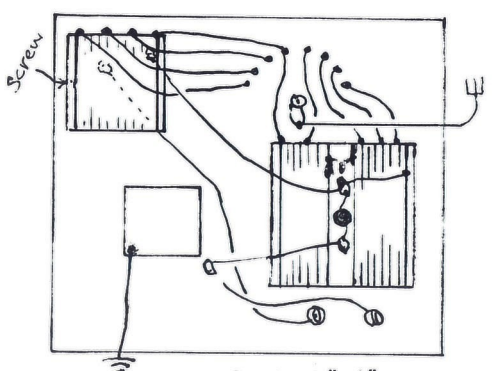
1. Variometer. Full scale.



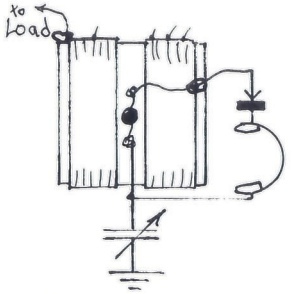
2. #29 Variometer Circuit



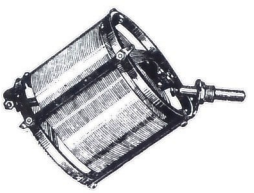
3. Panel Front and Back.



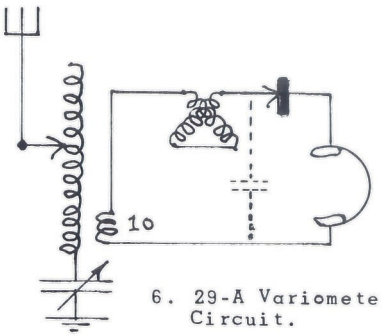
Scale ¼"-1".



4. Back of Variometer.



5. 1920-1930 Low-loss Variometer.



6. 29-A Variometer Circuit

PARTS LIST FOR #29.

1 7x8 Compo. Panel.
2 1¼" bar knobs and scales.
1 .00035 variable condenser.
1 Switch lever.
8 Switch points and 2 stops.
1 Knocked/down Xtal stand.
1 Steel galena or Diode.
2 Phone tip jacks.
1 #29 Loading coil, or make:
  1 P2XM Cello. form 2x2" long.
  35 ft. #26 DCC magnet wire.
  1 6-32 x 1¼" screw and nuts.
1 #29 variometer, or make:
  1 Bak. tubing 3x3" long.
  1 " " 2x1-3/4" long.
  40 ft. #24 DCC wire.
  25 ft. #26 enameled wire.
  1 Shaft bearing and nut.
  1 pc. ¼" wooden dowel & screw.
  1 Fibre bushing for shaft.
Lugs, hardware, wire, etc.

A variometer is a continuously variable inductance. Any coupler makes a variometer by connecting the rotor and stator in series, altho variometer windings should be about the same. Likewise, if you disconnect the variometer windings, you have a coupler, - which may be used in other experiments you may have.

VARIOMETER. You might pick up an old Kellogg, or other type of variometer, but they are hard to find. But they may be made very easily as follows:

Make 2 circles - 2" and 3" in dia. and draw a line thru their centers. Square up with an indelible pencil and mark the center holes in each form. For the 3" primary - drill a 3/8" hole for bearing; 3/16" for pigtails. Also drill eyelet lug holes near the edges and 4 tiny holes to split the winding as Fig. 4. Wind all coils same direction. For the primary, wind 50 turns #24 DCC and tap it at 5-10-20-35-50 and anchor to the eyelet lugs.

For secondary, drill a #4 hole for wood screw to shaft and 3/16 for pigtails. Also split this in the middle (Fig. 1). Wind 40 Ts. #26 enameled and bring out to eyelet lugs. Cement down with Light coil cement. Drill a tiny hole in wooden shaft and fit a wood screw in it. Slip the spacer in between bearing and form. By means of a long screwdriver, and shaft held in vise, run in wood screw. Make some loop wire pigtails and fish thru and solder to lugs (Fig. 1 and 4).

LOADING COIL. This is used to build up the primary. Wound on P2XM Cello. form 2x2". It has 60 turns #26 DCC, tapped at 20-40-60. You can see that total of all 3 coils is about 150 turns.

We believe panel layout is OK for this set. We prefer Steel galena for DX, but Diode is OK.

You'll be amazed at the drive of this set with tuned primary.

PARTS LIST for 29-A.

1 #29-A coil, or make:
  1 2XM Cello. form or 2x4½".
  80 ft. #28 DCC wire.
  15 ft. #22 "
1 #29 variometer.
  Balance parts about the same, except no loading coil.

This is an early circuit, using a variometer. But, in this case, it tunes the secondary. Because so much inductance is included in the Vario. - only 10 turns is required in the secondary. The same Aerial tuning principle is used for the primary, except we use only the coil and condenser for hi-gain.

About the same layout may be used for the 29-A, except we use no loading coil.

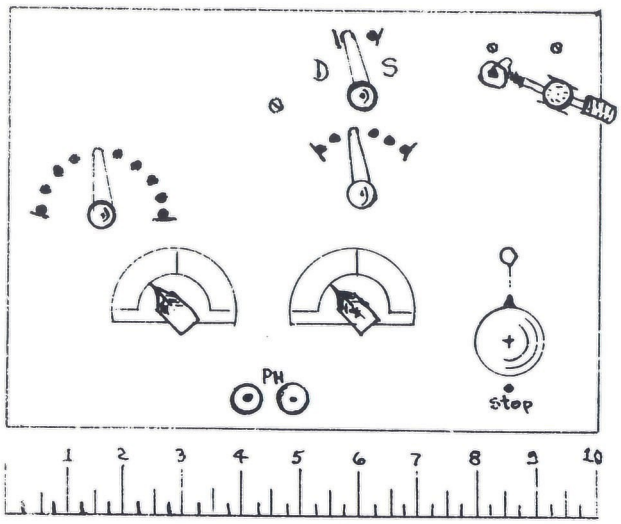
COIL. On 2XM Cello. form 2x4½" - wind 160 turns #28 DCC. Tap it at 5-10-20-35-55-80-115-160 - or 8 taps. Over the 5-tap end, wind 10 turns #22 DCC, or larger.

The small mica condenser may be added if desired. It is around .0001 to .0005, depending on the amount of inductance of the Variometer. By balancing up the circuit with this condenser, you will find you get a big boost in station volume. By using the 10-turn secondary, the selectivity will be greatly increased.

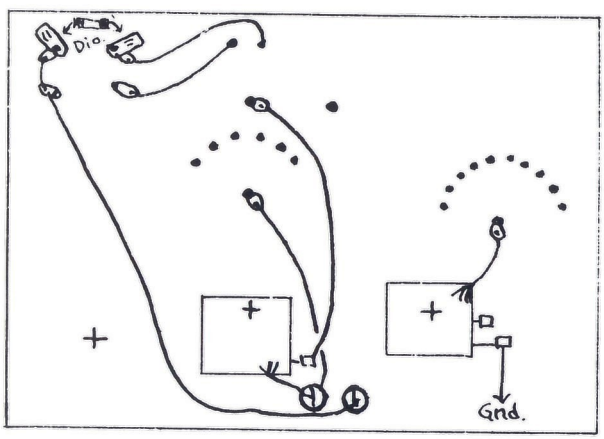
A Detail Print
by
Modern Radio Laboratories

MRL No. 35 - PRIZE SELECTOR CRYSTAL SET

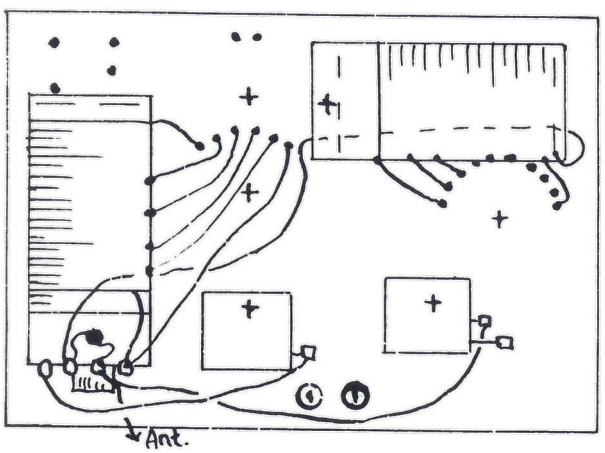
DP 48

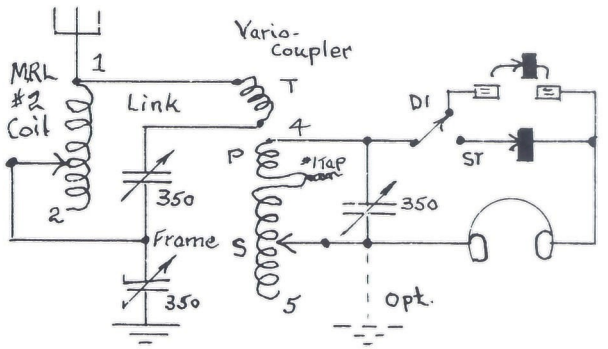


1. Front Panel Layout. Scale 5/16"- 1".



2. (Above) Rear View General Wiring.
3. (Below) Adding Coil Wiring.





