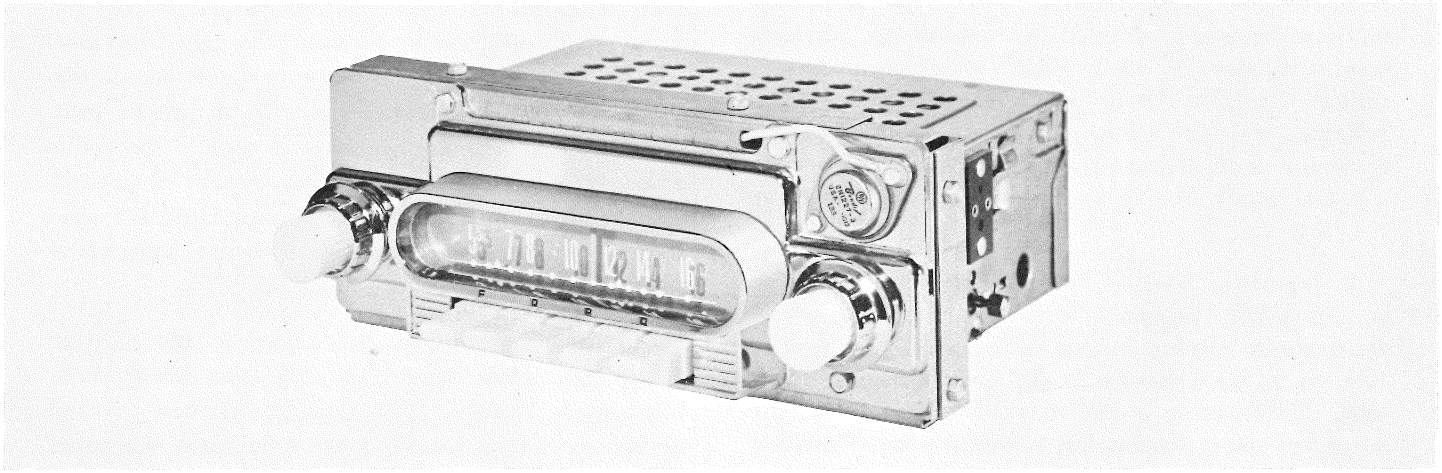
Bendix RADIO

Service Manual

1962 FORD FALCON Pushbutton Radio

Bendix Model	Serial Number Prefix	Ford Part Number
R22BFF	22BD	C2DZ-18805A



WARRANTY SERVICE PROCEDURE

Warranty service for the Bendix-Ford Falcon radio must be handled through the Ford Motor Company and its authorized representatives.

GENERAL INFORMATION

TYPE:--The 1962 Bendix-Ford Falcon Radio is a superheterodyne receiver with transistor output and two miniature tubes. Tube plate voltages are supplied directly by the 12-volt vehicle storage battery.

TUNING RANGE:--540-1600 kc/s—IF 262.5 kc/s.

POWER INPUT:--12-volt storage battery. Rating—14.4 VDC at 1.2 amperes.

AUDIO OUTPUT:--3 watts.

TUBE COMPLEMENT:--12FX8 r-f amp., conv., 12FR8 i-f amp., det.-avc-a-f amp.

TRANSISTORS:--Bendix 2N1287 audio driver, 2N1227-3 audio output.

EXTERNAL CONNECTIONS

When connecting the radio for service on the bench, be certain to connect the negative side of the power source to the radio housing and the positive side to the "A" lead. A SPEAKER OR DUMMY LOAD MUST BE CONNECTED ACROSS THE SPEAKER SOCKET AT ALL TIMES. Unless connections are made as above, permanent damage to radio components can result.

TO SET PUSHBUTTONS

The Bendix-Ford Falcon radio has five pushbuttons for automatic station selection. To set the pushbuttons for automatic tuning, proceed as follows:

1. Using the manual tuning knob, tune in a desired station being careful to tune exactly on the station.
2. Pull out the pushbutton to be set to unlock the mechanism, and then push button in firmly to set and lock.
3. Repeat the procedure for each remaining pushbutton.

