

Five-Band Magnetic Loop Antenna

Build a loop for QRP, and tune it up just right!

Francis Y. Kelson K2KSY/HL9BK
PSC 450, Box 0826
APO AP 96206-0826

The magnetic loop has been used successfully worldwide for many years, but one of the problems faced by builders today is the acquisition of suitable variable capacitors. Having tried ARCO trimmer caps which overheated on the higher frequencies, I decided to use coaxial cable, since it has the inherent capacity and voltage

protection needed for a 5 W-plus QRP signal. All coaxial cable has a specific capacitance per foot value, so it's a simple matter to calculate the length needed for a given capacitance. Also, its light weight maintains the loop's integrity.

With propagation conditions getting better by the day, this little device should lend itself quite well to the

QRP purist, or to the person who just wants to SWL or listen to his favorite net. Supplemented with a long wire antenna for the 3.5, 7.0 MHz bands, its noise-canceling ability should make for a good copy.

Construction

The loop consists of three parts. Printed circuit board 1 (PCB1) tunes the loop to the coaxial input. PCB2 mounts the desired capacitance on the other side of the loop. The loop itself (L2) is supported on a framework of crossed dowels.

Cut four 7/16-inch dowels to 31.5 inches each, and make a 1/16-inch slot in one end of each dowel. Shellac the dowels and set them aside to dry.

You'll need a block of wood for the hub, three inches square and two inches thick. Drill a 7/16-inch-diameter hole into the middle of each side of the block, to a depth of 1-1/4 inches. I also drilled a 1/4-inch hole through the center of the block for mounting. Shellac the block and set it aside to dry.

When the unslotted ends of the dowels are inserted into the hub, they should measure 30-1/4 inches from the hub's outer edge to the dowel tips.

