The LISTENER IN HANDBOOK

No. 2. CALL SIGNS 6D

FEATURES

Call Signs of all the Australasian Stations

How to Build the Simplicity Three.

Useful Wire Tables.

The Characteristics of Wireless Valves.

A List of Amateur Abbreviations.

A Useful Lesson in Soldering

Short Wave Stations of the World.

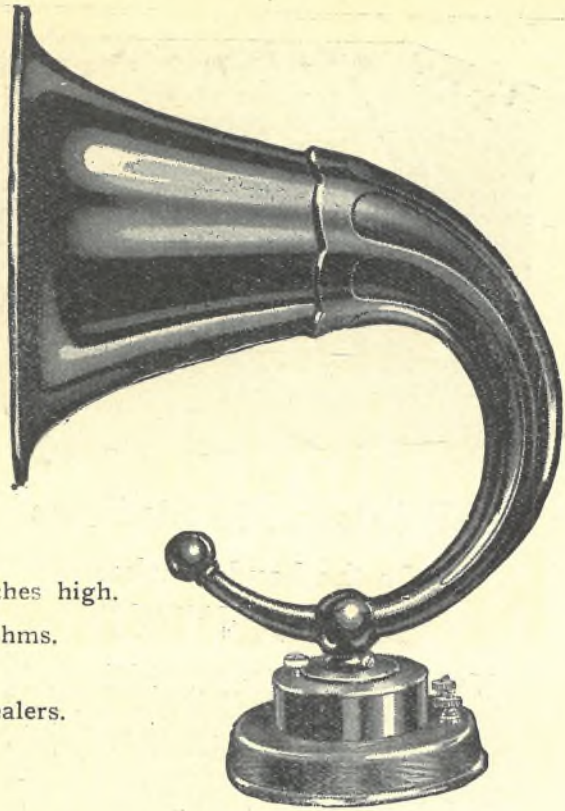
How to Build a Short Wave Receiver —The America Three.

How to Learn the Morse Code.

Aerials, and How to Erect Them.

How to Detect Faults Quickly.

How to Get the Best Results out of Your Crystal Receiver.



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The

Listener In Handbook

of

CALL SIGNS

and

USEFUL INFORMATION

for

RADIO ENTHUSIASTS

Price - - - SIXPENCE

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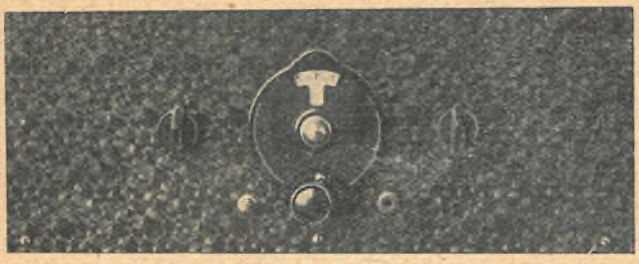


A Front panel view of the Receiver.

THE SIMPLICITY THREE

Particulars of the construction of an excellent broadcast receiver which will give loud speaker results on all the local stations.

IN DESIGNING the receiver hereafter described attention has been paid to the three chief characteristics of any good set. Simplicity has been obtained without in any way sacrificing the efficiency of the receiver, range is assured, and selectivity is made possible by the use of carefully designed tuning inductances.

No special care has been bestowed upon the appearance of the back portion of the receiver, the idea being to present an easily built receiver, which is within the power of the amateur set builder or the novice. For this reason the sub-panel arrangement has been dropped in favor of the older baseboard style. The more advanced set constructor will find it easy to adapt the layout to sub-panel mounting if desired, but for the novice baseboard mounting will be found to be much easier.

In searching for a circuit which would be easy to build, easy to tune, and would provide positive control of regeneration, consideration was given to the merits of many hook-up arrangements. Finally it was decided to use the standard throttle control receiver known in Australia as the "Schnell" circuit, because it was first introduced to Australia by Lieut. Schnell during the visit of the American Fleet in 1925.

This circuit is without peer for low wave work, and when tried out on broadcast wave lengths proved equal, if not superior, to any standard regenerative circuit yet tried.

The "throttle" method of regeneration control is effected by a capacity change of a variable condenser connected between the input of the first audio frequency transformer and the filament negative lead. The introduction of regeneration is brought about smoothly and easily by the rotation of the movable plates of the variable condenser.

From a perusal of the schematic diagram it will be seen that two variable condensers are used; the first controls the tuning and the second the regeneration. A verrier dial is fitted to the tuning condenser, but as

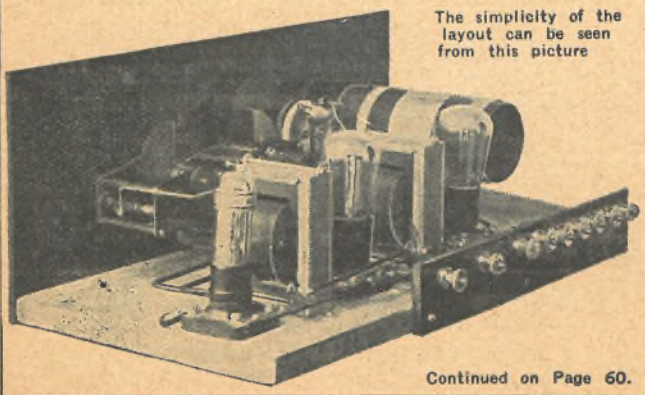
the regeneration control is capable of variation of a wide range without seriously affecting the reproduction of the receiver, it has been fitted with a similar knob to that used on the rheostat. One rheostat is used to control all three valves, it being found that the slight loss of efficiency due to this is more than offset by the gain in simplicity of control. In the audio frequency amplifying stages special low ratio transformers have been employed. The use of these in conjunction with proper "B" battery and bias voltages ensures tonal purity unmarred by the usual background of mush which accompanies the reception on the average valve set.

What's Wanted

The materials required to construct the receiver are as follow:—

1 panel, 18in. x 7in. by 3-16in.
1 baseboard 18in. by 9in. by ¾in.
3 valve sockets.
3 valves.
1 30-ohm rheostat.
1 filament switch.
1 phone jack.
2 .0005 mfd. variable condensers.
1 vernier dial.
1 5-megohm gridleak.
1 .0003 mfd. variable condenser.
2 transformers.
9 terminals.
1 piece bakelite, 2in. by 12in. by 3-16in.
1 bakelite former 2½in. diameter and 6in. long.
2 oz. 26 gauge d.c.c. wire.
12 lengths busbar wire.
6 lengths sleeving.
Miscellaneous screws and bolts.

The pictures will illustrate the layout of the receiver, but a few words about this phase of the work may not come amiss. The main tuning condenser is mounted directly in the centre of the panel, while the rheostat and the throttle condenser are mounted on the same plane, but four inches to the left and right of the main



The simplicity of the layout can be seen from this picture

Continued on Page 60.

AMATEUR ABBREVIATIONS

ABL.—Able.
ABT.—About.
ACT.—Account.
AER.—Aerial.
AGN.—Again.
AHD.—Ahead.
AMP.—Ampere.
AMT.—Amount.
ANI.—Any.
AUD.—Audible Audibility
B4.—Before.
BI—By.
BK.—Break, Back.
BLV.—Believe.
BD.—Bad.
BN.—Been.
BTR.—Better.
C.—See.
CANS.—Phones.
CKS.—Chokes.
CN.—Can.
COND.—Condenser.
CP-CPSE.—Counterpoise.
CRD.—Card.
CUD-CD.—Could.
CUL.—See You Later.
CUM.—Come.
DA.—Day.
DN.—Done, Down.
DNT.—Do Not.
DX.—Distance.
ERE.—Here.
EM.—Them.
ES.—And.
EVBDI.—Everybody.
EZ.—Easy.
FB.—Fine Business.
FM.—From.
FONES.—Telephones.
FR.—For.
FREQ.—Frequency.
GA.—Go Ahead.
GB.—Goodbye.
GE.—Good Evening.
GEN.—Generator.
GES.—Guess.
GG.—Going.
GM.—Good Morning.
GN.—Gone, Good Night.
GND.—Ground.
GUD.—Good.
HA.—Hurry Answer.
HAM.—Amateur.
HD.—Had, Head.
HI.—Laughter, High.
HR.—Hear, Here.
HRD.—Heard.
HV.—Have.
HVY.—Heavy.
HW.—How.
INPT.—Input.
KNW.—Know.
LITE—Light.
LTR.—Later, Letter.
LW.—Low.
MA.—Milliameter.
MANI.—Many.
MI.—My.
MILS.—Milliamperes.
MIM.—Exclamation.
MITY.—Mighty.
MK.—Make.
MSG.—Messages.
MTR.—Meter.
ND.—Nothing Doing.
NG.—No Good.
NIL.—Nothing.
NITE.—Night.
NM.—No More.
NT.—Not.
NW.—Now.
OB.—Old Boy.
OM.—Old Man.
OPR.—Operator.
OSC.—Oscillate.
OW.—Old Woman.
PSE.—Please.
PUR.—Poor.
PWR.—Power.
R.—All Right, Are.
RCD.—Received.
RES.—Resistance.
RITE.—Write, Right.
RPT.—Repeat, Report.
RUF.—Rough.
SA.—Say.
SED.—Said.
SEZ.—Says.
SHUD.—Should.
SIGS.—Signals.
SITE.—Sight.
SRI.SORRI.—Sorry.
SUM.—Some.
TKS-TNX.—Thanks
TNG—Thing.
TMW.—Tomorrow.
TRI.—Try.
TRUB.—Trouble.
TS.—This.
T.—The.
TT.—That.
U.—You.
UR.—Your.
V.—Volt.
URS.—Yours.
VY.—Very.
WD.—Word, Would.
WDS.—Words.
WN, WEN.—When.
WID.—With.
WK.—Work, Weak.
WL.—Will.
WN.—When.
WO.—Who.
WT.—What, Wait.
WUD.—Would.
WX.—Weather.
XMTR.—Transmitter.
XCUSE.—Excuse.
XPLAN.—Explain.
XTRA.—Extra.
YL.—Young Lady.
YR.—Your.
73.—Best Regards.
88.—Love and Kisses.
99.—Keep Out.
2.—Two, To, Too.
2DA.—Today.
4.—For, Four.
8.—Eight, Ate.

USES of WAVE TRAPS

A wave trap is simple to operate, once it is installed properly. Generally speaking, a wave trap works better when placed at a distance of four or five feet from the receiving set. If it is placed too close to the receiving set it acts as an inductor for the trap currents, throwing them back into the receiving set, and so diverting the purpose of the wave trap. The placing of the wave trap four or five feet from the receiving set does away with this possibility.

A good safe rule to follow is to place the wave trap at such distance from the receiving set that when one is seated in front of the receiver, the wave trap can be operated and yet the arm be fully extended while operating it.

Generally speaking, we find the wave trap to be very effective when the following conditions exist: Suppose for example that a distant concert can be tuned in while a local's is going so that the distant station can be heard through the local, then a wave trap may be expected to eliminate the local, and after a slight adjustment of the receiving set, the distant station can be heard very clearly without any interference from the local. This means that when you are able to hear a certain concert in the distance while a local is radiocasting, and wish to eliminate the local, leaving the distant concert sweet and clear, a wave trap will do the work very nicely. A wave trap once set for a particular station can be left alone for all time.

The Uses of the Trap.

Most wave traps have a switch attached to them in order that they may be connected in and out of the circuit at will. This feature is very useful and saves the changing of the wave trap when it is not in use. In this way it may be left set all of the time for some particular station which causes the bulk of interference, and then by simply throwing out the switch the wave trap is ready for instant service, and not even a word of a distant talk need be missed.

The wave trap provides a very simple yet effective device for those who feel that with a little greater selectivity they would be able to enjoy distant concerts even while a local concert was going.

An easy way to make a wave trap is to purchase one of the so-called neutroformers, or air-core transformers as they are sometimes called. By connecting the usual 23-plate condenser across the larger of the two coils and by connecting the smaller of the two coils (the one with the fewest number of turns) in series with the antenna lead, a very satisfactory wave trap can be constructed. A switch may be used to short the turns of the smaller coil (the one in series with the antenna), and this switch used as explained above.

A wave trap, however well designed, cannot be regarded as a "cure-all" for interference; but, properly used, it often adds just that element of selectivity that makes for enjoyable reception. It is a useful addition to any set, no matter how broad or selective the set may be.

Table of Wire Gauges

S.W.G	Diameter	Enamelled	TURNS PER INCH. S.S.C.	D.S.C.	S.C.C.	D.C.C.
16	.064	15	14.9	14.6	14.1	13.2
17	.056	17.1	16.9	16.5	15.9	14.7
18	.048	19.8	20.0	19.4	18.5	17.2
19	.040	23.7	23.8	23.0	21.7	20.0
20	.036	26.1	26.3	25.3	23.8	21.7
21	.032	29.4	29.4	28.2	26.3	23.8
22	.028	33.3	33.3	31.8	29.4	26.3
23	.024	38.8	38.5	36.4	33.3	29.4
24	.022	42.1	42.1	40.0	35.7	31.3
25	.020	46.0	46.0	43.5	38.5	33.3
26	.018	50.6	50.6	47.6	41.7	35.7
27	.0164	55.9	55.1	51.6	44.6	37.9
28	.0148	61.4	60.4	56.2	48.1	40.2
29	.0136	66.2	65.2	60.2	56.0	42.4
30	.0124	73.3	72.0	67.1	54.4	44.7
31	.0116	77.8	76.3	70.9	56.8	40.3
32	.0108	83.0	81.3	75.2	63.3	50.5
33	.0100	88.9	87.0	80.0	63.7	52.6
34	.0092	98.0	93.4	85.5	70.4	54.9
35	.0084	106	101	91.8	80.6	61.0
36	.0076	116	110	102	86.2	64.1
37	.0068	128	120	110	92.6	67.6
38	.0060	143	133	121	100	71.4
39	.0052	168	149	134	109	75.8
40	.0048	180	159	142	114	78.1

Current and Voltage Tables

The following are the electrical symbols generally employed in the computation of resistance, voltage, current and wattage:—

I=current in amperes
I×1000=current in milliamperes
I×1,000,000=current in microamperes
E=e.m.f., voltage, potential, electromotive force
R=resistance in ohms
Meg=megohm—1 megohm equals 1,000,000 ohms.
W=watts

By Ohm's Law—

$$I = \frac{E}{R}$$

$$R = \frac{E}{I}$$

$E = I \times R$ or IR

$W = E \times I$ or EI.

$W = I^2 \times R$ or I^2R

WHERE IS THAT FAULT?

To enable our readers to locate any fault that may occur in their apparatus, we have arranged the following charts—the Key and the Appendix. The working of these charts is very simple. For instance, suppose in your valve set that you are getting weak signals in your detector circuit. Look this up in the key, and you will see the figures 1, 2, 3, 4, 5, 6, 7, 8, 9, and 11. All that is now necessary is to look up these numbers in the Appendix to learn the most likely places for this fault to develop.

First, see that the earth, aerial, batteries, are connected to the set. If valves are used, see that they are O.K. For testing for short circuits, etc., use a pair of 'phones, connected in series with a dry cell.

——: KEY :——

VALVE SETS

No Signals. Weak Signals.

No signals in detector circuit. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

Weak signals in detector circuit. 1, 2, 3, 5, 6, 7, 8, 9, 11.

No signals in amplifier, but good in detector circuit. 4, 7, 12. Weak signals in amplifier, but good in detector circuit 4, 13, 14, 15.

Noises in detector circuit. Popping, scratching, knocking sounds.

Noises that are affected by tuning. 10, 16, 17, 18, 19, 20, 21, 22.

Noises that are not affected by tuning. 6, 10, 19, 20, 21, 23, 24, 25.

Noises similar to 2, but in amplifier.

Turn out filament valve or remove detector valve. If noise continues, it is in the amplifiers. 10, 12, 23, 38.

Howls, signals and whistles.

In detector circuit, and are affected by tuning. 16, 17, 18, 20, 26, 27.

In detector circuit; and are not affected by tuning. 4, 21, 28.

In amplifier circuit. 10, 15, 29, 30.

Humming Sounds. 9, 31, 32, 33, 34, 44.

Unsteady Signals. 19, 23, 35, 36, 37.

Audio Frequency Tube Oscillating. 38.

CRYSTAL SETS

Noises weak, or no signals. 3, 6, 7, 8, 36, 40, 41, 42, 43

APPENDIX

1 Run down batteries.
2 Grid condenser short circuited.
3 Aerial or ground not connected.
4 Valve not making proper contact with socket.