4. Schematic Diagram.

A Detail Print
by
Modern
Radio Laboratories

PARTS LIST

1	Compo. panel 7x10.
1	.00035 var. cond.
1	2-gang same.
2	1¼" bar knobs and scales.
3	Switch levers.
17	" points.
6	" stops.
1	Crystal stand.
1	1" pointer knob.
1	Crystal diode.
1	Steel galena Xtal.
2	Phone tip jacks.
4	½" Fahnstock clips.
1	MRL Variocoupler 4-5 (See DP-13).
1	#2 Coil (1-2).
7	Ft. Hookup wire. Lugs, screws, etc.

If you make 1-2 coil:

1	2x4½" long Cello. or Bakelite form.
50	Ft. #24 DCC wire.
1	1¼" mtg. screw, nuts, lockwashers.

This is a revision of a novel 3-condenser set that took a good prize in a N.Y. Radio show in the early days. It was the most selective set for local reception exhibited. However, we have further improved it for current operating in congested areas.

We have reversed the coupler - from the original, as it gives much better control. You will be amazed at its selectivity control. It allows you to play stations not often separated on Xtl sets. We cannot vouch for its DX properties- altho tuning the Aerial-ground separately is quite an advantage. The 2-gang condenser is like our #2 circuits. With this combination, the dials run surprisingly close together.

ASSEMBLY and WIRING.

Altho this set is for the more advanced Xtal Fan - we have arranged it systematically for easy assembly. The arrangement seems to be the best. Note the 5/16" scale, whereby you can figure any distance with a pair of dividers.

Be sure all joints are tight. Run the nuts up on the levers until they are fairly tight. Hold the large nut with end wrench as you lock-nut the small nut close to it. More kit builders have set trouble because they don't have things tightened up enough.

Note (Fig. 2) shows all of the back wiring except coils. Do this first. (Fig. 3) shows the coil connections with all others left off. If you follow these two diagrams - it's easy!

COILS. If you are using our standard #2 coil - re-drill the mounting hole on the opposite side as contacts come off at the bottom of the coil. Latest #2 coil is 90 turns #24 DCC on 2XM Celluloid form (2x4½" long) and tapped at 5-10-16-23-31-40-50-61 and 90.

Details on making Coupler are shown in MRL DP-13 in detail. It is made on a 2XM form with rotor in one end. Rotor is 10 turns of #24 DCC on a 1½" fibre tube 3/4" long. Next to shaft, on the 2XM, wind 10 turns #24 for primary and bring to lugs. Next to this, wind 100 turns #24 tapped at 5-15-35-60-100 and bring ends out. In connecting the Coupler - connect starting end of secondary to lug as shown, so the lug is used as #1 on the switch.

When you have tuned in a station- run the rotor around until station goes out. Fix pointer at the top so you get ZERO at this point. On either side you'll increase coupling and lose your selectivity. Set some kind of screw, or stud in panel at bottom of pointer for a stop so you won't twist the wires off.

A 2-contact switch has been added so you can slide over to a fixed Diode or the stand at will without knocking out the Xtal. A good Steel galena is best for the stand, altho others may be used. You may also find differences in fixed Diodes, which are hooked across Fahnstock clips as shown on back.

When tuning, you use low selectivity and get the station as loud as possible. Then sharpen selectivity with the rotor and again check tuning with both of the condensers and sets of taps. When you get them set best, turn the rotor to more selectivity. Then, bring condensers over together and you'll find the weaker stations - possibly several you never got on a Xtal set.

No. 2 coil is mounted back of the panel about 1" - while the Coupler is mounted up close- using just the bearing nut.

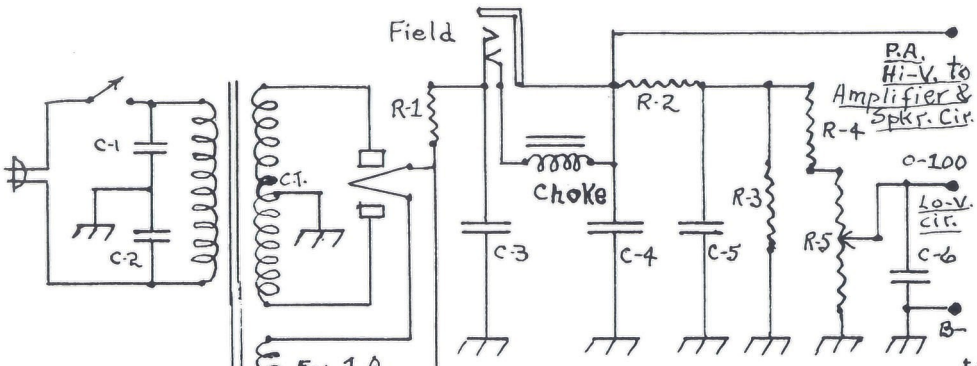
You can mount this in a cabinet to keep it dustproof. There should never be any need for going inside unless lever nuts get loose, etc.

Build it up and you'll be surprised at the results this set will give you.

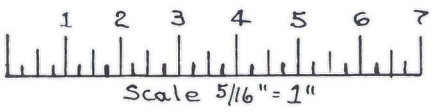
MRL UNIVERSAL "NO HUM" POWER SUPPLY.

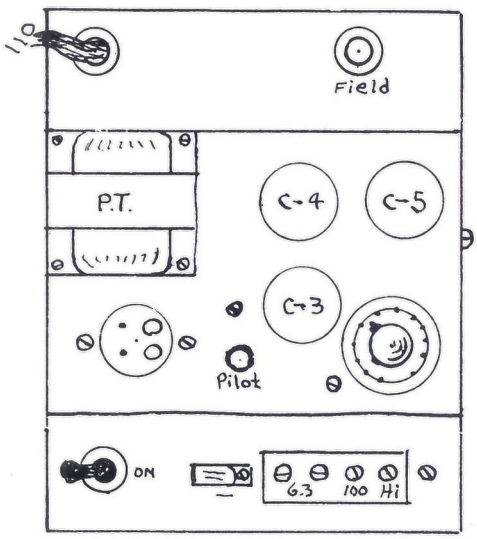
DP 49

A Detail Print by Modern Radio Laboratories.

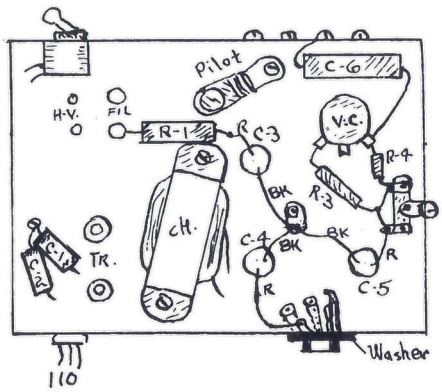


1. Schematic Diagram.





2. Base Layout. Scale 5/16-1".



3. Under Chassis Layout.

PARTS LIST.

1 5x7x2 Aluminum chassis.
1 350-350 (or other) Pwr. Trans.
1 Double phone jacks; bushings.
1 10 henry filter choke.
1 110 cord and plug.
1 SPST toggle switch.
1 #40 or 44 pilot and jewel.
1 Fahnstock clip.
1 4-screw terminal strip.
Fish paper insulation, same.
1 4-prong UX wafer socket.
2 2-lug tie points.
1 5Z3 or 80 rectifier tube.
1 Small pointer knob & scale.
C-1,2 .05 x 600 bypass cond.
C-3 8 x 450 can filter cond.
C-4 30 x 450 "
C-5 2 x 450 "
C-6 4 x 450 electro. condenser.
R-1 50 x 10 watt resistor.
R-2 50K x 2 carbon "
R-3 100K x 1 " "
R-4 30K x 1 " "
R-5 50K vol. control, no sw.
Hookup wire and hardware.

This is a project for the more advanced Fan- so, due to lack of space, we have had to eliminate wiring details. Suggested placement of parts shown for your convenience. This is a heavy-duty power supply - which will handle most sets. You can also work Ur small Xmtrs from it, Keep it on your bench for various testing.

CONSTRUCTION. As a new feature of MRL DPs - we are now showing the scale. Use dividers to find any distance with ease. Top and sides of chassis are arranged for best operation. Use chassis punches for the filter cans and power transformer. Drill a series of holes for the terminal strip slot - and work it out with a file. Insulate it well with fish paper, or other insulation, all around the terminals. Also - let paper project around the front so you won't get shorts.