THE Bendix® CORPORATION • BENDIX RADIO DIVISION • BALTIMORE 4, MARYLAND

AUTOMOTIVE PRODUCTS DEPARTMENT

Part No. 2092100-3 Price 35 cents Printed in U.S.A. 9-61

SERVICE SUGGESTIONS

The Bendix-Ford Falcon radio utilizes the most recently developed component parts along with the most advanced design techniques to provide improved quality and longer life.

TRANSISTORS:--Transistors used in the receiver can be expected to give unusually long trouble-free service. However, certain precautions must be observed to prevent premature failure.

1. **Trouble Shooting.**--Use a battery-operated VTVM or multimeter when making voltage or resistance measurements—a-c operated instruments can produce transients exceeding the 25 VRMS maximum transistor rating. Use care not to "short across" leads or components. Always be sure receiver power is off before removing or replacing a transistor or other component —make certain of polarity before applying power to the receiver.

2. **Transistor Test.**--A rough check of transistor condition can be made with an ohmmeter. The resistance in the conduction direction is very low in relation to the resistance in the non-conducting direction. Substituting a known good transistor for the suspected one is the simplest and most positive method of checking transistor condition.

3. **Power Transistor Bias Circuit.**--The power transistor bias circuit is designed to automatically adjust to optimum bias conditions. The familiar bias control for collector current adjustment is no longer required. Basically the circuit operates as follows: filament current of tube V1 through base bias resistor R22 produces a constant voltage level approximately 1 Volt lower than the supply voltage and provides a relatively fixed voltage point for the transistor base. Emitter resistor R23 is made of special positive temperature coefficient wire and is sensitive to current flow. The filament current of tube V2 together with the transistor collector current flows through R23 and provides optimum bias for the transistor. If transistor collector current increases, the increased voltage drop across emitter resistor R23 is of the correct polarity to reduce the base-emitter bias which reduces the collector current. A point of equilibrium is reached at approximately 550 ma collector current and will vary slightly above or below this figure from one transistor to another.

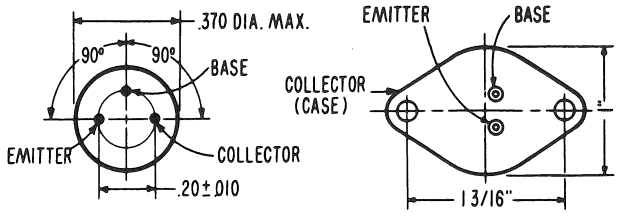
NOTE: EMITTER RESISTOR R23 MUST BE REPLACED WITH AN IDENTICAL UNIT WHEN REPLACEMENT IS NECESSARY!

4. **Transistor Replacement.**--If transistor replacement is necessary always replace with identical parts DO NOT USE SUBSTITUTES.

When replacing the power transistor, apply a coating of silicone grease to both sides of the insulating disc. Be careful of the insulating washers so that no short circuit will occur between the transistor case and the heat radiator. If improperly mounted, the transistor can be damaged by lack of proper heat transfer. If it becomes necessary to replace the audio driver transistor TX1 use extreme caution to prevent damage to the printed circuit board. Hold the new transistor with metal pliers to dissipate heat while soldering.