5 Batteries reversed. Negative H.T. to plate.
6 'Phones broken or burnt out, broken cords.
7 'Phone or transformer condenser shorted.
8 Primary circuit not tuned.
9 Grid coil disconnected.
10 Poor connections. Apparatus worn out. Re-wire set.
11 Reaction coil reversed. Alter connections.
12 Transformers burnt out.
13 "A" battery unable to supply current for more than one valve.
14 Lighting amplifiers after tuning in upsets detector valve.
15 Primary of transformer reversed.
16 Too high a "B" battery voltage on detector valve.
17 Too much inductance in reaction coil.
18 Filament voltage on detector too high.
19 Valve oscillating intermittently, due to poor contacts in aerial circuit. Popping or knocking sounds.
20 Excessive grid charge, thus paralysing the detector valve. A howl of any pitch, down to a knocking sound about 10-30 per second. Decrease filament voltage; decrease reaction coupling; reduce inductance of plate coil; reduce resistance of grid leak.
21 Dust between plates of variable condenser.
22 Touching metallic parts of oscillating circuit.
23 Bad rheostat; use vernier type on soft detectors.
24 Plate and grid shorted. This shorts the "B" battery to negative filament.
25 Crashes and crackles that cannot be eliminated are static. No remedy.
26 Resistance of grid leak too high.
27 Whistling notes which do not alter during tuning indicate that two stations are almost on the same wave. Your neighbor is listening with an oscillating receiver.
28 Plate leads near, or touching grid condenser.
29 Try placing a fixed condenser of .002 across the secondary of the transformer.
30 Transformers too close. Separate and place at right angles.
31 Plate and ground leads too close.
32 Vibrations from A.C. mains picked up by grid condenser.
33 Do not use circuits in which the aerial is connected to the plate. Bad connection or leaks causing leakage from plate to earth, or negative filament.
34 A hum may be picked up when the leads from a battery charger are left connected to the set.
35 Loose coils vibrate and change inductance.
36 Rain, which causes leaks from aerial to earth.
37 Fading. No cure.
38 Shorts between turns or layers of A.F. transformer.
39 R.F. valve oscillating. Adjust potentiometer.
40 Point of cat whisker oxidised. Cut with scissors.
41 Greasy crystal.
42 Bad contact between crystal and cup.
43 Detector not adjusted to most sensitive spot.
44 A humming sound of about 60 cycles, which cannot be eliminated, may be due to induction from A.C. lighting mains.

2 VOLT VALVES—

Type	Fil. Volts	Fil. Amps	B Volts	C Volts	Impedance	Amp. Factor	Make	Use
DE2 LF	1.8	0.12	20.80	—	22,000	7	Osram	1, 2
DE2 HF	1.8	0.12	40.100	4	45,000	12	Osram	2, 3
DE6	1.8	0.5	60.120	9	10,000	5	Osram	5
PM1 HF	1.8	0.1	30.100	2.3	28,000	13	Mullard	1, 2, 4
PM1 LF	1.8	0.1	30.100	1.4	18,000	9	Mullard	2, 3
PM2	1.8	0.15	50.100	4.10	8,750	5	Mullard	5
A225	2.0	0.06	80.120	1.3	41,000	25	Philips	4
A209	2.0	0.06	50.120	1.6	20,000	9	Philips	1, 2, 3
A241	2.0	0.06				41	Philips	
B205	2.0	0.15	80.120	4.9	3,500	5	Philips	3
B203	2.0	0.15	50.150	4.10	2,000	3	Philips	5
R52	1.8	0.25	40.80	3.4	40,000	7	Radio Technique	1, 2
R50	1.8	0.25	40.80	3.4	25,000	7	Radio Technique	1, 2, 3
WD11	1.5	0.25	20.90	4	14,000	5	Radiotron	1, 2, 3
WD12	1.5	0.25	20.90	4	14,000	5	Radiotron	1, 2, 3
210 HF	1.8	0.1	50.70	—	44,000	22	Cossor	1
210 D and LF	1.8	0.1	30.50	4.6	22,000	9	Cossor	2, 3
210 RC	1.8	0.1	80.120	3	70,000	40	Cossor	4
220 P	1.8	0.2	90.110	2.16	5,000	5	Cossor	5
B21	2	0.1	40.150	4	32,000	16	BTH	1, 2, 3
B22	2	0.1	40.100	6	14,000	7	BTH	1, 2, 3
B23	2	0.2	40.100	6	8,000	6	BTH	1, 2, 5
B8	1.8	0.1	100.150	3	180,000	50	BTH	1, 2, 3
B3	1.8	0.35	20.80	3	27,000	7	BTH	1, 2, 3

Key.—1 Radio Frequency Amplifier, 2 Detector, 3 Audio Frequency Amplifier, 4 Resistance Coupled A.F. Amplifier, 5 Power Valve.

4 VOLT VALVES—

Type	Fil. Volts	Fil. Amps	B Volts	C Volts	Impedance	Amp. Factor	Make	Use
DE 38	2.8	0.06	40.120	4	50,000	17	Osram	1, 2, 4
DE 3	2.8	0.06	20.80	4	22,000	7	Osram	2, 3
DE 4	3.8	0.3	20.120	6	10,000	7	Osram	5
PM 3	3.7	0.1	30.125	1.4	16,000	13	Mullard	1, 2, 3, 4
PM 4	3.7	0.1	30.100	2.7	7,000	7	Mullard	1, 2, 3
PM 254	3.7	0.25	50.125	5.17	3,500	3	Mullard	5
A 410	3.4	0.06	50.90	—	22,000	10	Philips	1
A 430	4.0	0.06	50.90	—	60,000	30	Philips	1
A 409	3.4	0.06	15.120	1.9	9,000	9	Philips	1, 2, 3
A 425	3.4	0.06	20.120	4.6	25,000	25	Philips	1, 2, 3
B 403	3.4	0.15	50.150	15.24	2,100	3	Philips	5
B 406	3.4	0.1	30.120	3.9	4,300	6	Philips	1, 2, 3
R15	3.2	0.06	80.120	4.6	15,000	11	Radio Technique	4
R 24	3.2	0.06	80.120	4.6	50,000	15	Radio Technique	4
R 31	3.5	0.85	120.250	6.8	6,000	5	Radio Technique	5
R 54	3.8	0.4	80.200	6.10	4,000	8	Radio Technique	5
UX 199	4.5	0.06	45.90	4	15,000	6	Radiotron	1, 2, 3
UX 120	4.5	0.125	135	22	6,600	3	Radiotron	5
410 HF and DET	3.8	0.1	60.100	30.45	20,000	20	Cossor	1, 2
410 LF	3.8	0.1	70.100	4.7	10,000	10	Cossor	3
410 RC	3.8	0.1	80.120	2	80,000	40	Cossor	4
410 P	3.8	0.1	90.110	10.16	5,000	5	Cossor	5
R	4	0.7	40.100	3	27,000	7	BTH	1, 2, 3
B 5	2.8	0.06	20.80	4	17,000	7	BTH	1, 2, 3
B 5 H	2.8	0.06	40.120	1½	55,000	17	BTH	1, 2, 3
B 6	2.8	0.12	40.120	4	12,000	8	BTH	1, 5

Key.—1 Radio Frequency Amplifier, 2 Detector, 3 Audio Frequency Amplifier, 4 Resistance Coupled A.F. Amplifier, 5 Power Valve.

6 VOLT VALVES—

Type	Fil. Volts	Fil. Amps	B Volts	C Volts	Impedance	Amp. Factor	Make	Use
DE 8 HF	5.6	0.12	20.120	4.9	25,000	16	Osram	1, 2, 4
DE 8 LF	5.6	0.12	20.120	4.9	8,000	7	Osram	1, 2, 3
DE 5 B	5.0	0.25	40.120	4.6	30,000	20	Osram	2, 4
DE 5	5.0	0.25	20.120	4.6	8,000	7	Osram	3,5
DE 5 A	5.0	0.25	60.120	10.18	4,000	3	Osram	5
PM 5 X	5.5	0.1	30.125	1.3	19,000	17	Mullard	1, 2, 3, 4
PM 5 B	5.5	0.1	50.125	2	74,000	37	Mullard	1, 2, 4
PM 6	5.5	0.1	30.100	2.6	5,700	7	Mullard	1, 2, 3
PM 256	5.5	0.25	50.125	5.17	3,500	3	Mullard	5
A 609	6.0	0.06	20.150	5.15	6,000	9	Philips	1, 2, 3
B 605	6.0	0.1	20.150	3.18	3,100	5	Philips	5
A 630	6.0	0.06	20.180	4.10	35,000	30	Philips	1, 2, 4
R 46	5.0	0.25	80.120	6	12,000	7	Radio Technique	1, 2, 3
R 27	4.5	0.8	120.250	10	6,000	5	Radio Technique	5
UX 200 A	5.0	0.25	15.40	—			Radiotron	2
UX 200	5.0	1.0	15.25	—	11,000	8	Radiotron	2
UX 201 A	5.0	0.25	15.135	4.9	11,000	8	Radiotron	1, 2, 3
UX 112	5.0	0.5	22.157	6.10	4,800	8	Radiotron	3, 5
UX 171	5.0						Radiotron	5
610 HF and DET	5.5	0.1	20.120	3.6	20,000	20	Cossor	1, 2
610 LF	5.5	0.1	60.100	3.7	8,000	8	Cossor	3
610 RC	5.5	0.1	80.120	1.3	80,000	50	Cossor	4
610 P	5.5	0.1	100.150	12.30	3,000	3	Cossor	5
B 2	5	0.7	40.120	4	37,000	10	BTH	1, 2, 3
B 4	6	0.25	40.120	4	6,000	6	BTH	1, 5
B 4 H	6	0.25	60.150	3	28,000	20	BTH	1, 2, 3
B 7	6	0.06	40.120	27	12,000	8	BTH	1, 5
B 11	6	0.5	160.200	33	25,000	3	BTH	5

Key.—1 Radio Frequency Amplifier, 2 Detector, 3 Audio Frequency Amplifier, 4 Resistance Coupled A.F. Amplifier, 5 Power Valve.

AMATEUR "Q" SIGNALS
and Their Meanings

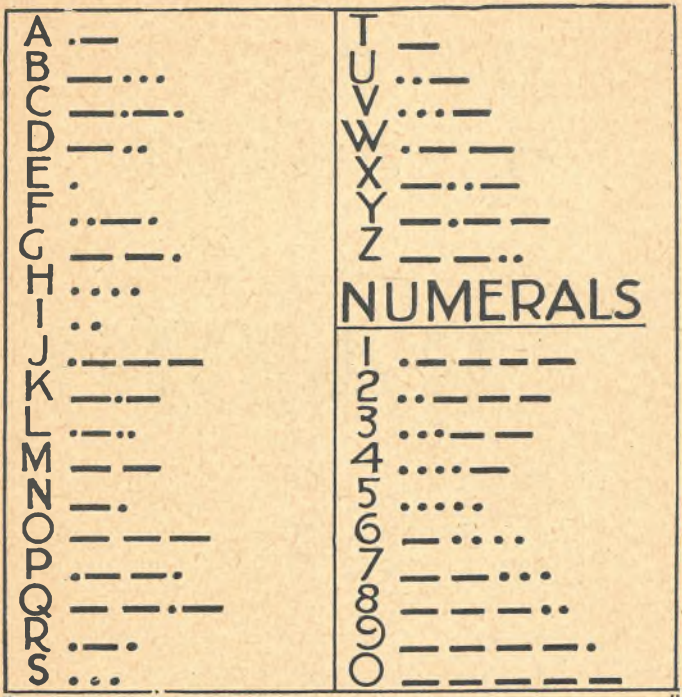
Many Listeners who tune in the transmissions of both commercial and amateur telegraph stations are puzzled by the "Q" signal abbreviations used by their operators. This list comprises the most generally used signals and should render intelligible many messages which are at present cipher to the listener who does not understand the "Q" abbreviations.

QRA?—What is your address?
QRB?—What is your distance?
QRH?—What is your wavelength in metres?
QRK?—How are my signals?
QRM?—Are you being interfered with?
QRN?—Are atmospherics strong?
QRQ?—Shall I send faster?
QRS?—Shall I send slower?
QRT?—Shall I stop sending?
QRV—I am ready. All right now.
QRX?—Shall I stand by?
QRZ?—Are my signals weak?
QSA?—Are my signals strong?
QSC?—Is my morse (sending) bad?
QSL?—Will you acknowledge?
QSO?—Are you in communication with any ship or station?
QSS?—Are my signals fading?
QSSS?—Are my signals swinging?
QST?—Have you received the general call?
QSY?—Shall I send on a wavelength of —— metres?
QSZ?—Do you wish me to send each word twice?

AUDIBILITY SIGNALS

The meanings of the several audibility signals as as follows:—

R1—Faint signals, just audible.
R2—Weak signals, barely readable.
R3—Weak signals, but readable.
R4—Fair signals, easily readable.
R5—Moderately strong signals.
R6—Strong signals.
R7—Good strong signals, readable through lots of interference.
R8—Very strong signals, several feet from ear-phones stuff.
R9—Extremely strong signals.



LEARNING THE CODE

The average broadcast listener is often non-plussed by the Morse signals which sometimes break in on his receiver, and wishes he could decipher them. When he is attracted to short wave reception a knowledge of the Morse code is even more necessary, for nine-tenths of the communication carried out on the lower waves is by means of code. However, given time and patience, there is no reason why anyone cannot learn to read the code at a speed sufficient to enable him to decipher the greater part of any message which he may hear, excepting, of course, those transmitted by high speed automatic apparatus, which sends the signal out at the rate of 100 to 400 words per minute.

The only apparatus necessary to commence code practice is a telegraph key and a high-pitched buzzer. These are connected in series with a battery of sufficient voltage to operate the buzzer.

Firstly, the code should be memorised. It is important that the code should be thought of as sounds and not as a combination of dots and dashes. For instance, C would be thought of as dah dit dah dit, and not as dot dash dot dash. Then the characters should be sent very slowly, until the learner gets an idea of the various sounds which go to make up each character.

Once the beginner is satisfied that he knows all the characters he may commence listening to code transmissions. These may be heard on almost any wave length, but the best place to find them is on the 30-40 metre wave band, where there are many amateur and commercial stations always at work.

The beginner should not become discouraged if he can only read a few letters in every sentence. Speed and accuracy in reception will come after practice. It is always best to listen to a station which is transmitting slightly faster than one can comfortably receive.

A much better method is to get a friend who is an expert at code reception and transmission to send words and sentences at varying speeds, increasing the latter as the reader becomes more proficient. It is bad practice to attempt to guess the words being sent, and for this reason it is advisable for the sender to "cipher" the transmission. Another point well worth noting is that it is considered good practice among telegraph operators to keep at least a word behind the transmitter, so that no words will be guessed at.

The Weight of Ebonite

As most home constructors know, ebonite is sold by weight, at so much per pound weight. Sheet ebonite is obtainable in varying thicknesses, and can be obtained in practically any size desired, being cut to size usually as it is required by the purchaser.

The following table will probably prove of assistance to purchasers, enabling them beforehand to have an accurate idea of the cost of a piece of any given size and thickness.

Thickness.	Sq. ins. to the oz.	1 square foot weighs
1/16in.	11	13oz.
3-16in.	7.38	1lb. 3 1/2oz.
1/4in.	5.54	1lb. 10oz.
3/8in.	3.69	2lb. 7oz.
1/2in.	2.76	3lb. 4oz.

From the foregoing the weight of a panel of a given size can be calculated, and if the price per lb. is known the price can readily be calculated. For example, suppose a panel of ebonite 9in. by 6in. by 1/4in. thick is required. The total area of a panel of that size is 54 sq. in., or three-eights or a sq ft. The weight of the panel will therefore be three-eighths of 1lb. 10oz. (see table above), or 8 1/2oz., a fraction over half a lb.

AMATEUR INTERMEDIATES

An authoritative list of the prefixes which enable listeners to determine the nationality of the stations they hear.

A WORD of explanation may not be out of place. The "international intermediate" is the combination of letters used by telegraphing amateurs instead of the formerly-used "de" between the call of the station desired and the call of the sending station, for the purpose of indicating the nationality of the stations involved. In recent months the number of countries "on the air" has grown to proportions that exhausted the alphabet, thus involving two-letter combinations, many of them unofficial and without co-ordination.

New Intermediate

The international Amateur Radio Union recently announced a new and carefully-considered plan of two-letter intermediates for all the countries of the world, to be employed in the same fashion as hitherto. Under this plan the first letter of the intermediate indicates the continent, the second the nation. Whereas under the old procedure it was necessary to assign and anounce an intermediate for each new country coming on the air, the present plan provides for every country in existence, and only a repartitioning of the nations of the world wil make further revision necessary.