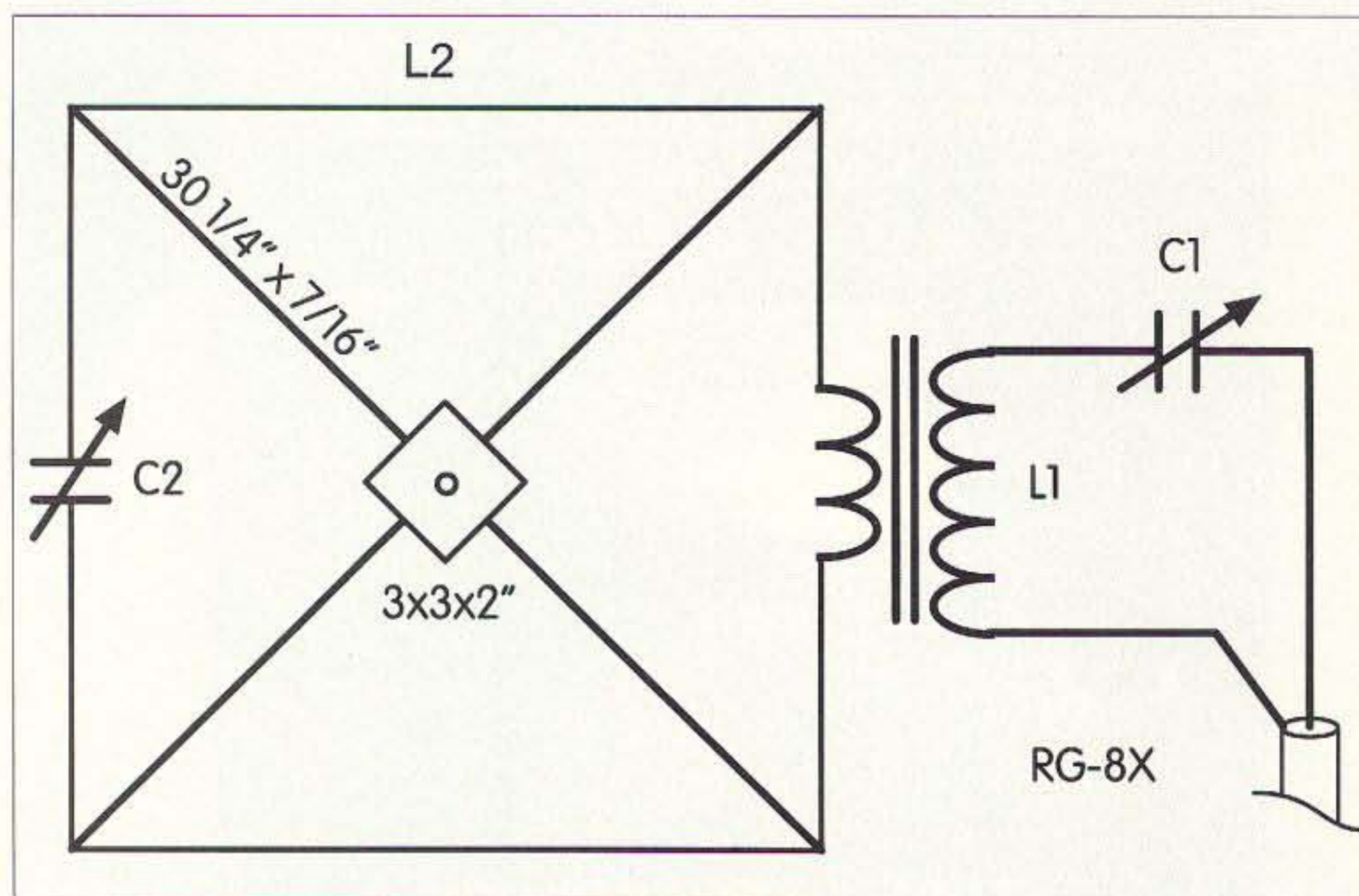


Fig. 1. Schematic diagram of the Five-Band Magnetic Loop Antenna.

Cut two segments of #22 audio wire, each 7 feet, 4-1/4 inches long. Strip 1/8 inch of insulation from each of the wires' four ends; tin each end with solder. Solder a Caltern™ ring terminal, common to auto wiring (the #22-18 Red are suitable), to each end of the wires.

Prepare two single-clad PCBs as depicted in Figs. 2 and 3. You may use something else, just as long as you keep the separation for L2 the same as shown, or else you may have trouble keeping L2 taut with the dimensions shown.

The coaxial input is L1, toroid T 68-7 White, wound with #24 enamel wire 25 turns, spaced approximately one millimeter apart. The secondary winding is prepared by winding the #24 enamel wire for a total of six turns, encompassing at least three-quarters of the toroid's primary. This will approximate a 75-ohm input, which is easily matched up with the RG-8X coax.

Remove the insulation from the toroids' four leads, and solder to PCB 1 (Fig. 2). Solder C1 across the copper traces on PCB1 as shown.

At this time you may want to apply coil dope or clear fingernail polish to coil L1.

Note that the negative PCB trace continues along a path beneath C1, so don't mount C1 flush against the PCB.

Mount the ring terminals of the audio wire to PCB1 and PCB2, using 6-32 x 1" screws, nuts, and washers. Use three nuts on each PCB, so that removal of L2 will be easy later on.

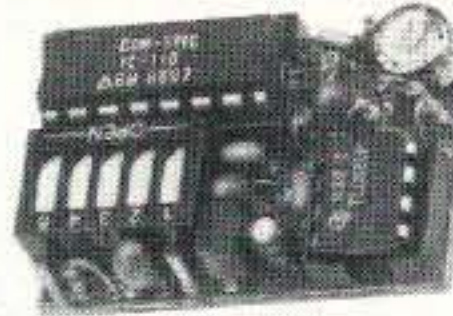
Insert the dowels into the hub, and align the wire on the dowels as shown in Fig 1.

You may remark on the fact that, worked out by the formula for determining cross-arm lengths, one quarter of L/7071 = 63.50 inches, but ours is 64 inches. This gives us a slight bow to the loop for rigidity—and it also looks nicer that way.

To build the various capacitors, you will need approximately five feet of RG-174U mini coaxial cable, plus a little extra to play with. Cut all coax as specified by the chart for your frequency of choice.

On each piece of coax, measure off one inch, and remove the outer insulation. Bend the coax at the point where

- DIP switch programmable
- CTCSS encoder
- All 32 EIA tones from 67.0 to 203.5 hz included
- May be ordered with custom tones



SS-32PA Encoder
.9" x 1.3" x .4"

SS-32PA DIP Switch Programmable CTCSS Encoder \$28.95

- Fully enclosed CTCSS encoder
- All 32 EIA tones from 67.0 to 203.5 hz included
- Perfect for mobile / base applications



TE-32
5.25" x 3.3" x 1.7"

TE-32 Multi-Tone CTCSS Encoder \$49.95



TP-3200 Shared Repeater Tone Panel

- 51 CTCSS Tones
- 106 DCS Codes
- Supports 157 Repeater Subscribers
- On-Line Computer Help
- Repeater CW ID
- Air Time Loading & Analysis Graphs
- Signalling Formats: CTCSS, DCS & DTMF

TP-3200D Table Top Version \$269.95 each
TP-3200RM-A Single Rack Mount version \$279.95 each
*TP-3200RM-B Triple Rack Mount version \$279.95 each
*Holds up to three TP-3200s.



