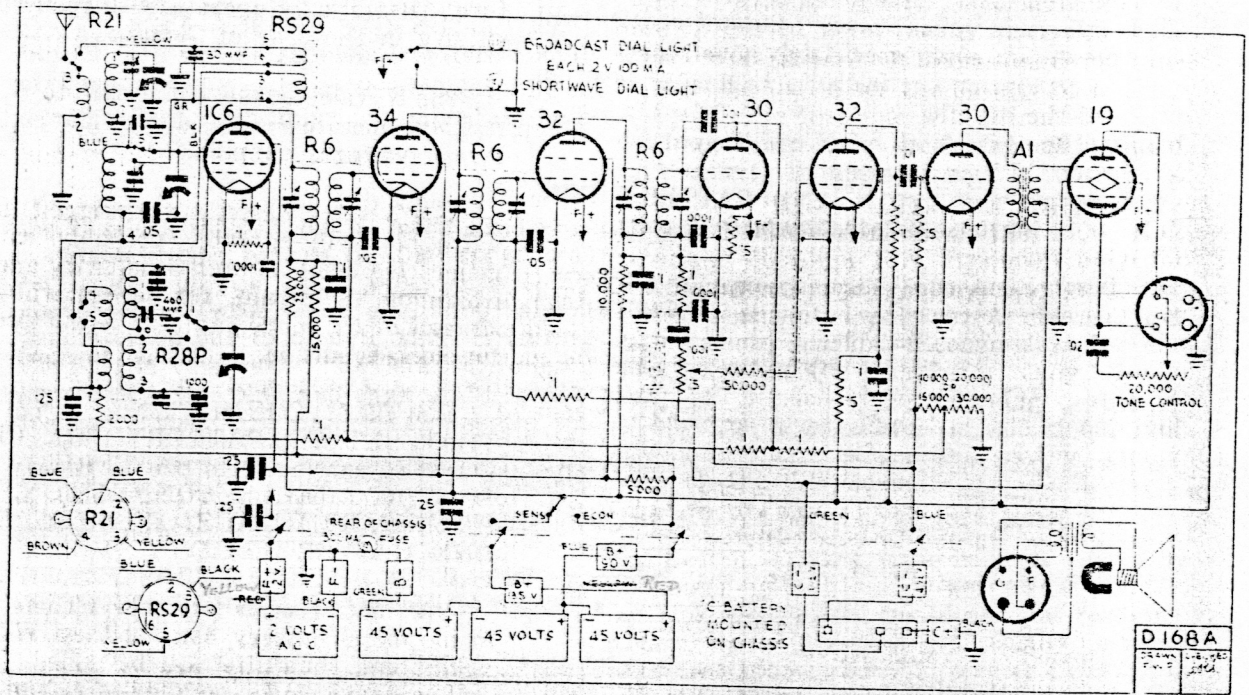


SERVICE INSTRUCTIONS & DATA FOR CQ 72 DUAL WAVE BATTERY OPERATED MODEL.

CIRCUIT DIAGRAM:



GENERAL NOTES:

"B" batteries required	135 volts (15-25 MA)
"A" or filament battery	2 volts (780 MA)
"C" batteries (mounted on chassis or in cabinet)	1 x 4½ volt block
Undistorted output	2 watts
Valves used	1-IC6, 1-34, 2-32, 2-30, 1-19, 2 p.l. lamps 2 V. 100 MA type
Intermediate frequency	465 K.C.
Broadcast Band coverage	550-1500 K.C.
Short Wave Band coverage	5.5-15.5 M.C.
Line-up and test frequencies	465, 1400, 1200, 1000, 800, 600 K.C., 15, 12, 9, 6 M.C.
Image ratio for broadcast band	50,000
Image ratio for short wave band	5

BATTERY EQUIPMENT AND SERVICE:

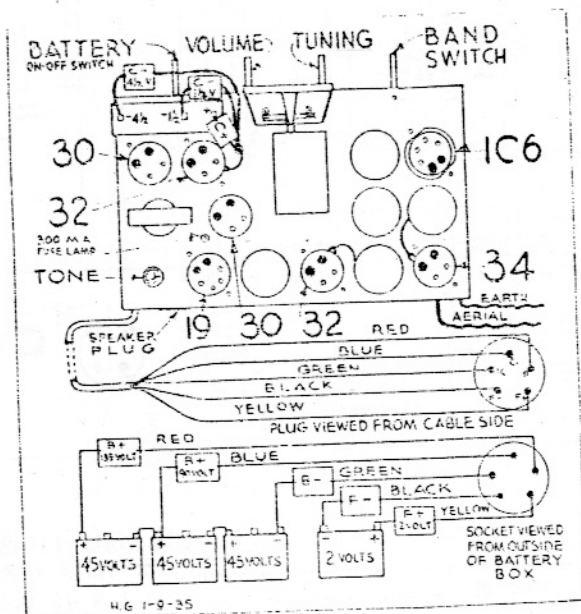
Care must be exercised in the service, adjustment and transport of this model battery set, as the valves are designed for the greatest economy in filament battery consumption, and are necessarily delicate and sensitive to excessive voltage. Filament supply may be obtained from either of two sources:—

(1) The most desirable and economical source is a 2 volt accumulator which can be re-charged. In this case, no external series filament resistor is used. The rating of the 2 volt accumulator should be 90 ampere-hours or higher. This ensures at least a few weeks' use at a time between chargings.

A further saving will result in that the customer will probably mostly use the switch in "Economy" position, and will, therefore, have only two "B" blocks to replace. The third one used for full sensitivity will most probably last several months longer.

