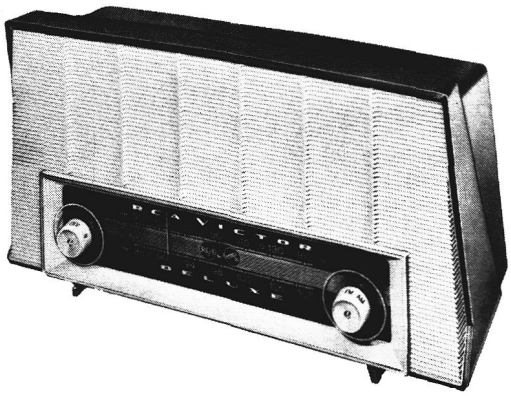
RCA VICTOR



MODEL XF-412

**AM-FM Radio Receiver**

# MODEL XF-412

# SERVICE DATA

**— 1959 No. 12 —**

ISSUED BY
SERVICE DIVISION
RCA VICTOR COMPANY, LTD.
MONTREAL, CANADA

## GENERAL DESCRIPTION

The model XF-412 is a table model AM-FM radio receiver designed to operate on a 115 volts A-C or D-C power supply. The tuning range covers the standard broadcast band 540 to 1600 kc and the FM band 88 to 108 mc. A ferrite rod antenna is used on AM and a power line antenna on FM. Provision is made for connecting an external FM antenna.

The chassis and speaker are housed in a two-piece molded wrap-around cabinet. Two sets of dual knobs are used for on-off volume, tone control, selector switch, and tuning. The controls are located at either end of the slide-rule dial with a neon on-off indicator in the center.

The circuit design features a minimum amount of switching; with none in the high-frequency circuits. On the standard broadcast band, four tubes and a selenium rectifier are used. On FM, six tubes and a selenium rectifier are used. The FM circuit includes a grounded-grid r.f. stage, an autodyne detector and three stages of i.f. amplification.

## ELECTRICAL AND MECHANICAL SPECIFICATIONS

**TUNING RANGE**

Standard Broadcast (AM) ..... 540–1600 kc
Frequency Modulation (FM) ..... 88–108 mc

**INTERMEDIATE FREQUENCIES**

AM ..... 455 kc  FM ..... 10.7 mc

**TUBE COMPLEMENT**

(1) RCA 12DT8 ..... FM R-F Amplifier and FM Converter
(2) RCA 12BE6 ..... AM Converter
(3) RCA 12BA6 ..... 1st FM I-F Amplifier
(4) RCA 12BA6 ..... AM and FM I-F Amplifier
(5) RCA 12AU6 ..... 3rd FM I-F Amplifier
(6) RCA 19T8 ..... FM Detector, AM Detector and Audio Amp.
(7) RCA 35C5 ..... Audio Output

A selenium rectifier is used.
A neon bulb is used for ON-OFF indication.

**POWER SUPPLY RATING**

115 volts, 50–60 cycles, or 115 volts d.c. ..... 35 watts

**LOUDSPEAKER**

Size and Type ..... 4" x 6" P.M.
Voice Coil Impedance ..... 3.2 ohms

**AUDIO POWER OUTPUT**

Undistorted ..... 1.0 watt
Maximum ..... 1.3 watts

**TUNING DRIVE RATIO** ..... 9½:1 (4¾ turns of knob)

**NET WEIGHT** ..... approx. 8¼ lbs.

**DIMENSIONS (Overall)**

Height ..... 8⅜"  Width ..... 15"  Depth ..... 6 13/16"

## ALIGNMENT PROCEDURE

**CAUTION**

**THE CHASSIS IS CONNECTED DIRECTLY TO ONE SIDE OF THE POWER LINE. AN ISOLATION TRANSFORMER SHOULD BE USED DURING ALIGNMENT OR OTHER SERVICE WORK.**

