ELECTRONIC INDUSTRIES LTD.
CAR RADIO DIVISION
Astor House, 161-173 Sturt Street, South Melbourne.

File: Receivers Auto
Date: 1–6–61
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SERVICE DATA

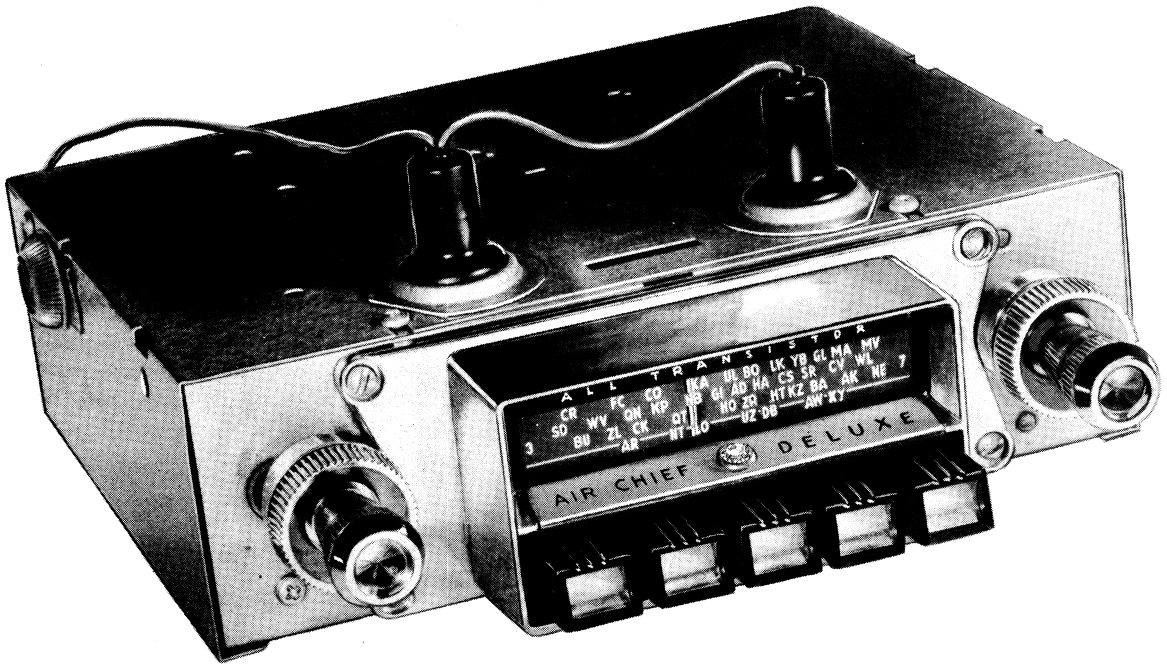
MODEL "JVZ"

7 TRANSISTOR 12 VOLT CAR RADIO RECEIVER

Push Button and Manual Tuning

ESPECIALLY DESIGNED FOR TAILORED FITTINGS
(Vehicle battery negative terminal connected to chassis)

ILLUSTRATION IS 1961 CHEVROLET AND PONTIAC FITTING



TUNING RANGE:	530 – 1610 Kilocycles	
INTERMEDIATE FREQUENCY:	455 Kilocycles	
BATTERY CONSUMPTION:	13 Volts DC. input: .65 Amps.	
SPEAKER VOICE COIL IMPEDANCE:	15 Ohms	
POWER OUTPUT:	2 Watts (undistorted)	
TRANSISTOR COMPLEMENT:	2N484	R.F. Amplifier
	2N485	Mixer – Oscillator
	2N484	I.F. Amp.1.
	2N483	I.F. Amp.2.
	2N483	I.F. Amp.3.
	874	Audio Driver
	1138	Audio Output
GERMANIUM DIODES:	1N295	AGC.
	1N295	Detector/AGC.

TECHNICAL DESCRIPTION

Aerial Stage

The aerial coil circuit, consists of the perm-tuner aerial coil, the aerial trimmer (1) and aerial plus lead-in capacitance and the .0015 mfd capacitor (2).

In order to match the high impedance whip aerial to the low input resistance of the R.F. transistor, this circuit provides an impedance step down. Hence there is an apparent loss in sensitivity from the dummy aerial terminal to the R.F. base instead of the voltage gain usually found in valve car radios.

The R.F. transistor is forward biased by the AGC line and the resistor (52). The perm-tuner R.F. coil circuit is similar to that used in hybrid car radios. The signal fed to the low impedance input of the oscillator-mixer is developed across the .0018 mfd capacitor (7). Because of the fairly low R.F. gain, neutralizing of this stage is not necessary.

Self Oscillating Mixer:

The oscillator tuning coil and 1st I.F. transformer are in series from collector to ground. Emitter feedback at the oscillator frequency is taken from the capacitive tap (junction of capacitors (11) and (12)).