ID-8 Automatic Morse Code Identifier
1.85" x 1.12" x .35"

NEW LOWER PRICE
\$69.95

ID-8 Automatic Morse Station Identifier \$89.95

Call or write to receive our full Product Catalog or visit our Web site for complete information at:
<http://www.com-spec.com>

COMMUNICATIONS SPECIALISTS, INC.
426 WEST TAFT AVENUE • ORANGE, CA 92665-4296
(714) 998-3021 • FAX (714) 974-3420
Entire U.S.A. (800) 854-0547 • FAX (800) 850-0547
<http://www.com-spec.com>

CIRCLE 10 ON READER SERVICE CARD

CALL TOLL FREE (800) 292-7711 orders only
Se Habla Español

YOUR ONE STOP SOURCE FOR ALL YOUR TEST EQUIPMENT NEEDS

CALL OR WRITE FOR OUR NEW FREE 64 PAGE CATALOG! (800) 445-3201

NEW XK-700 Digital / Analog Trainer
Elenco's newest advanced designed Digital / Analog Trainer is specially designed for school projects. It is built on a single PC board for maximum reliability. It includes 5 built-in power supplies, a function generator with continuously sine, triangular and square wave forms. 1560 tie point breadboard area. Tools and meter shown optional (Mounted in a professional tool case made of reinforced metal)

XK-700 Assembled and Tested \$189.95

XK-700 - SEMI KIT w/ Fully Assembled PC Board \$174.95

XK-700K - Kit \$159.95

Made in the USA

Elenco Scopes
Free Dust Cover and Probes

\$1325 25MHz	\$325
\$1330 25MHz Delayed Sweep	\$439
\$1340 40MHz	\$475
\$1345 40MHz Delayed Sweep	\$569
\$1360 60MHz Delayed Sweep	\$749
\$1390 100MHz Delayed Sweep	\$995
DS 303 40MHz/20Ms/s Analog/Digital	\$995
DS603 60MHz/20Ms/s Analog/Digital	\$1295

Four Functions in One
MX - 9300 \$459.95

Features:
• One instrument with four test and measuring systems:
• 1.3GHz Frequency Counter
• 2MHz Sweep Function
• Generator
• Digital Multimeter
• Digital Triple Power Supply
• 0-30V @ 3A, 15V @ 1A, 5V @ 2A

NEW Tektronix DMMs
• 40,000 count
• High Accuracy
• Tektronix quality
• 3yr warranty

DMM 912 \$189
DMM 914 \$235
DMM 916 \$275

20MHz Sweep/Function Generator with Freq Counter
B&K 4040

- 0.2Hz to 20MHz
- AM & FM modulation
- Burst Operation
- External Frequency counter to 30MHz
- Linear and Log sweep

10MHz B&K 4017 \$309
5MHz B&K 4011 \$239

\$399

Fluke Scopemeters

123...NEW...\$350
325.....\$1445
325B.....\$1695
99B.....\$2095
105B...NEW \$2495

ALL FLUKE PRODUCTS ON SALE

Technician Tool Kit
TK - 1500

28 tools plus a DMM contained in a large handle tool case with a handle ideal for every-one on the go.

\$49.95

Fluke Multimeters

Model 10	\$63	Model 12	\$84
Model 701i	\$75	Model 83	\$235
Model 731i	\$97	Model 85	\$269
Model 751i	\$129	Model 87	\$289
Model 771i	\$154	Model 853E	\$475
Model 791i	\$175	Model 867BE	\$650

B&K Precision Multimeters

Model 389	\$109	Model 388A	\$99
Model 390	\$127	Model 2707	\$75
Model 391	\$143	Model 2860A	\$79
Model 5360	\$195	Model 5370	\$219
Model 5380	\$265	Model 5390	\$295

DIGITAL LCR METER
Model LCR-1810

- Capacitance: 1pF to 20µF
- Inductance: 1µH to 20H
- Resistance: .01Ω to 2000MΩ
- Temperature: -20°C to 750°C
- DC Volts 0 - 20V
- Frequency up to 15MHz
- Diode/Audible Continuity Test
- Signal Output Function
- 3 1/2 Digit Display

\$99.95

B & K High Current DC Power Supply

- Variable 3-14 VDC
- Thermal Protection
- Current Limiting

Model 1686 12A \$159
Model 1688 25A \$239

B & K 13.8V Fixed DC Power Supplies

Model 1680 6A	\$39
Model 1682 15A	\$75

Quad Power Supply
Model XP-4

4 Fully Regulated DC Power Supplies in One Unit
4 DC voltage: 3.3V, -5V @ 1A, 5V @ 250mA, +12V @ 500mA
1 Variable 0-12V @ 500mA

\$29.95

Digital Multimeter
Model M-1700

\$39.95

11 functions including freq to 20MHz, cap to 20µF. Meets UL-1244 safety specs.

10% OFF ON ALL STANDARD AMATEUR RADIO PRODUCTS Including Accessories

Handheld Universal Counter

F2850 10Hz - 2.8GHz Dual Input \$149.00

NEW

F2800 1MHz - 2.8GHz \$99.00

Features:
• Full range 10Hz - 2.8GHz (F-2850)
• 16 segment RF signal strength bargraph 1MHz - 2.8GHz (F-2800)
• Dual 50Ω/1MΩ inputs. (F-2850 only)
• 16 segment RF signal strength bargraph (F-2850 only)
• 10 digital LCD display with backlight.
• 6 hour NiCd battery operation.
• High speed 250MHz direct count for high resolution.
• Multifunctions: Frequency, Period and Auto Trigger & Hold. (F-2850).