Parts are not critical - but wattage of resistors and working voltage of condensers are. Any standard power transformer, tube, or choke may be used. As most controlling of sets is done in the set itself- the power supply does not have to be critical.

RESISTORS. R-1 is a protective resistor - to protect your filters, etc. A condenser/choke input is usually hard on condensers - but R-1 helps. It will not get hot if you use a 10-watter - but resistance is not critical. R-2,4 are the ones to watch. If they get hot, or sizzle (hi) you are draining too much off 0-100 v. circuit. Note the variable resistor R-5 is protected by R-3,4 and prevents it becoming noisy.

C-1,2 are used to lessen line noises by neutralizing them. The supply has almost perfect filtering - no hum is present. Hum is carried thru a set from the detector and amplifier circuits, so the 100 v. output is heavily filtered to take care of this.

FIELD. This is used when you want to use an electro-dynamic speaker field. Just plug in with a phone jack - and this cuts out the choke. Field acts as choke.

WIRING. Use heavy insulated wire as much as possible to prevent shorts. As the pack puts out a lot of power - you don't want to start any fires.

CAUTION. The 0-100 is for low voltage ONLY. Do not hook speaker or output circuits to it. It is for use of detectors, TRF or possibly first audio circuits. U can see the difference in other circuits - where the output is run off separately. Run the P.A. hi-voltage (about 400) to the output transformer primary and you'll have no trouble. You'll really get a lot of volume on Ur set. Run the rest of your set off the low-power and you'll have no trouble. In case the resistors heat up - you're using too much power. In this case, cut down from the hi-voltage with a resistor to handle amplifiers.

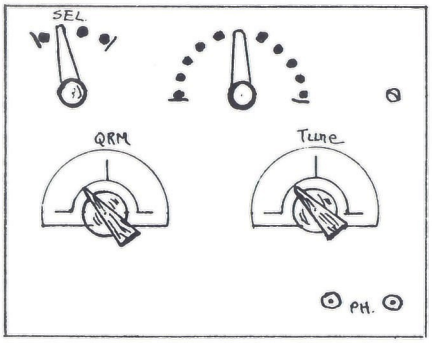
This is calibrated at no load, but when you hook something up - the voltage drops. It may also be used for Transistor circuits. Use low voltage as possible. Refer to their ratings - as they seldom go over 20 volts DC.

CAUTION. Switch throws on 110, which shows up on pilot light. As we use lots of filtering, the condensers will hold their D.C. charge about a half minute - and are "hot" to the touch! Be sure to short the hi-voltage to chassis if you are going inside. Except for the screw connections, on the front, you'll have very little trouble with shocks.

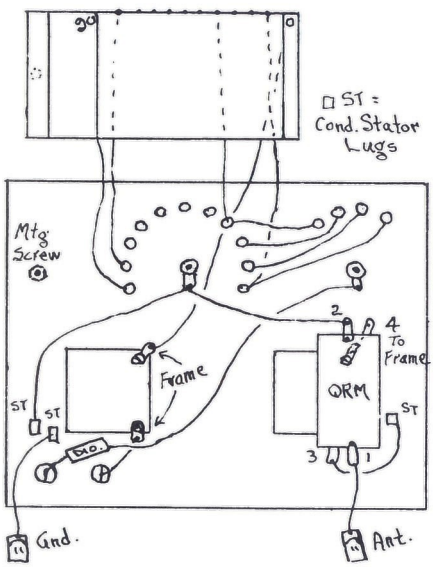
TESTS. Put a 1/25 watt Neon in series with low voltage and use it to test DRY condensers for leakage. If you get an occasional flash - the condenser is OK. If it flashes fast - it leaks. If you get a steady lite - it is shorted. This does not work on electrolytics - they all show a short. Test them with a hi-resistance ohmmeter, in series with the hi-voltage. On a good condenser, the hand will drop about half way back and slowly creep up to about 100K to a meg.

We have taken a lot of time designing this power supply and we hope it serves you well.

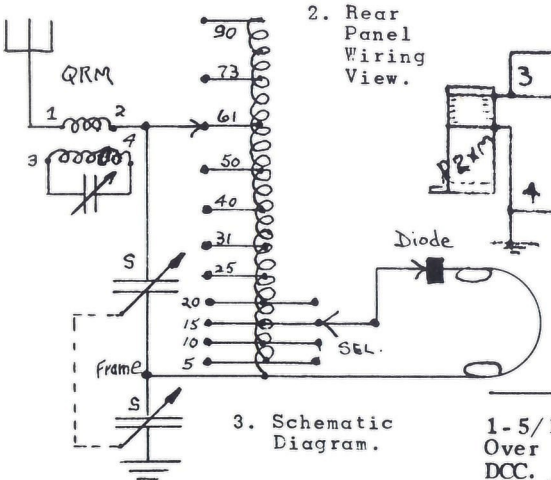
MRL Nº 11 - DX ALL-WAVE CRYSTAL SET.



1. Front Panel View.



2. Rear Panel Wiring View.



3. Schematic Diagram.

Construction. Lay out the panel as shown. Use dividers on the scale to check distances (a new MRL feature). Layout is the best we can figure out. Mount condensers down tight. Cement scales on with Heavy Coil Cement or glue. Mount all other points and parts securely. If using rivet switch points - tin them before you begin your wiring.

PARTS LIST.

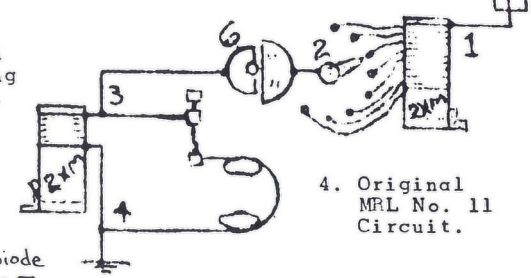
1 Compo. panel 5½x 7.
1 2-gang .00035 variable cond.
1 .00035 single condenser.
2 1¼" bar knobs and scales.
1 MRL QRM Coil.
2 Switch levers.
15 " points; 4 stops.
2 Phone tip jacks.
1 Crystal diode.
1 6x1¼" mounting screw & nuts.
10 ft. #22 plastic hookup wire.
2 Fahnstock clips for A-G.
1 MRL #11 Coil, or make:
1 2XM Celluloid form.
50 ft. #22 DCC wire.
Light coil cement.

Wire up all parts except the large coil - which is put on last to make it easier. Wire the four leads to the selective switch to the other switch. Use as short leads as possible.

Coil. Wind 90 turns #22 DCC on an MRL 2XM celluloid form, starting at one end. Tap it by running a ½" strip of heavy paper under the tap turns. Run a short strip to catch taps 10 and 20 to make it easier to solder. Make taps at 5-10-15-20-25-31-40-50-61-73-90. Anchor the ends with tape and put Light Coil Cement along edges and near tap strips.

Mount the coil 1" away from the panel on nuts and lockwashers. Use a wrench to tighten them up so coil won't flop around. Sandpaper the tap turns and tin them before mounting. Run leads as shown. Scrape between points, after soldering, to break any leakage path between points. Leave a little slack in leads. Hook A-G up to Fahnstock clips.

QRM Coil. 3-4 is 105 turns #32 enamel on 1" fibre tubing, 1-5/16" long and cement down. Over this is 1-2 of 20 turns #30 DCC. Light cement over all. Solder #4 lug onto lug on frame and a stiff wire to stator of cond.



4. Original MRL No. 11 Circuit.

Our original circuit is shown in Fig. 4. This brought in lots of good DX reports - principally from Fans in the country. Its direct-coupling to the Aerial and ground is the reason.

However, times do change. With over 24 BC stations around us - it was necessary to re-design the original. Interference from a couple of strong 50,000 watters became quite a problem.

So, we came up with the revised circuit in Fig. 3. While our original used the standard Steel galena and stand - we can now use a crystal Diode. All Diodes are much broader than a Steel galena, due to a difference in impedance. A variation of the selectivity switch will make up for impedance match.

Instead of two tuning coils - we now use only the one, but we added a QRM coil for wave trap. The coil is like our #2 coil but with more taps. You will note the first 4 taps also run to the selectivity switch. You'll be surprised how this regulates your selectivity. Many circuits use this on the secondary, but have never seen it used on the single coil circuit we use here.

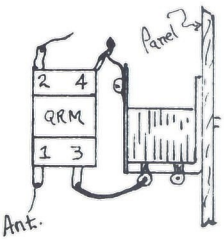
Then, if you are near a station with a strong ground wave, set the QRM condenser on that station until it goes down or completely out. Leave it tuned to this station - while you go ahead and tune the balance of the band. This traps out the interfering station. Usually the QRM coil needs a direct connection to ground, but peculiarities of this circuit allow it to work perfectly with the ground condenser in series.