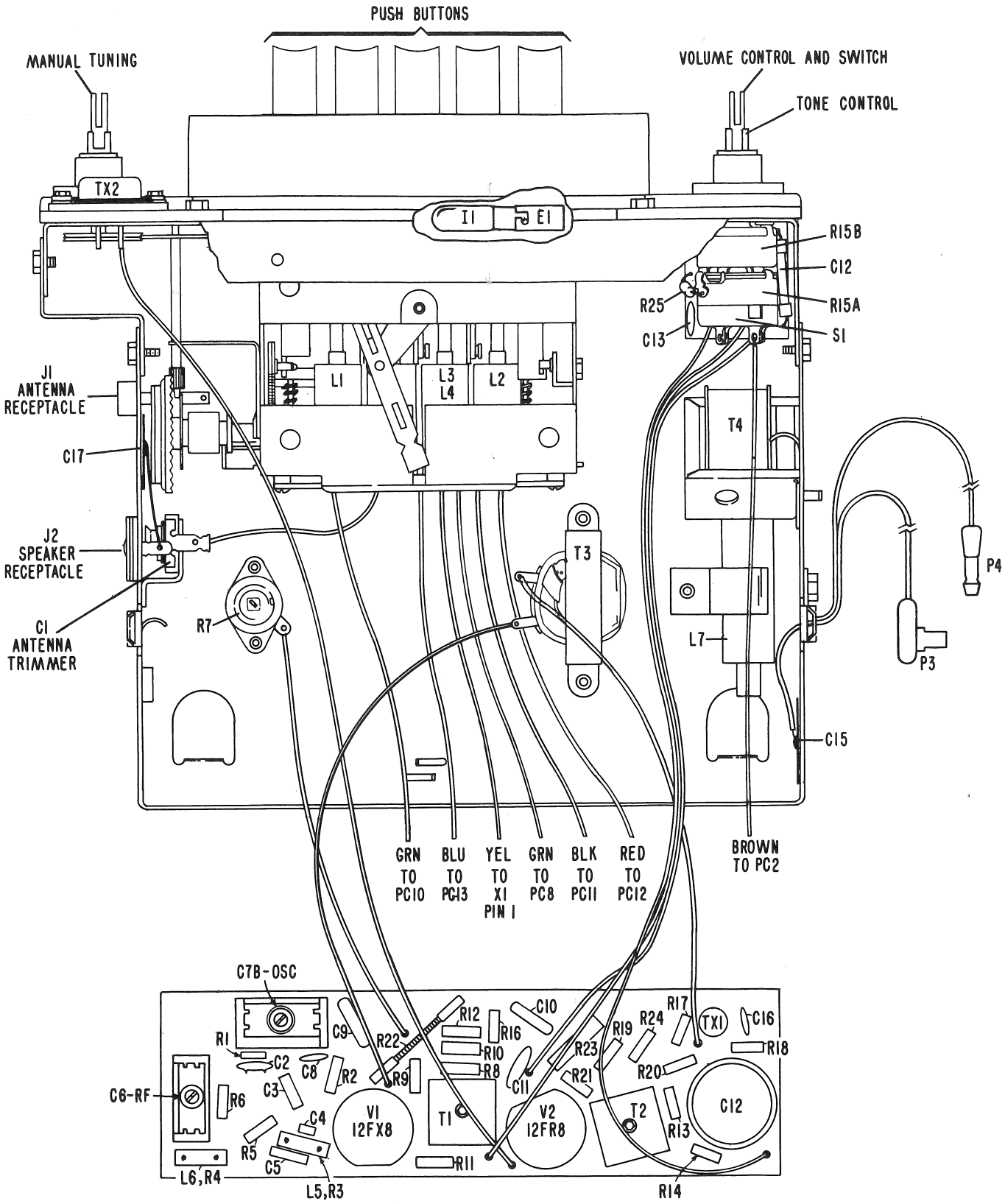
TUBES:--The low voltage tubes used in the receiver obtain their plate voltages directly from the automobile storage battery. This type tube is best checked by substituting a known good tube for a suspected one. The most common cause of tube failure is a drop in input impedance. Symptoms are distortion, reduced gain, and loss of selectivity.

PRINTED CIRCUIT BOARD:--When it becomes necessary to replace a part connected to the printed circuit board the defective part should be clipped out leaving the leads connected. This will permit connecting the new part to the old leads without soldering directly to the printed conductors, use a light soldering iron of 40 watts or less and apply heat no longer than necessary. Too much heat will cause the conductor to "blister". Small "blisters" can be repaired with Duco cement or equivalent. Large "blisters" must be cut out and replaced with a wire jumper.