The adjustable shunt coil is connected in parallel with the oscillator tuning coil to assist in tracking the oscillator with the aerial and R.F. sections. The signal is amplified at 455 Kc/s before being passed to I.F. amp. 1. by the coupling winding on the first I.F. transformer.

I.F. Stages:

The first I.F. stage is biased from the AGC line. A double tuned transformer in two seperate cans and capacitively coupled by (22) is used between I.F. amp. 1. and I.F. amp. 2. I.F. amp. 1. is neutralized by capacitor (16). Pins B and C are used to connect a 20 db I.F. attenuator across this transformer primary to assist in aligning the first I.F.T. and the R.F. section. The remainder of the I.F. gain is made up of I.F. amp. 2. R.C. coupled to I.F. amp. 3. A single tuned transformer couples the signal to the detector. I.F. amp. 3 is neutralized by capacitor (29).

Detector and AGC:

The diode load resistance consists of the 2.2K (76) and the AGC line feed resistors to R.F. stage and I.F. amp. 1. The volume and tone control circuits are coupled through the 2 mfd capacitor (40).

The collector currents of the R.F. and I.F. amp. 1. transistors are reduced with increasing signal strength by the voltage from the diode detector causing the bias applied to the base of these stages to be reduced. The feed resistors and emitter stabilizing resistors are proportional so that most of the current reduction (i.e. AGC action) occurs in the I.F. amp. 1. transistor. In addition, further AGC action is achieved by the use of a reverse-biased diode across the primary of the first I.F. transformer. The reverse bias of .5 volt is the difference between the collector voltages of the convertor and I.F. amp. 1. transistors. As the I.F. amp. 1. transistor current falls as a result of AGC operation, the collector voltage of this stage will rise and reduce the reverse bias across the diode. The removal of the reverse bias results in a very large reduction of the diode resistance and attenuates the signal in the I.F. transformer.

Audio Amplifiers:

An audio driver transistor transformer-coupled to the audio output transistor mounted on the anodised heat sink completes the line-up of the receiver. Two wire wound Positive Temperature Co-efficient resistors, number (92) in the emitter of the output transistor and number (88) in the bias network are used to ensure thermally stable operation over a wide range of temperatures.

WARNING MODEL "JVZ" RECEIVER MAY BE INSTALLED ONLY IN A CAR WHICH HAS THE NEGATIVE TERMINAL OF THE CAR BATTERY CONNECTED TO THE CAR CHASSIS.

BATTERY CONNECTION OF INCORRECT POLARITY WILL DAMAGE THE RECEIVER.

SERVICE INSTRUCTIONS — electrical

ALIGNMENT EQUIPMENT

Signal Generator - modulated 400 cps
Output Meter - 15 ohm impedance
Dummy Aerial - 65 pF. Part No. M486

Series Capacitor - Sig. gen. for I.F.T. alignment .1 MF Part No. C113

I.F. Attenuator - Part No. A103/2073.

Alignment Tools

(a) Chisel point type Part No. M195 for trimmer cond. adjustment.

(b) Flat metal blade type Part No. A101/2076 for I.F.T. and osc. shunt coil iron core adjustment.

(c) Tuning unit iron core adjustment Part No. M471.

(d) Tuning unit pointer pivot spanner Part No. M445.

Collector current Meter Connection - Jack plug Part No. M502.

ALIGNMENT CONDITIONS

Remove small knob located on side of receiver can.
Remove the screws fastening the metal can to receiver then slide can off receiver.

Volume Control - maximum volume (fully clockwise)
Tone Control - maximum treble (fully clockwise)
Output Level - 50 milliwatts output meter reading with speaker voice coil disconnected.

Output Meter Connection - NOTE: The speaker socket of receiver incorporates shorting contacts to protect the output transistor when speaker plug is removed from socket. Connect leads attached to speaker plug to the terminals of output meter.

Supply Voltage and Connections - 13.0V. D.C. Connect battery lead of receiver to positive terminal and connect negative terminal to the receiver chassis.

INTERMEDIATE FREQUENCY TRANSFORMER ALIGNMENT

Turn tuning control until perm. tuner iron cores are out of the coil windings.

Oper. No.	Generator Connection	Generator Frequency	Dummy Aerial	Instructions
1.	To base of IF. amp. 3 (test point "D" on circuit board)	455 Kc/s	.1 MF Cond. P/No. C113 in series with generator	Adjust iron core of 4th I.F. trans. for max. output
2.	To base of IF. amp. 1 (test point "A" on circuit board)	455 Kc/s	As Oper. 1.	Adjust iron core of 3rd and 2nd I.F. trans. for max. output
3.	Connect I.F. attenuator Part No. A103 to test pins "B" and "C" on circuit board. Resistor end of attenuator to pin "B".			
4.	To base of mixer transistor (term. 5 of tuner unit)	455 Kc/s	As Oper. 1.	Adjust iron core of 1st I.F. trans. for max. output.

BROADCAST ALIGNMENT

When iron cores and tuning coil assy. is in original factory sealed condition.