Kit Corner over 100 kits available

Model AR-2N6K
2 meter / 6 meter Amateur Radio Kit
\$34.95

Model AM/FM-108K
AM/FM Transistor Radio Kit
\$29.95

35mm Camera Kit
Learn all about photography
AK-540 \$14.95

No Soldering Required

REMOTE CONTROL CAR KIT
MODEL AK870

- 7 functions
- Remote control included

\$24.95

No Soldering Required

Guaranteed Lowest Prices

C&S SALES, INC.

UPS SHIPPING 48 STATES 5%
OTHERS CALL FOR DETAILS
IL Residents add 8.25% Sales Tax

150 W. CARPENTER AVENUE
WHEELING, IL 60090
FAX: (847) 541-9904 (847) 541-0710
http://www.elenco.com/cs_sales/

15 DAY MONEY BACK GUARANTEE
FULL FACTORY WARRANTY

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

CIRCLE 184 ON READER SERVICE CARD

73 Amateur Radio Today • January 1998 19

RF POWER AMPLIFIERS

High Power Amps
 144MHz 400watts
 220MHz 225watts
 440MHz 185watts

Model	Pin (W)	Pout (W)	Ic (A)	Gain/NF (dB)	Type
50 MHz					
0503G	1-5	10-50	6	15/0.7	LPA
0508G	1	170	28	15/0.7	Standard
0508R	1	170	28	-	CnDty/cc
0510G	10	170	25	15/0.7	Standard
0510R	10	170	25	-	CnDty/cc
0550G	5-10	375	59	15/0.7	HPA
0550RA	2-6	375	59	-	CnDty/fan
0552G	25-40	375	54	15/0.7	HPA
0552RA	25-40	375	54	-	CnDty/fan
144 MHz					
1403G	1-5	10-50	6	15/0.7	LPA
1405G	1-2	100	14	15/0.7	Standard
1410G	5-10	160-200	28	15/0.7	Standard
1410R	5-10	160-200	28	-	CnDty/cc
1412G	25-45	160-200	22	15/0.7	Standard
1412R	25-45	160-200	22	-	CnDty/cc
1448RA	25-5	160-200	29	-	CnDty/fan
1450G	5-10	350+	56	15/0.7	HPA
1450RA	2-6	350+	56	-	CnDty/fan
1452G	10-25	350+	50	15/0.7	HPA
1452RA	10-25	350+	50	-	CnDty/fan
1454RA	50-80	350+	40	-	CnDty/fan
220 MHz					
2203G	1-5	8-35	5	14/0.8	LPA
2210G	5-10	130	20	14/0.8	Standard
2210R	5-10	130	20	-	CnDty/cc
2212G	25-45	130	16	14/0.8	Standard
2212R	25-45	130	16	-	CnDty/cc
2250G	5-10	225	40	14/0.8	HPA
2250RA	2-6	225	40	-	CnDty/fan
2252G	10-25	225	36	14/0.8	HPA
2252RA	10-25	225	36	-	CnDty/fan
2254	75	225	32	-	HPA
2254RH	75	255	32	-	CnDty/fan
440MHz					
4405G	1-5	15-50	9	12/1.2	LPA
4410G	10	100	19	12/1.2	Standard
4410R	10	100	19	-	CnDty/cc
4412G	15-30	100	19	12/1.2	Standard
4412R	15-30	100	19	-	CnDty/cc
4448G	1-5	75-100	25	12/1.2	HPA
4448RA	1-5	75-100	25	-	CnDty/cc
4450G	5-10	185	35	12/1.2	HPA
4450RA	2-6	185	35	-	CnDty/fan
4452G	25	185	30	12/1.2	HPA
4452RA	25	185	30	-	CnDty/fan
4454RA	60-80	185	26	-	CnDty/fan

Description	Size	Wt	Connectors
LPA=Low-power amp	3x6x5	4lbs	UHF
Standard=Mobile/Base	3x6x11	6lbs	UHF or N
HPA=High-power amplifier	3x10x11	9lbs	UHF or N
CnDty/cc=Cont-duty/rack-mt	4x12x19	17lbs	UHF or N
CnDty/fan=Continuous-duty,rack-mount,w/forced-air cooling(2 fans) and low-profile.	Size=19wx5hx14d"		



Model 1410G

Model 1452G

Description: All amplifiers (non-rptr) are linear, all-mode with fully automatic T/R switching and PTT capability. The receive preamps use GaAs FET devices rated at .5 db NF with +18dbm 3rd order IP. LPA, Standard and HPA amps are intermittent duty design suitable for base and mobile operation. Continuous-Duty(repeater amps) are class C and convection-cooled(cc) or fan-cooled(fan).