PINS OR LEADS .017 $^{+.004}_{-.001}$ DIA

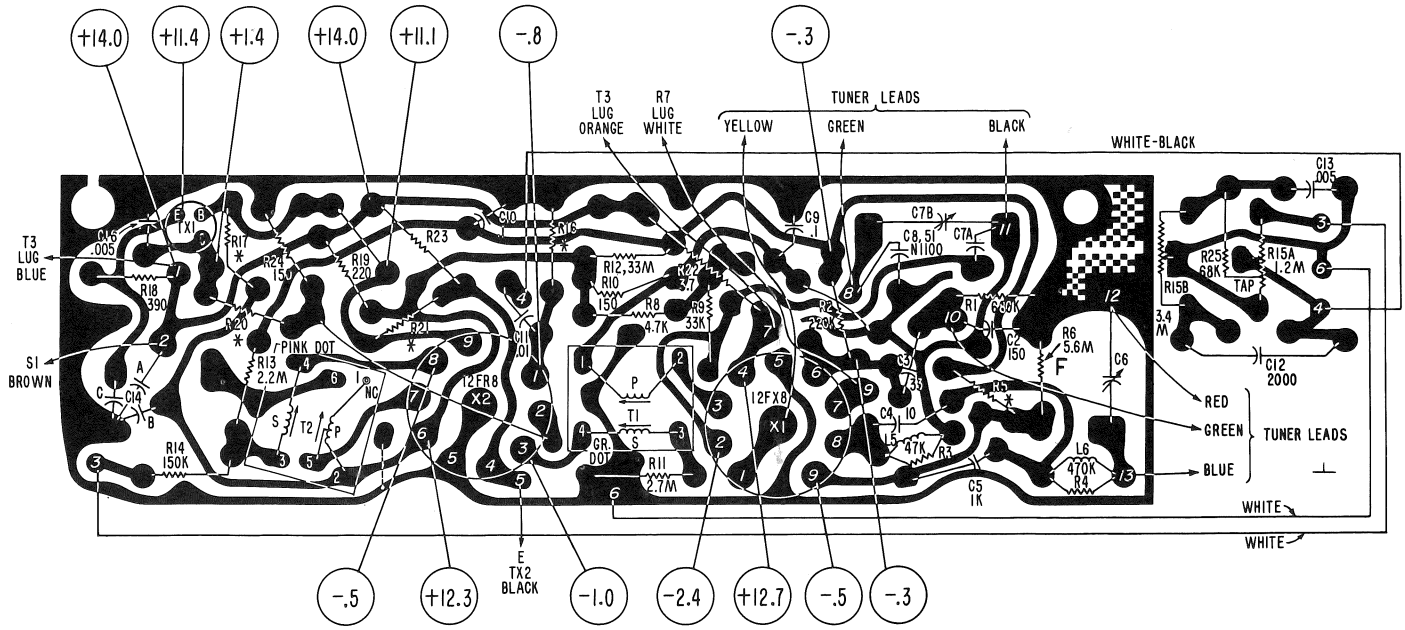
TRANSISTORS - PIN VIEW


PUSH BUTTONS
MANUAL TUNING
VOLUME CONTROL AND SWITCH
TONE CONTROL
TX2
I1
E1
R15B
C12
R25
R15A
C13
S1
J1
ANTENNA
RECEPTACLE
L1
L3
L4
L2
T4
C17
J2
SPEAKER
RECEPTACLE
T3
P4
C1
ANTENNA
TRIMMER
R7
L7
P3
C15
GRN
TO
PC10
BLU
TO
PC13
YEL
TO
X1
PIN 1
GRN
TO
PC8
BLK
TO
PC11
RED
TO
PC12
BROWN
TO PC2
C7B-OSC
C9
R22
R12
C10
R16
R17
TX1
C16
R1
R10
R24
R19
R23
R18
C2
C8
R2
R8
C11
R21
R20
C6-RF
C3
R6
R9
V1
12FX8
T1
V2
12FR8
T2
C12
C4
R13
R5
C5
R11
L6,R4
L5,R3
R14