1.	Connect I.F. attenuator to pins "B" and "C" on circuit board (resistor to pin "B").			
2.	Aerial lead-in socket	1615 Kc/s	Part No.M486 65 pF in series with generator	Turn tuning control to low freq. end of travel (iron cores full out). Adjust osc. RF. and aerial trimmer for max. output.
3.	Aerial lead-in socket	600 Kc/s	As Oper. 2.	Rock tuning control through signal, adjust iron core of osc.shunt coil for max. output
4.	Aerial lead-in socket	1200 Kc/s	As Oper. 2.	Tune receiver to generator frequency. Adjust R.F. and aerial trimmers for max. output

SETTING OF THE DIAL POINTER

Disconnect the I.F. attenuator.

Disconnect the generator cable from the dummy aerial then connect 20 ft. of aerial wire to the dummy aerial terminal.

Accurately tune the receiver to a station marked on the dial near 800 Kc/s.

Using spanner (Part No. M445) or a 3/32" hexagonal key wrench adjust the eccentric pointer arm pivot so that the pointer coincides with the centre of the tuned station call sign.

Check dial logging and if necessary readjust eccentric pivot of pointer arm.

NOTE: After this adjustment the eccentric section of the pointer arm pivot must be within $\pm$ 90° of the rear position when the pointer is set at the centre of the dial. Incorrect length of travel and logging will result if the eccentric section is outside these limits.

BROADCAST ALIGNMENT

When iron cores or tuning unit coil assy. have been replaced and therefore are not in original factory sealed condition.

1. Before fitting the tuning unit into the receiver turn the tuning control spindle until the perm. tuner is against the high freq. end of travel stop. Adjust the iron cores so that distance between the extreme end of the formers protruding through the rubber grommet and the iron core in the former is to be between $1\frac{3}{8}$" and 1-17/32".

2. Fit and wire the tuning unit into the receiver.

3. Connect I.F. attenuator (Part No. A103) to pins "B" and "C" on circuit board. (Resistor to pin "B").

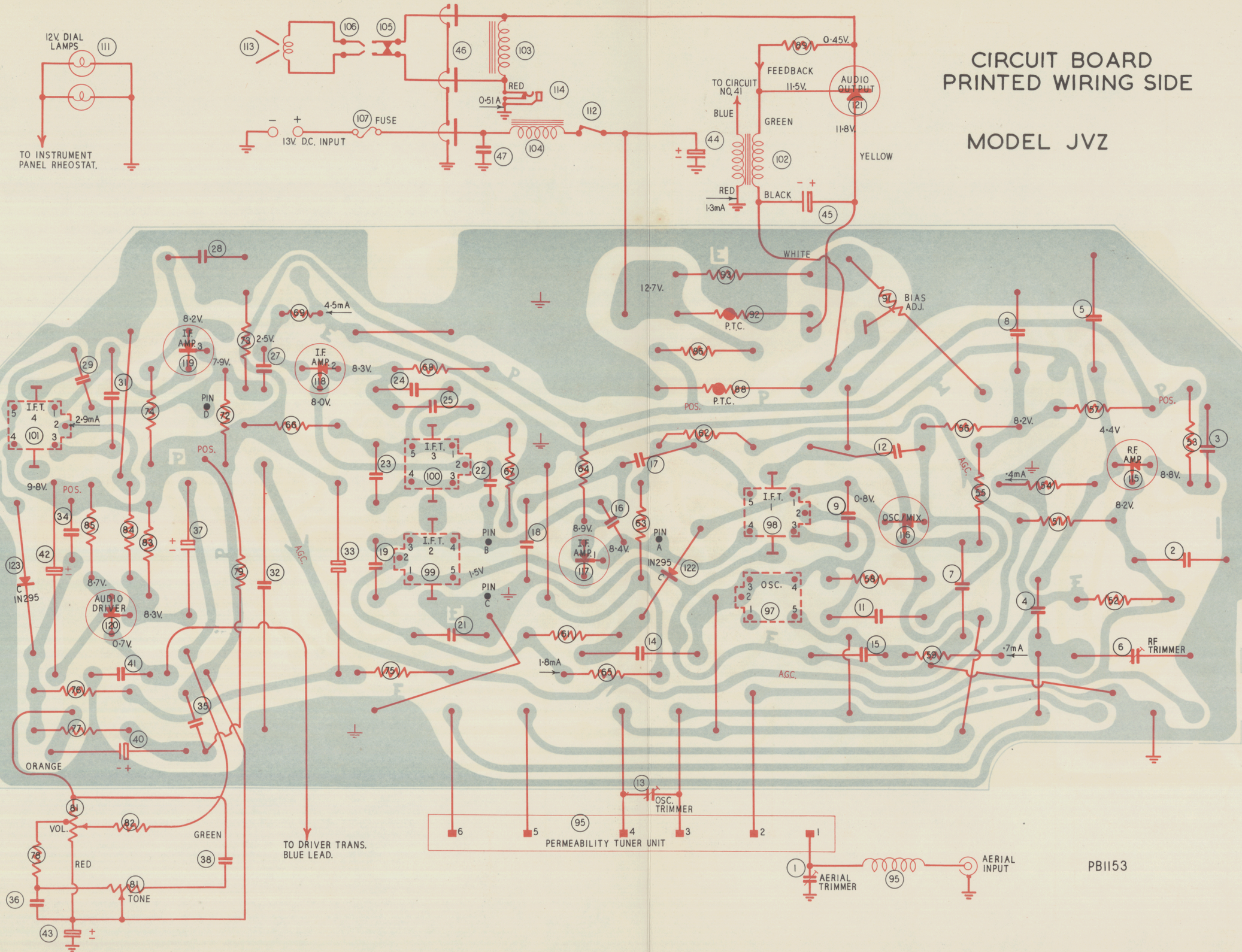
4.	Aerial lead-in socket	1615 Kc/s	Part No.M486 65 pF. in series with generator	Perm. tuner against high freq. end of travel stop. Adjust osc., aerial and RF. trimmer conds. for max.output.