Original Circuit. Fans, away from strong stations, may want to build the original with some later changes. Coil is 132 turns #24 DCC on 2XM 4½" form, tapped every 11 turns for 12 taps. The 3-4 coil is 35 turns #20 DCC on P2XM 2" form with no taps. Tuning condenser is .00035. QRM coil can go in between 3-6 on diagram. A crystal stand, using a Steel galena works fine.

With a big, high Aerial this set has a terrific drive. It is a wonderful DX-getter when away from hi-powered stations. Here are some reports on this set:

Calif., J. A. Cattrell: "Get lots of SW DX on this set."

Indiana, South Bend, B. T.: "I'm having lots of fun with #11 set. Loads of volume - more than any other Xtal set. Selectivity is excellent where I am. I receive 3 Chicago stations - even with locals on in daytime. After midnite, when locals sign off, I get everything within 1000 mile radius. When output is hooked to a 10K primary and 8 ohm secondary - I play a 2½" PM speaker on our local stations." (lots more)



5. Side View of QRM Coil on Condenser.

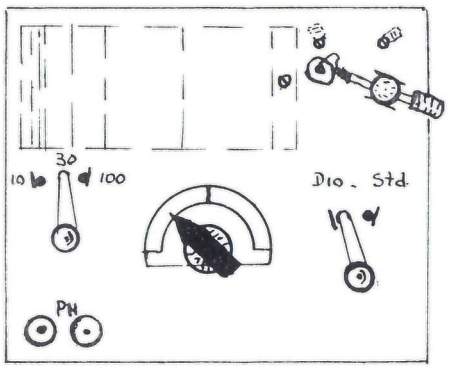
A Detail Print by Modern Radio Laboratories

DP 56

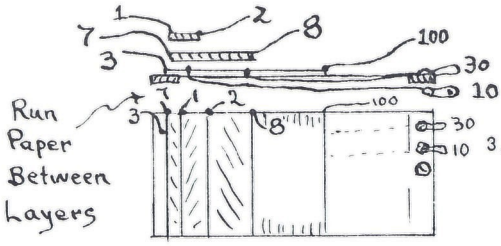
MRL

MRL Nº 4 TELEFUNKEN CRYSTAL SET

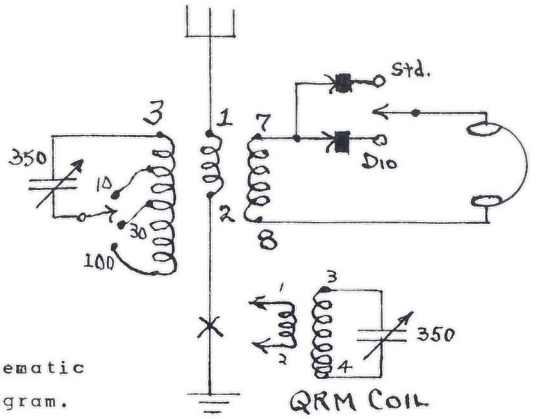
DP 58



1. Front Panel Layout. Scale 5/16"- 1".



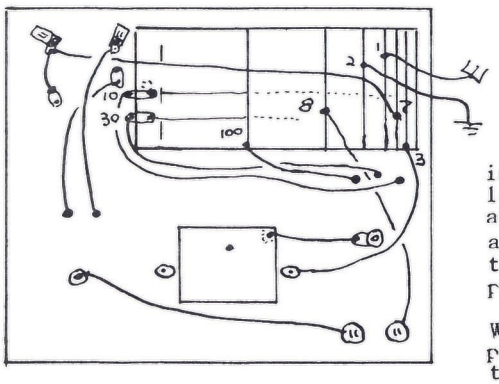
3. Details for Building the Coil.



4. Schematic Diagram.

670

A Detail Print by Modern Radio Labs.



2. Rear Panel & Wiring View.

PARTS LIST.

1 .00035 or .0004 var. cond.
1 Dial scale and bar knob.
1 6x7 Compo. panel.
1 k/d Xtal stand.
2 Switch levers; 5 pts., 4 stops
2 Phone tip jacks.
2 ½" Fahnstock clips for Diode.
1 Steel galena or other Xtal.
1 Crystal Diode.
1 #4 Coil or build:
1 2XM 2x4½ Cello. form.
50' #24 DCC magnet wire.
20' #20 "
6-32 x 1¼" BH screw for coil.
1 MRL QRM Coil if desired.
1 .00035 var. for QRM Coil.
Wire, hardware, etc.

During 1924, C.D. Tanner, a Radio Pioneer Wholesaler, came to our new store at 1909 E. Nadeau, Los Angeles. He demonstrated a small single dial Xtal set in a box. At that time - it was really selective. The only way we had then to make a set more selective was to pull the primary and secondary apart - which is still hard to beat.

Anyway, we grabbed it up for $6 and before he was out of our sight my brother and I had the bottom off and circuit checked. It turned out to be one of the highly selective Telefunken circuits used on ships in Wireless days altho we can't find it in early Telefunken circuits.

The set we bought had the coil inside the condenser but this lowers efficiency. It works by absorption tuning like a QRM as a booster where signals of certain frequencies are allowed to pass and others shut out.

PANEL LAYOUT. Easy to build. We use our new 5/16" scale and a pr. of dividers for measurements to make it easier. Layout seems to be about right. Mount 2 Fahn stock clips for Diode as shown.

COIL. On 2XM Cello. form or 2" Bak. form 4" long - wind 100 Ts #24 DCC tapped at 10-30-100. On Cello. we find it best to solder onto wire and punch hole thru form and tie to Eyelet lug on opposite end. Do the same with the 30th turn. On 100, fasten it down with tape put under next to last turn and Cello. tape over it. We tried tapping at 5 for SW but think so many turns causes a deadend effect - but you may try it. Taps seem to give plenty of overlap with a .00035 variable.

Over this, place a piece of paper 2" wide and cement down. Wind 25 Ts #20 DCC and paper 1" wide over this. Then final 10 Ts of #20. Light cement edges.

Mount coil out from panel on 1¼" BH screw, nuts and lockwashers. Mount solidly. Mount coil after balance of set is wired.

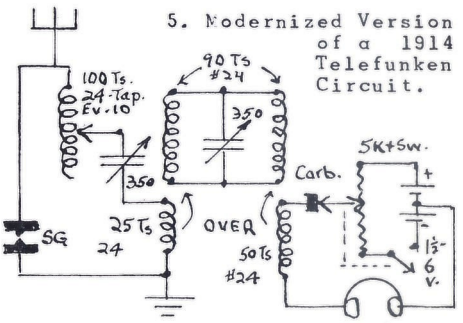
We have records of over 1000 mi. but especially recommended for locals. Different lengths of Aerial affect tuning. Oftentimes one may add a loading coil of 100 turns tapped every 10 for more volume on the low frequency stations. In fact, a loading coil is always useful to the Experimenter.

On our original plan (about 1935) they had police stations around 1600 KC. and it brought them in good on the 30 tap. But now police are around 175 mc. and a special type of circuit must be used.

An MRL QRM Coil with condenser may be inserted in the ground line if you would like to separate any "closely-fitted" station that may interfere. This QRM coil will not interfere when you tune SW stations.

You may also use this set as a booster for weak stations. Just hook (1-2) across the Aerial and ground of your set and it will really give them a jolt.

This set is similar to our #9 (DP-24) which you may also find interesting.



5. Modernized Version of a 1914 Telefunken Circuit.

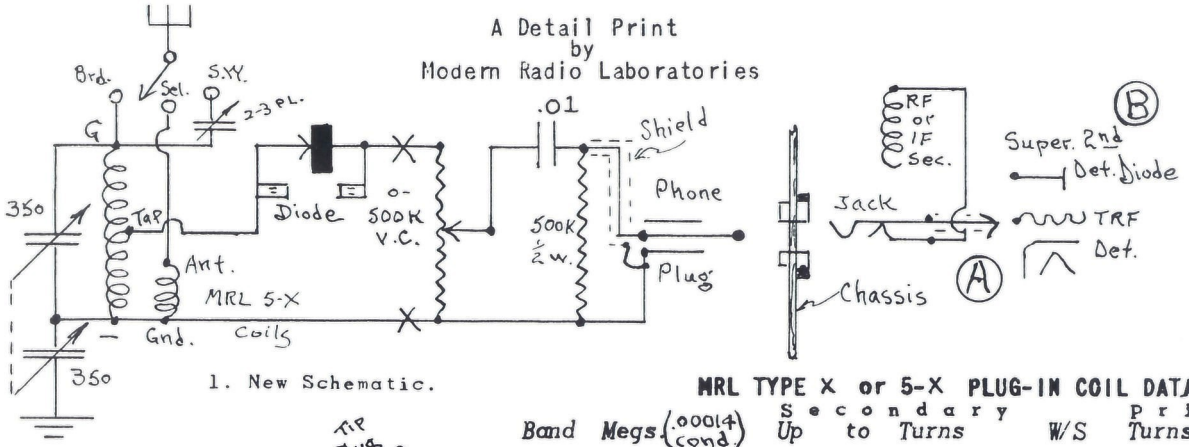
Becha don't know what "SG" is. It is a static spark gap - very much needed aboard ships in the Tropics. They are spaced 1/100" apart. Off Mexico I could draw 1/16" sparks off my Aerial, and working with a 1-stage audio was really hard on the ears. Static jumped my series cond. plates if a hail, snow or static storm was around, or if ship's whistle was blown near the Aerial. You could get a good jolt off the plates.