Amplifier capabilities: High-power, narrow or wideband; 100-200 MHz, 225-400MHz, 1-2 GHz Military (28v). Also full Commercial line available - consult factory.

RX Preampifiers(Low-Noise)				
Freq	Model	NF (dB)	Gain (dB)	Connector
50 MHz	0520B	0.5	25	BNC
50 MHz	0520N	0.5	25	N
144 MHz	1420B	0.5	24	BNC
144 MHz	1420N	0.5	24	N
220MHz	2220B	0.5	22	BNC
220MHz	2220N	0.5	22	N
440MHz	4420B	0.5	18	BNC
440MHz	4420N	0.5	18	N
1.2GHz	1020B	0.9	14	BNC
1.2Ghz	1020N	0.9	14	N

Consult your local dealer or send directly for further product information/catalog. All products made in USA.

TE SYSTEMS TEL (310)478-0591
 P.O. Box 25845 FAX (310)473-4038
 Los Angeles, CA 90025

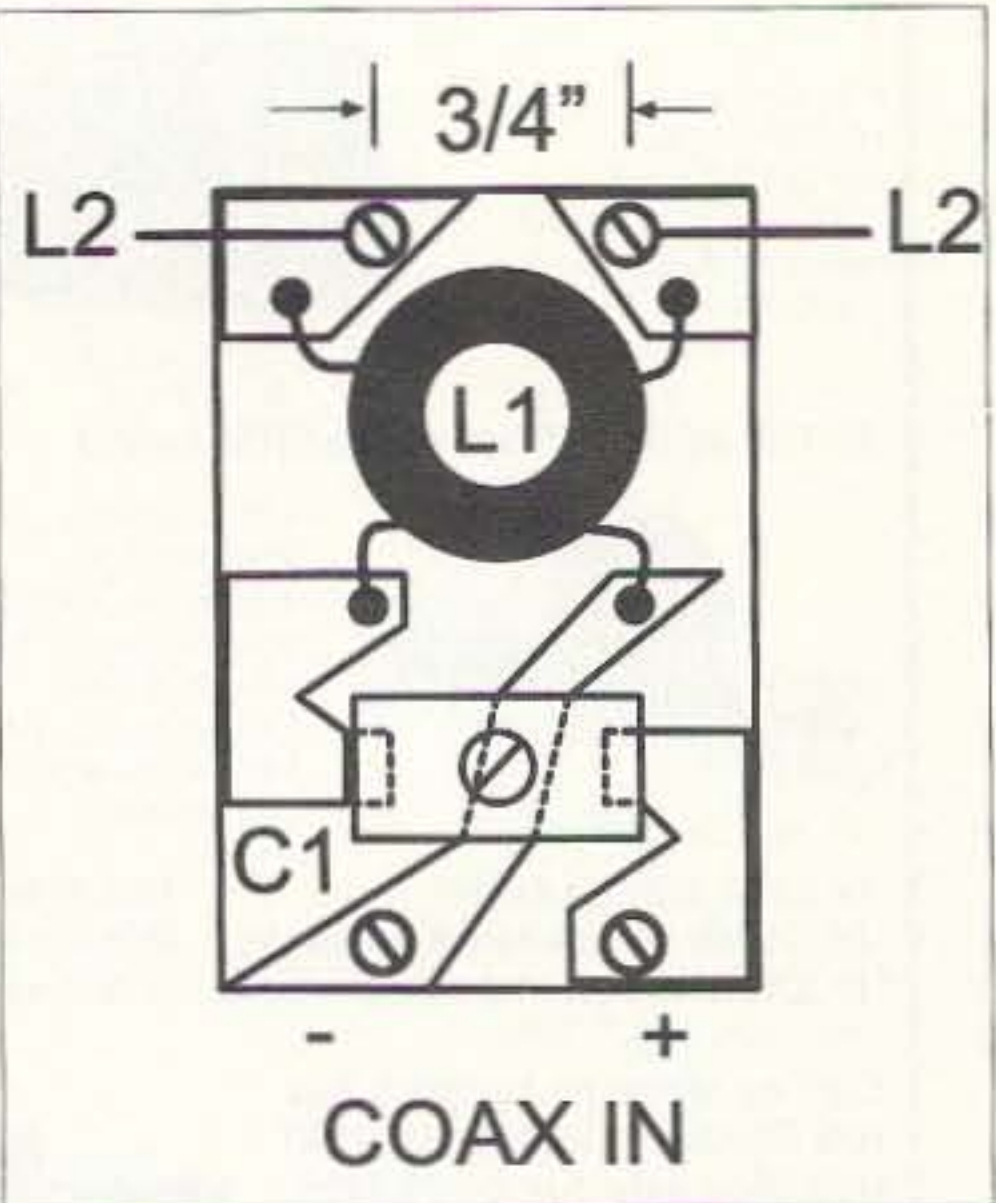


Fig. 2. PCB1 (approximately 2-1/4" x 1-1/2") provides mounting for the input circuit.

the outer insulation now meets the braid. With a sharp-pointed instrument, push aside the braid until the center conductor is exposed; extract it from the braid, leaving two terminal leads each one inch in length. Tin each tip lead, and solder on a ring terminal.