5. In the side of tuning unit near the tuning spindle there are two slots, place a gauge in the form of a flat piece of metal 0.3" wide into the slot nearest the front of tuner. The 0.3" gauge is to be against front edge of the slot. Refer diagram, Page 6.
Turn tuning spindle until metal tongue in the slot touches the 0.3" gauge.

Aerial lead-in socket	1200 Kc/s	Part No.M486 65 pF in series with generator	With tuning unit set in position detailed, adjust osc., aerial and R.F. iron cores for max. output.
6. Aerial lead-in socket	600 Kc/s	As Oper. 5.	Rock tuning control through signal, adjust osc.shunt coil iron core for max. output.

CIRCUIT BOARD PRINTED WIRING SIDE

MODEL JVZ



7. Turn tuning control to the low freq. end of travel (iron cores full in). Tune signal generator to approx. 525 Kc/s. The low freq. tuning limit should be between 515 and 530 Kc/s. If the receiver tunes outside these limits repeat operations 4, 5, 6 and 7.

8. Repeat operation 5.

9. Align dial pointer as detailed on page 5.

AERIAL COMPENSATING CONDENSER ADJUSTMENT

When the receiver is refitted to the car, the aerial trimmer condenser must be adjusted to ensure correct matching of the aerial to the receiver for maximum long distance reception.

A small knob attached to the trimmer condenser shaft is located on the passenger side of the receiver case.

To adjust the trimmer condenser, extend the aerial to half its fully extended height then tune the receiver to a barely audible distant station near 1200 Kc/s. Slowly turn the small knob in either direction for maximum volume of the signal.

For best results it should be adjusted in a locality free from interference from overhead power lines, etc. Once the trimmer condenser has been set it should not require readjustment unless the receiver or aerial and lead-in cable have been moved or removed from the vehicle.

TRANSISTOR COLLECTOR CURRENT ADJUSTMENT

A plug P/No. M502 is to be inserted into the jack socket located on underside of receiver. Before use the high resistance fine leads connected to the terminals of plug (M502) are to be replaced with suitable heavy conductor connecting leads.

Connect the leads from the plug to the terminals of an 0-1 amp. DC. meter. (Positive terminal of meter connected to centre contact of jack plug).

Connect receiver battery lead to the negative terminal of a 13 volt DC. supply.

Switch receiver "ON" and turn volume control to minimum position.

Allow a minimum of three minutes for thermal stabilization after initial switching on.

Carefully adjust bias rheostat so that transistor collector current is .510 amps.

NOTE 1: It is essential that the supply voltage be maintained at 13 volts when measuring the collector current.

NOTE 2: The transistor bias rheostat should be readjusted if the power transistor or P.T.C. resistors are replaced.

NOTE 3: After a long period of operation it will be noticed that the collector current will decrease slightly. This is normal and is due to the warming up of the positive temperature coefficient components.

PRECAUTIONS WHEN TESTING TRANSISTOR RECEIVERS

A. A transistor is extremely sensitive to heat. If a soldering iron is to be used close to a transistor move the transistor or place non-conductive material between the iron and transistor.
When making soldered connections to the leads of the transistors hold the lead which is being soldered between the heat source and transistor body with pliers; excess heat will be dissipated away into the pliers. Use a soldering iron which supplies just the required heat for satisfactory soldering of connections.

B. When checking components, cut the long pigtail of the component in preference to unsoldering from the circuit board. Components checked in this way may be returned into the circuit by pressing the ends of the pigtail together then solder. Faulty components should be removed from the circuit board by cutting through the body of the component leaving two short stubs of wire protruding (approx. $\frac{1}{8}$") above the circuit board. The pigtail leads of the new component are to be soldered to these stubs.

C. A continuity meter must not be applied to the receiver wiring with the transistor in circuit. A transistor must not be checked for continuity with an ohmmeter as the applied voltage and resultant excess current flow may result in permanent damage to the transistor. A voltmeter of at least 20,000 ohms/volt or a high impedance vacuum tube type voltmeter is a safe means of measuring circuit voltages.