It is interesting to note that even when switched to "Economy," Paris can be received on short waves. Some localities will probably experience fairly good short wave reception on the 90 volt "Economy" position of the switch.

TUBE LOCATION AND BATTERY CONNECTION DIAGRAM:



BATTERY BOXES—IMPORTANT:

Special attention is called to the fact that this model will not work in any previous battery box, neither will it work satisfactorily in a 5 valve battery box.

SENSITIVITY:

465 K.C.	16,000
465 K.C.	450
465 K.C.	25
1400 K.C.	.6
1000 K.C.	1.
600 K.C.	2.5
12 M.C.	2

Micro-volts absolute to grid of 32 I.F. Amp.
 Micro-volts absolute to grid of 34 I.F. Amp.
 Micro-volts absolute to grid of 1C6 Mixer.
 Micro-volts/meter to blue aerial wire (through Dummy).
 Micro-volts/meter to blue aerial wire (through Dummy).
 Micro-volts/meter to blue aerial wire (through Dummy).
 Micro-volts/meter to blue aerial wire (through Dummy).

Refer to actual cable markings on each set and those of the connecting leads within the boxes, and the difference between the 5 and 7 valve high tension and screen connections is obvious.

Briefly, no great damage will be done if either the 5 or 7 are plugged in to alternate boxes. If 7 valve (or 5 valve) set is plugged into an old 6 valve box it will blow out fuse. It will only operate with reduced sensitivity in the case of 7 valve.

The 7 valve radio connected to 5 valve box will operate poorly, due to low plate and screen voltages supplied.

The 5 valve battery set plugged in to 7 valve box will operate (probably with regenerative hiss) at high sensitivity and with excessive "B" drain, for screen will be 90 instead of 67 volts, and bias is not provided for such condition.

BEFORE CONNECTING ANY BATTERY SET TO BATTERY BOX CHECK CONNECTIONS OF BATTERIES WITH BATTERY CABLE CONNECTION, COMPARE CABLE TAGS ON BOTH RADIO AND BATTERY BOX.

"B" batteries must not become damp inside metal battery box, or they will short circuit and their life will be ended. Water and acid should not be allowed to run out of "A" battery and come in contact with "B's."

GRAMOPHONE CONNECTIONS:

Gramophone connection can be made as indicated in circuit diagram. A dotted circuit alteration beneath the first 30 tube shows where to connect. An external switch should be provided for disconnecting gramophone when radio is required.

CALIBRATION AND ALIGNMENT:

This method of calibration and alignment is based on the possession of a standard oscillator or signal generator covering all frequencies.

IMPORTANT:

When applying signal to grids of I.F. or mixer valves, signal must be coupled through a .1 Mfd. Condenser.

INTERMEDIATE FREQUENCY:

First, connect output from signal generator to grid of 1C6 mixer tube. Use $\frac{1}{4}$ MF condenser between 1C6 grid and signal generator output to obviate short-circuiting the bias in this valve. Set standard signal generator to 465 K.C. and align up I.F. transformers. These are aligned from top of the cans at back of chassis. Read micro-volts absolute input as required to give standard 50 mill-watts output as shown on the sensitivity chart.

BROADCAST BAND:

To line up the broadcast bands, chassis must be removed from cabinet. The broadcast and shortwave trimmers are mounted underneath chassis both for convenience and efficiency in electrical layout and to avoid customers tampering with adjustments. They are unmarked, distinct from the short-wave trimmers which are marked with RED SPOTS THESE LATTER SHOULD NOT BE TOUCHED UNLESS ONE HAS STANDARD TEST OSCILLATOR OR CAN LISTEN TO SHORT WAVE STATIONS OF KNOWN FREQUENCY.

If trimmers are not marked, the SECOND and FOURTH trimmers from front of the chassis are for short wave adjustment.

Proceed as follows:—

(1) See that pointer is adjusted in a horizontal position when condensers are in full mesh, that is, full capacity.

(2) Turn dial to 1400 K.C. position. Adjust receiver oscillator and R.F. trimmers until 1400 K.C. signal from standard signal generator gives maximum output.

(3) Set receiver dial to 600 k.c. position. Adjust broadcast padder (left-hand end of chassis viewed from front) until 600 K.C. signal from generator gives maximum output. Check sensitivity with chart.

Important: Make no further adjustment on oscillator trimmer or padder condensers.

(4) Re-set receiver dial to 1400 K.C. position. Re-align R.F. trimmers only for maximum output of 1400 K.C. signal, and check sensitivity with chart. No further adjustment should be necessary for the broadcast band.

(5) Check sensitivity at 800, 1000, 1200 K.C.

SHORT-WAVE BAND (See Note):

Switch to short wave band as shown by indicator on dial, but do not adjust pointer, as this would upset broadcast dial readings. Short wave trimmers are usually marked with red spots. Set dial pointer to bring in 12 M.C. signal. **The oscillator must be set at a higher frequency than the R.F. circuits.** To check this, tune to 11.88 M.C., and a weak image-repeat point should be heard. Note the condition that when the oscillator is set correctly at 465 K.C. (the I.F. frequency) higher than the R.F. signal received, the image repeat will be 912 (i.e., $2 \times$ I.F. frequency) lower than the received signal.

TO LINE UP SET WITHOUT STANDARD GENERATOR:

Note.—Alignment and calibration of the short wave band requires very delicate adjustment, and had best be attempted only when calibrated oscillator is available. However, some servicemen have been able to make a fairly acceptable line-up by using as a signal source stations whose frequencies are as near as possible to the suggested line-up frequencies mentioned above, and following the same procedure.