Wind coils on 2XM Cello. forms as shown. Wind 25 and 50 turns over ends of others. Note center connection for crystal Batts. In original they used an electrolytic detector but Carborundum is better. Varying coupling between 25 and 50 turn coils and 2 90 turn coils will change your selectivity. Note 50 turn circuit is untuned but tuned by absorption - like the #4. It is an interesting circuit to try.

MRL ALL-WAVE CRYSTAL HI-FI ADAPTER.

DP 59

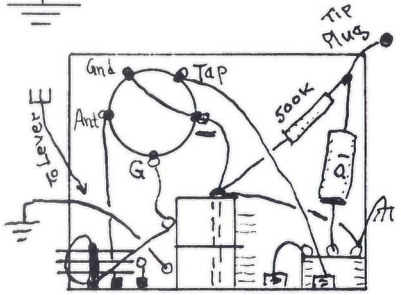
A Detail Print
by
Modern Radio Laboratories

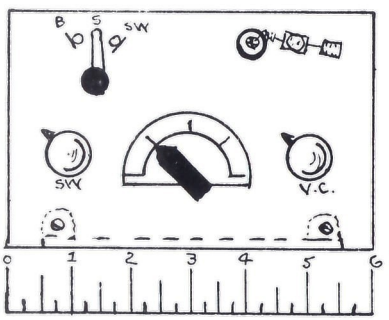


1. New Schematic.

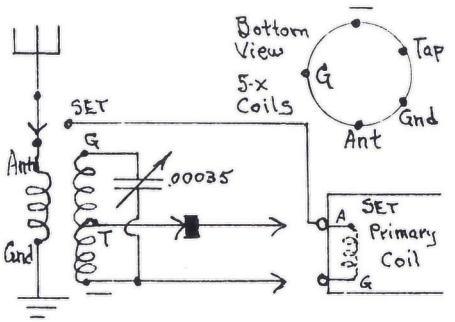
MRL TYPE X or 5-X PLUG-IN COIL DATA.

Band	Megs (.00014 cond)	Secondary Up	Secondary to	Secondary Turns	W/S	Primary Turns	Primary Wound
20	21.5 -12.7	1"	1-3/16"	4-22 En.	3/16"	3-24 DCC	over
40	13. - 6.	1"	1-7/16	10-24 En.	7/16"	5 "	"
80	6.2 - 2.7	7/8"	end	22- "	Close	10-28 DCC	end
160	2.8 - 1.25	¼"	"	65- "	"	12-28 En.	"
HF-BC	2.1 - .95	¼"	"	84-28 En.	"	13- "	1/8" end
BC	1.35- .6	¼"	"	120-32 En.	"	15-32 En.	¼" end
LF-BC	1. - .436	¼"	"	170-34 "	"	15- "	¼" "
Long	.6 - .29	¼"	"	350- "	"	20- "	1/8" end

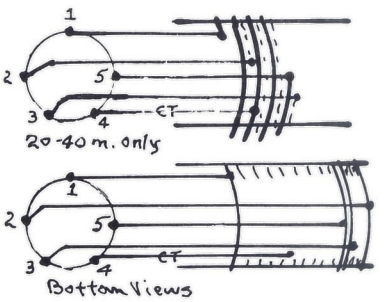




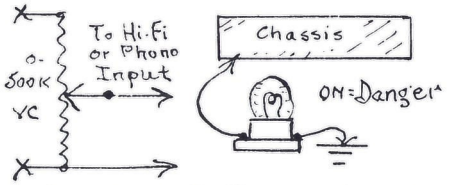
3. Base & Panel Layouts. Scale 5/16" - 1".



2. Old Schematic, using 5-X Coils.



6. MRL Type 5-X Coil Data.



4. Output to Hi-Fi or Phonograph

5. Testing Chassis of AC-DC, series Filament Sets.

PARTS LIST

1 Compo. panel 4x6. Base 4x5.
1 2-gang .00035 variable cond.
1 2-3 plate " "
1 .01 x 600 v. bypass cond.
1 500K vol. control; no switch.
1 500K x ½ watt resistor.
1 5-prong base socket.
1 switch lever; 3 pts; 2 stops.
1 1¼" bar knob and scale.
2 small pointer knobs.
1 K/D stand. 1 Steel galena.
1 Phone plug 1 double jack.
2 ½ x ½ brackets, 2 Fahnstocks.
MRL 5-X coils, or make.

In Fig. 2, we are showing a re-vamped circuit of our original DP-59. The only change specifies MRL 5-X coils instead of A. The only difference, between the 5-RF and 5-X is the latter is center-tapped for better selectivity. Any Diode is OK, altho an adjustable Steel galena or Iron pyrites is more selective. The output feeds into the Aerial and ground circuit of any receiver. Tune the receiver to any blank spot on the dial. Switch allows converter to be hooked up permanently and switched off and on. On the BC band, this will aid in selectivity and sensitivity when tuning the BC set.

Another change is in the name "police call." Most police circuits now use HF or FM - to get away from the "police chasers" of early days. Now it can be kept fairly secret on HF bands.

Receiving conditions have made many changes since we made our first DP-59. Around metropolitan areas, it is almost impossible to find a "blank" spot on the BC band - into which to feed your converter. If you're in the far country - you may have better luck at finding blind spots.

As our plans are aimed at the more practical - we now prefer to feed the output into the detector tube of any TRF set - or the diode of a Superhet. second detector tube. As these circuits are most efficient, in the modern receivers - we take advantage of this. By grounding the detector grid, thru a 500K resistor - we make another audio stage from it. As most small receivers need but one stage - we now have a real "boom" coming from our small set. After all, - what we want is good amplification. There is no more enjoyment for a Xtal, or 1-tube Fan, than to have his signals amplified.

Preparing the receiver. Mount double jack in rear of chassis. Break lead to TRF grid (1-A) and run to jack as shown. If Superhet - break Diode lead (1-B) as it goes to coil.

If you have an AC-DC set, using series tube filaments - make the ground test as in Fig. 5. If lamp lights - reverse 110 plug.

Fig. 4 shows output to a Hi-Fi or phonograph amplifier.

Construction. Our new MRL DP plans now show scale. Use dividers to find any distance. Mount Fahnstock clips on Xtal stand screws for Diode. Our coils, or any others may be used as desired. It may be a good idea to shield the hot lead - going to grid, in case you get microphonics. Ground the shield, but do not let it touch grid wire.

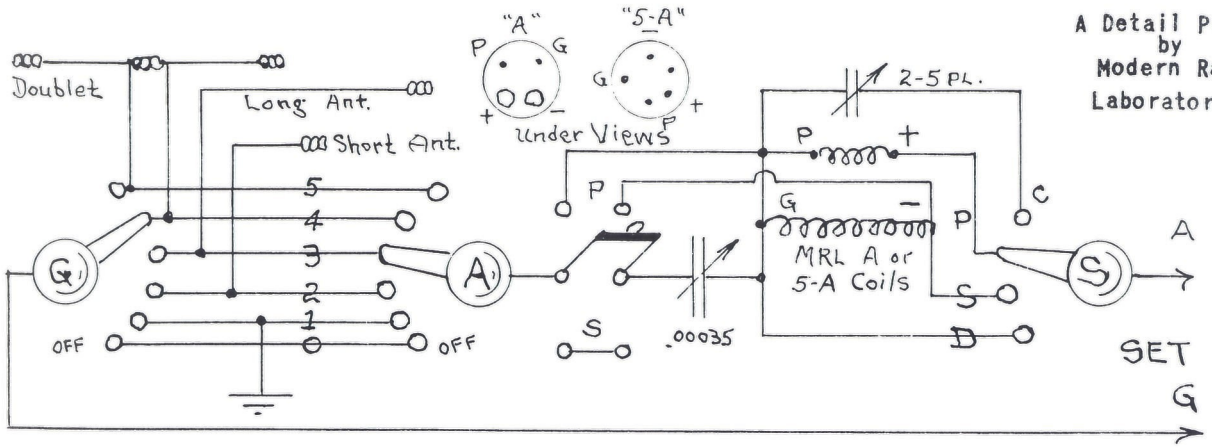
Use. This Xtal set, or any other may be used, by hooking to points marked (X). Also, phone tip jacks from a 1-tuber may be hooked likewise. Try the adjustable stand for real DX stations. No tone control is shown, as the receivers usually have it.