According to Table 1, measure off the specified length, from the junction of the braid and center conductor to the coax tip. Hold it!

Despite what the chart specifies, add one inch to each coax. You will use this extra length to compensate for the area density (capacitive effect) in which you will place your loop for operation. I tuned mine in the shack.

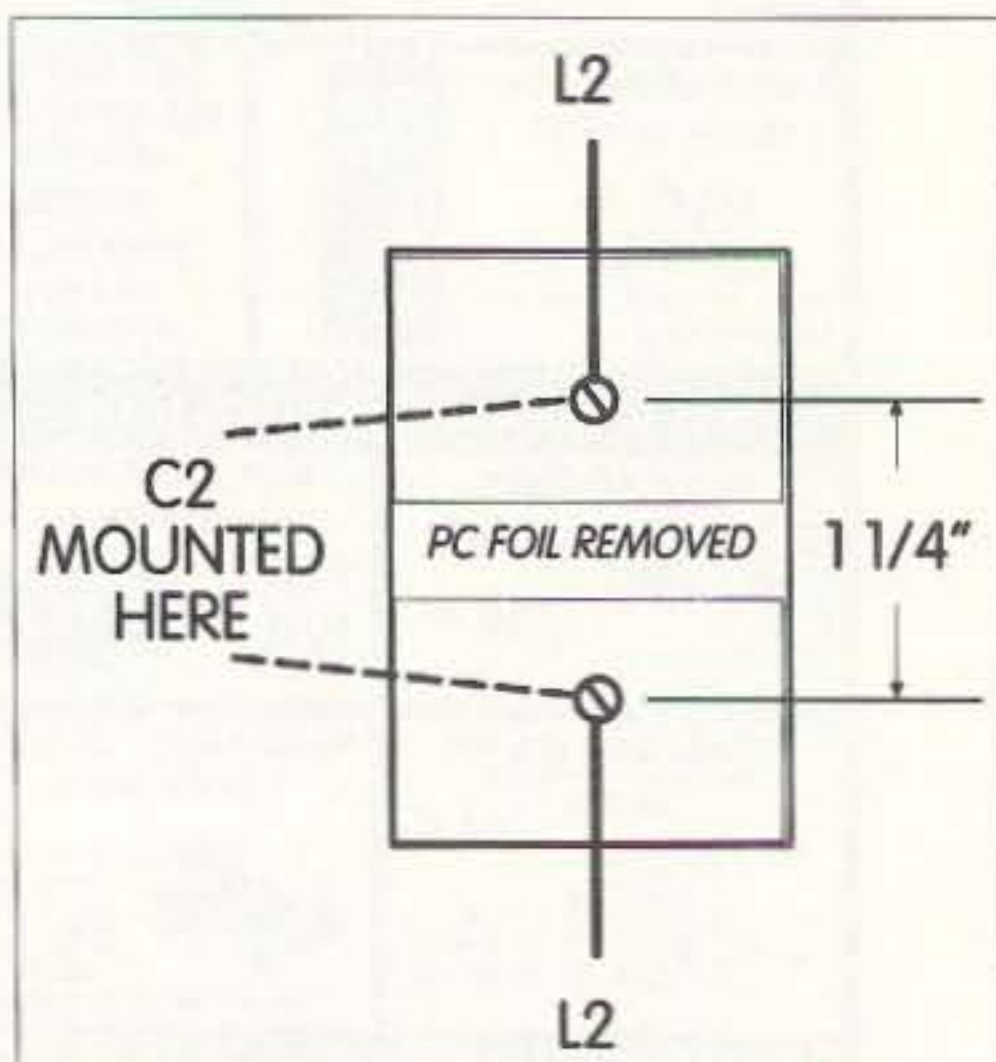


Fig. 3. PCB2 (approximately 2-1/4" x 1-3/4") connects the various capacitors to loop L2.

When I moved it out to the patio there was no change, but this will vary depending on your own surroundings. A 500 pF trimmer was used for the 3.5 MHz band, since the length of coax needed would have been quite long enough. However, this limits the power on this band to only a couple of watts.

If you elect to use the trimmer capacitors for all bands and are going to use two watts or less, just drop me an SASE if you're unsure of values and tuning, and I will be glad to explain it.

Tuning the loop

Connect your RG-8X mini coax to the loop's input as in Fig 2. You can use just about any length—I've used 16 to 50 feet in various situations. Connect the free end of this coax to an MFJ-249 SWR Analyzer. At this point you should have the capacitor of choice mounted securely to PCB2.