EUROPE

EA—Austria
EB—Belgium.
EC—Czechoslovakia.
ED—Denmark and Faroe Ids.
EE—Spain and Andorra.
EF—France and Monaco.
EG—Great Britain and North Ireland.
EH—Switzerland.
EI—Italy.
EJ—Jugo-Slavia.
EK—Germany.
EL—Norway, Spitzbergen and Franz Josef Land.
EM—Sweden.
EN—The Netherlands.
EO—Irish Free State.
EP—Portugal, Madeira Id., and the Azores.
EQ—Bulgaria.
ER—Rumania.
ES—Suomi (Finland) .
ET—Poland, Esthonia, Latvia, Courland and Lithuania.
EU—U. S. S. R. ("Russia"), including Ukraine.
EV—Albania.
EW—Hungary.
EX—Luxemburg
EY—Greece.
EZ—Zone of the Straits.

ASIA

AA—Arabia.
AB—Afghanistan.
AC—China (including Treaty Ports), including Manchuria, Mongolia and Tibet.
AD—Aden.
AE—Siam.
AF—French Indo-China.
AG—Georgia, Armenia and Azerbaijan.
AH—Hedjaz.
AI—India (and Baluchistan) and Goa.
AJ—Japan and Chosen (Korea).
AK—(Unassigned).
AL—(Unassigned).
AM—Federated Malay States (with Straits Settlements).
AN—Nepal.
AO—Oman.
AP—Palestine.
AQ—Iraq (Mesopotamia).
AR—Syria.
AS—Siberia, including "Central Asia."
AT—Turkey.
AU—(Unassigned).
AV—(Unassigned).
AW—(Unassigned).
AX—(Unassigned).
AY—Cyrpus.
AZ—Persia.

NORTH AMERICA

NA—Alaska.
NB—Bermuda Id.
NC—Canada, Newfoundland and Labrador.
ND—Dominican Republic.
NE—(Unassigned).
NF—Bahama Ids.
NG—Gautemala.
NH—Honduras.
NI—Iceland.
NJ—Jamaica.
NK—(Unassigned).
NL—Lesser Antilles.
NM—Mexico.
NN—Nicaragua.
NO—British Honduras.
NP—Porto Rico and Virgin Ids.
NQ—Cuba and Isle of Pines.
NR—Costa Rica.
NS—Salvador.
NT—Haiti.
NU—United States of America.
NV—(Unassigned).
NW—(Unassigned).
NX—Greenland.
NY—Panama.
NZ—Canal Zone.

SOUTH AMERICA

SA—Argentine.
SB—Brazil, Trinidad Id., and St. Paul, Id.
SC—Chile.
SD—Dutch Guiana.
SE—Ecuador and Galapagos Archipelago.
SF—French Guiana.
SG—Paraguay.
SH—British Guiana.
SI—(Unassigned).
SJ—(Unassigned).
SK—Falkland Ids. and Falkland Dependencies.
SL—Colombia.
SM—(Unassigned).
SN—Ascension Id.
SO—Bolivia.
SP—Peru.
SQ—(Unassigned).
SR—(Unassigned).
SS—(Unassigned).
ST—(Unassigned).
SU—Uruguay.
SV—Venezuela and Trinidad.
SW—Unassigned).
SX—(Unassigned).
SY—(Unassigned).
SZ—(Unassigned).

OCEANIA

OA—Australia (and Tasmania).
OD—Dutch East Indies.*
OE—Melanesia.*
OH—Hawaiian Ids.
OI—Micronesia.*
OO—Polynesia.*
OP—Philippine Ids.
OZ—New Zealand.

Continued on Page 56.

LONG DISTANCE AERIALS

A non-technical discussion of the points which should be observed in erecting an efficient aerial system.

It does not follow from the title of this article that there is any material difference between the type of aerial which will give the best results on local stations. A point which does arise, though, is that whereas one hundred per cent. efficiency is not absolutely necessary when an aerial is to be used for local work, it becomes essential when long-distance work is tackled. It is often a disadvantage to have a very good aerial as under such conditions the energy picked up by it is so great as to overload even a crystal when a couple of stages of amplification are used to work a loud speaker.

Those who really desire a really efficient aerial for long-distance work can get over this difficulty in a number of ways without the trouble of erecting two aerials. They can, of course, use a couple of stages of radio frequency amplification without either aerial or earth, and use the outdoor aerial for receiving another station on another set at the same time. This is quite practicable. Some alteration in tuning is effected, of course, but this is a minor matter. Perhaps the best method is to disconnect the earth wire altogether when using a super efficient aerial. This should tone down the reception from the local station to reasonable volume. A certain amount of detuning can also be tried.

The Best Type.

Now to consider what really is the best type of aerial for long-distance work. The type and size of aerial is governed, when no transmitting is done, mainly by the wavelengths on which the user wishes to receive. As a general rule, it may be stated that it is inadvisable to make any very great changes in the wavelength of an aerial either by adding inductance or capacity in the receiver itself. This, of course, is the normal method of tuning. What it means is, that if the natural wavelength of the aerial is a hundred metres and inductance is added in the receiver to enable it to tune up to ten thousand metres, the results would not be so good as if an aerial which had a natural wavelength nearer to that to be received were used. However, as few amateurs wish to receive anything on a wavelength higher than six hundred metres, it can be assumed that the aerial is to be used somewhere about the broadcast band. This type of aerial will be discussed first. A great deal has been said about the comparative merits of the "T" and

the inverted "L" type of aerial. Possibly, under local conditions, one may be a little better than the other, but it is doubtful whether there is anything in the choice. It is not so much a matter of type as of construction that is the vital point in aerials.

Choose either the inverted L or T and then make certain that it is properly erected. If broadcasting is the main reception wanted, then a single wire aerial is better than a double or multi-wire one, unless space is very confined.

Height Important.

The main point in aerial erection is to raise the wire above the ground level. This does not mean above the ground itself, but above the level of any surrounding objects which are earthed. The ground level in this case may be taken as the level of the roof tops of surrounding houses, unless there happen to be a number of trees about, when the tops of the trees will constitute the ground level. It must be remembered that anything touching the wire will convey the currents passing in it to earth if the other end of the interfering object is earthed. An earthed object, therefore, such as a tree, will convey these currents if it is sufficiently near the aerial wire or lead in, and the space between it and the aerial acting like a condenser. As the currents flowing on the surface of an aerial wire are high frequency currents it follows that they are capable, to some extent, of jumping physical gaps. Therefore, we arrive at our first rule. Erect the aerial in such a way that it clears the ground level, if only by a few inches, and so that the nearest earthed object is far enough away from it to be safe. It will be found that even if the aerial has to be shortened to achieve this object, the results will be better.

We have now succeeded in ensuring that currents will flow in the aerial when they come into contact with it, in preference to flowing to earth via trees or some such adjacent conductors. Let us now ensure that we do not lose any of these currents while they are passing via the lead-in to the set.

Again, it must be remembered that high-frequency currents will jump gaps, and will prefer to the actual aerial a directly-earthed conductor if they can reach one.

This means that every portion of the aerial system must be kept well clear of surrounding earthed objects.

A common fault is to arrange the lead-in so that it falls in close proximity to the walls of the house.

This is very bad practice, even when insulated wire is used. Insulation will not keep high-frequency currents in a wire.

In nearly all cases where the inverted "L" is used the lead-in will fall parallel with the house wall. In the case of a "T" aerial the lead-in, brought from the aerial at a point some distance from the house, will not come into proximity to it until it actually enters the lead-in tube.

Precautions must not be relaxed even after the lead-in has entered the house. The tube should pass through the wall or window frame, and be long enough to project a considerable distance, say a foot at least, on either side, thus keeping the wire clear of walls.

It is suicidal to fasten the interior lead-in wire along the wainscoting or wall. It should be carried from the inside end of the tube is such a manner that it hangs absolutely clear of ceiling, walls and floor until it reaches the set.

Having considered the most important points, it is well to attend to some which, though less important, are still worthy of consideration.

Insulators and Their Uses.

If an aerial mast carries no guy wires any higher than about half way up, it is not necessary to worry about insulators. If the guys are carried to the top, then every guy wire, whether reaching to the top or not, should carry insulators breaking it into unequal parts.

These insulators should be set in pairs; one is not sufficient.

The aerial itself should carry double insulators in series between the wire and the spreader. If this is done and the insulators spaced a fair distance apart, no trouble should be experienced; and additional insulators between spreader and pole are rather a disadvantage than an advantage.

Distance From Mast

Again, even if it means sacrificing some of the length of the aerial, it is wise to erect it so that the wire itself finishes some distance from the pole.

A wire drawn so tight that the insulator is touching the pole itself is not efficient.

If the aerial is of the "T" type, measure the point where the lead-in is to connect so that it is absolutely the electrical centre; if an inverted type, connect the lead-in so that it is at the exact end.

If attention is paid to these points in construction instead of to the fetish of erecting an aerial as high and as long as possible, the results will be surprising.

It is quite certain that the man with a small, and, perhaps, not too high aerial which is really efficiently erected, will get results far better than the man with a great aerial reaching seventy feet above his house and stretching for a full hundred feet from pole to pole if this latter is erected, as many aerials are, without any considerations of electrical efficiency.

It is all very well to have an aerial which will catch the faintest tremors, but what is the use of it unless these are conveyed safely to the receiver?

For short-wave work the length of the aerial does not matter greatly although its insulation does. The aerial described above will work perfectly down to twenty metres.

BEHIND THE SCENES

AS a strictly wholesale house, A. G. Healing Ltd. are not much "in the public eye" — the work they do for radio is more or less unseen — behind the scenes, as it were.

But, nevertheless, radio is benefiting considerably from the influence of houses like this, whose fair dealing, trade protection policies and permanent financial stability have already done much towards stabilising radio.

The biggest responsibility that a wholesaler has is to be sure that the goods they distribute are dependably satisfactory. Proof that A. G. Healing Ltd. recognise and shoulder this responsibility is seen in their steady, consistent growth right through the thirty years during which they have been in wholesale business — this growth is a tribute to their policy of selling only high grade, dependable products.

A plan recently adopted by Healing's in order to help radio users to identify dependable products, has already made a considerable impression, both on the public and on the trade. All advertisements for those selected products which Healing's stand behind, now carry a special identification symbol, indicating that these brands are Healing Quality Products, and Satisfaction is guaranteed. Readers will be well advised to specify the brands which are associated with the Healing Quality Symbol, when buying radio products.

The illustration below, reproduced from the architect's sketch, shows the new building now in course of erection for A. G. Healing Ltd., on the corner of Franklin and Anthony streets. The floor space available here will amount to one hundred thousand square feet.

SOLDERING HINTS

In the construction of radio receivers it is highly important that all electrical connections have a low resistance, and the most satisfactory way to accomplish this is to make a smooth, firm soldered joint at every point where a connection exists. The necessity of soldering is probably the reason why thousands of radio enthusiasts have not attempted to build their own sets, and also, the lack of properly soldered connections is one of the chief faults with most home-constructed sets.

Although the very thought of soldering may cause many to turn away from building sets, it should be explained that if the directions, which appear in newspapers, and magazines at frequent intervals, are followed carefully no difficulty should be experienced. After a half-hour of experimenting it should be possible for anyone to make satisfactory small soldered connections of the type used in wiring radio sets. However, it must be remembered that there are rules which must be followed if good results are to be obtained, and in this article a few valuable suggestions on the subject will be made.

Clean Iron Necessary

As an aid to making good soldered joints a clean iron is absolutely necesary. The heat which is continually applied to a soldering iron causes it to become dirty and unfit for service very quickly. Also, only too frequently, the careless radio constructor attempts to solder with a dirty iron rather than spend a few seconds cleaning it, and as a result he spends twice as much time making a poor connection as would be required to make a good connection with a clean iron.

There are many ways in which an iron may be cleaned, some are very satisfactory and others are not recommended. Some set builders make a practice of attempting to keep their iron in condition by dipping it in a tin of soldering paste at frequent intervals. This method is not good. In most cases soldering paste is resin dissolved in some solvent and the hot iron is apt to boil out the solvent and cause the resin to become hard. Also by this method the iron is not thoroughly cleaned, due to the fact that only a small part of it touches the paste and therefore above the tip a hard substance will form which can be removed only with a file.

It is possible thoroughly to clean an iron with the least amount of effort by using neutralised soldering acid. Soldering acid may be made by buying a small bottle of commercial muriatic acid at the drug store and neutralising it by placing a few small pieces of metalic zinc in the bottle. The zinc is added in small quantities until the acid fails to dissolve any more.

Use of soldering acid is not advisable for cleaning joints when soldering, but it is excellent for cleaning the iron. If the iron is very dirty it should be filed until it is bright on all sides. The oxide on the surface of the iron should next be removed with sal ammoniac when the iron is hot. Sal ammoniac may be purchased at any ironmonger's. A block large enough to last the set constructor for many years should not cost more than a few pence. Next, while the iron is still hot solder should be applied on all sides in order to "tin" the iron. If a thin coat of solder adheres to the iron it has been properly cleaned. On the other hand, if it is found difficult to "tin" the iron it should be reheated and treated with sal ammoniac.

In soldering, it is possible to use either a small electric iron or the old type of iron which is heated over a flame. For radio construction work the electric iron is far more convenient and satisfactory. It keeps at the proper heat without the necessity of returning it to the flame at frequent intervals. This is a great advantage, as it gives the constructor ample time to make a good. job. Small ordinary irons are not recommended.

Kinds of Flux

There are two types of flux which may be used with satisfaction; one is a paste flux consisting of resin dissolved in vaseline, and the other a liquid flux consisting of resin dissolved in alcohol, to which a small quantity of glycerine is added. As a flux it is also possible to use resin core-wire solder, and this is probably the most satisfactory of all, as the solder and flux may be applied at the same time. Also the resin core solder has just the right amount of flux to make a good joint.

In soldering, it is important to have the iron properly heated. It should always be just hot enough to allow the solder to run freely, but should never be "red" hot. In making a joint, apply a small quantity of flux first, then the iron and then the solder. As soon as the solder flows remove the iron, and when the joint is cold remove the excess flux.

It is not advisable to use an acid flux when soldering connections in a radio receiver, and under no condition should it be employed for soldering connections to phone jacks, transformers, etc. It is apt to eat or corrode the metal and cause a leak across the two terminals upon which it has been used. Corrosion of this kind will often materially decrease the efficiency of the set. The best flux to employ when wiring a radio receiving set is ordinary resin, or resin dissolved in denatured alcohol. Resin is an excellent insulator, and will not cause corrosion.

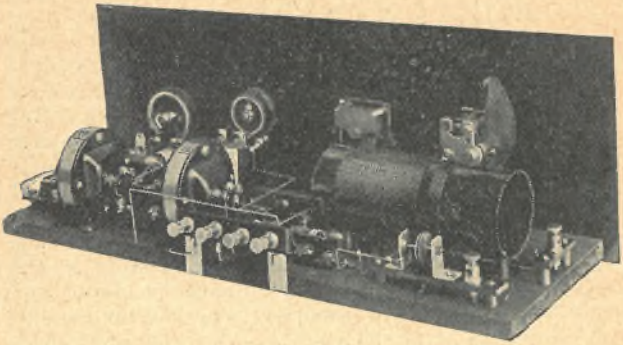
Emergency Solder.—When you are out of solder, small joints can often be "soldered" by using tinfoil, with the usual fluxes. Care should be taken, however, to get enough foil melted down to complete the job, as owing to its lack of thickness there usually is very little metal present.

FOR CRYSTAL USERS

Although they do not realise it, very many listeners who use crystal receivers are having their results considerably impaired by the use of defective crystals. Unless carefully protected from dust, and particularly from grease from the fingers, a piece of crystal gradually loses its sensitivity. Even when the crystal is not handled and is protected by a glass cover, there is a tendency for the crystal to fall off in sensitivity, due mainly to the deposition of traces of moisture on the crystal surface from the air. Tarnishing of the surface of the crystal is a secondary factor causing trouble. As the falling off in efficiency is only gradual and there is no visual evidence, the trouble may escape notice until a new crystal is put in place of the older one. When this is done the increase in signal strength is often asonishing.

A faulty crystal usually has few really sensitive spots. It is a good plan to keep available a spare crystal, preferably in a sealed tube, and if there is any suspicion that the crystal in use is faulty to replace it. If the new crystal shows an improvement then the old crystal is at fault, but if there is no change the trouble must be elsewhere in the receiving set.

Several methods of restoring old crystals to full sensitivity have been suggested from time to time. As good new crystals are now so cheap and easily obtained it is hardly worth using any of these methods except as an emergency. The simplest way of improving the operation of a faulty crystal is to split it in two with a light blow from a hammer, or with a pair of pliers. A new surface is thus exposed. Occasionally this method will fail, because certain crystals are sometimes treated chemically to increase their sensitivity, but this treatment affects only the surface exposed at the time of treatment. Because there is so little apparatus used in the crystal receiver the average listener is rather inclined to take its satisfactory operation for granted. However, the fact that there is so little to go wrong with the crystal set is all the more reason why nothing should be allowed to impair reception. Of course the most important item in any set, whether valve or crystal, is the aerial system, and this should be the most efficient possible. In the receiver itself all connections should be soldered, and the contact-making faces of all terminals kept bright and clean. The receiver should preferably be enclosed in a cabinet, but when this has not been done it should be dusted periodically. Nothing will reduce the strength of a receiver so much as the breakdown in insulation caused by particles of dust forming a partial short circuit.