Point (1) tunes broadly. (2) puts primary coil into use. (3) is for more selectivity or when tuning short wave stations.

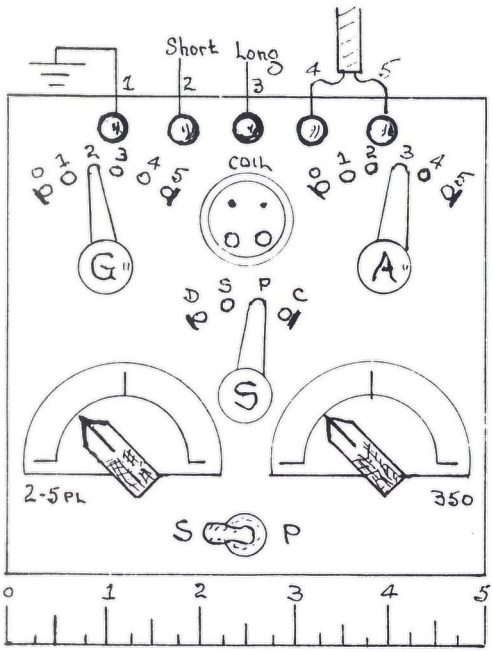
MRL "50-IN-1" ANTENNA TUNER.

A Detail Print by Modern Radio Laboratories.

DP 61



1. Schematic Diagram.



2. Panel View. ½" - 1".

We tried to figure out the number of combinations this rig could be used for - and found it would be well over 50. So, we named it the "50-in-1 Tuner."

It will help reception on any longwave, BC or SW set. It will not injure any set - but will help reception on most of its combinations. All this is done without a tube, or outside power of any kind - except the signal energy from the Aerial.

When tuned as a booster - it tunes to the incoming signal and increases the volume and selectivity on that station. As a wave trap - it can cut out, or down, the interference from any station - and allowing you to tune with your receiver as desired.

It is compact, and may be set into a nicely finished box, and set alongside, or on top of your regular set. Certain combinations will cut the unit clear out of circuit, if desired.

We have had lots of good reports on its use. Many say they couldn't be without it. Because you use plug-in coils - the different bands are changed as required for best reception.

PARTS LIST.

1 Compo. panel 5 x 5.
1 .00035 variable condenser.
1 2 to 5 plate var. "
2 1¼" bar knobs and scales.
1 DPDT toggle switch.
1 4 or 5 prong wafer socket.
3 Switch levers.
16 " points; 6 stops.
5 Binding posts.
MRL A or 5-A plug-in coils, or make.
Hardware, solder, wire, etc.

CONSTRUCTION. All new MRL DPs are drawn with the scale - shown in inches. All you have to do is to use a pair of dividers to get any distance. This is ½" - 1" so it is easy to figure.

We increased size of the panel to 5x5 - giving plenty of room to work. We also added the DPDT toggle switch - that allows you to put the .00035 variable condenser in series or parallel. Series tuning often builds up the Aerial circuit like a cannon because most all Aerial circuits are out of tune in most sets. Building this up will increase the volume on any station.

This layout is preferred, altho you may arrange as desired.

We also use a larger variable condenser than the original 140 - as the .00035 has more advantages - especially in series tuning of the Aerial.

WIRING. After all parts are mounted - proceed by wiring all similar numbers together. First, mark your panel and BPs with the numbers as shown. It may help to mark them on the back, too. For instance, from (1) on (G) switch over to (1) on binding post, and then to (1) on (A) switch. Continue until all 5 sets of points are wired. From then on, it is easy to connect up the other parts. Be sure all connections are good and solid. Scrape between switch points - after they are soldered, to remove excess rosin, paste, etc.

AERIALS. You may use any assortment of Aerials and grounds you wish. For short Aerial - you may substitute a telephone box, light standard, or a wire around the room. It is fun to experiment - and this box will quickly show you the advantage, or disadvantage of any combination. For the greatest volume - hook BP 2-3-4-5 together!

COILS. We specify MRL 5-A type coils. If you want to wind a 5-A HF-BC - to cover most of BC band - wind 84 Ts #28 enam. wire on an MRL 5-prong plug-in form, 2½" long. At the end, wind 14 turns same wire. Run leads out as on diagram. For more info. on other A or 5-A coils, see MRL DP-63.

An MRL QRM Coil may be mounted on a tube base and substituted for the above coil - as an experiment.

The MRL Longwave coil makes a good one for series tuning of BC stations. It is wound with 350 Ts #34 enam. on an MRL Long form 3½" long. The other winding is 40 Ts #32 at the end. If you are working on long waves - this is excellent as a booster.

LOG IT DOWN. Make up a logbook so you don't have to figure out past combinations, as follows:

G1-A2-DP Puts set direct to SH Ant. and ground, or in normal operation; switch parallel.
G2-A5-PP Gnd. to SH Ant. as a counterpoise; 1 side doublet for Ant.; going thru Pri. of coil (P) for wave trap; switch in parallel.
G1-A3-CP Gnd. to gnd.; Ant. thru 5 pl. to LG Ant.; sw. parallel.
G4-A5-DS Tuned doublet; switch in series tuning.
G2-A3-CP Gnd. to counterpoise; LG Ant.; 2 pl. for SW.; Paral.
G0-A1-DP No gnd. used; Use gnd. for Ant.; Switch parallel.
G3-A3-DP Gnd. on Gnd.; LG Ant.; S on D as booster; Sw. par.
G1-A3-SP Pull coil out; Gnd. to Gnd.; LA thru .00035. Sw. Par. allel. Fine for 1200 KC, BC.
G1-A2-SS Gnd. to gnd.; SH Ant.; thru big Sec. for series tuning; switch series.
G1-A3-PS Gnd. on gnd.; LG Ant.; thru series cond. and pri. of coil for loading of tuned Ant. Switch in series.

On and on - there are lots more for you to work on. Be sure to try it on that big Ham receiver.

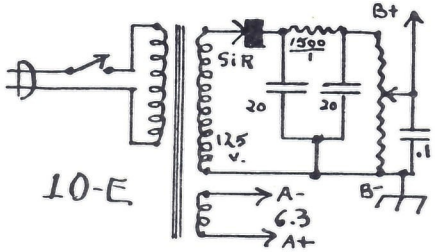
Some stations just naturally work better with certain combinations. You'll find its best use on those DX stations.

with a light coat of colored Aerosol enamel lacquer. It may be baked in the oven for awhile and then let dry overnite.

Before mounting condensers - be sure to countersink the paint out of the screwholes for better connections.

Aluminum is a peculiar metal. They claim the Oxide, that is formed on the surface - offers ½ volt resistance to HF circuits. So, it is a good idea to always use lockwashers when making up a screw/nut joint.

A SIMPLE, SAFE POWER SUPPLY FOR 1-TUBER OR OTHER SETS



PARTS LIST.

1 Isolation transformer.
1 400 PIVoltage Silicon rect.
1 20x20 - 150 v. filter cond.
1 .1 x 600 v. bypass cond.
1 100K volume control and switch
1 Small pointer knob.
1 1500 ohm x 1 watt resistor.
1 110 cord and plug.
4 Binding posts.
1 Compo. panel and box.

This power supply can also be made up into a separate unit. It has lots of uses around the Lab. It is safe because the 110 v. is isolated by transformer. It can be hooked directly to the one-tuber when using 6.3 v. AC tubes and make a complete AC job. But, don't use the 6.3 v. on 1.4 v. tubes - but the DC B supply is OK. Switch, on volume control, will cut off everything. It can be mounted in a box with Compo. top. Leave a couple of holes in the side of box for ventilation of rectifier unit and transformer. With your DC meter - calibrate output voltage at no load. You can then see how much your sets drain. Parts are over-rated so power supply should last a long time. Your regulated voltage will help smooth out any regeneration problems.

10 METER BANDS.

While the set is not designed for highest frequencies - we've often had good results down here with the following coil. Take a 1" Celluloid plug-in form and punch up about 3/4". Wind 3 TS #20 DCC - closewound. For tickler - use about 4 turns #26 enameled. Also closewound and up against the secondary. A little experimenting with spacing and number of turns may be to your advantage. It depends a lot on how good your set was built as to how this range will work.

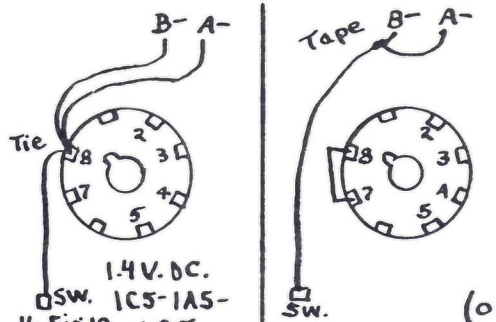
SOME REAL DX ROLLS IN!