Search the analyzer for a frequency that obtains a dip. With the added one inch of coax, your frequency should be somewhat lower than expected. Then adjust C1 for the best dip possible. C1 will pull the loop's resonance point a little higher in frequency, so adjust the analyzer a little higher in frequency, and you will note that the SWR is getting lower.

Start to trim your RG-174 coax, about 1/8 of an inch at a time, until you are very close to the frequency selected, and repeat the procedure:

1. Check frequency for a dip.
 2. Adjust C1 for a dip.
 3. Check frequency again.
 4. Trim coax, recheck frequency.
- Repeat steps 1 through 4.

Once all your coax caps are resonant, simply roll the larger lengths of coax over two fingers and secure with a rubber band or tie-wrap. The 18 and 21 MHz capacitors are short enough to just hang freely.

Once C1 is optimized, for purity an antenna coupler can be used despite C1 being in series. Since the loop's bandwidth is about 50 kHz, the antenna coupler will allow wider frequency variations.

Desired Frequency	Length of Coaxial Cable
7.0 MHz	26-1/8 inches
14.0 MHz	5-3/4 inches
18 MHz	3-1/8 inches
21 MHz	1-5/8 inches
3.5 MHz	1 each Arco trimmer 500 pF

Table 1. RG-174U chart.

A wattmeter or SWR meter placed at the input of the loop should reveal a flat SWR when full power is applied. If it doesn't, retune the coupler and re-touch C1. Proper tuning is the key to success when using an antenna of this type. Use of a field-strength meter or neon lamp is a great help, too.

For operation outdoors, a couple of plastic pill bottles can be slipped over PCBs 1 and 2.

Seal the coax caps with Shoe Goop™, or cement, at their tips and terminal junctions.

If you cannot beg, borrow, or acquire an MFJ-249 SWR Analyzer, you could use a grid dip meter to acquire resonance, and with the application of very little RF power, obtain a roughly suitable SWR.

I have accomplished QRP DXCC, WAC QRP, and 1,000 miles per watt with Argentina using one watt of power. I also have 40 states confirmed, using mostly wire and loop antennas. **73**

See the FUN you've been missing!



Slow Scan TV

Every day more and more hams are enhancing their enjoyment of ham radio by adding images to their conversations. Join the fun!

new Pasokon TV Lite \$30 + \$3 shipping.
Pasokon TV Classic \$200 + \$5 shipping.

Absolute Value Systems
115 Stedman St. #7
Chelmsford, MA 01824-1823
(508) 250 0611

<http://www.ultranet.com/~sstv>

CIRCLE 351 ON READER SERVICE CARD

Qty.	Description
4	7/16" dowels, each at least 31.5 inches long
1	Wooden block for hub, 3 x 3 x 2 inches wide
15	Feet #22 insulated audio wire
5	Feet RG-174U mini coaxial cable
1	PC board, single sided, 3 x 5 inches
12	Caltern ring terminals, Red #22-18
1	Toroid, T 67-7 White
5	Feet #24 enamel wire
1	trimmer var. cap 500 (from Marvac, San Diego, CA)
6	6-32 x 1 inch screws
16	6-32 nuts, plus 12 #6 lockwashers

Table 2. Parts list.

WE SHIP WORLDWIDE Barry Electronics Corp. WORLD WIDE AMATEUR RADIO SINCE 1950 Your one source for all Radio Equipment!

KITTY SAYS: WE ARE OPEN 7 DAYS A WEEK
•Sat. 10-5 •Sun. 12:30-6 •M-F 9-6 Come to Barry's for the best buys in town.

MOTOROLA SP10, SP50, P110, GP300, GP350, P1225, M1225, M120, GM300, GR300 repeaters, & SM50

Radios for Business, Governments, Consulates, Embassies. Stocked and Serviced. Overseas and Domestic Orders.

"YAESU HAM & VERTEX BUSINESS RADIOS" FT51-R, FT-8500, FT-10, FT-11, FT-2500, FT-3000, FRG-100B, FT-1000D, FT-50R, FT-5200, FT-840, FT-900AT, FT-920, VXR-5000 repeater 25 watts, VHF or UHF. Marine Mobile VXM-100.



WHEREVER I GO, I TAKE MY RADIO. SPECIALIST IN RADIOS: •BUSINESS •MARINE •AVIATION •HAM RADIOS •SCANNERS

KENWOOD



Shortwave Receivers R-10, R-100, R-7000, R-8500, R-9000

NEW — 220 MHz BUSINESS RADIOS WITH REPEATERS

Business Radios: Motorola, ICOM, Maxon, Yaesu, FTH 2008/7008, etc. Uniden, Regency, Reim Marine ICOM: M10A, mli, etc. Aviation ICOM: A22, A200

Electron Tubes 3-500z, 572B, 6JS6C, 12BY7A, & 6146B



Save money on batteries. Call for Special Prices.

Barry's supplies all MFJ products Call us direct.