A back panel view of the receiver.

THE AMERICA THREE

The short wave receiver described in the following article has a world-wide range, and will bring in the international short-wave broadcasting.

IN the early days of radio, before the advent of broadcasting, it was the fashion of experimenters to sit up all hours of the night, copying the Morse press messages transmitted from the high-powered long wave-length stations operating in various parts of the world. When broadcasting arrived this practice was displaced and the next generation of experimenters was far more interested in listening to baritones and sopranos than in lying in wait for the high-pitched whistles of the code transmitter.

However, the true experimenter is ever in search of fresh fields, and it was not long before local broadcast reception palled, and attention was given to the logging of stations located in other countries.

Commercial broadcasting is not intended for ultra long distance reception; the stations are designed to give maximum service over a limited range, and, although the station engineers are always pleased to receive reports of reception of the station in distant parts, they do no operate the transmitter with this idea in view.

It was not long before the experimenter realised the foregoing, and the immediate result was a desire to achieve something more in the way of "D.X." than the reception of stations some 1500 or 2000 miles distant. It is on this account that the reception of low wave length stations has become increasingly popular. Where

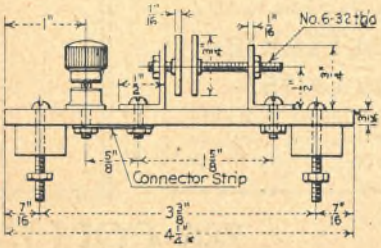
the logging of a broadcasting station 2000 miles distant requires the use of a powerful receiver of the super-heterodyne variety, the reception of Morse stations 12,000 miles distant can be accomplished with the aid of a simple receiver, sometimes with only a single valver.,

The First Low Loss Receivers.

The beginning of the short wave era was marked by the use of the "low loss" receiver — a truly fearsome-looking object, and one calculated to strike terror into the heart of the would-be short wave experimenter. The coils were mounted "on air," and the condensers were fitted with extension shafts from twelve to eighteen inches in length. The bases were usually removed from the valves, which were mounted in the receiver upside down and connections made direct to the grid, plate and filament leads where they were brought through the "pinch."

The operation of these early short wave receivers was even more complicated than their construction. The use of inductive reaction obtained by the use of home-made coils on variable mountings made it almost impossible to duplicate the logging position of a single station. To add to the experimenter's troubles it was almost impossible to get authoritative information on the construction and operation of short wave sets.

Contrast this with the present day short wave receiver which is designed like an ordinary broadcast set, is no more difficult to build, and, if anything, is easier to operate than its high wave length prototype. The great change which has taken place in short-wave set design during the past twelve months is in the direction of reaction control. The old unstable, inductive, form of reaction has given way to the more efficient and stable capacitative method. Vernier dials, too, play an important part in the construction of short wave sets and with the aid of these and capacity control of reaction, it is possible to duplicate the logging positions of a station at any time, provided, of course, that, in the meantime. the owner of the transmitter has not altered the wave length.



How the Micro Condenser is Made.

Printed and Published by EDGAR H. BAILLIE for United Press Proprietary Limited, "Herald" Building, 62 to 74 Flinders St., Melbourne.

Broadcasting Stations On The Low Waves.

The broadcast listener may say, "Oh, yes; that's all right, but what's the use of my building a special receiver for short wave work when I can't read Morse?"

In answer to this pertinent question, it may be said that, although the majority of the stations found on the lower wave lengths use the Morse code as a medium of communication, there are also a number of broadcasting stations in operation. The latter are all experimental stations, and as such have no fixed schedules, but the short wave set owner can be assured of picking up at least one of these experimental stations at almost any time. In addition to several high-powered stations, including the Americans WGY, KDKA, and 2XN, the Dutch station PCJJ and the Japanese station J1PP, there are a number of Australian amateur transmitters operating broadcast stations on the lower wave lengths. Principal among these are 6AG Perth and 5BG Adelaide. The former station is operated by Mr Coxon, Chief Engineer of the Westralian Farmers', while Mr. Harry Kauper, Chief Engineer of 5CL, is responsible for the South Australian transmitter. Station 6AG operates on 100 metres, and puts over some very fine re-broadcasts of the ordinary 6WF programmes. This station has been heard at excellent strength by listeners located in the Eastern States, and can be found almost any Sunday evening from 10 o'clock onward.

Lower down the wave length scale 5BG can be heard on approximately 33 metres. This transmitter is only one of the several operated by Mr. Kauper, and the broadcast programmes, which consist mainly of gramophone selections, come in at excellent strength.

Easy To Build.

As mentioned previously, the construction of a short wave receiver is not difficult, and provided that the intending constructor approaches the job with a full understanding of the conditions under which the set is to function, no trouble should be experienced in obtaining first-class results. A glance at the schematic diagram of the receiver will show that the circuit is, in many respects, similar to the well-known Schnell receiver. The main differences are that a series aerial condenser is used instead of the inductive method of aerial coupling, and that the regeneration control is effected by means of a resistance in the "B" battery lead to the detector valve. Another refinement is the inclusion of a micro variable condenser in shunt with the main grid tuning condenser.

The resultant receiver has marked advantages over the usual "throttle" control type of set, and is an example of the latest American practice in short wave receiver design.

What You Will Need.

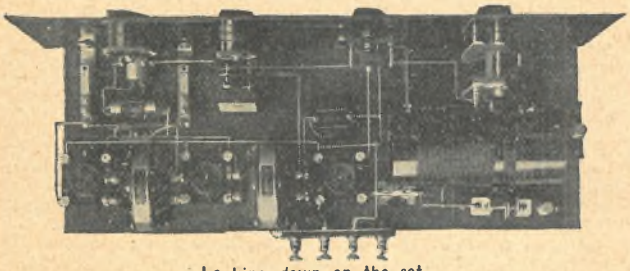
Materials required to build the set are as follows:—

1 Aerial coupling condenser.
1 Grid condenser of .00025 mfd. capacity.
1 By-pass Condenser of .0005 mfd. capacity.
1 Grid tuning Condenser (3 plate variable).
1 Auxiliary tuning condenser (3 plate micro-cond.)
1 .25 mfd. By-pass condenser.
1 Grid leak, 7-10ohms resistance.
1 100,000 ohm. resistance (variable).
1 6 ohm. Filament Rheostat.
1 ½ amp Ballast Resister.
3 Valve sockets.
2 Audio Frequency Transformers.
1 Vernier Dial.
1 Filament Switch.
1 Single Circuit Phone Jack.
I Double Circuit Phone Jack.
6 Terminals.

In addition to the foregoing, wire, bakelite for the coil formers, screws, nuts and bolts will be wanted. The bakelite tubing should be of 2in. diameter for wave lengths up to 48 metres, and of 2½in. diameter for wave lengths up up 95 metres. It should be understood that the diameter of the former has nothing to do with the wave length to be received. The larger diameter coil former is used in order to get on a greater length of wire for the same number of turns, and thus keep all the formers the same length. The only other component which has to be made is the micro condenser used to couple the aerial to the grid coil of the receiver.

This is simply made and consists of two metal discs each of three-quarters of an inch in diameter. One of these is bolted on to a metal angle bracket, and the other threaded through the hole which was previously tapped in another angle bracket. Both these brackets are mounted on a strip of bakelite, which, in turn, is mounted on the wooden base-board of the receiver.

The diagram will explain fully the construction of the coupling condenser. The wiring of the receiver is simple, and should not require a point to point description. The only thing likely to prove troublesome is the construction of the grid and plate coils. These data will be given, but as every receiver is bound to vary slightly, some readjustment of the number of turns and the spacing is sure to be necessary.



Looking down on the set.

Continued on Page 64

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AFRICA

FA—Abyssinia.

FB—Madagascar, Reunion Id., Comoro Id., etc.

FC—Belgian Congo, Ruanda, Urundi.

FD—Angola and Kabinda.

FE—Egypt.

FF—French West Africa, including French Sudan, Mauritania, Senegal, French Guinea, Ivory Coast, Upper Volta, Dahomey, Civil Ter. of the Niger, French Togoland, etc.

FG—Gambia.

FH—Italian Somaliland.

FI—Italian Libya (Tripolitania and Cyrenaica).

FJ—Somaliland Protectorate and Socotra.

FK—Kenya, Zanzibar Protectorate, Uganda, Anglo-Egyptian Sudan, and Tanganyika Territory.

FL—Liberia.

FM—Tunisia, Algeria, Morocco (including the Spanish Zone), Tangier.

FN—Nigeria.

FO—Union of South Africa, Northern and Southern Rhodesia, Bechuanaland Protectorate, and Southwest Africa.

FP—Portuguese Guinea and Cape Verde Ids.

FQ—French Equatorial Africa and Cameroons.

FR—Rio de Oro and adjacent Spanish Zones, Ifni, and Canary Ids.

FS—Sierre Leone.

FT—Eritrea.

FU—Rio Muni (Spanish Guinea) and Fernado Po.

FV—French Somaliland.

FW—Gold Coast Colony, Ashanti, Northern Territories and British Togoland.

FX—Seychelle Dependencies.

FY—(Unassigned).

FZ—Mozambique.

*To be further partitioned when activity warrants.

SHIP STATIONS

Ship stations with amateur calls will place an X before their usual intermediate—e.g., Australia 3AA at sea, calling U.S. 1AW, would send "1AW NUXOA 3AA." The reply would be "3AA XOANU 1AW."

Low Loss Coil Construction

Probably the simplest and most practical type of low-loss coil is the single layer or solenoid type. A good low-loss coil should have maximum inductance for a given size, minimum distributed capacity, and minimum resistance. The distributed capacity may be lowered by spacing the windings. The space between the turns should not, however, be greater than the diameter of the wire used. A low resistance is obtained by using a fairly large size wire without dope of any form on the coil to hold it in position. Maximum inductance depends upon these two things just mentioned and on the nature of the coil support. An equally good type, if properly constructed, is the basket weave coil. For practical broadcast reception it will perform well. The spider-web coil requires little space for mounting.

Mountings for coils should be made up of as little material as possible, and still make the coil mechanically strong. The nearer the coil is supported in air the higher the efficiency. A simple mounting may be made by securing two bakelite discs and drilling six holes in each at the points of a hexagon inscribed in the circle. Pieces of glass rod may be made to pass through these holes so the form will be rigid.

SOME HELPFUL HINTS

Drilling Aluminium.—When drilling or turning aluminium, it should be lubricated with kerosene (coal oil) to prevent tearing and trouble.

Head Phones are Delicate.—Head phones, when well made, are delicate instruments, and should be handled just as carefully as a fine watch. One should naver let them drop, or handle them roughly, any more than one would willingly let a glass tumbler fall on the floor. Though head phones will often stand considerable rough treatment without serious damage, strict adherence to the rules of care is the best assurance of good reception.

Insulating Paper.—A quite satisfactory insulating paper can be made by coating both sides of ordinary manila paper with shellac, and then drying in a warm room.

Replacing 'Phone Tips.—If the tips of a telephone cord break off, or are lost, a short piece of about No. 12 bare copper wire can be substitute. Then if the tinsel ends are bound firmly to this with small copper wire a quite satisfactory job will result.

Sagging Causes Fading.—Fading experienced by listeners in has been traced frequently to sagging aerials that were being swung back and forth by the wind. When the slack was taken up the fading was eliminated.

Short Circuiting the Accumulator.—Although it may be a very spectacular experiment, don't try fusing copper wire across a lead storage battery, as it will quickly ruin it.

The Life of a "C" Battery.—There is practically no drain on a "C" battery, therefore its period of usefulness depends upon its shelf life. In the average set this battery should be changed once a year.

Volume and Range.—Audio-frequency amplification will give greater volume on local stations, but radio-frequency amplification has the characteristic of being able to amplify a weak signal, thereby increasing the range of the receiver.

Watch the Filament Current.—In any set, the filament power lost in heating the rheostat is just so much good money wasted, as the heat does no good. Remember, then, when connecting batteries, not to connect so many cells in circuit that you have to use the whole, or almost the whole, of the filament rheostat to control the current.

When Drilling Bakelite.—In drilling bakelite, even at ordinary speeds, it is much better policy to use "high speed" steel drills, as these will not be damaged by the overheating which is usually experienced. They cost a little more, but their increased life will more than make up for their first cost.

Continued from Page 11.

condenser. The filament switch and the phone jack are mounted 2 inches from the bottom of the panel and four inches on each side of the tuning condenser shaft. The coil former is mounted alongside the rheostat, and secured to the panel by a small angle bracket and a ⅛in. bolt.

The coil consists of three windings, the aerial being of 15 turns, the grid of 45 turns, and the reaction or plate of 25 turns. The reaction coil is wound at one end, the grid coil in the centre and the aerial coil at the other end. The plate coil should be separated from the grid coil by about half an inch. The amount of coupling permissible between the aerial coil and the grid coil varies with the degree of selectivity desired, but may be from half an inch up to two inches.

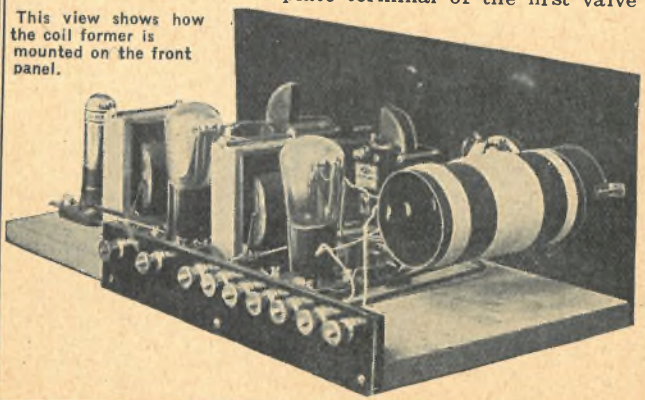
The pictures and diagram will make clear the arrangement of the components, and no trouble should be experienced by the set builder in arranging these.

Wiring the Receiver

Taking for granted that the various parts have been mounted on the baseboard and the front panel with its assembled apparatus secured to the base, the wiring can now be commenced. This is done by connecting the aerial terminal of the receiver to one side of the aerial coil. The other side of this coil is connected to the earth terminal. The secondary coil has one of its leads wired to the grid leak and condenser, the other being connected to the filament negative busbar.

To wire the filaments a lead is taken from the negative filament terminal to one side of the rheostat. The other side of the rheostat is connected to one filament terminal on each valve socket. The other filament terminal on each socket is now wired together, and the lead taken to one side of the switch. The remaining connection on this switch is wired to the "A" battery positive terminal, which in turn is linked with the "B" battery negative terminal.

The grid tuning condenser is now connected in circuit by wiring one of its terminals to the grid lead side of the grid coil and the other to the negative filament side of the coil. The plate terminal of the first valve



This view shows how the coil former is mounted on the front panel.

is connected to one side of the plate coil, the other side of which is connected to the P terminal of the first audio frequency transformer. The "B" plus terminal of this transformer is wired to the first positive "B" battery terminal on the strip. The G terminal of the transformer is connected to the grid connection on the second valve socket. the plate connection of which is linked with the P terminal on the second trasformer. The "B" positive terminal of this transformer is connected to the second "B" battery positive terminal on the strip. The G terminal is wired to the grid connection on the third valve socket, the plate terminal of which is connected to one side of the phone jack. The remaining contact on the jack is wired to the second "B" battery terminal, to which one "B" battery lead has been already attached.

The filament negative terminals of the two transformers are linked together, and a lead taken from the link to the "C" battery negative terminal on the strip. The remaining terminal on this strip is the "C" battery positive one, and this is linked with the "A" battery negative terminal.

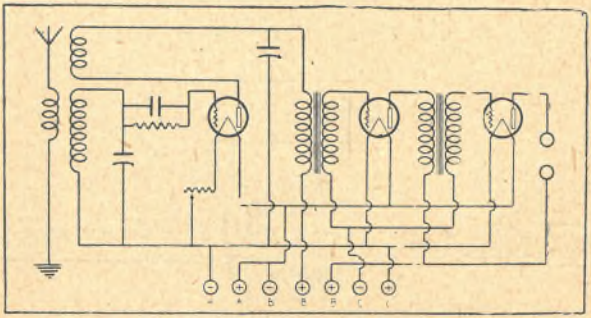
All that is required now is to conect the "throttle" condenser in circuit. This is done by connecting one terminal of the condenser to the P terminal of the first transformer, and the other terminal to the filament negative busbar.