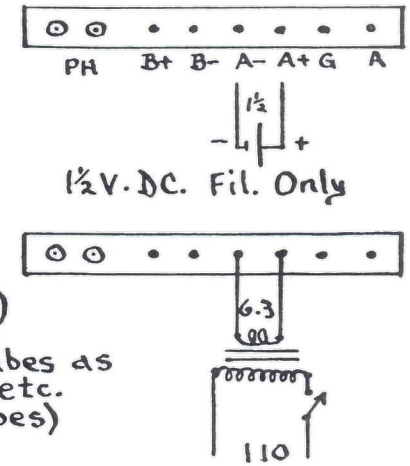
Paul T. Stroud, N. Car.: "I'm 16. I wired up 1-tuber. Been SWL for 3 yrs. but 1-tuber best yet. So. Africa (8400).. Peking (7500) Moscow, Albania (5200).. Prague (4800).. Cologne (4600).. Holland (4200).. Lisbon, London (4000).. Quito (2800).. Panama pt-pt(2000) Cuba (900).. VOA, 40 m. coil and about every nite. Peking at 0330 GMT and loudest on 40 m. Raleigh police on HF-BC and airports. The point-to-point station, in Panama, was on SSB, but finally I got the regeneration adjusted OK. Above logged in one month. I think you know what we Experimenters want and need. You may print this."

DISTANCES measured on a Globe. No other way is accurate. When you receive a DX station - write it down - giving dial setting as well as Antenna trimmer position as latter often works as a trimmer on SW stations. It isn't too hard to mount a Vernier dial on the 1-tuber. See page 12-B.

Page 12 cont. on page 13

CIRCUIT CHANGES FOR AC TUBES





As 1.4 v. tubes are getting scarce - we have arranged these circuit changes as shown. With this slight alteration - you may use either 1.4 v. or 6.3 v. AC tubes. For the latter - a 6.3 v. filament transformer is used - but don't use it with 1.4 tubes.

As no tube connection is used to #8 prong - we originally used it as a tie point. However, it is the cathode connection of an AC tube - so we ground it thru #7. After soldering the B-A- together - be sure to tape the joint as it is close to other connections.

Believe diagram is self-explanatory. Following tubes may be used without socket changes: 6EY6, 6EZ5, 6F6, 6G6, 6K6, 6L6, 6U6, 6V6, 6W6 or others by making minor socket changes. This extra power should bring in a lot more DX for you.

OVER OSCILLATION.

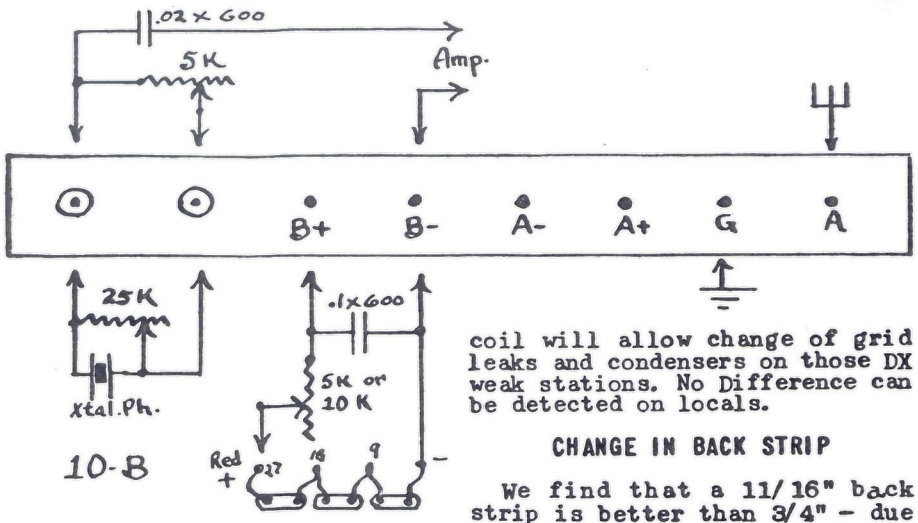
The better you wire your set - the more it will oscillate. The tickler windings are more or less standard. Certain tubes may oscillate more than others - so we've found by experience. Some tubes, of same mfr. are softer (detectors) and others harder (amplifiers). We used to shift 201-A tubes in early sets and increase DX many times. Also the elements may be spaced differently and change capacities.

Cutting the B-battery will help to control this situation. Put a 10K VC, shunted by a .1 by 600 v. bypass cond. in series with B as shown. Correct adjustment will smooth it out. As your batts. run down - a slight adjustment can be made. One Fan uses a 5K VC, set at 650 ohms on a new 22½ v. B-battery.

USING TRX BATTS. FOR B-SUPPLY.

Use 2 or 3 TRX 9 v. batts. in series by using battery connectors as shown. B drain is very low in a regenerative set - as it helps feed itself like an electrical motor. With connectors, batts. may be easily replaced at will.

If DP received separately, fold and push staple thru from center of HB-4. Trim off.



USING CRYSTAL PHONES.

Good results with matching impedance of Xtal phones is shown in diagram. Use about 25K for 1-tuber. 50K for Xtal sets - because 25K may cause Xtal sets to tune broadly.

ANOTHER WIRING CHANGE.

As HF signals on 20-40 meters prefer a very short path - we've helped them along by about 2". In our kits, some have wondered why the extra hole in the base. Solder a piece of #20 stranded hookup wire to frame of tuning condenser. Run thru hole and hook to (-) on coil socket for a more direct ground connection. Should help a lot in DX on SW BC.

A DIFFERENT GRID LEAK.

We have found a 3 or 3.3 meg. resistor is better than the regular 2.2 meg. as shown in most circuits. It helps weak stations a lot. Grid currents should be allowed to "leak off" at just the exact speed for utmost efficiency. 2½" Fahnstock clips soldered to #5 prong and grid of coil will allow change of grid leaks and condensers on those DX weak stations. No Difference can be detected on locals.

CHANGE IN BACK STRIP

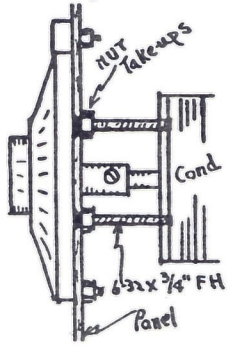
We find that a 11/16" back strip is better than 3/4" - due mostly to types of brackets in current use.

VOLUME CONTROL.

Often a 3/8" hole washer, put behind the panel, will place the VC in better position. Also when soldering the .0001 regeneration cond.- be sure leads don't short on frame. While we usually recommend 50K - 25K and others will work OK.

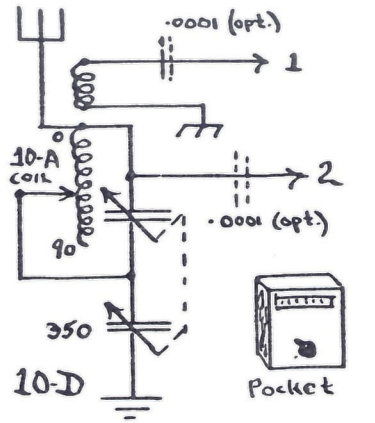
MOUNTING MRL VERNIER DIALS.

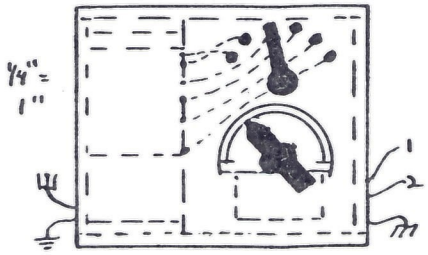
One of the best parts the Japs make - are their vernier dials. Their literature says "flush mounting" but, as languages differ, it is not what we call it. So Ur cond. must set back as shown. Use 6-32 x 3/4 FH screws and nuts as shown. Mount screws 4 dial loosely. Tighten up the lock nuts.



10-C

A GOOD SELECTIVE RF BOOSTER UNIT FOR ANY SET.





PARTS LIST.

1 2 gang .00035 var. condenser.
1 1½" bar knob and scale.
2 .0001 mica or ceramics.
1 Switch lever.
6 Switch points. 2 stops.
1 Compo. panel 5x6.
1 MRL 10-A coil.

This is an uncanny unit. It should be made up as a test instrument for your Lab. It should be mounted in a dust-proof box. It can be controlled from the top.

