



Model 788A

The PHILCO Model 788A is an eleven tube table model superheterodyne receiver for reception of programmes over the complete radio spectrum from 540 K.C. to 22 M.C. In addition to good selectivity and high sensitivity, this receiver has smooth, easy tuning, excellent tone and a minimum amount of local noise interference.

There are nine tuning bands controlled by a band selector switch located on the front panel. Each band is separately illuminated in its individual section, with its range scale printed on a glass panel. The four scales are tuned by a variable gang capacitor which has a ratio of 16 to 1 with regular tuning and 80 to 1 with vernier tuning. The five scales on the right side of the panel are for band-spread tuning which is designed to spread the shortwave frequencies from 9 to 22 megacycles, and simplify the tuning of the shortwave bands. The spread bands are tuned by a three gang permeability tuner, with shunt aligning compensators for each gang.

Other features of design include:

Tuned R.F. stage for increased selectivity.

Two I.F. stages, using fixed capacitors and variable iron cores in the tuned circuits. (Iron core compensator adjustments include a locking arrangement to ensure a permanent setting.)

Variable tone control with bass compensation.

Automatic volume control.

Phase inverted, push-pull audio system.

Degenerative circuit in the audio stages for higher fidelity.

Antenna filter circuit to reduce static interference.

Sensitivity control for adjusting the receiver to a noisy location.

Balanced field, electro-dynamic speaker.

Provision for permanent phonograph connection controlled by band switch.

POWER SUPPLY: 230 volts A.C., 50 cycle, 90 watts.

INTERMEDIATE FREQUENCY: 455 K.C.

TUNING RANGES:

STANDARD TUNING

Switch Position	Range
1	540 — 1700 K.C.
2	1.45 M.C. — 2.6 M.C.
3	2.3 M.C. — 7.3 M.C.
4	7.2 M.C. — 22 M.C.

BANDSPREAD TUNING

Switch Position	Range
5	9.4 M.C. — 9.9 M.C.
6	11.4 M.C. — 12 M.C.
7	14.8 M.C. — 15.6 M.C.
8	17.3 M.C. — 18.2 M.C.
9	21 M.C. — 21.8 M.C.
10	Phonograph

PHILCO TUBES, TYPE AND FUNCTION

Quantity	Type	Function
1	7C7E	R.F. Amplifier
1	7J7E	Converter or Mixer
1	78E	1st I.F. Amplifier
1	7C7E	2nd I.F. Amplifier
1	7A6	2nd Detector A.V.C.
1	76	1st Audio Amplifier
2	76	2nd Audio Phase Inverter
2	6V6EG	Push-pull Audio Amplifier
1	80	Rectifier

ALIGNMENT DATA

EQUIPMENT REQUIRED

Signal Generator: To properly adjust the various trimmers of this receiver, a calibrated signal generator is required.

Aligning Indicators: A vacuum-tube voltmeter or audio output meter is required. Instructions for connecting these instruments are listed below.

Aligning Tools: A fibre-handle screwdriver, Philco Part No. 45-2610, and aligning wrench, Part No. 7696 or similar tools, are also necessary.

CONNECTING ALIGNING INSTRUMENTS

Signal Generator: The signal generator output is connected to the receiver through a dummy antenna which consists of a capacitor or a resistor connected in series with the high-side output lead. (See dummy antenna, Note A, in tuning range chart for values to be used at various frequencies.) Connect ground lead from signal generator to chassis.

Vacuum-Tube Voltmeter: If the vacuum-tube voltmeter is to be used as an alignment indicator, it should be connected as follows:

1. Connect the negative (—) terminal of the voltmeter through a 2 meg. ohm resistor to any grid-return connection in the A.V.C. circuit.
2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an alignment indicator, it should be connected to plate and screen terminals (No. 3 and No. 4) of either one of the 6V6EG Tubes. The meter should be set on 0 to 30 volts A.C. scale. After the Signal Generator and aligning meter are connected, the compensators should be adjusted in the order as shown in the tabulation chart. If the pointer of the aligning meter goes off scale when making compensator adjustments, reduce the Signal strength from the Signal Generator.