The receiver is now complete, and after checking over the wiring the valves may be inserted in their sockets, the batteries and aerial connected, and the phones plugged in. On pulling out the filament switch the receiver should become alive; and, providing that broadcasting is in progress, a rotation of the dials should bring in the stations.

Operating Hints

It will be found that the throttle condenser can be used over a wide range without causing the receiver to oscillate, although sufficient regeneration may be present to interfere seriously with the purity of reception.

No claims for interstate reception are made for this receiver, but the writer has found it possible to tune in the majority of the interstate stations at good loud speaker strength while the locals are on the air.



The schematic diagram of the receiver.

Continued from Page 55

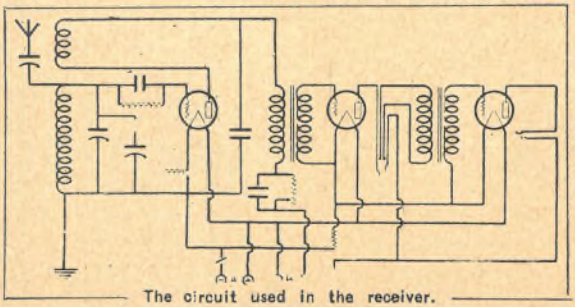
Coil Data.	Secondary	Reaction
Coil No. 1	4 turns	2 turns
Coil No. 2	7 turns	2 turns
Coil No. 3	11 turns	3 turns
Coil No. 4	15 turns	3 turns
Coil No. 5	25 turns	4 turns

The wave length range of this set of coils is from 16 metres to 95 metres, which covers the whole of the experimental short wave length bands, with the exception of the five and ten metre ones. However, as there is very little work going on on the two latter at the present time, it is hardly worth while to attempt the elaborate structural alterations to the receiver which would enable it to be operated on these very low wave length bands.

The coils are all wound with 12 gauge enamel wire, each turn of which is spaced a distance equal to its own diameter. The simplest way to wind the coils is to lay on the wire, together with a similar length of string of approximately the same gauge as the wire. When the winding is completed and the ends made fast the string may be unwound. Provided that the wire has been wound up tightly, there will be no subsequent slipping of turns. The spacing between the grid coil and the reaction coil may be from three-quarters of an inch to one inch, depending upon the freedom with which the detector valve will go into oscillation. The coils are fitted with four pins which connect to the two ends of each winding. These are arranged so that they will fit into four sockets mounted on a bakelite strip, which is secured to the baseboard of the receiver. Care should be exercised in wiring the set to see that these leads which carry high frequency currents are spaced widely apart and run as direct as possible from point to point, and all connections should be soldered.

Operating The Set.

Short wave work, although perhaps not so affected by local receiving conditions as broadcast reception, nevertheless requires a certain amount of attention if maximum efficiency is to be obtained. The aerial system which is being used for broadcast reception will do quite well for the short wave receiver, provided, of course, that it is properly erected for the long wave work for which it was originally intended. However, a



The circuit used in the receiver.

Cossor Valve Chart

Serial No.	Type of valve.	Filament. Volts.	Filament. Amp.	Uses for which valve is suitable.	High Ten. volts.	Grid Bias. volts.	Impedance ohms.	Amp Factor	PRICE.
210D	Point One .. .. (Black Band)	1.8	.1	Detector and Low Frequency.	60—120	3-4 if H.T. is over 100.	22,000	9.0	13/6
210H	Point One .. .. .. (Red Band).	1.8	.1	H.F., Reflex, Resistance or Choke Coupling.	70—120	ditto.	44,000	20.0	13/6
210R.C.	Point One R.C. .. (Blue Band).	1.8	.1	Resistance Capacity Coupling Power Amplification.	120	6-9 with max. H.T.	70,000	35.0	13/6
215P	Stentor Two .. .. (Green Band).	1.8	.15		Up to 150	3-6 with max. H.T.	6,000	5.0	15/
	4-VOLT SERIES			High Frequency and Detector.	120	3-6 with max. H.T.	20,000	20.0	13/6
410H	Point One .. .. (Red Band).	3.8	.1	Low Frequency Amplification.	90	3 - 4½ with max. H.T.	10,000	10.0	13/6
410D	Point One .. .. (Black Band).	3.8	.1	Resistance Capacity Coupling.	120	6-9 with max. H.T.	To be issued shortly		13/6
410R.C.	Point One R.C. .. (Blue Band)	3.8	.1	Power Amplification.	120	3-6 with max. H.T.	5,000	5.0	15/
410P	Stentor Four ..	3.8	.1						
	6-VOLT SERIES					3-6 with max. H.T.	To be issued shortly		13/6
610H	Point One .. .. (Red Band).	5.5	.1	High Frequency and Detector.	120	3-6 with max. H.T.	8,000	8.0	13/6
610D	Point One .. .. (Black Band).	5.5	.1	Low Frequency Amplification.	120	3-6 with max. H.T.	To be issued shortly.		13/6
610R.C.	Point One .. .. (Blue Band).	5.5	.1	Resistance Capacity Coupling.	120	4½ - 12 with max. H.T.	3,000	3.5	15/
610P	Stentor Six	5.5	.1	Power Amplification.	150				

high aerial will sometimes affect the operation of the short wave set on account of the amount of static which it picks up. Looking at the aerial question from this standpoint it may appear best to construct a smaller aerial system, say, 25 to 30 feet in height and about the same length. The lead in wire in this case should be portion of the aerial, and not be soldered to it, as is often done with broadcast aerials.

Turning to the operation of the receiver, it will be found that careful manipulation of both the grid tuning condenser and the reaction condenser is necessary before low wave broadcasting can be brought in at good strength and clarity. It is in controlling the reaction that the series resistance in the detector "B" battery lead will be found of great use. The throttle and resistance methods of oscillation control, when used in conjunction, provide one of the smoothest regeneration control systems it is possible to obtain.

In the receiver concerned the two plate micro condenser used to couple the aerial to the grid coil must first be adjusted so that there are no "dead spots" throughout the tuning range. For the benefit of those not acquainted with the "dead spot" trouble it may be explained that this state of affairs is evidenced by the failure of the receiver to go into oscillation at certain points along the tuning scale.

Sometimes the receiver will go into oscillation at these points, but only by greatly increasing the "B" battery voltage on the detector valve and rotating the reaction condenser until the plates are "all in." It may require some slight experiment to determine the amount of coupling capacity which must be used in order to remove the "dead spots," but this is not difficult, provided time and care are taken in making the necessary adjustments. The plate potentials used on the audio valves are not critical, and for good all round working may be in the vicinity of 90 volts. On the detector valve, however, the "B" battery voltage should be kept as low as possible—certainly not more than 22½ volts. Low voltages on this valve make the regeneration control very flexible and assist greatly in the reception of short wave telephony. The small parallel condenser in the grid tuning circuit will be found very useful in obtaining true tuning of the station being received.

On phone work this condenser will enable the "mushy" side of the transmission to be tuned out, whilst on code work its use will allow the operator to alter the pitch of transmitting station's note to suit his individual requirements.

One point worth noting is that in the case of reception of very weak broadcasting, when it may be found that even the fine oscillation control methods used on this receiver do not provide sufficient control of regeneration, adjustment of the filament voltage on the detector valve by means of the filament rheostat will often result in clear reception of the weak transmission.

Lastly, do not expect to achieve success all at once. The operation of short wave receivers, although not difficult, requires both patience and experience before perfect results can be expected.

LOGGING SHEET

STATION	WAVE LENGTH	1st DIAL	2nd DIAL	3rd DIAL	STATION	WAVE LENGTH	1st DIAL	2nd DIAL	3rd DIAL

CLASS "A" and "B" BROADCASTING STATIONS OF AUSTRALIA

CLASS "A" BROADCASTING STATIONS

2BL.—Broadcasters (Sydney) Ltd., Sydney. 353 metres. 5000 watts.

2FC.—Farmer and Co., Sydney. 442 metres. 5000 watts.

3AR.—Associated Radio Co. of Australia Ltd., Melbourne, Victoria. 484 metres. 5000 watts.

3LO.—Broadcasting Co. of Australia, Melbourne, Victoria. 371 metres. 5000 watts.

4QG.—Queensland Government, Brisbane, Queensland. 385 metres. 5000 watts.

5CL.—Central Broadcasters Ltd., Adelaide, South Australia. 395 metres. 5000 watts.

6WF.—Westralian Farmers Ltd., Perth, West Australia. 1250 metres. 5000 watts.

7ZL.—Associated Radio Co., Hobart, Tasmania. 516 metres. 3000 watts.

CLASS "B" BROADCASTING STATIONS

2EE.—Burgin Electric Co., Kent street, Sydney. 326 metres.

2GB.—Theosophical Broadcasting Station Ltd., Sydney, New South Wales. 316 metres.

2HD.—Douglas, H. A., Newcastle. 288 metres.

2KY.—Trades and Labor Council, Trades Hall, Sydney, New South Wales. 280 metres.

2MK.—Mockler Bros., Bathurst, New South Wales, 250 metres.

2UE.—Electrical Utilities Co., Randwick, New South Wales. 297 metres.

2UW.—Sandell, O., Bellevue Hill, Sydney.

3DB.—3DB Broadcasting Pty. Ltd., Swanston st., Melbourne. 255 metres.

3UZ.—Nilsen, O. J., Melbourne. 319 metres.

4GR.—Gold Radio Electric Service, Toowoomba, Queensland. 294 metres.

5DN.—5DN Pty. Ltd., Parkside, South Australia. 313 metres.

5KA.—Sport Radio Broadcasting Co., Prospect, South Australia. 285 metres.

LIST OF AUSTRALASIAN STATIONS

TABLE OF ABREVIATIONS:—

A.—"A" Class Broadcasting Station.
B.—"B" Class Broadcasting Station.
D.— Dealer's Station.
E.— Experimental Station.
L.— Land Station.
P.— Portable Station.
S.— Special.
T.— Trawler.

NEW SOUTH WALES

Call Sign	Class	Name and Address
2AB	E	A. V. Badger, 20 Neutral street, North Sydney.
2AC	E	A. C. Edwards, Waikare, Lane Cove road, Lane Cove, N.S.W.
2AD	E	A. L. Dixon, 59 Second street, Canterbury, N.S.W.
2AG	D	Ashfield Service Station, Ashfield, N.S.W.
2AN	E	W. Gardner, Piper street, Broken Hill, N.S.W.
2AR	E	W. H. Hudson, 1 Terrace road, Dulwich Hill.
2AS	E	A. J. Smith, 27 Station street, Harris Park, Parramatta.
2AV	E	A. W. Thurstan, Argyle road, Penshurst, N.S.W.
2AY	E	J. P. Cureton, 203 Burwood road, Burwood.
2BA	T	Bar-eu-mal.
2BC	E	N. J. Hurll, Strathcona, Northcote avenue, Killara.
2BD	L	Burrinjuck Dam (Public Works Department).
2BE	B	Burgin Electric Co., Kent street, Sydney.
2BF	E	L. E. Forsythe, "Hoylake," Sailor Bay road, Northbridge.
2BK	E	F. N. Leverrier, "Lorette," Wentworth road, Vaucluse.
2BL	A	Broadcasters (Sydney) Ltd., Sydney.
2BM	E	Bernard Martin, Mona street, Bankstown, N.S.W.
2BR	T	Brolga.
2BS	E	H. B. Sunter, 3 Flat, Ambassadors Court, Bondi road, Bondi Beach.
2BV	E	Waverley Amateur Radio Club, 89 Macpherson street, Waverley.
2BW	E	W. H. Barker, "Euripides," Wallace street, Concord.
2BY	E	E. C. Arnold, Binnia street, Coolah.
2CA	L	Cootamundra Public Works Department.
2CC	E	University of Sydney.
2CL	E	G. Caletti, "Boston," Beauchamp street, Punchbowl.
2CM	E	C. D. Maclurcan, "Naman Ila," Agnes street, Strathfield.
2CR	E	L. V. G. Todd, Denison street, West Tamworth.
2CS	E	L. Swain, Frederick street, Waratah, N.S.W.
2CU	E	D. D. Campbell, Ulmarra, N.S.W.
2CX	E	H. A. Stowe, Royal street, Chatswood.
2CZ	E	G. W. Exton, 173 Molesworth street, Lismore.
2DE	E	W. P. Renshaw, "Waimea," Lord street, Roseville.
2DG	E	D. G. Campbell, Sunny Ridge, Kyogle.
2DI	T	Dibbu.

NEW SOUTH WALES

Call Sign	Class	Name and Address
2DJ	E	F. B. Cooke, Namoi road, Northbridge.
2DN	E	G. E. H. Blanchard, 60 Bligh street, Newtown.
2DS	E	R. R. Davis, "Yuruga," Fisher avenue, Vaucluse.
2DU	T	Durendee.
2DY	E	D. G. Lindsay, "Navatu," Burgoyne street, Gordon.
2EC	E	E. C. Crouch, 26 Spencer street, Mosman.
2EH	E	H. Miller, "Broadway," Ness avenue, Dulwich Hill.
2EM	E	E. J. T. Moore, 180 Kurraba road, Neutral Bay.
2FC	A	Farmers Ltd., Sydney.
2FG	E	F. Gibbons, 20 Phillips street, Neutral Bay.
2FK	E	F. Welch, 1 Augusta road, Manly, N.S.W.
2FM	E	F. H. Murray, Dumaresq road, Rose Bay.
2FP	E	E. J. Baker, 62 Estell street, Maryville, N.S.W.
2FR	E	F. R. Bassett, "Ramona," Carrington street, Bexley.
2FT	E	L. R. Filmer, "Bundee," Toronto.
2FW	E	F. P. Woolacott, 55 St. George's crescent, Drummoyne.
2GA	E	Miss F. V. Wallace, c/r. Richard and George streets, Greenwich.
2GB	B	Theosophical Broadcasting Station Ltd., Adyar House, 29 Bligh street, Sydney.
2GC	E	G. C. Cawood, Kurrajong road, Dorrigo.
2GI	L	Gundagai, Public Works Department.
2GM	E	G. M. Cutts, 10 Simpson street, Mosman.
3GO	T	Goorangai.
2GP	E	C. S. Mackay, Urunga, N.S.W.
2GQ	E	E. Barlow, Guildford, N.S.W.
2GU	T	Gunnundaal.
2GW	E	W. G. Woolnough, Park avenue, Gordon, N.S.W.
2HC	E	H. R. Carter, School, Armidale, N.S.W.
2HD	B	H. A. Douglas, Newcastle.
2HH	E	H. H. Davis, Torrington road, Strathfield.
2HM	E	E. H. A. Marshall, 94 Frances street, Bondi.
2HR	E	H. E. Rose, Wanganbil, Warren, N.S.W.
2HS	D	Fankler and Hooker, 38 Phillip street, Bondi.
2HT	E	H. K. R. Thomas, Strathearn, Murdoch street, Neutral Bay.
2IJ	E	A. H. Gray, 5 Flat, "The Maples," Killara, N.S.W.
2IN	D	J. Payne, 53 Allison road, Randwick.
2JA	E	A. J. Mead, 13 Hampden street, Ashfield.
2JC	E	Cootamundra, N.S.W.
2JD	E	J. B. Davies, 1 Mills crescent, Burwood, N.S.W.
2JK	E	J. H. Brown, Shadwell, Chelmsford avenue, Botany.
2JL	E	J. L. Young, Bulli Plain, Corowa.
2JP	E	J. H. A. Pike, Rawson street, Epping.
2JR	E	J. G. Reed, 7 Sloane street, Summer Hill.
2JS	E	J. M. Stanley, 97 Byng street, Orange.
2JT	E	C. F. A. Luckman, "Aldersey," Wongee road, Lakemba.
2JU	E	J. L. White, Tarrawingee Station, via Broken Hill.
2JW	E	E. J. Williams, 51 Ocean avenue, Double Bay.
2JY	E	J. W. Young, "Yothahnee," Eastern road, Turramurra, N.S.W.
2KC	E	R. H. Fry, "Baretta," Brighton street, Croydon, N.S.W.
2KF	E	K. Fryer, Lumsden street, Suspension Bridge, N.S.W.
2KO	T	Koraaga.
2KT	E	L. M. Seccombe, 20 Villiers street, Rockdale, N.S.W.
2KW	E	Archibald Grant, Taylors Arm Roadside, Macksville.