Input is to Aerial and ground. Output can be directly inductively-coupled to the set from (1) or capacitatively-coupled to the set from (2). An optional, more selective coupling may be had thru the .0001's. You can set a Pocket TRX set alongside this unit and increase volume many times - besides eliminating directional effects. Latter is one of the disadvantages of the Pocket sets - especially on DX. You will also find the Booster is effective when Pocket set is several feet away from it. It is amazing how the waves travel. It will also affect other nearby sets - if they have an Aerial or not. In apartments - where an Aerial is a big problem- it will also help. As Loopstick Aerials in Pocket sets are usually placed horizontally - try to lay the Loopstick parallel to the coil in the Booster.

The 1-tuber can hook to either (1) or (2), whichever you wish. Because the 10-A coil has taps to 5 turns - you can get down on SW stations very well. If you want lower than this- substitute a 3 turn coil on a 1" form for the 10-A coil.

10-A is wound on a 2XM Celluloid form (2 x 4½" long). At the end - wind 30 turns #26 enameled wire. Next to this - wind 90 Ts #24 DCC tapped at 5-10-20-40-65-90. We prefer #24 as it is more selective than #22.

Drill Compo. panel and spray it black or ? Use ¼" plywood box so coil fits snugly. Lift coil from panel with 6-32 x 3/4" BH-screw. Wire it up before putting in box. Run taps 5-10 shortest path. Lo-F taps as shown.

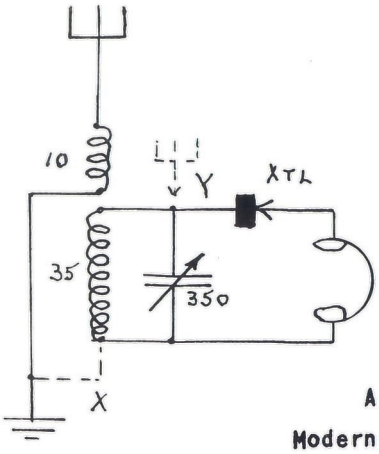
Many experiments can be made with this tuning unit. The 30 T. coil may couple direct to a TRX. It may be used as tuning unit for all kinds of circuits.

FINISHING PANEL AND BASE.

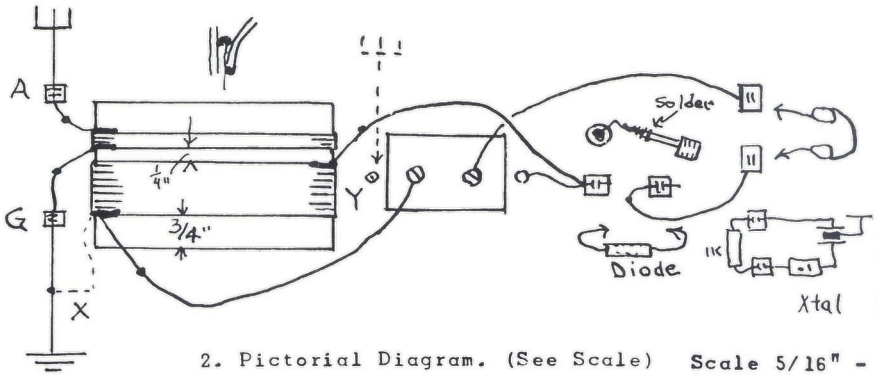
As time goes on - we get different methods of finishing. The base can be drilled and sprayed with Aerosol spray cans.

For the Aluminum panel - you can grain it by fastening a pc. of felt to a block of wood. Hold 0000 Sandpaper on this and run lengthwise in one direction. It can then be washed and sprayed with clear Lacquer. If you wish color- drill and clean with Ajax or other cleanser. Then spray

MI "ORIGINAL RADIO" CRYSTAL SET



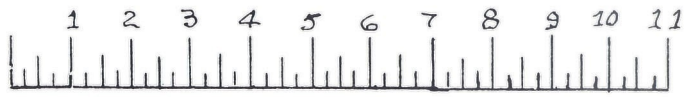
1. Schematic Diagram.

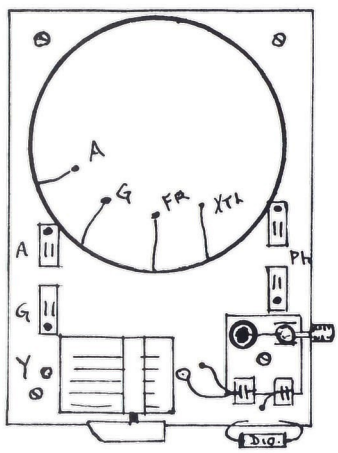


2. Pictorial Diagram. (See Scale) Scale 5/16" - 1"

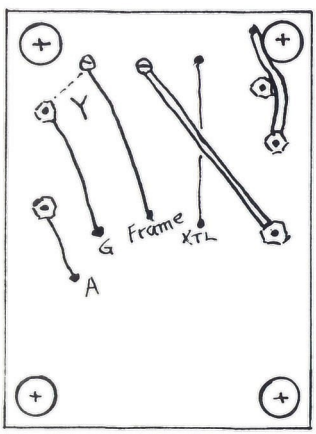
DP 74 MRL

A Detail Print by Modern Radio Laboratories.





3. Top Base View.



4. Bottom Base View.

In Dec., 1970, issue of "Mechanix Illustrated" (MI) appeared an article by Len Buckwalter, a customer of MRL. Altho it was entitled "Original" - it was about the type we were using in the early 1920's when broadcasting began. As for being "Original" - Marconi didn't invent the Wireless - he only helped commercialize it. Hundreds of able Scientists worked on it before him. It has been a hard pull to make Radio as simple as it is today for all of us.

This Xtal set contains about as few parts as anyone can use and still have practical tuning and separation of BC stations. For the beginner, with no previous experience - it should be easy to construct and operate.

Parts List.

1 5x7 plywood base, drilled.
1 .00035 variable condenser.
1 Assembled Xtal stand.
50' #22 Enameled magnet wire.
1 Pkg. MRL fine catwhiskers.
1 Crystal Diode.
1 1¼" black bar knob.
1 Dial scale to match cond.
4 3/4" Fahnstock clips.
4 ½" x 1" long wooden feet.
4 4 x 3/4" wood screws.
7 6-32 x ½" RH mach. screws.
5 6-32 x 5/16" hex. nuts.
1' #22 hookup wire.

LAYOUT. Use dividers and the 5/16" scale as shown to measure all distances. Drill holes in base - using 1/8" drill for all screw holes, and smaller drill for wire holes. After drilling - mount the condenser, stand and 4 Fahnstock clips. Cut around dial scale on top and leave flat bottom for glueing to the condenser frame.

COIL. Take a 4" dia. Quaker Oats' box and cut off at 2½" up from bottom. 3/4" up from bottom punch 2 tiny holes for start of secondary coil (2). Leave about 8" of wire and pull thru, back and thru to make it tight. Then stretch out wire and pull thru a rag to take out kinks. Wind on 35 turns and punch 2 more holes and anchor. Then 1/4" from this, punch 2 more holes for primary winding, leaving 8" of wire. Now wind on 10 turns and anchor the wire again. Lay coil on base and punch tiny holes thru bottom of box and pull wires thru (3).

Scrape ends of wire as Electricity won't travel thru enameled (shellacked) wire insulation. Hook to screws, etc. as shown. For simplicity - no soldering is required - altho wires soldered to lugs is better. Be sure to cinch up nuts good.

Push stand rod thru ball and solder heavy catwhisker (c/w) to shaft. Wrap fine c/w around this to make a fine contact with Xtl.

Put up a good high Aerial of 50 ft. in a City or 100 ft. or more in the Country. Clamp your ground wire around a water pipe or pipe into ground.

If within a few miles of a BC station - use set as is. Try reversing A-G connections for best results. If 10 or more miles to nearest station - put a jumper wire at (X). If more volume is needed - also put Aerial lead on condenser stator, or stationary plate lug (Y).

Steel galena, or other c/w Xtl may be used. For less trouble - push a fixed Crystal Diode into clips on the stand.

Any good magnetic phones are OK. If using Crystal phones - be sure to hook up a 1000 ohm resistor and .1 mfd. fixed condenser across phone clips as shown.

Altho we had been advertising Xtal sets since 1932 in many Radio magazines - we were surprised to find it was new to so many younger people. Dads had built them; their children had never heard of them! Evidently we hadn't been advertising in the best places. In 1920's Xtal sets were standard on all ships. At present writing we have received over 675 letters pertaining to this "new" field.

Many wanted the complete kit so we were forced to make them up - altho originals didn't use the primary winding. This is essential if you want good selectivity in separating stations. So by now - hundreds more are enjoying Xtal sets as a result of this article.

Xtal and small sets is a real big field. We have spent a good part of our life in this range. Look over our catalog and you'll see what we mean. You will also find our literature useful and interesting - we hope!

You never heard of Xtal sets? Did you know the present Transistor is a crystal set? It has 2 or 3 c/w contacts instead of just one, Looks like we'll never get away from them!