ADJUSTMENT OF I.F. STAGES

Connect a .1 mfd. capacitor (dummy antenna) in series with the signal generator output lead (high side). The ground lead of the signal generator should be connected to the ground terminal of the chassis for all operations. Connect high side of signal generator to stator lug of the middle section of the tuning gang capacitor.

Place the band switch in position and set the dial at 1700 K.C. The volume control should be at maximum for all adjustment operations. Set signal generator at 455 K.C. Padder adjustment 45B should be tuned to full counter-clockwise position (all the way out) before adjusting other padders. Adjust successively, padders 45A, 45C, 50A, 50B and 51A for maximum output meter readings. Adjustment should be rechecked, and then padder 45B should be adjusted to maximum output meter readings as the final I.F. adjustments. This completes the adjustments. This completes the adjustment of the I.F. stages.

ALIGNMENT CHART

NORMAL TUNING RANGES

SIGNAL GENERATOR				RECEIVER			
Operations in Order	Output Connections to Receiver	Dummy Antenna. Note A.	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	SPECIAL INSTRUCTIONS
1	Tuning Capacitor Stator Lug Middle Section	.1 mfd.	455 K. C.	1700 K. C.	Vol. Max. Band Selector "Broadcast"	45A, 45C, 50A, 50B, 51A	Note D
2	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Band Selector "Broadcast"	34A, 25X, 4	Note B Roll Gang
3	Antenna and Ground	200 mmfd.	580 K. C.	580 K. C.	Vol. Max.	34B	Roll Gang
4	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Band Selector "S.W.2"	34A, 25X, 4	Roll Gang
5	Antenna and Ground	400 ohms	6.0 M. C.	6.0 M. C.	Vol. Max.	34C	Roll Gang
6	Antenna and Ground	400 ohms	20 M. C.	20 M. C.	Vol. Max. Band Selector "S.W.3"	38A, 22A, 8A	Note C

NOTE: The S.W.1 tuning band requires no adjustment.

NOTE A: The dummy antenna consists of a capacitor or resistor connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the chart procedure.

NOTE B: Dial Calibration: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning capacitor. To adjust the dial, proceed as follows: With the tuning capacitor closed (maximum capacity) set the dial pointer on the first mark at the left edge (low-frequency end of the broadcast scale).

NOTE C: When adjusting the oscillator compensator, be sure to tune in the fundamental signal (20 MC.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning the signal generator dial 910 KC above the fundamental signal, which will be 20.910 KC.

NOTE D: Before adjusting padders 45A, 45C, 50A, 50B 51A, turn padder 45B to full counterclockwise position (all the way out). After the padders are adjusted to maximum, then adjust padder 45B for maximum.

ALIGNMENT CHART

BAND-SPREAD TUNING RANGES

SIGNAL GENERATOR				RECEIVER			
Operations in Order	Output Connections to Receiver	Dummy Antenna. Note A.	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	SPECIAL INSTRUCTIONS
1	Antenna and Ground	400 ohms	9.7 M. C.	9.7 M. C.	Band Selector Position "31M" on Dial	38B, 22B, 8B	Note E—Note F
2	Antenna and Ground	400 ohms	11.7 M. C.	11.7 M. C.	Band Selector Position "25M" on Dial	38C, 22C, 8C	Note F
3	Antenna and Ground	400 ohms	15.2 M. C.	15.2 M. C.	Band Selector Position "19M" on Dial	44A, 27A, 11A	Note F
4	Antenna and Ground	400 ohms	17.8 M. C.	17.8 M. C.	Band Selector Position "16M" on Dial	44B, 27B, 11B	Note F
5	Antenna and Ground	400 ohms	21.5 M. C.	21.5 M. C.	Band Selector Position "13M" on Dial	44C, 27C, 11C	Note F