NEW SOUTH WALES

Call Sign	Class	Name and Address
2KY	B	Trades and Labor Council, Trades Hall, Sydney.
2LB	D	L. P. R. Bean and Co., 229 Castlereagh street, Sydney.
2LC	E	L. C. Presdee, 20 Norton street, Leichhardt, N.S.W.
2LH	E	Leichhardt and District Radio Club, 176 Johnston street, Annandale.
2LL	E	L. S. Lane, The Avenue, Leichhardt.
2LM	E	L. M. Wilson, Reginald street, Cremorne.
2LO	E	L. N. Schultz, "Waraba," Burns Bay road, Lane Cove.
2LP	E	L. P. R. Bean, 86 Muston street, Mosman.
2LR	E	R. L. Rowe, 36 Alfred street, Milson's Point.
2LW	E	L. J. Wellman, 18 Meeks road, Marrickville.
2LY	E	R. H. Shaw, 129 Grafton street, Woollahra, N.S.W.
2MH	E	C. E. Morton, "Saida," Underwood road, Homebush.
2MK	B	Mockler Bros., Howick street, Bathurst.
2ML	E	Mosman Radio Research Lab., 100 Muston street, Mosman
2MM	L	Murrumburrah Public Works Department.
2MR	E	J. E. Stewart, Gorrick street, Mayfield.
2MS	E	M. Spitzkowsky, 3 Veda street, Hamilton, N.S.W.
2MU	E	J. Nangle, "St. Elmo," 11 Tupper street, Marrickville.
2MW	E	M. L. G. Warne, Windsor avenue, Nth. Croydon, N.S.W.
2NI	E	H. B. Hammond, "Chesterfield," Chesterfield road, Epping.
2NO	E	D. B. Knock, 142 South Head road, Vaucluse.
2NS	E	T. Evans, Charles street, Blayney.
2OB	E	L. W. Mashman, "Gresley," 8 Donnan street, Besley.
2OG	E	G. J. Menon, Ramsay street, Haberfield, N.S.W.
2PA	P	Public Works Department.
2PB	P	Public Works Department.
2PL	P	Public Works Department.
2PQ	P	Public Works Department.
2PR	P	Public Works Department.
2PS	D	P. G. Stephen, Mona street, Granville.
2QA	T	Goonambie.
2QB	T	Gunner.
2QD	T	Beryll.
2QJ	T	Jane.
2QT	E	A. H. Mutton, 31 Stafford street, Stanmore.
2RB	E	R. E. Beljon, 92 Lawrence street, Lithgow.
2RC	E	R. Chilton, c/o J. E. Sleemer, Gloucester, N.S.W.
2RE	E	R. M. E. Rees, 608 Old South Head road, Bellevue Hill, N.S.W.
2RG	E	E. C. Reading, Charlotte street, Bangalow.
2RH	E	P. R. Hentye, Eagleton, Gordon road, Killara.
2RJ	E	R. J. Fagan, "Sunnyridge," Mandurana.
2RM	E	R. A. MacFarlane, Wakenden street, Griffith, N.S.W.
2RO	E	R. W. Turnbull, 2 Ethel street, Burwood, N.S.W.
2RP	D	R. Primmer, Gordon street, Gordon.
2RT	E	R. J. Turner, 250 Sloane street, Goulburn.
2RV	E	R. V. Thomas, 18 Plowman street, North Bondi.
2RW	E	R. W. Cusiter, "Bellaire," Kissing Point road, Turramurra.
2RX	E	H. C. St. John, 82 Gibbs street, Rockdale, N.S.W.
2RZ	E	J. M. Atkinson, 80 Spencer street, Mosman.
2SA	E	W. E. Salmon, Park road, Naremburn, N.S.W.
2SB	E	A. Sibley, 20 Carrabella street, Kirribilli, N.S.W.

NEW SOUTH WALES

Call Sign	Class	Name and Address
2SH	E	A. Short, Young street, Lambton, N.S.W.
2SM	E	H W. S. Caldecott, 52a Quinton road, Manly.
2SP	E	R. Evans, "Garth Craig," 6 Flood street, Clovelly.
2SS	E	A. E. Wright, Colldale, N.S.W.
2ST	E	S. E. Tatham, 160 Castlereagh street, Sydney.
2SW	E	C. L. Southwell, "Khan Unis," Kameruka road, Northbridge.
2SX	E	C. W. Slade, "Rockleigh," Lang street, Croydon, N.S.W.
2TB	D	T. H. Squelch, Byron street, Bangalow.
2TK	E	T. K. Abbott, "Murulla," Wingen, N.S.W.
2TM	E	H. E. A. Turner, "Carmen," 13 Erith street, Mosman.
2TY	E	T. R. Troy, "Glenroy," Great Northern road, West Maitland.
2UE	B	Electrical Utilities, Story street, South Randwick.
2UI	E	Illawarra Radio Club, 75 Montgomerie street, Kogarah, Rockdale.
2UK	E	H. L. Sigal, 91 Jersey road, Woollahra, Sydney.
2UW	B	O. Sandel, 213 Elizabeth street, Sydney.
2UX	D	O. Sandel, 9 Gurwood street, Wagga.
2VS	E	V. E. Stanley, 9 McLean avenue, Chatswood.
2WA	E	W. A. Royal, 329 New South Head road, Edgecliffe.
2WB	E	W. N. Bullivant, Charles street, Albury.
2WC	E	W. Cavanagh, Wylde, street, Pott's Point.
2WE	E	Standard Telephones and Cables Ltd., 200 Castlereagh street, Sydney.
2WG	E	W. D. Graham, 44 Cameron street, Rockdale.
2WH	E	W. H. R. Stitt, "Wandary," Forbes, N.S.W.
2WI	E	W.I.A. (N.S.W. Division), 5 Elizabeth street, Sydney.
2WJ	E	W. J. Peell, 3 Chapman street, Summer Hill.
2WK	E	W. D. Kennedy, 16 Mabel street, Willoughby.
2WL	E	W. L. Carter, 53 Cardigan street, Stanmore.
2WO	D	W. H. Hand & Son, High street, Penrith.
2WR	E	Wahroonga Radio Club, East Anglia, Young street, Wahroonga.
2WS	E	W. S. Breden, Kitchener parade, Newcastle.
2WT	E	C. R. Watt, "Warrenfels," Tenterfield.
2WW	E	Wireless Weekly, Lavender street, Lavender Bay.
2WZ	E	W. J. Zech, 124 Parramatta road, Ashfield.
2XA	E	H. K. James, 12 Rosemount avenue, Summer Hill.
2XI	E	W. A. Craig, "Uabba," Irrara street, Croydon, N.S.W.
2YB	E	Croydon Radio Club, Lang street, Croydon.
2YD	E	C. W. Donne, 12 Palm street, Darlinghurst.
2YH	E	W. H. Hannan, "Glen Osmond," 23 Prince Alfred street, Mosman.
2YI	E	P. Spencer Nolan, "Monesk," 152 Bellevue road, Double Bay.
2YJ	E	R. H. Sainsbury, "Kermanshah," 6 Wallaray street, Concord West.
2ZJ	E	A. W. Simpson, Tibbick street, Five Dock, N.S.W.
2ZL	E	W. Otty, "Hurst Villa," Killingworth, via Newcastle.
2ZO	E	T. R. Wilmot, Coramba road, South Grafton.
2ZU	E	N. S. Gilmour, 101 Wycombe road, Neutral Bay.
2ZX	E	J. M. Bristow, "The Towers," Kurraba road, Neutral Bay.
2ZY	E	N. Woollett, 33 Wolseley road, Mosman.

VICTORIA

Call Sign	Class	Name and Address
3AC	E	Prahran Radio Club, 161 High street, Prahran.
3AD	E	J. A. Davey, 28 Cole street, Elsternwick.
3AF	E	A .F. W. Bent, 14 Coronation street, Geelong West.
3AH	E	A. H. Faul, 3 St. Leonard's avenue, St. Kilda, Victoria.
3AJ	E	E. Salamy, Timor street, Warrnambool.
3AK	E	N. V. C. Cansick, 81 Southey street, St. Kild
3AL	E	H. D. Kerr, 1214 Sturt street, Ballarat.
3AM	E	A. Forecast, 22 St. George's road, Malvern.
3AP	E	R. D. Morris, 61 Bealiba road, Caulfield.
3AR	A	Associated Radio Co., Elizabeth street, Melbourne.
3AT	E	A. W. Thomson, "Arbroath," Ridley street, Sunshine.
3AU	E	S. H. Milligan, "Allawah," Nicholas street, Chilwell, Victoria.
3AY	E	W. W. Jenvey, "Devonshire," 12 Lord strreet, Caulfield.
3BC	E	Brighton Radio Club, Higinbotham Hall, Brighton Library Buildings, Bay street.
3BD	E	E. H. Cox, 45 Orrong road, Elsternwick.
3BF	E	G. H. Hall, No. 1 Flying Training School, Point Cook.
3BG	E	Laing Osborne, Terang.
3BH	E	C. R. Whitelaw, Violet Town.
3BK	E	S. C. Baker, 237 Clarendon street, South Melbourne.
3BM	E	H. K. Love, "Lindum," Ferncroft avenue, East Malvern.
3BP	E	J. H. Hood, 6 Alexander street, East St. Kilda.
3BQ	E	W. F. M. Howden, 10 Hill street, Box Hill.
3BU	E	Connolly, Balaclava road, St. Kilda.
3BY	E	H. Holst, 27 Bambra road, Caulfield.
3CA	E	C. H. Hughes, Ingor street, Ararat.
3CB	E	W. F. Sievers, 30 Lesney street, East Richmond.
3CC	E	University, Melbourne.
3CF	E	C. I. Falconer, 13 Norris street, Canterbury.
3CH	D	A. C. Harris, Sterwood street, Birchip.
3CI	L	Cliffy Island Lighthouse.
3CJ	E	C. J. Manning, Whitehorse road, Ringwood.
3CK	E	Ernest Cook, Glenhope, Tresco.
3CM	E	F. W. Cook, 23 Henry street, Footscray.
3CP	E	C. I. Patterson, 82 Burke road, East Malvern.
3CR	E	Coburg Radio Club, 2 O'Connor street, East Brunswick.
3CS	E	C. J. Sabe'berg, 100 Station street, Port Melbourne.
3DA	E	R. S. Dawson, 23 Kensington road, South Yarra, Victoria.
3DB	B	3DB Broadcasting Pty. Ltd., Swanston street, Melbourne.
3DC	E	S. A. Embling, 296 Williams road, Toorak.
3DJ	E	D. A. J. Stocks, 35 Highfield road, Canterbury.
3DK	D	Geelong Radio Service, 225 Moorabool street, Geelong.
3DP	E	N. Culliver, 91 Manningtree road, Hawthorn.
3DR	E	J. H. Dexter, 23 Beaconsfield parade, Northcote.
3EF	E	H. W. Maddick, 89A Spray street, Elwood.
3EH	S	Metropolitan Fire Brigade, Eastern Hill.
3EJ	S	Metropolitan Fire Brigade, Eastern Hill.
3EL	E	N. J. Boyd, Pearce street, Caulfield, Victoria.
3EM	E	H. W. Doudney, 7 Dickens street, Balaclava.
3EP	E	J. Givens, 19 Logan street, Canterbury.
3ER	E	E. H. W. Read, 147 Lygon street, East Brunswick.
3ES	E	H. W. Read, 147 Lygon street, Brunswick.
3EW	E	E. W. Hughes, 14 Broadway road, St. Kilda.
3FA	D	Kerang Motors, Scoresby street, Kerang.

VICTORIA

Call Sign	Class	Name and Address
3FR	E	C. E. H. Robson, 16 Hawsleigh avenue, Balaclava.
3FY	E	Fitzroy Radio Club, North Fitzroy.
3GF	E	G. J. Frogley, 5 Richmond terrace, Richmond.
3GG	E	G. A. Gamon, 310 Clark street, Northcote.
3GH	E	W. M. Hale, "Ben Nevis," Harvey street, Anglesea.
3GI	E	F. G. Cresswell, 5 Loch street, Camberwell.
3GL	E	G. L. Barthold, 72 Union street, Malvern.
3GM	E	G. R. McCulloch, 511 Havelock street, Ballarat.
3GN	E	H. G. Selman, 51 Fairview avenue, Newtown, Victoria.
3GR	E	G. H. Rumbold, 120 Mill street, Bendigo.
3GS	E	G. S. C. Semmens, State School, Queenstown, Victoria.
3GW	E	H. G. Williamson, Rainbow.
3HA	E	H. H. Blackman, 44 Osborne avenue, East Malvern.
3HB	E	Sunshine Radio Club, Hampshire road.
3HH	E	F. H. Maughan, 15 Staniland avenue, Malvern.
3HL	E	A. T. Hutchings, "Byron Avon," Calawadda.
3HR	E	A. H. Reid, 3 Kingston street, East Malvern.
3JD	E	J. E. Dane, "Wahroonga," Toorak road, Hawthorn.
3JG	D	Jones and Glew, corner Moreland road and Down street, Brunswick.
3JH	E	A. J. Holland, "Cotswold," Kinnord street, Essendon.
3JJ	E	J. J. McMath, 54 St. Vincent place, Albert Park.
3JK	E	J. K. Herd, Main street, Bacchus Marsh.
3JM	E	R. W. Bryson, 149 Eglington street, Kew.
3JO	E	C. L. Ruck, 3 Glentilt road, East Malvern.
3JS	E	J. Schultze, 130 Glenferrie road, Glenferrie.
3JW	E	R. W. Bruce, 87 Alma road, Caulfield.
3JZ	E	R. P. Whalley, "Cumnor," Myrtleford.
3KB	E	A. L. H. Kissick, 7 McFarland street, Brunswick.
3KG	E	Radio Engineering Co., 101 Foam street, Elwood.
3KJ	E	W. E. C. Sawyer, "Sunleigh Park," Hurstbridge.
3KM	D	Kerr and Muir Ltd., 241 Bay street, North Brighton.
3KN	E	R.A.A.F., Victoria Barracks, Melbourne.
3KR	E	K. R. Rankin, Boundary street, Kerang.
3KX	E	M. C. McCalman, "Ivanhoe," Dryden street, Canterbury.
3LD	L	Deal Island.
3LF	E	J. F. T. Baker, 82 Beavers road, Northcote.
3LG	E	L. G. Glew, 73 Elphin street, Newport.
3LJ	E	L. J. Simmons, State School, Foster North.
3LO	A	Broadcasting Co. of Australia, 360 Collins street, Melbourne.
3LP	E	L. A. Paul, 137 St. George's road, North Fitzroy.
3LR	E	Elsternwick Radio Club, A.N.A. Hall, Regent street, Elsternwick.
3LS	E	R. T. Busch, "Stratford," 20 Wordsworth street, Moonee Ponds.
3LW	E	C. Hiam, 222 Carlisle street, St. Kilda.
3MA 3MB 3MC 3MD 3ME 3MF 3MG		AMALGAMATED WIRELESS (Australasia) LTD. 167-9 Queen Street, Melbourne
3MH	E	M. H. Stuart, 571 Mount Alexander road, Moonee Ponds.
3MI	E	J. R. Alsop, "Nirvana," 28 Molesworth street, Kew.
3MJ	E	J. F. Martin, 17 Newry street, North Fitzroy.
3MM	E	B. Pringle, 29 Collins street, Essendon.
3MP	E	S. V. Hosken, Queen street, Surrey Hills.
3MS	E	L. J. Moore, "Avalon," Railway grove, Seymour.