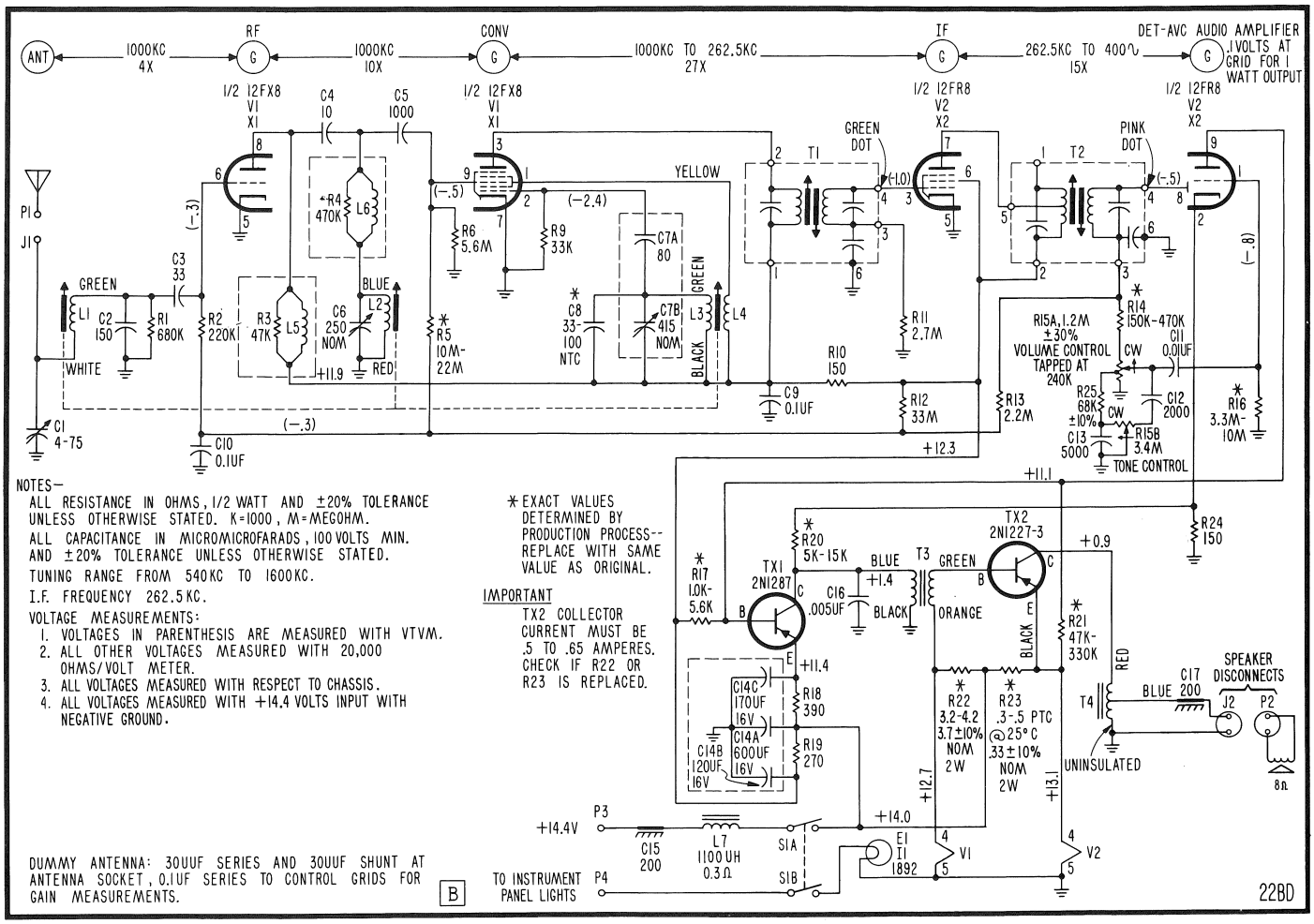
ALIGNMENT

Connect a VTVM across Volume Control (#3 on printed circuit board to ground). Set Volume Control to minimum, set Tone Control to normal (full CW). Attenuate signal generator as required to keep VTVM reading between one and two volts.

STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	SET TUNER TO	ADJUST	REMARKS
1	Thru 0.1 mf cond. to pin 9 of conv. V1	262.5 kc	HI-END STOP	T2 LOWER T2 TOP T1 LOWER T1 TOP	Adjust for maximum output.
2	Thru DUMMY ANT TO ANT RECEPT.	1605 kc	HI-END STOP	C7B C6 C1	Adjust in order for maximum output.
3	With radio in car and antenna fully extended, tune in a weak station near 1600 kc. Readjust antenna trimmer C1 for maximum volume.				
	IF A TUNING COIL OR CORE HAS BEEN REPLACED, PROCEED AS FOLLOWS:				
4			HI-END STOP	L1 L2 L3	Back cores out of coils to where they just remain in coil form.
5	Thru DUMMY ANT. TO ANT. RECEPT.	1605 kc	HI-END STOP	C7B C6 C1	Adjust in order for maximum output.
6	Thru DUMMY ANT. TO ANT. RECEPT.	1000 kc	0.276 inch carriage movement from HI-END STOP	L3 L2 L1	Adjust cores in order for maximum output.
7	REPEAT STEPS 5 AND 6 UNTIL NO FURTHER GAIN IN OUTPUT CAN BE OBTAINED.				



* SEE NOTE ON SCHEMATIC



NOTES—

ALL RESISTANCE IN OHMS, 1/2 WATT AND ±20% TOLERANCE UNLESS OTHERWISE STATED. K=1000, M=MEGOHM.

ALL CAPACITANCE IN MICROMICROFARADS, 100 VOLTS MIN. AND ±20% TOLERANCE UNLESS OTHERWISE STATED.

TUNING RANGE FROM 540KC TO 1600KC.

I.F. FREQUENCY 262.5KC.

VOLTAGE MEASUREMENTS:

1. VOLTAGES IN PARENTHESIS ARE MEASURED WITH VTVM.
2. ALL OTHER VOLTAGES MEASURED WITH 20,000 OHMS/VOLT METER.
3. ALL VOLTAGES MEASURED WITH RESPECT TO CHASSIS.
4. ALL VOLTAGES MEASURED WITH +14.4 VOLTS INPUT WITH NEGATIVE GROUND.

* EXACT VALUES DETERMINED BY PRODUCTION PROCESS--REPLACE WITH SAME VALUE AS ORIGINAL.

IMPORTANT

TX2 COLLECTOR CURRENT MUST BE .5 TO .65 AMPERES. CHECK IF R22 OR R23 IS REPLACED.

DUMMY ANTENNA: 30UUF SERIES AND 30UUF SHUNT AT ANTENNA SOCKET, 0.1UF SERIES TO CONTROL GRIDS FOR GAIN MEASUREMENTS.