PRELIMINARY MECHANICAL ADJUSTMENT

Before the padders of the band-spread tuning ranges are adjusted, the iron cores of the antenna, R.F. and oscillator transformers must be mechanically set as follows:—

1. Turn the band-spread tuning control to the extreme counterclockwise position (lowest frequency).
2. Adjust location of oscillator iron core so that the end of the iron core is flush with the end of the transformer. With the oscillator iron core in this position, the antenna and R.F. cores will be correctly located.
3. When installing a new oscillator transformer or core, make sure that the iron core slides freely in the transformer. It is important to do this to eliminate backlash in the tuning mechanism. If adjustment is necessary, slightly move transformer in the direction required.
4. After mechanically setting the transformers and iron cores, adjust the padders as given in the chart.

NOTE E: Before adjusting padders, turn the band-spread tuning knob to its extreme counterclockwise position. Set the band-spread dial pointer on the first mark on the left edge (low-frequency end) of the 31-meter scale.

NOTE F: To make sure that the dial reads properly after adjusting the compensator with the signal generator as outlined in the chart, a known station on each band near the adjusting frequency should be tuned in with the band-spread tuning control. If the dial reading is incorrect, adjust the oscillator compensators on each band until the stations are heard at the correct points on the dial. After adjusting the oscillator compensators to the correct frequency of the known station, the antenna and R.F. compensators should be adjusted to maximum signal.

ALTERNATIVE METHOD

Locate a known station near the centre of each band-spread and zero beat the signal generator with it at the time of aligning the band. This makes available a signal of adjustable strength and known frequency. This

method will be simpler when conditions make its use possible, as it is much easier to align a receiver to a strong signal.

SPECIAL SERVICE INFORMATION

BAND-SPREAD TUNING MECHANISM

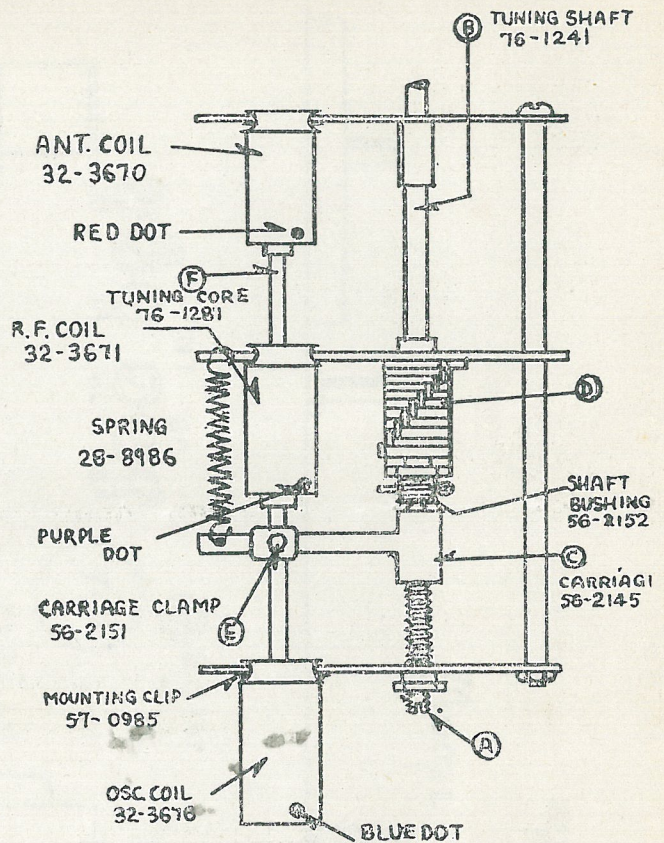
Should it become necessary to make any adjustments or replacement of parts in the band-spread tuning assembly the following instructions should be observed:

ADJUSTMENT OF TUNING SHAFT

End play can be removed by adjusting the rear bearing (A) figure 16. Care should be taken when adjusting the screw so that shaft (B) does not turn too tightly on bearing. To make this adjustment, insert screwdriver in line with shaft in slotted screw. After adjustment, tighten check nut on screw.