VICTORIA

Call Sign	Class	Name and Address
3MY	E	L. D. Money, 8 Maling road, Canterbury, Victoria.
3ND	E	Police Patrol Car No. 1.
3NN	E	H. R. Brown, Yanac.
3OT	E	R. M. Cameron, "Ma ka," Coonil crescent, Malvern.
3PD	S	Police Department (Headquarters Station), Russell street, Melbourne.
3PJ	E	V. L. Smyth, 130 McIver street, Bendigo.
3PL	E	L. P. Learmonth, McIntyre street, Hamilton.
3PX	E	S. Taylor, 24 Dalgety street, St. Kilda.
3QH		J. F. Feldman, Forest street, South Geelong.
3RA	E	R. A. Parker, c/o Royal Bank, Bendigo.
3RB	E	R. N. Bugaeoth, 532 New street, Elsternwick.
3RI	E	V.R.I. Radio Club, V.R. Institute, Flinders street, Melbourne.
3RK	E	T. E. Evans, 21 Brunswick road. East Brunswick.
3RL	E	R. Lighton, "Nothgil," 232 Alma road, East St. Kilda.
3RM	E	R. Margrall, 255 Nicholson street, Carlton.
3RN	E	Northcote Radio Club, 82 Gooch street, Thornbury.
3RO	E	C. E. H. Robson, 16 Hawsleigh avenue, Balaclava.
3RP	E	R. L. Payne, 39 Retreat road, Geelong.
3RS	E	R. C. Shortell, 421 Inkerman street, St. Kilda.
3RY	E	G. G. Soilleux, Yacht Utiekah III., Port Philip Bay.
3SA	E	L. R. Simpson, "Montana," Queen street, Ararat.
3SJ	E	S. J. Mitchell, 5 Brandon street, Brighton.
3SL	E	L. W. Southwell, c/o Mrs Neal, High street, Seymour.
3SR	E	J. Sullivan, Yallourn.
3SW	E	S. W. Gadsden, 5 Miller grove, Kew.
3TC	E	T. P. Court, 4 Sorrett avenue, Malvern.
3TM	E	A. H. Buck, 7 Carrington street, Glenferrie.
3TR	E	W. S. Tregear, 22 Cole street, Upper Hawthorn.
3TU	E	R. C. Leckie, "Clifstone," 40 Bamfield street, Sandringham.
3UI	E	R. M. Dalton, 281 Canterbury road, Canterbury.
3UR	E	R. N. Abbott, 52 Blanche street, St. Kilda.
3US	E	A. H. Watson, 345 Richardson street, Middle Park.
3UZ	B	O. J. Nilsen, Bourke street, Melbourne.
3VP	E	C. W. Baker, "Ewell," 101 Williamson street, Bendigo.
3WB	E	W. L. Bertram, 158 Blyth street, Brunswick.
3WG	E	W. R. Gronow, 12 Ackland street, St. Kilda.
3WH	E	A. W. H. Chandler, "Cliffs House," Beach road, Beaumaris.
3WI	E	W.I.A., Victorian Division, Ashburton.
3WJ	E	S. M. Sandford, "Roslen," Welsh street, Kyneton.
3WM	E	W. J. M. McAuley, "Mia Mia," Union street, Brunswick.
3WP	L	Wilson's Promontory Lighthouse.
3WR	D	Wangaratta Sports Depot.
3WS	E	W. M. Sweeney, 10 Foam street, Elwood.
3XC	E	Xavier College, Kew.
3XF	E	M. Chaffer, 41 Norwood crescent, Moonee Ponds.
3XO	E	F. J. Adams, "Hambra," Moule avenue, Middle Brighton.
3XW	E	C. A. Cullinan, "Bayview," Digger's Rest.
3YX	E	B. Hardie, Missouri avenue, Gardenvale.
3YY	E	A. M. Bush, 54 Brougham street, Bendigo.
3YZ	E	A. McKeown, 54 Yarra street, Alphington.
3ZH	E	Police Patrol Car No. 2.
3ZK	E	F. R. Bradley, "Worthing," Beach crescent, Sandringham.
3ZN	E	M. Israel, "Atossa," Station street, Burwood, Victoria.
3ZR	E	L. Snaith, 1 Byron street, Footscray.
3ZY	E	M. Ireson, 516 Drummond street, South Yarra.

QUEENSLAND

Call Sign	Class	Name and Address
4AB	E	W. F. Bardin, McIlwraith street, South Townsville.
4AC	E	A. C. Walker, Oxford street, Sandgate.
4AK	E	E. J. Milner, Woodland street, Ashgrove.
4AL	E	B. W. Munro, Gordon street, Hawthorn, Qld.
4AN	E	W. L. Gibson, Kirkland avenue, Greenslopes.
4AT	E	A. Bauer, Rose street, Annerley.
4AW	E	A. E. Walz, cr. Eton street and Sandgate road, Nundah.
4AZ	E	F. V. Sharpe, Ashton Hall, Old Sandgate road, Woolowin.
4BD	E	B. D. Grimes, Tarragindi road, Annerley.
4BM	D	A. B. Milne, Mackay.
4BN	E	E. R. Cooling, Donation Lane, Toowoomba.
4BW	E	A. Cooper, Lloyd street, Mareeba, Qld.
4BY	E	H. W. Berry, 101 Flight, R.A.A.F., Bowen.
4CF	E	C. Fortescue, "Matlock," Arthur street, Toowoomba.
4CG	E	C. H. Gold, Drake street, Hill End, Brisbane.
4CK	E	E. L. Norris, "Parkview," Hume street, Toowoomba.
4CM	E	Dr. V. McDowell, Observatory Tower, Wickham Park.
4CP	E	C. R. Pinney, Konedobu, Port Moresby, Papua.
4CR	E	C. F. Rich, London Bay Missionary Station, Fife Bay, Papua.
4CS	E	J. V. Geraghty, Christian Bros'. College, Toowoomba.
4CU	E	C. Walker, Devonport street, Clifton, Qld.
4CW	E	A. T. Buck, Geebung, North Coast Line.
4DA	E	E. Egleton, Grenier street, Toowoomba.
4DC	E	D. F. Cribb, Foxton street, Indooroopilly.
4DO	E	H. L. Hobler, 8 Lennox street, Rockhampton.
4EO	E	E. C. Sims, R.A.A.F., Bowen.
4EG	E	E. E. Gold, Linsday street, Toowoomba.
4EI	E	State Engineer, General Post Office, Brisbane.
4ES	E	E. N. Sagar, Moonthalie, Douglas street, Greenslopes.
4FK	E	V. F. Kenna, Allen street, Hamilton, Qld.
4GO	E	G. Oxlade, cr. Badger ave. and Irving st., Newmarket, Bris.
4GR	B	Gold Radio Service, Lindsay street, Toowoomba.
4HB	E	H. E. Baker, Gowrie Station, Charleville.
4HG	E	H. G. Bell, Sandford road, South Toowoomba.
4HL	E	H. L. Miller, Lloyd street, Cooparoo.
4HM	E	H. L. Milburn, 10th street, Home Hill, Qld.
4HW	E	H. D. Walsh, "Vailima," Toorak Hill, Hamilton, Qld.
4JG	E	C. J. Grant, Victoria parade, Woolowin.
4JJ	L	Oriomo Oil Ltd., Papua.
4KR	E	J. R. Richardson, "Ascot Downs," Barcaldine.
4KY	E	H. F. Coffey, 6 Oxford street, Hamilton, Qld.
4LG	E	S. W. Le Grand, 7th avenue, Windsor, Qld.
4LJ	E	L. J. Feenaghty, Dickson street, Woolowin.
4MO	E	M. J. McAherson, Merinda, via Bowen.
4MF	E	D. C. Winterford, Collins street, Annerley.
4MM	E	M. M. O'Brien, Fewings street, Toowong.
4NW	E	T. W. Starke, Sandgate road, Nundale.
4PG	E	P. J. Golden, Waterview avenue, Wynnum South.
4PJ	E	P. F. Jessop, Kamma, near Edmonton.
4QG	A	Queensland Government, Brisbane.
4RB	E	R. J. Browne, "Clifden," Church street, Toowong.
4RG	E	H. J. Stephenson, Thorrold street, Woolowin.
4RK	E	R. K. Knight, "Forest Lodge," Jellicoe street, Toowoomba.
4RP	D	Robertson and Provan Ltd., Toowoomba.
4SM	E	W. G. Ikin, River road, New Farm, Brisbane.
4SR	L	Waitara O l Co., Sepik River, New Guinea.
4TC	E	Toombul Radio Club, Eton street, Nundah.
4WA	E	W. A. Young, Granville street, Brisbane.
4WB	E	W. H. Bright, Hume street, North Toowoomba, Qld.
4WE	E	W. E. Vinning, Brickland road, Nundah.
4WF	E	W. Finney, "Milbong," Arthur Terrace, Red Hill, Bris.
4WH	E	W. E. Hagarty, Kingfisher street, Longreach.
4WI	E	W.I.A. (Queensland Division), Queen street, Brisbane.
4WN	E	Woolowin Radio Club, c/o F. J. Thomas, Willmington street, Woolowin.
4WR	D	H. D. Walsh, D ckson Ter., Hamilton, Qld.
4WS	E	W. F. Scott, 229 Boundary street, West End, Brisbane.
4YN	E	D. J. Harkin, 101 Flight, R.A.A.F., Bowen.

SOUTH AUSTRALIA

Call Sign	Class	Name and Address
5AC	E	V. R. P. Cook, 37 Johns road, Prospect, S.A.
5AE	E	J. M. Honnor, Alpha road, Prospect, S.A.
5AG	E	W. J. Bland, Buller terrace, Alberton.
5AH	E	F. L. Williamson, 25 Dequetville terrace, Kent Town.
5AM	E	P. Kennedy, State Engineer's Office, G.P.O., Adelaide.
5AQ	E	Sacred Heart College, Glenelg.
5AW	E	A. W. Kelly, Lyndoch, S.A.
5AX	E	A. H. Traeger, Brigalow avenue, Kensington Gardens.
5BD	E	F. E. Hearle, 6 Hakewell road, St. Peters.
5BF	E	F. G. Miller, Eleanor Ter., Murray Bridge.
5BG	E	H. A. Kauper, 6 Rothbury avenue, Tusmore.
5BJ	E	R. H. Bruce, 1 Henry street, Glenelg.
5BN	E	N. L. Austin, 8 Parade, Norwood, S.A.
5BP	E	R. B. Caldwell, 53 Hughes street, Unley, S.A.
5BR	E	Blackwood Radio Club, Waite street, Blackwood.
5BW	E	J. G. Phillips, 31 Partridge street, Glenelg.
5BX	E	A. L. Saunders, 17 Esplanade, Glenelg.
5BY	E	D. E. Whitbrun, Cudmore avenue, Toorak Gardens.
5CL	A	Central Broadcasters Ltd., Grosvenor Hotel, North Terrace, Adelaide.
5CM	E	R. M. Anthony, 3 High street, Unley Park.
5DA	E	S. R. Buckerfield, 4 Regent street, Parkside.
5DN	B	5DN Propty. Ltd., Parkside.
5DP	E	H. E. Brock, 14 Canterbury terrace, Malvern.
5DX	E	D. G. Taylor, 67 Victoria street, Forestville.
5FT	E	J. S. Fitzmaurice, St. Andrews, street, North Walkerville.
5GB	D	G. Bailie, Mount Gambier.
5HG	E	H. M. Cooper, 51 Hastings street, Glenelg.
5HP	E	Hyde Park Radio Club, 18 Commercial road, Hyde Park.
5HY	E	A. A. Cotton, Harvey street, Kilkenny.
5JA	E	P. J. Brewer, 21 Douglas street, Parkside.
5JH	E	V. Chennell, 53 Osmond terrace, Adelaide, S.A.
5JL	E	J. Henry, Wave Hill Station, via Katherine.
5KA	B	Sport Radio Broadcasting Co., 51 Kintore avenue, Prospect,
5KW	E	K. Wadham, 2 Elizabeth street, Parkside.
5LA	E	L. M. Atkins, Brougham street, Magill.
5LF	E	L. F. Sawford, Mead street, Peterhead.
5LH	E	L. H. Northeast, Addison road, Rosewater.
5LP	D	A. L. Perry, Strathalbyn.
5MA	E	M. B. Anderson, Torrens road, Cheltenham, S.A.
5MB	E	H. M. Brown, 24 Northcote street, Torrensville.
5MU	E	S.A. Rlwys. Inst., Murray Bridge.
5PM	E	J. E. Vardon, 11 Bellevue place, Unley Park.
5PR	E	Port Radio Club, Pennington.
5QP	E	K. M. Theel, 81 First avenue, St. Peters.
5RB	E	R. Bedford, Kyancutta Cottage Hospital, Kyancutta.
5RG	E	R. C. Gurner, 220 Glen Osmond road, Fullarton Estate.
5RI	E	S.A. Rlys. Inst., North Terrace, Adelaide.
5RJ	E	D. M. Hancock, 14 Railway Terrace, Kadina.
5RM	E	R. M. Barker, 49 Newbon street, Prospect.
5SA	E	E. R. Turner, 10 Godfrey terrace, Leabrook, S.A.
5SF	E	S. F. Ackland, 74 Johns road, Prospect.
5SL	E	F. Fielder, Claire street, Woodville.
5SR	E	South Suburban Radio Club, Castle street, Parkside.
5WA	E	W. K. Adamson, 25 Olive street, Parkside.
5WH	E	W. H. Barber, 50 Somerset avenue, Cumberland.
5WI	E	Wireless Institute of Australia (Sth. Australia Division), 6 Bakewell road, St. Peters.
5WP	E	W. S. Pitchford, "Southview," 318 Wakefield street, Adelaide.
5WS	E	West Suburban Radio Club, 44 King street, Mile End.
5XG	E	K. J. Malpas, 13 Lipson avenue, Kadina.

WESTERN AUSTRALIA

Call Sign	Class	Name and Address
6AB	E	C. Cecil, 53 Macdonald street, Kalgoorlie.
6AG	E	W. E. Coxon, 5th Avenue, Inglewood.
6AK	E	University of W.A., Perth.
6BB	E	J. C. W. Park, 29 Suburban road, Mill Point, South Perth,
6BH	E	F. H. Burrows, Govt. School, Kalgoorlie.
6BN	E	A. E. Stevens, 7 Ruth street, Perth, W.A.
6BO	E	A. E. Grey, Archdeacon street, Nedlands.
6BW	E	C. D. McLauchlan, 14 Clydesdale street, Victoria Park.
6CJ	E	E. J. Darley, Darley street, Perth.
6DA	E	F. W. Saw, 76 Leonard street, Victoria Park, W.A.
6DH	E	D. C. Hardisty, 2 Duncan street, Victoria Pk., W.A.
6DW	E	D. W. Edgar, Glentromie, New Norric.
6DZ	E	E. W. Burrows, Station House, Geraldton.
6GB	E	G. B. Sutherland, 36 Fairfield street, Mount Hawthorn, Perth, W.A.
6GM	E	G. A. Moss, Willis street, Cottesloe Beach, W.A.
6HB	E	H. B. Johnston, 119 Bourke street, Leederville, W.A.
6HE	E	H. E. Cox, Marine Terrace West, Geraldton.
6JJ	E	T. J. Jewell, Leitchfield street, Victoria Park, W.A.
6KM	E	A. Saar, Post Office Bldgs., Eucla, W.A.
6KX	E	H. T. Simmons, 34 First Avenue, Inglewood.
6LS	E	L. Symonds, Glyde street, Cottesloe Beach.
6LT	E	L. L. Throssell, May street, Northam, W.A.
6MC	E	M. C. Hoad, 154 Gloster street, Subiaco, W.A.
6MU	E	M. E. Urquhart, Hawkestone street, Cottesloe.
6PL	E	P. E. C. Lindsay, 16 Clive street, West Perth.
6SA	E	S. C. Austin, 39 Sussex street, Victoria Park, W.A.
6SR	E	Subiaco Radio Society, Fire Station, Rokely road, Subiaco,
6UP	E	Victoria Park Radio Club, 12 Freemantle road, South Perth.
6VJ	E	J. Vincent, 124 Varden street, Kalgoorlie.
6WF	A	Westralian Farmers Ltd., Perth.
6WI	E	Wireless Institute Australia, c/o W. E. Coxon, 5th Avenue, Inglewood, W.A.
6WP	E	W. R. Phipps, 97 Rupert street, Subiaco, W.A.

TASMANIA

7AB	E	A. C. Smith, 21 High st., Launceston.
7AH	E	F. W. Medhurst, "Cranleigh," Beach rd., Lower Sandy Ba
7AR	E	C. F. Johnson, Ryder st., W. Hobart.
7AS	E	A. S. Gill, 17 Frankland st., Launceston.
7BK	E	T. A. C. Preston, King st., Queenstown.
7BQ	E	L. J. Crooks, 64 Frederick st., Launceston.
7BT	E	E. C. Sheldrick, 15 Richards ave., Launceston.
7CH	E	C. Harrison, Rokeby rd., Bellerive, Tas.
7CS	E	A. C. Scott, 14 Law st., Launceston.
7CW	E	C. Walch, 36 Bath st., Battery Point, Hobart.
7DX	E	W. T. Watkins, 146 Warwick st., Hobart.
7GD	E	G. A. Douglas, Lochleven, Gormanstown.
7GH	E	G. L. Hall, Waddamanna.
7HL	E	Hubert F. Lovett, 14 Summerhill rd., West Hobart.
7JK	E	J. F. Heine, 305 Elizabeth st., Hobart.
7LA	E	L. A. Hope, 210 George st., Launceston.
7LJ	E	L. R. Jensen, 15 Bayley st., Glebe, Tasmania.
7MK	E	E. E. Cooper, Edgeley House, Youngtown, Tasmania.
7NP	L	National Portland Cement Co., Maria Island.
7NW	E	N. W. Gilham, 38 Grosvenor st., Sandy Bay.
7OM	E	R. D. O May, "Elonera," Esplanade, Bellerive, Tas.
7PF	E	P. O. Fysh, 46 Mary st., Launceston.
7RS	E	R. S. Hope, 210 George st., Launceston.
7UX	E	G. W. Steane, 128 Brisbane st., Launceston.
7WI	E	W.I.A. (Tas. Div.), 181 Charles st., Launceston.
7ZL	A	Associated Radio Co., Hobart.