D. A screwdriver or similar instrument must not be used to short components together or to the common negative. The use of this method of checking for the existance of voltage or signal clicks may result in permanent damage to the transistors and components.

E. The receiver must not be operated at high power unless the speaker choke is loaded with either a speaker voice coil or power meter.
Safety contacts which prevent open circuit operation, are incorporated in the speaker socket attached to the leads from receiver. These contacts short circuit the choke when the speaker plug is withdrawn from the socket.

F. The metal mount face of the power transistor and the lead washer are insulated from the heat sink by a black anodised finish of the heat sink.

CHASSIS SERIAL NUMBER

The chassis serial number is stamped into the metal base of the receiver and is visible on the underside of the receiver.

COIL, DRIVER TRANSFORMER AND SPEAKER CHOKE CONNECTIONS

Lead colours and terminal numbers for the connections to these components are shown on the circuit.

FAULT LOCATION GUIDE - GENERATOR CHECK

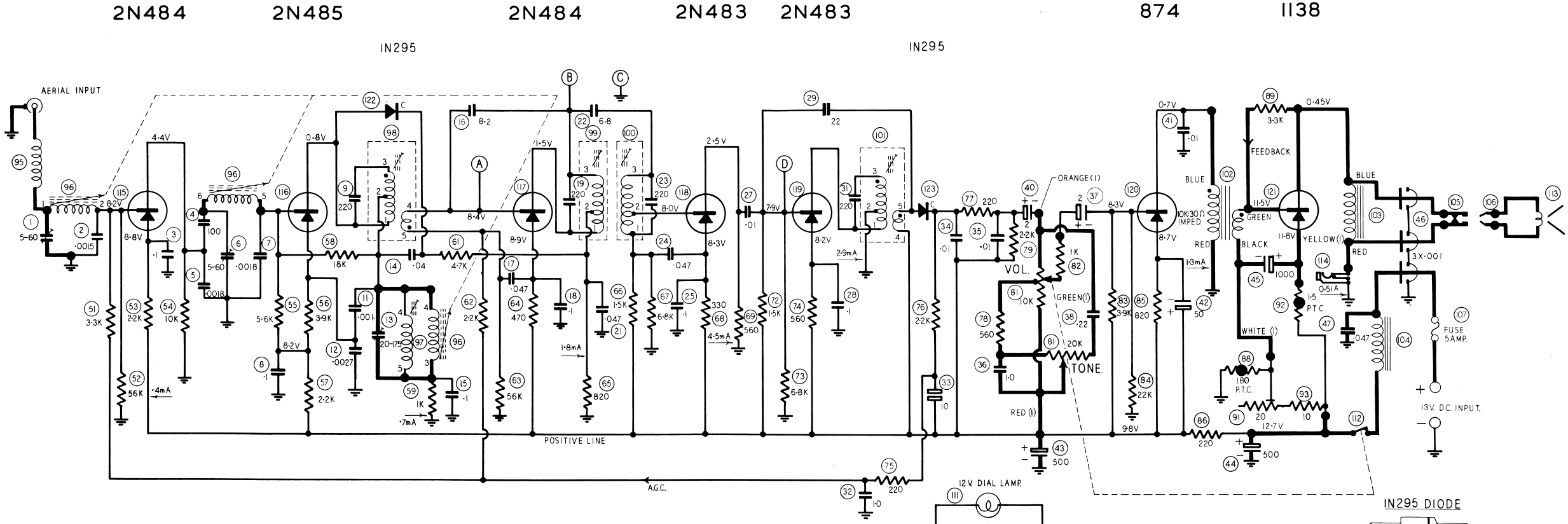
Connect generator through .1 mfd capacitor to the following points. CAUTION: Always start with low generator output. Strong signals may overload the receiver or cause the AGC to function. Set volume control at maximum. 20 dB attenuator Part No. A103/2073.

CHECKPOINT	LOCATION Circuit Nos. or Test Pins at Junction Point	SIGNAL GENERATOR FREQUENCY	SIGNAL STRENGTH
Output transistor base	At socket	Audio	Weak
Audio driver base	Nos.37, 83 & 84	"	Increase in level
Detector o/p or v/cont.		"	Same level as above
Detector input	Term.5 of I.F.T.4	455 Kc/s	Signal
IF amp No. 3 base	Test pin D	" "	Increase in level
IF amp No. 2 base	Term.2 of I.F.T.3	" "	Increase in level
IF amp No. 1 base	Test pin A	" "	Increase in level
Fit 20 dB IF attenuator	to pins B & C before	proceeding	
Osc. mixer base	Term.5 tuner unit	455 Kc/s	Increase in level
Osc. mixer base	Term.5 tuner unit	Sig.Freq.	Signal
RF base	Term.2 tuner unit	" "	Small increase
Dummy aerial		" "	Small decrease

FAULT LOCATION GUIDE - CLICK TEST

Connect one end of 6.8K resistor to the chassis. Touch the other end on and off the following points and listen for a click. Volume control at maximum.