REMOVAL OF TUNING SHAFT (B)

1. Remove tuning-knob shaft and coupling.
2. Loosen lock-nut on rear bearing and remove adjusting screw and ball-bearing.
3. Remove cotter-pin from stop assembly.
4. Unscrew carriage as shaft is pulled out through front of R.F. tuner and chassis.
5. When installing new shaft (B), adjust positions of stop assembly and carriage before inserting cotter-pin, so that the carriage (C) is approximately five turns from the stop assembly (D) with the shaft in extreme counterclockwise position from the front. The stop assembly is rotated until all washers are in contact. The bottom washer should be located between the stops nearest together.



BAND-SPREAD TUNING MECHANISM

ADJUSTMENT OF BAND-SPREAD TUNING CORE ASSEMBLY

1. Cores are correctly located when the rear of the oscillator core (blue dot identification) is flush with the rear of the oscillator coil and the tuning shaft is in extreme counter-clockwise position.
2. The carriage clamp (E) must not be tightened excessively as this will bend the tuning-core rod (F) and cause back-lash.

INSTALLATION OF DRIVE CORDS
 BROADCAST POINTER AT LOW FREQUENCY END OF DIAL, GANG CLOSED.
 BAND SPREAD POINTER AT LOW FREQUENCY END OF DIAL.