B

1962 FORD FALCON 22BD
PUSHBUTTON RADIO REPLACEMENT PARTS LIST

Symbol No.	Description	Part No.	Unit List Price
ELECTRICAL PARTS			
Capacitors			
C1	Antenna trimmer, 5-80 mmf	219083-4	.50
C2	150 mmf 20%, mica, 100 V	2090926-8	.40
C3	33 mmf 20%, ceramic, 100 V	2091700-1	.20
C4	10 mmf 20%, ceramic, 500 V	2091473-100M	.25
C5	1000 mmf GMV, ceramic, 100 V	2091700-4	.25
C6	205-270 mmf, RF Trimmer	2091418-5	.60
C7A, B	A- 80 mmf 10%, B- 380-445 mmf, OSC Trimmer	2091418-4	.80
C8	51 mmf 10%, ceramic, 100 V	220332-91	.25
C9, C10	.1 mf 20%, ceramic, 100 V	2090207-30	.30
C11	.01 mf GMV, ceramic, 500 V	220332-3	.35
C12	2000 mmf 20%, ceramic, 100 V	2091700-20	.30
C13	5000 mmf 20%, ceramic, 100 V	220332-86	.25
C14A, B, C	A- 450 mf, B- 100 mf, C- 100 mf, electrolytic, 16 V	2091503-2	2.00
C15	185 mmf, spark plate	220267-25	.05
C16	5000 mmf 20%, ceramic, 100 V	220332-66	.25
C17	200 mmf, spark plate	220267-9	.05
Miscellaneous Electrical			
E1	Lamp holder and lead assy.	287319-3	.35
I1	Lamp, dial	1892	.20
J1	Receptacle, antenna	223198-1	.20
J2	Receptacle, speaker plug	2090419-1	.20
L1,L2,L3,L4	Part of tuner assembly		
L5	RF coil assy., includes R3	2090088-15	.50
L6	Image trap assy., includes R4	2090088-14	.30
L7	Choke, filter	2092050-1	.60
LS	Speaker assy., 5 x 7" PM 8 ohms	2091542-1	6.00
P2	Plug, speaker lead	287309-1	.10
P3	Connector & lead assy., "A" 32.25"	2090435-11	.35
P4	Connector & lead assy., dial lamp, blue 13.0"	2090095-29	.30
Resistors			
R1	680K ohms 20%, ½W, comp.	2091540A-684M	.15
R2	220K ohms 20%, ½ W, comp.	2091540A-224M	.15
R3	Part of L5 (47K 20%, ½ W)	2090088-15	.50
R4	Part of L6 (470K 20%, ½ W)	2090088-14	.30
R5	15 megohms 20%, ½W, comp.	2091540A-156M	.15
R6	5.6 megohms 20%, ½ W, comp.	2091540A-565M	.15
R7	0-600 ohms (Sens. control)	219555-19	.80
R8	4.7K ohms 20%, ½ W, comp.	2091540A-472M	.15
R9	33K ohms 20%, ½ W, comp.	2091540A-333M	.15
R10, R24	150 ohms 20%, ½ W, comp.	2091540A-151M	.15
R11	2.7 megohms 20%, ½ W, comp.	2091540A-275M	.15
R12	33 megohms 20%, ½ W, comp.	2091540A-336M	.25
R13	2.2 megohms 20%, ½ W, comp.	2091540A-225M	.15
R14	150K ohms 20%, ½ W, comp.	2091540A-154M	.15
R15A,B,S1A,B	Volume control, Tone Control and ON-OFF switch (less P.C. board)	2090405-8	2.25
R16	10 megohms 20%, ½ W, comp.	2091540A-106M	.15
R17	2.2K ohms 20%, ½ W, comp.	2091540A-222M	.15
R18	390 ohms 20%, ½ W, comp.	2091540A-391M	.15
R19	220 ohms 20%, ½ W, comp.	2091540A-221M	.15
R20	6.8K ohms 20%, ½ W, comp.	2091540A-682M	.15
R21	100K ohms 20%, ½ W, comp.	2091540A-104M	.15
R22	3.7 ohms 10%, 2 W, wirewound	2090948-18	.30
R23	.33 ohms 10%, 2 W, wirewound	2090948-16	.45
R25	68K ohms 10%, ½ W, comp.	2091540A-683K	.15
Switches			
S1A, B	Part of volume control assy. R15	2090405-8	2.25
Transformers			
T1	Input IF, 262.5 kc	2090907-14	1.40
T2	Output IF, 262.5 kc	2090908-12	1.45
T3	Driver, audio	2090815-8	1.75
T4	Output, audio	2091874-1	1.90
Transistors			
TX1	Driver, audio	2090924-4	2.50
TX2	Power output, audio	2091859-1	4.00
Tubes			
V1*	Electron (Bendix #2092105-1)	12FX8	3.80
V2	Electron	12FR8	4.35
Sockets			
X1, X2	Tube, 9 prong miniature	2090010-1	.35