CHECKPOINT	LOCATION Circuit Nos. or Test Pins At Junction Point	STRENGTH OF CLICK
Output base	At socket	Weak click
Audio driver base	Nos.37, 83 and 84	Loud click
IF amp No. 3 base	Test pin D	Weak click
IF amp No. 2 base	Term.2 of I.F.T.3	Weak click
IF amp No. 1 base	Test pin A	Loud click
Osc. mixer collector	Anode of 1N295 (Cir. No.122)	Loud click
Osc. mixer base	Term.5 tuner unit	Loud click
RF Collector	Nos.4, 5 and 54	Loud click
RF base	Term.2 tuner unit	Loud click



NUMBERS ASSIGNED TO TERMINALS OF COILS AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT BE FOUND ON THE UNIT.

ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND CHASSIS WITH A VACUUM TUBE VOLTMETER. NO INPUT SIGNAL.

HEAVY LINES INDICATE CIRCUITRY NOT ON PRINTED BOARD, LEAD COLOURS (E.G. RED (I)) INDICATE FLEXIBLE CONNECTIONS TO PRINTED CIRCUIT BOARD.

FOR USE OF TEST POINTS A B C & D AND ADJUSTMENT OF 1138 TRANSISTOR COLLECTOR CURRENT REFER TO SERVICE BULLETIN JVZ-1.

ISSUE 2. VOLTAGE READINGS AMENDED AND CURRENT READINGS ADDED.
ISSUE 3. CIRCUIT NO. 81 (TONE CONTROL) WAS 10KΩ. CIRCUIT NO. 38 WAS ·5MF. CIRCUIT NO. 79 ADDED. TRANSISTOR 2N485 WAS 2N486