"TS-50S" TS-570D, TS-850S, A441A, TM-V7A, TM-942A, TR-751A, Th-235A, Kenwood Service Repair, TS140S, TS690S, TS-790A, TS950SD, TH 79A(D), TH2848A, TM-741A, TM-733A, TM-641A, TM-742A.

MARINE RADIOS ICOM M7, M11, M56, M710, M810, AVIATION PORTABLE ICOM A22, MOTOROLA, TRITON, MARINE

Surveillance Devices Available

Shortwave Receivers Drake • Grundig • JRC • Sony Sangean • Panasonic • Yaesu ICOM • Lowe • Kenwood

CB Radios Stocked 148GTL, Washington, Ranger 2950-70, Antennas: Wilson, Antron, etc. Power mikes w/boops - ECHO - SilverEagle etc.

ALINCO DJ-180, DJ-G5TY, etc.

Telephone Scramblers Hy-Gain Towers

ANTENNAS: A-S, AES, Cushcraft, Hy-Gain, Hustler, KLM, METZ, Urban, MODUBLOX, TONNA, Butternut, Multi-Band, Alpha Delta, ANLI, Antenna Specialist, Barker & Williamson, Comet, Diamond, GAP, Laresen, Etc. Watt-Meters Stocked.

Cellular Phones Shortwave Radios Scanners Best Prices

MOTOROLA RADIOS EXPORT & DOMESTIC CALL FOR PRICES



SHORTWAVE RECEIVERS STOCKED

Wide selection of SW & Amateur Publications

Computer Interfaces Stocked: MFJ-1270B, MFJ-1274, MFJ-1224, Kam Plus, KPC-3, MFJ 1278T, PK-900, DRSI PRODUCTS DSP 2232

Antenna Tuners: MFJ, ICOM, KENWOOD, YAESU, VERTEX

COMMERCIAL & HAM REPEATERS STOCKED. WRITE FOR QUOTES

KANTRONICS KAM PLUS Etc.

2 Meter, 440, 220MHz Band-Pass Filters from DCI

Bird Wattmeters & Elements in Stock



MOTOROLA AUTHORIZED DEALER KACHINA COMMUNICATIONS DEALER AUTHORIZED DEALER SONY Shortwave Radios Stocked

Overseas Telephone Systems for Rural Areas

BENCHER PADDLES BALUNS, LOW PASS FILTERS IN STOCK

ASTRON POWER SUPPLIES Belden Wire & Cable, Int'l Wire

Amplifiers- Icom, Kenwood, Yaesu, RF concepts, Mirage, TE Systems, HF/VHF/UHF, AMERITRON, etc.

Telephone Autopatch

Fm & AM Broadcast Transmitters Stocked Satellite Phones

Garmin & Magellan Global Positioning Systems

NEXTEL Radios-5 burrough coverage in NY.

BARRY ELECTRONICS CORP., 540 BROADWAY, NY, NY 10012 (Five blocks N. of Canal St., between Spring & Prince St.) FAX 212-925-7001 Phone 212-925-7000

New York City's LARGEST STOCKING TWO WAY RADIO DEALER COMPLETE REPAIR LAB ON PREMISES

"Aqui Se Habla Espanol" BARRY INTERNATIONAL FAX 212-925-7001 Phone 212-925-7000 For Orders Call 1-800-990-2929

Monday-Friday 9 AM to 6 PM Saturday 10-6 PM / Sunday 12:30-6

Subways: #6 Spring St. stop, N. or R. train to Prince St. stop F train to Houston St. stop. Bus: Broadway bus to Prince St. stop, Path train to 9th St./6th Ave.

COMMERCIAL RADIOS STOCKED: •MOTOROLA •ICOM •MAXON •STANDARD, •YAESU •RELM etc. We serve municipalities, businesses, Civil Defense, etc. Portables, mobiles, bases, repeaters...

e-mail: barry_electronics@compuserve.com
We stock: Alinco, Ameco, Ameritron, Antenna Specialist, ARRL, Astatic, Astron, Belden, Bencher, Bird, Butternut, CES, Cushcraft, Codan, Daiwa, Eimac, Henry Heil, Hustler, Hy-Gain, Icom, KLM, Nextel, Kantronics, Kenwood, Larsen, Maxon, MFJ, Mirage, Motorola, Nye, Palomar, RF Products, Shure, Standard, TUBES & Tube Carbons, Uniden, Yaesu, Vibroplex, Duplexers, Repeater, Scanners, Radio

WE NOW STOCK COMMERCIAL COMMUNICATIONS SYSTEMS DEALER INQUIRIES INVITED PHONE IN ORDER & BE REIMBURSED COMMERCIAL RADIOS STOCKED & SERVICE ON PREMISES. EXPORT orders shipped immediately. CALL

SALES FINAL Technical help offered upon purchase FAX: 212-925-7001

CIRCLE 41 ON READER SERVICE CARD