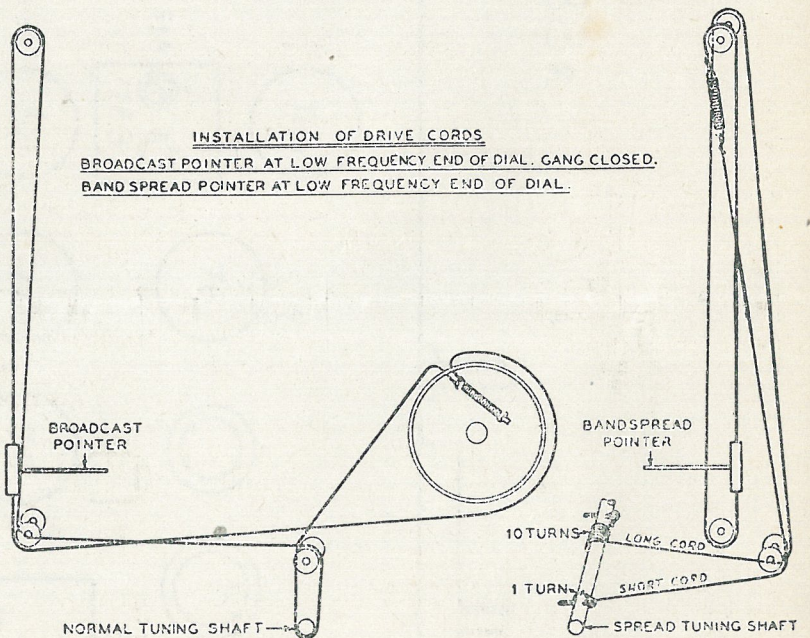


FIG. 2 — INSTALLING TUNING DRIVE CORDS



7C7

7J7

78

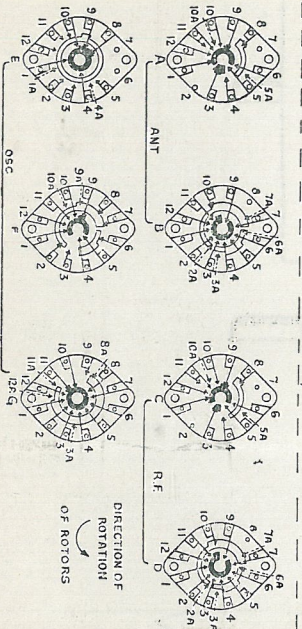
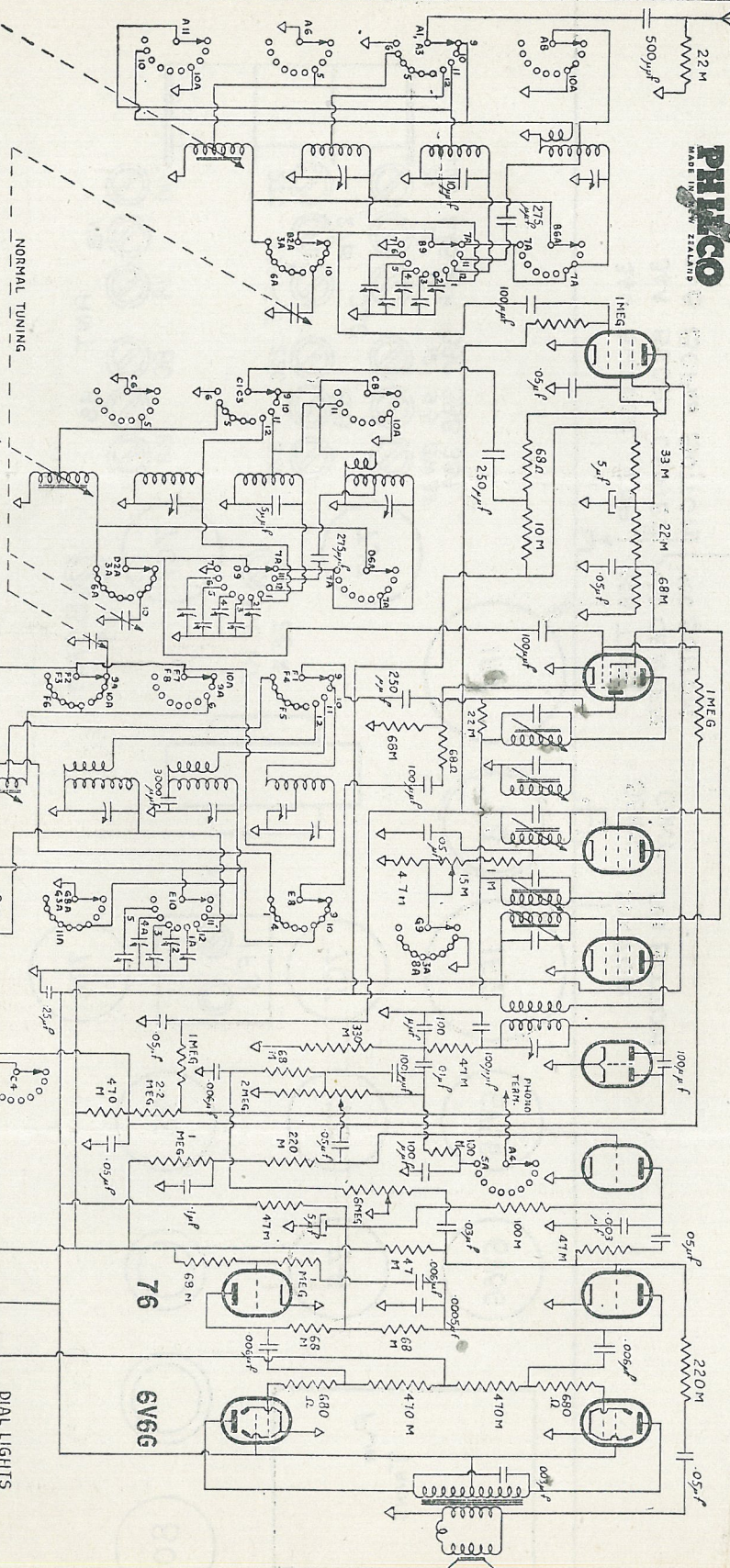
7C7

7A6

76

76

6V6G



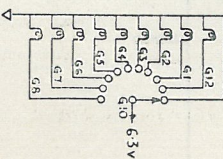
DIRECTION OF ROTATION OF ROTORS

BLACK ROTOR AT REAR OF WATER WHITE ROTOR AT FRONT OF WATER WATERS VIEWED FROM REAR OF CHASSIS SWITCH IN B.C POSITION

I.F. 455 K.C.