MODEL JVZ

NEGATIVE TO CHASSIS

PUSH BUTTON TUNING

PB1138

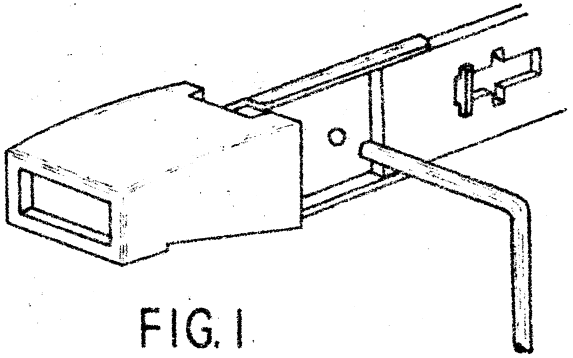


FIG. 1

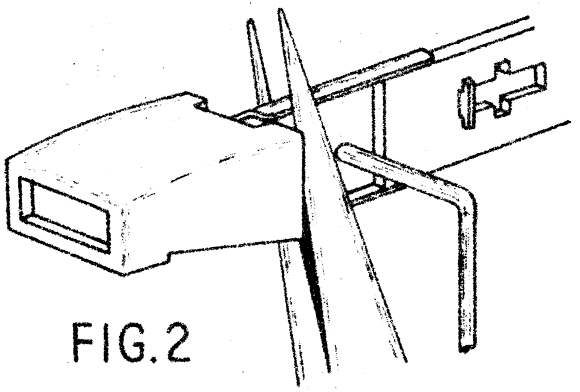


FIG. 2

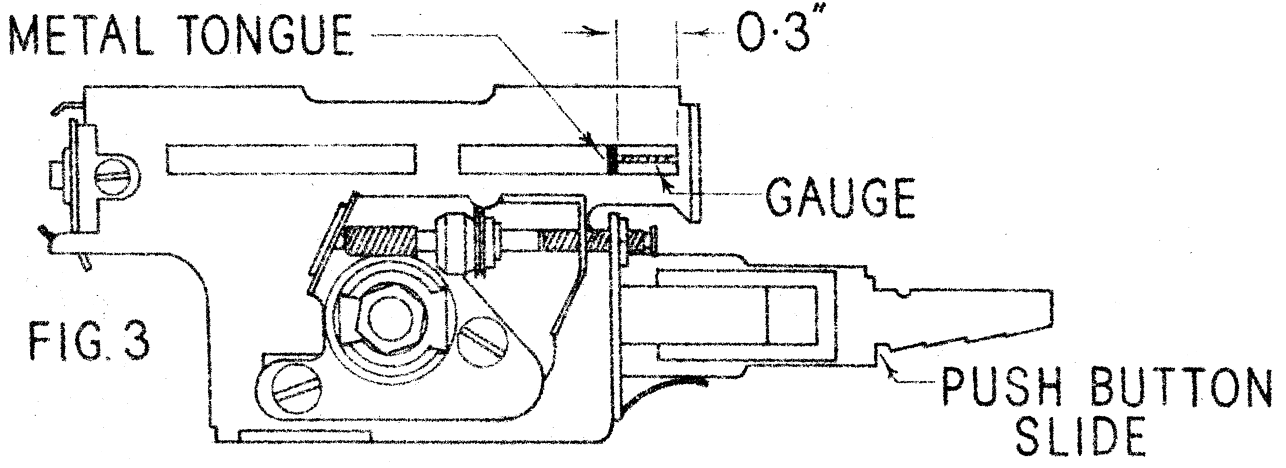


FIG. 3

Circuit No.		Condensers	Tol.	Rating	Part No.
22	6.8pF	Disc ceramicon NPO	±.5pF	500V DCW	C405
23	220pF	Tubular ceramicon N750	± 5%	33V DCW	C392
24	.047MF	Ceramic	+80% -20%	33V DCW	C388
25	.1MF	Ceramic	+80% -20%	33V DCW	C387
26					
27	.01MF	Ceramic	+80% -20%	33V DCW	C391
28	.1MF	Ceramic	+80% -20%	33V DCW	C387
29	22pF	Disc ceramicon NPO	±1pF	500V DCW	C403
30					
31	220pF	Styroseal	±5%	600V DCW	WG2211
32	1.0MF	Metalised paper	±20%	200V DCW	PC997
33	10MF	Electrolytic non polarised	+250%-10%	3V DCW	C408
34	.01MF	Ceramic	+80% -20%	33V DCW	C391
35	.01MF	Ceramic	+80% -20%	33V DCW	C391
36	1.0MF	Metalised paper	±20%	200V DCW	PC997
37	2MF	Electrolytic	+250% -10%	6V DCW	C323
38	.22MF	Polyester (Ref. P.15)	±10%	125V DCW	4009-007-01
39					
40	2MF	Electrolytic	+250% -10%	6V DCW	C323
41	.01MF	Ceramic	+80% -20%	33V DCW	C391
42	50MF	Electrolytic	+250% -10%	3V DCW	C307
43	500MF	Electrolytic	+100% -10%	16V DCW	C378
44	500MF	Electrolytic	+100% -10%	16V DCW	C378
45	1000MF	Electrolytic	+100% -10%	1.8V DCW	C418
46	3x1000pF	Triple unit button type Ceramic feed thru Each section 1000pF	GMV	500V DCW	C360
47	.047MF	Ceramic	+50% -25%	150V DCW	4008-057-02
48					
49					
		Resistors	Tol.±		
50					
51	3,300 ohm	Carbon	10%	½W	R3322
52	56,000 ohm	Carbon	10%	½W	R5632
53	2,200 ohm	Carbon	10%	½W	R2222
54	10,000 ohm	Carbon	10%	½W	R1032
55	5,600 ohm	Carbon	10%	½W	R5622
56	3,900 ohm	Carbon	10%	½W	R3922
57	2,200 ohm	Carbon	10%	½W	R2222
58	18,000 ohm	Carbon	10%	½W	R1832
59	1,000ohm	Carbon	10%	½W	R1022
60					
61	4,700 ohm	Carbon	10%	½W	R4722
62	2,200 ohm	Carbon	10%	½W	R2222
63	56,000 ohm	Carbon	10%	½W	R5632
64	470 ohm	Carbon	10%	½W	R4712
65	820 ohm	Carbon	10%	½W	R8212
66	1,500 ohm	Carbon	10%	½W	R1522
67	6,800 ohm	Carbon	10%	½W	R6822

Circuit No.		Resistors	Tol±	Rating	Part No.
68	330 ohm	Carbon	10%	½W	R3312
69	560 ohm	Carbon	10%	½W	R5612
70					
71					
72	1,500 ohm	Carbon	10%	½W	R1522
73	6,800 ohm	Carbon	10%	½W	R6822
74	560 ohm	Carbon	10%	½W	R5612
75	220 ohm	Carbon	10%	½W	R2212
76	2,200 ohm	Carbon	10%	½W	R2222
77	220 ohm	Carbon	10%	½W	R2212
78	560 ohm	Carbon	10%	½W	R5612
79	2,200 ohm	Carbon (Refer. P.15)	10%	½W	R2222
80					
81	Volume and tone control, concentric shaft potentiometers (Refer P.15) Front section 20,000 ohm carbon Rear section 10,000 ohm carbon tapped 4K ohm SP.ST. Rotary switch attached				4030-009-01
82	1,000 ohm	Carbon	10%	½W	R1022
83	3,900 ohm	Carbon	10%	½W	R3922
84	22,000 ohm	Carbon	10%	½W	R2232
85	820 ohm	Carbon	10%	½W	R8212
86	220 ohm	Carbon	10%	½W	R2212
87					
88	180 ohm	Wire wound positive temperature coefficient	10%	1W	R358
89	3,300 ohm	Carbon	10%	½W	R3322
90					
91	20 ohm	Wire wound rheostat	20%		R360
92	1.5 ohm	Wire wound positive temperature coefficient	5%	½W	R228
93	10 ohm	Wire wound	10%	½W	PR553
94					
95	Spark filter choke 6.8 micro H. Moulded case				L348
96	Push-button permeability tuner unit - complete consists of:-				L521
		Iron sleeve (2) aer. and R.F. coils			56/249
		Iron sleeve - oscillator coil			51/249
		Iron core (3)			52/249
		Coil assy. Includes:-			L510
		Aerial coil			L495
		R.F. coil			L495
		Oscillator coil			L496
97	Oscillator shunt coil				L503
98	No. 1 I.F. transformer - 455 Kc/s.				L491
99	No. 2 I.F. transformer - 455 Kc/s.				L492
100	No. 3 I.F. transformer - 455 Kc/s.				L493
101	No. 4 I.F. transformer - 455 Kc/s.				L494
102	Driver transformer 10,000 - 30 ohms imped.				T245
103	Speaker choke - 15 ohms imped.				T269