Symbol No.	Description	Part No.	Unit List Price
TUNER PARTS			
	Tuner assy., (complete with pushbuttons) (RCC)	2091948-10	16.00
	Tuner assy., (complete with pushbuttons) (GIC)	2091948-5	16.00
L1,L2,L3,L4	Tuner coil assembly (RCC)	2090131-38	3.50
L1,L2,L3,L4	Tuner coil assembly (GIC)	2090131-34	3.50
	Pointer and arm assembly (RCC)	2090129-30	.75
	Pointer and arm assembly (GIC)	2090129-26	.75
	Spring, pointer backlash (RCC)	2090130-14	.15
	Spring, pointer backlash (GIC)	2090130-15	.15
	Clutch assy. incl. mtg. bracket (RCC)	2090133-31	2.15
	Clutch assy. less mtg. bracket (GIC)	2090133-30	2.00
	Bracket, manual clutch retaining (GIC)	2091197-11	.20
	De-clutch gate (RCC)	2091807-1	.50
	De-clutch gate (GIC)	2091807-2	.50
	Spring, de-clutch gate return (RCC)	2091808-1	.15
	Spring, de-clutch gate return (GIC)	2091808-2	.15
	Pushbutton	2092045-1	.15
	Screw, #4 x ¼ rd. hd. S. T. (RCC tuner coil assembly replacement)	H295609-5	.03
ESCUTCHEON AND DIAL PARTS			
	Escutcheon, calibrated dial glass, and paper shield assy.	2092067-1	3.25
	Dial glass, calibrated	2092008-1	.55
	Sub-dial, black	2092007-3	.45
	Shield, dial lamp blue	2092011-1	.35
	Shield, gray paper light	2092102-1	.05
MISCELLANEOUS PARTS			
	Printed circuit board assy., large (less tubes)	2091482-5	16.00
	Printed circuit board, small	2091480-2	.10
	Cover, radio chassis (less mtg. bolt)	2092012-1	.65
	Plate, tuner mounting	2092014-2	.60
	Bracket, corner (covers TX-2 socket)	2092027-1	.20
	Bracket, P. C. board support	2092025-1	.25
	Clamp, two interconnecting leads	2091507-1	.05
	Clamp, L7 choke retaining	2091447-1	.20
	Bushing, transistor insulator	2090026-1	.04
	Insulator, transistor mounting (Note: Do not use a substitute for this part)	2090882-3	.20
	Receptacle, transistor pin	2090732-1	.05
	Shaft assembly, pinion	2092015-3	.35
	Shaft assembly, manual drive	2092048-1	.60
	Sleeve, manual drive shaft nylon	2090396-1	.05
	Clip, manual drive shaft retaining	2090385-1	.03
	Bolt, ¼-20 x 23/32, radio mtg.	H2091298-2	.10
	Screw, #8-18 x ¼, hex. hd. S. T.	H2092151-1	.02
	Screw, #8-18 x ⅜, hex. hd. S. T.	H2092150-1	.02
	Screw, #4 x ½, hex. hd. S. T. (TX2 mtg.)	H2090077-08	.02
	Screw, #8-32 x ¼, hex. hd. S. T.	H2090772-204	.02
	Screw-washer assy., #8 x ⅜ S. T.	H2090814-1	.04
	Nut, ¼-20, hexagon	H2090028C-S07	.05
INSTALLATION PARTS			
	Installation kit (includes all parts listed below)	2090281-25	4.00
	Fuse, 7.5 amperes	SFE-7½	.15
	(2) Knob assy., tuning or volume	2090413-3	.35
	(2) Disc, tone control	2090411-1	.35
	Capacitor, voltage regulator	220214-3	.90
	Capacitor assy., generator	2090298-1	.85
	Bracket, radio rear support	2092046-1	.20
	(2) Clamp, speaker retaining	2091539-1	.03
	(2) Spring, static coil	2091541-1	.30
	(2) Screw, #8-15 x ⅜ pan hd. S. T.	H2090139-11	.02
	Screw-lockwasher assy., ¼-20 x ⅞	H295929-8	.05
	Nut, ¼-20, hex. hd.	AH274247-2	.03
	(2) Nut, 9/16-28, hex. hd.	HSZ775S-83	.05
	(2) Lockwasher, ID- .565 OD- .685 TH- .022	H2090012-1	.04

*Special tube — Order by Bendix Part #2092105-1

PRICES SUBJECT TO CHANGE WITHOUT NOTICE