DOMINION RADIO & ELECTRICAL CORP. LTD AUCKLAND N.Z.

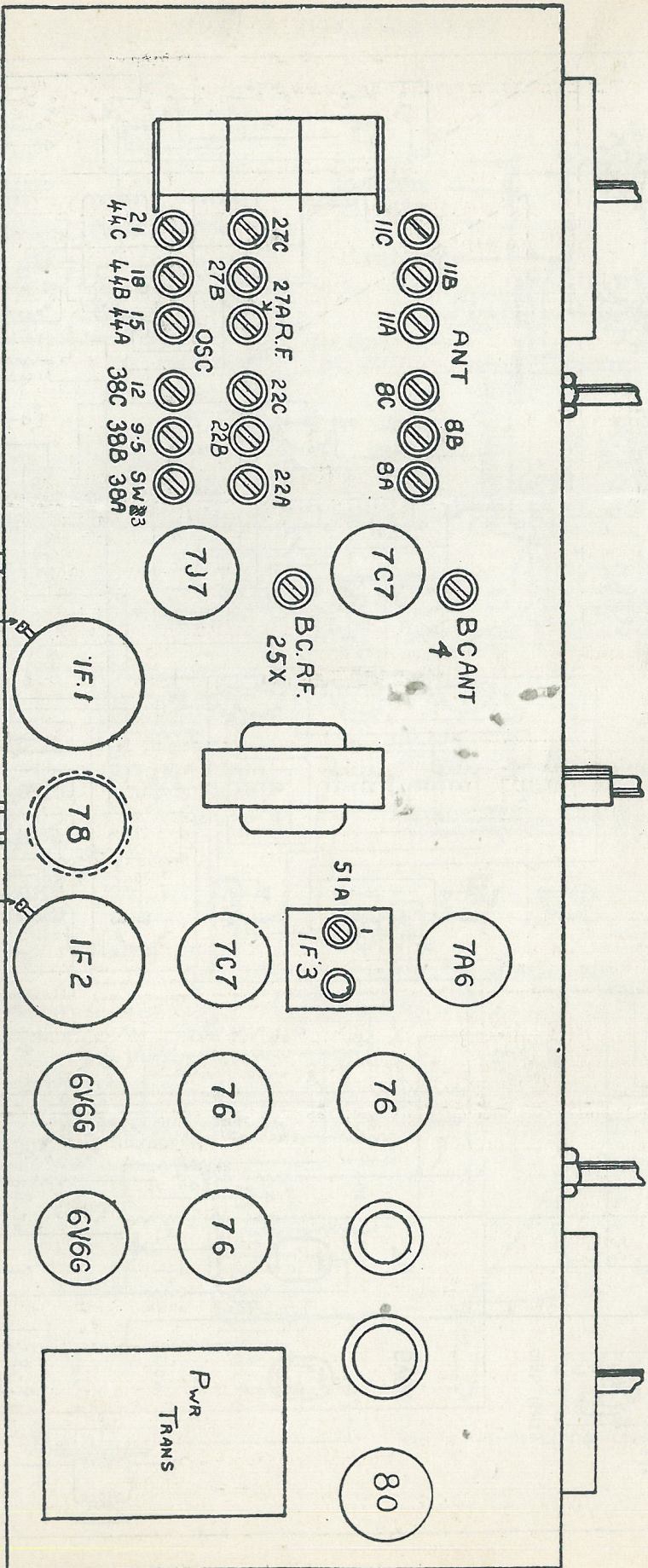
DIAL LIGHTS



M.Z. PHILCO 788A	
DRAWN BY	67
CHECKED BY	24-7-45
APPROVED BY	1173



MODEL 788A



ADJUST AS PER ALIGNMENT DATA

or af
 1
 2
 3
 4
 5
 A
 1.
 2.

MODEL 788 A.

Certain Model 788 A sets use the type 6K8G Triode-Hexode converter tube.

The only circuit alteration is a change of values of screen feed resistors as shown in the diagram.

The numbers round the tube in this diagram represent pin numbers.