Circuit No.	Miscellaneous	Part No.
104	Filter choke - laminated	T250
105	Speaker socket and lead assy.	PA681
	socket only	A114/851
106	Speaker plug	A113/851
107	Fuse - 5 amp.	PM894
108		
109		
110		
111	Dial lamp - 12V 2.2W min.bay.base G3½ bulb	M370
112	Switch - part of circuit No. 81	
113	Speaker - 15 ohm voice coil impedance	
	7" x 5" type 75L00/46/15	K249
114	Socket collector current adjust.	A127/250
115	R.F. amp. transistor type 2N484	2N484
116	Converter transistor type 2N485	2N485
117	1st I.F. Amplifier transistor type 2N484	2N484
118	2nd I.F. Amplifier transistor type 2N483	2N483
119	3rd I.F. Amplifier transistor type 2N483	2N483
120	Audio driver transistor type 874 (Refer page 15)	874
121	Audio output transistor type 1138	1138
122	AGC control diode type 1N295	1N295
123	Detector diode type 1N295 (Refer page 15)	1N295

NOTE: Circuit Nos. 88 and 92 are special positive coefficient temperature coefficient resistors. The use of a substitute type of resistors as replacement may result in damage to the power transistor.

Mechanical

Socket - aerial lead-in	585/250
Socket - power transistor	735/250
Lead washer - power transistor	1/398
Insulator (2) power transistor	34/396
Screw (2) ⅝" x No. 6 Phillips head, power transistor	78/560-30
Terminal strip type 1E	A592/30C
Terminal strip type 1E1	A591/30C
Terminal strip (2) 5 lug flat type	A672/30C
Hexagon pillar - supports circuit board	13/398
Speed nuts (4) driver trans. and speaker choke mounting	476/250-4
Screws (4) driver trans. and speaker choke mounting	93/560-6
Lead holder	670/81-1
Fuse cover	509/81
Fuse holder	508/81
Spring - fuse holder	566/250
Eyelet - fuse holder	175/291
Lead - battery, red	WM248-2
Lead and plug assy. - speaker	A209/387-6

Contact (2) battery and lamp lead	714/250
Shroud (2) battery and lamp lead	715/250
Dial lamp and lead assy.	7129-001-01
Lamp (2) 12V. 2.2W, min. bay. base G3½" bulb	M370
Sockets (2) lamps	1603/250
Knob - antenna matching control	341/81
Push-button knob (5)	A106/393-1
Knob retaining clip (2)	432/250
Knob (2) volume control and tuning (front)	A223/370
Knob (2) tone control and tuning (rear)	61/370
Barrel nut (2)	17/304-10
Chrome ferrule (2) barrel nuts	63/370
Dial reading - group of four	A220/370
Dial pointer assy.	A219/370
Dial background	A217/370
Transistor jewel.	160/245
Name plaque assy. includes transistor jewel	A221/370
Escutcheon - chrome	56/370
Tuning spindle	2806/250
Bush - tuning spindle	193/386
Ball bearing (9) ⅛" dia. tuning spindle bush	2/563
Ball bearing - 5/32" - tuning spindle thrust	4/563

AUDIO DRIVER TRANSISTOR - CIRCUIT NO. 120.

Due to a shortage of type 874 transistors a type 2N591 transistor will be used in the audio driver stage.
No changes are necessary to the circuit.

DETECTOR DIODE TYPE 1N295 - CIRCUIT NO. 123.

Detector diode type SFD106 may be used as a replacement for type 1N295 in the detector stage.
Type SFD106 must not be used as the A.G.C. control diode.

OSCILLATOR/MIXER TRANSISTOR - CIRCUIT NO. 116.

Type 2N486 transistor may be used in place of a type 2N485.
No circuit changes are required.

VOLUME CONTROL AND TONE CONTROL - CIRCUIT NO. 81.

The control detailed on page 13 is being fitted to receivers wired after the first production run. First production run receivers were fitted with a control as follows:

FRONT SECTION - 10K ohm
REAR SECTION - 10K ohm tapped at 4K ohm
SP.ST. switch attached R439

CIRCUIT NO. 38.

This condenser was a .5MF in first run receivers, and was wired between the tone control and the junction of circuit Nos. 82 and 37.

CIRCUIT NO. 79.

This resistor was added after the first production run.