NEW ZEALAND

Call Sign	Name and Address
1AA	Edwards, C. N., 50 Point Chevalier Rd., Auckland.
1AC	Spackman, L. S., 10 Ardmore road, Ponsonby, Auckland.
1AE	Roberts, R. V., 59 Hepburn street, Ponsonby, Auckland.
1AF	Smithson, G. W., 39 Surrey street, Ponsonby, Auckland.
1AG	Roberts, F., 24 Kimberley road, Epson, Auckland.
1AH	Hartle and Gray, 7 Alton road, Auckland.
1AJ	Shepherd, N. C., Whangarei, Auckland.
1AK	Claxton, H., Parawai road, Thames, Auckland.
1AN	Arthur, H. B. M., 266 Jevois road, Herne Bay, Auckland.
1AO	White, R. G., 125 Grafton road, Auckland.
1AP	Winch, N., Brady street, Te Awamutu, Auckland.
1AR	Hobbs, F. B., 131 Grafton road, Auckland.
1AS	Grainger, R. E., 88 Clarence street, Auckland.
1AT	Swain, G. S., Te Awamutu, Auckland.
1AU	Aubin, R. E. L., Parnell, Auckland.
1AV	Reardon, F. C., 154a Hobson street, Auckland.
1AX	Orbell R. J., Wilson street, Te Aroha, Auckland.
1AY	Woskett, H. C. A., 10 Ethel street, Eden terrace, Auckland.
1AZ	Sherson, J. R., Te Aroha street, Claudelands, Auckland.
1FA	West, G. R., White Island, Auckland.
1FB	Gulde. G. T., Bridge street, Opotiki, Auckland.
1FC	Burrell, R. F. L., 2 Hauraki road, Takapuna, Auckland.
1FD	Booth, F. R., 28 Rosstrevor street, Hamilton, Auckland.
1FE	Wood, A. F., Waihau, Auckland.
1FG	Lonsdale, J., "Heathdale," Marohemo.
1FL	Liggins Dr., J. B., Queen street, Thames, Auckland.
1FM	Warn, J. E. B., Woodford road, Mount Eden, Auckland.
1FN	Stace, G. O. M., Stanley road, Te Aroha, Auckland.
1FO	Cooper, E. R., 8 London street, Ponsonby, Auckland.
1FQ	Clarkson, T. R., Madeira Lane, Auckland.
1FR	Gillies, R. H., 8 Young street, Hamilton, Auckland.
2AA	Brown, A. S., 14 Christian street, Dannevirke, Wellington.
2AB	Wilkinson, D., High street, Motueka, Wellington.
2AC	O'Meara, I. H., 209 Harris street, Gisborne, Wellington.
2AD	Stevens, P. R., 4 Rutene street, Kaiti, Gisborne, Wellington.
2AE	Patty, R. J., 159 Lowe street, Gisborne, Wellington.
2AF	Sinclair, W. J. Score street, Gisborne, Wellington.
2AG	Strong, S. W. S., Harris street, Gisborne, Wellington.
2A1	White, R.H., 2 Breakwater road, Napier, Wellington.
2AK	Rowson, L., 438 Devon street, New Plymouth, Wellington.
2AM	Buist, W. F., Dr., Hawera, Wellington.
2AN	Weston, M. L., 47 Barraud street, Dannevirke, Wellington.
2AO	Brunette, G. A. J., Opunake, Wellington.
2AQ	Coutts, W. M. Kuku street, Taihape, Wellington.
2AS	Boyle, H. R., 1 Breakwater road, Napier, Wellington.
2AV	Chatfield, R. G., 42 Raroa road, Kelburn, Wellington.
2AW	Clarke, C. R., 133 Thorndon Quay, Wellington.
2AX	Kyle, J. V., Aokautere, Palmerston North, Wellington.
2AZ	McDonald, H. L., 89 Hamilton road, Hataitai, Wellington.
2BB	Ward, C., 63 Norway street, Kelburn, Wellington.
2BD	Cunningham, N. R., View road, Karori, Wellington.
2BF	Wilkins and Field Hardware Co. Ltd., Hardy street, Nelson, Wellington.
2BG	Tinney, J. G., 74 Kainui road, Hataitai, Wellington.
2BJ	Evans, A., 269 Taranaki street, Wellington.
2BK	Hanson, L. A., 77 Linton street, Palmerston North, Wellington.
2BL	Wellington College Radio Club, Wellington College, Wellington.

NEW ZEALAND

Call Sign	Name and Address
2BN	Hislop, S. J. K., 8 Fitzroy road, Napier, Wellington.
2BP	Macklin, W. N., 75 Waipapa road, Hataitai, Wellington.
2BQ	Edmundson, E. D., 8 May avenue, Napier, Wellington.
2BR	Lambert, K. A., "Belmont," Tayforth, Wanganui, Wellington.
2BS	Hunter, W. R., Barker's Hill, Gisborne, Wellington.
2BT	Tanner, R. A., Karere road, Longburn, Wellington.
2BV	Lane, F. J., 31 Manawatu street, Palmerston North, Wellington.
2BX	Black, R. G., Stafford street, Wellington.
2GA	Johnson, J., Fortunatus street, Brooklyn, Wellington.
2GC	Howarth, A., 12 High street, Dannevirke, Wellington.
2YM	Gisborne Radio Co., 4 Rutene road, Gisborne, Wellington.
2XA	Shrimpton, E. A., 38 Rongotai terrace, Wellington.
3AA	Worthington, L. G., 92 Office road, Christchurch, Canterbury.
3AC	Radio Society of Christchurch, St. Asaph street, Christchurch, Canterbury.
3AD	Fooks, A. C. L., Cr. Park and Peter streets, Ashburton, Canterbury.
3AE	Donald, J. G., c/o Mr J. Purser, Leeston, Canterbury.
3AF	Ball, L. F., 90 Nursery road, Linwood, Canterbury.
3AI	Rangiora High School, Rangiora, Canterbury.
3AJ	Blake, R. G. F., Rangiora, Canterbury.
3AK	Grubb, A. H. McL., 205 Wai-iti road, Timaru, Canterbury.
3AL	Dawson, W. M. Ashburton, Canterbury.
3AM	Halcrow, L. A., 441 Madras street, Christchurch, Canterbury.
3AP	Cooper, A. M., Wills street East, Ashburton, Canterbury.
3AR	Buchanan, D. W., Ashburton, Canterbury.
3AS	Brown, S. E., 2b Salisbury street, Christchurch, Canterbury.
3AT	Marquet. L. J., 30 Chichester street, Woolston, Christchurch.
3OB	Taylor, C. R. H., 45 Weston road, St. Alban's, Christchurch-Canterbury.
3CC	Grubb, A. H. M. (Portable), 205 Wai-iti road, Timaru, or elsewhere, Canterbury.
3CF	Simpson A. E. H., 99 Abberley road, St. Albans, Canterbury.
3CG	Brown, H. P. V., 49 Gracefield street, St. Albans, Canterbury.
3CH	Maxted, R., Rolleston House, Rolleston avenue, Christchurch, Canterbury.
3CK	Baxendale, J., Blackall, Canterbury.
4AA	Bell, F. D., Waihemo, Otago.
4AB	Otago Radio Association (R. Bruce), Princess street, Dunedin, Otago.
4AC	Robinson, R. E., 3 Chetham avenue, Dunedin, Otago.
4AD	Jordan, A. E., 17 Biggar street, Invercargill, Otago.
4AH	MacDonald, I. S., 45 Royal terrace, Dunedin, Otago.
4AI	Samson, G. G., 401 North road, North East Valley, Dunedin.
4AK	Shiel, W. L., 103 Macandrew road, Dunedin, Otago.
4AM	Crockett, W. McG., Tiverton street, Palmerston, Otago.
4AO	Shrimpton, H. N., Coney Hill, Dunedin, Otago.
4AP	Invercargill Amateur Radio Club, Cr. Esk and Dee streets, Invercargill, Otago.
4AQ	Arundel, N., 26 Moray place, Dunedin, Otago.
4AR	Wilkinson, W. G., 21 Melrose street, Roslyn, Otago.
4AS	Mason, P. H., 211 Highgate, Maori Hill, Dunedin, Otago.
4AV	Milnes, J. H., 39 Lees street, Dunedin, Otago.
4AX	Earland, F. P., 33 Waverley street, Dunedin, Otago.
4AZ	Sidey, T. K. S., Caversham, Dunedin, Otago.

EXPERIMENTAL STATIONS

1X1	Auckland University College, Prince's street, Auckland.
2XB	Florance, Prof. D. C. H., Victoria University College, Wellington.
3XB	Bingham, J. M., 387 Gloucester street, Christchurch, Canterbury.

BRAZILIAN TRANSMITTERS

Call Sign.	Name and Address
1AA	Jose Jonoyskoff Almeida Gomes, 23 rua Xavier da Silveira, Rio de Janeiro.
1AB	Hiron Jacques, 86 rua Visconde da Gavea, Rio de Janeiro.
1AC	Carlos G. Lacombe, 105 Cosme Velho, Rio de Janeiro.
1AD	Pedro S. Chermont, Caixa postal n° 1663, Rio de Janeiro.
1AE	Victoriano Augusto Borges, 168 rua Visconde de Silva, Rio de Janeiro.
1AF	Jose Cardoso de Almeida Sobrinho, rua Buenos Ayres, 41-2°, Rio de Janeiro.
1AG	Edgard Roquette Pinto, 13 rua Villa Rica, Rio de Janeiro.
1AH	Harold May, 65 rua dos Oitis Gavea, Rio de Janeiro.
1AI	Elvan Costa Guimaraes, Caixa postal n° 1587, Rio de Janeiro.
1AJ	Joao do Lago, 11 rua Leite Leal, Rio de Janiero.
1AK	Cid Santos, 130 rua Alzira Brandao, Rio de Janeiro.
1AL	Mario Liberalli, 113 rua Voluntarios da Patria, C. VII, Rio de Janeiro.
1AM	Alberto Regis Conteville, 620 rua Copacabana, Rio de Janeiro.
1AN	Waldemar Aguiar, 359 rua de Itapagipe, Rio de Janeiro.
1AQ	Mario Bardedo, 82 rua Xavier da Silveira, Rio de Janeiro. Janeiro.
1AP	Newton de Barros Ignarra, 48 Laranjeiras, Caixa postal n° 68, Rio de Janeiro.
1AG	Mario Bardedo, 82 rua Xavier da Silveira, Rio de Janeiro.
1AR	Joaquim Paula Resa Junior, 191 rua Grajahu, Rio de Janeiro.
1AS	Francisco Penalva Santos, 17 rue Nathalia, Rio de Janeiro.
1AT	Democrito Seabra, 1170 Alto da Boa Vista, Caixa postal n° 567, Rio de Janeiro.
1AU	A. F. da Costa Junior, 71 rua Itacurussa, Rio de Janeiro.
1AV	Antonio da Silva Lima, 86 rua Voluntarias da Patria, Rio de Janeiro.
1AW	Vasco Abreu, 89 rua Riachuelo, C.IV, Rio de Janeiro.
1AX	Joao V. Parero, 180 Praia do Russel, Rio de Janeiro.
1AY	Yvonne Moorby, Caixa postal n° 1595, Rio de Janeiro.
1AZ	Juvenil Pereira, 52 rua do Livramento, sob., Rio de Janeiro.
1BA	Narciso dos Anjos Lima, 149 rua Jose Clemente, Rio de Janeiro.
1BB	Raul Kennedy de Lemos, 106 rua Barroso, Caixa postal n° 1587, Rio de Janeiro.
1BC	Raul Berrogain, 144 rua Gomes Carneiro, Rio de Janeiro.
1BD	Alberto L. Villela, 76 Cosme Velho, Rio de Janeiro.
1BE	Manoel Macedo, 239 av. 28 Septembre, C. IV., Rio de Janeiro.
1BF	Alberico Tavares, 19 rua Senador Dansas, Rio de Janeiro.
1BG	Gentil Pinheiro Machado, 46 av. Rio Branco, ler andar, Rio de Janeiro.

SHORT WAVE STATIONS

This list of short wave stations, both Australian and foreign, may be considered one of the most up-to-date yet published. The majority of the stations listed are commercial stations, which are operated by large radio interests for experimental purposes. These stations, unlike the amateur transmitting stations, do not often alter the wavelengths upon which they operate, hence they provide a valuable aid to the short wave listener who is desirous of logging his receiver.

Wave Length Metres.	Call Sign	
13.1	GEC	Oakland, California.
13.4	NKS	Bellevue, U.S.A.
13.5	POF	Nauen, Germany.
14.0	FFW	Ste. Assise, France.
14.93	U2XS	Rocky Point, U.S.A.
15	2BR	Chelmsford, England
15.0	U2XAW	Schenectady, N.Y.
16.0	NKF	Bellevue, U.S.A.
16	POF	Nauen, Germany
17.0	NKF	Bellevue, U.S.A.
18.0	POF	Nauen, Germany.
20	JIPP	Tokio, Japan.
20.0	OCTN	Toulon, France.
20.0	NAL	Washington, U.S.A.
20.0	POX	Nauen, Germany.
20.0	U2XAD	Schenectady, U.S.A.
20.8	NKF	Bellevue, U.S.A.
21.0	PCTT	Kootwijck, Holland.
21.0	U2XAD	Schenectady, U.S.A.
22	2XAD	Schenectady
22	VIM	A.W.A., Melbourne.
22	VIS	A.W.A., Sydney.
22	VJZ	A.W.A., Rabaul.
22.0	WIK	New Brunswick, U.S.A.
23.0	FFW	St. Assise, France.
24.5	ANF	Malabar, Java.
25	PCMM	The Hague, Holland.
25.0	G2YT	Poldhu, England.
25.0	TCMM	P.u.T.-Ministry, Holland.
25.0	POY	Nauen, Germany.
25.0	FW	St. Assise, France.
25.3	AGA	Nauen, Germany.
25.3	AGB	Nauen, Germany.
25.6	NKF	Bellevue, U.S.A.
26	VIM	A.W.A., Melbourne.
26	VIS	A.W.A., Sydney.
26	VIT	A.W.A., Townsville.
26	VJZ	A.W.A., Rabaul.
26.0	POX	Nauen, Germany.
27.0	PCPP	Kootwijck, Holland.
27.5	PCMM	Kootwijck, Holland.
28.0	POW	Nauen, Germany.
29.0	OCNG	Nogent le Rotrou, France.

Wave Length Metres.	Call Sign	
30	AC VPS	Hong Kong, China
30.0	F8GA	Clichy, Paris, France.
30.0	U2XI	Schenectady, N.Y., U.S.A.
30.5	PCJJ	Eindhoven, Holland.
30.6	NAL	Washington, U.S.A.
31	SAD	Stockholm, Sweden
31.5	HVA	Hanoi, Indo China.
31.5	OCDJ	Issy les Moulins, France.
32	VIS	A.W.A., Sydney.
32	VJZ	A.W.A., Rabaul.
32.0	G2YT	Poldhu, England.
32.0	FL	Paris, France.
32.0	LY	Bordeaux-Lafayette, France.
32.0	OCNG	Nogent le Rotrou, France.
32.0	ANE	Malabar, Java.
32.5	PCLL	Kootwijck, Holland.
32.79	U2XAF	Schenectady, U.S.A.
33.0	VMG	Samoa.
33.5	IDO	Rome, Italy.
34	VZDK	S.S. Jervis Bay.
34.0	NAJ	Great Lakes, Ill., U.S.A.
34.5	OCTN	Mourillon, Toulon, France.
34.0	WNP	Holstenborg, Greenland, U.S.A.
35	JIPP	Tokio, Japan.
35.0	U2XI	Schenectady, U.S.A.
35.03	WQO	Rocky Point, U.S.A.
36.0	LPZ	Buenos Ayres, Argentine.
36.0	PCUU	Kootwijck, Holland.
37.0	NPU	Tutuila, Samoa.
38.5	ANDIR	Bandoeng; Java.
39.0	OCMV	Mont Valierien, Paris.
39.6	JHHB	Tokio, Japan
39.6	K4YAE	Rottenburg, Germany.
40.0	NOSN	Coco-Solo, Panama.
40.0	NPG	San Francisco, U.S.A.
40.0	UIXAO	Belfast, U.S.A.
40.0	U2XAC	Schenectady, U.S.A.
40.2	AGC	Nauen, Germany.
40.5	FFW	St. Assise, France.
41.3	NKF	Bellevue, U.S.A.
42	VIM	A.W.A., Melbourne.
42	VIS	A.W.A., Sydney.
42	VIT	A.W.A., Townsville.
42	VJZ	A.W.A., Rabaul.
42.0	PCUU	The Hague, Holland.
43.0	GCS	Yarmouth, England.
43.0	NPG	San Francisco, U.S.A.
43.02	WIZ	New Brunswick, U.S.A.
44.0	WQO	Rocky Point, U.S.A.
44.0	KZA	Los Angeles, U.S.A.
44.0	KZB	Los Angeles, U.S.A.
45.0	NPG	San Francisco, U.S.A.
45	RFM	Siberia

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