### FM Alignment

**FUNCTION SWITCH IN FM POSITION—VOLUME CONTROL MINIMUM—TONE CONTROL CENTER**

| Steps | Connect high side of sig. gen. to— | Sig. gen. output | Turn radio dial to— | Adjust for max. output |
|---|---|---|---|---|
| 1 | Pin #1 of V5 (12AU6) | Connect VoltOhmyst across C8 | | |
| 2 | | 10.7 mc | — | T4 top core for ZERO voltage |
| 3 | | Connect VoltOhmyst across R11 | | |
| 4 | | 10.7 mc | — | T4 bottom core for MAXIMUM voltage |
| 5 | | Repeat Steps 2 and 4 | | |
| 6 | Pin #1 of V4 (12BA6) | Connect VoltOhmyst to pin #1 of V5 through a 270 k resistor with minimum exposed lead at pin #1 | | |
| 7 | | 10.7 mc * | — | T3 top core |
| 8 | Pin #1 of V3 (12BA6) | | — | T2 top and bottom cores† |
| 9 | Antenna terminal board, center | | — | T102 top and bottom cores† |
| 10 | Antenna terminal board, center, thru 270 ohms | 87.5 mc * | Tuning condenser closed | FM tuner string drive collar |
| 11 | | 108.5 mc * | Tuning condenser fully open | Osc. trimmer C107 |
| 12 | | 95 mc * | Tuned to 95 kc signal | R-F trimmer C104 |

* Adjust output level of signal generator to provide approximately 1 volt indication on VoltOhmyst.

† Alternate loading may be required for accurate peaking; the winding not being peaked should be loaded with a resistor, 270 ohms in Step 8 and 470 ohms in Step 9.

Oscillator frequency is above signal frequency on both AM and FM.

## ALIGNMENT INDICATORS:

An RCA VoltOhmyst® or equivalent VTVM is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate maximum audio output during AM alignment. Connect the output meter across the speaker voice coil. The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure AVC voltage. When audio output is being measured, the volume control should be turned to maximum. Adjust tone control to mid-position.

## SIGNAL GENERATOR:

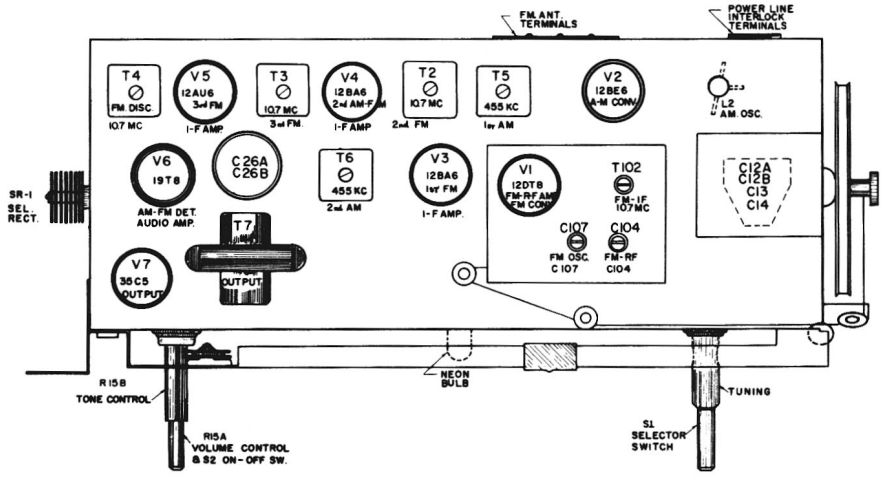
For all alignment operations, connect the low side of the signal generator to the receiver chassis, close to the point of signal injection. If output measurement is used for AM alignment, the output of the signal generator should be kept as low as possible to avoid AVC action.

If an FM sweep generator is used for FM alignment, adjust for 10.7 mc, 0.4 mc sweep. Connect oscilloscope across C8, adjusting discriminator T4 top core for 10.7 mc crossover, and T4 bottom core for balanced peaks. Peak separation should be approximately 330 kc. When aligning the other FM tuned circuits, connect oscilloscope lead through a 270K resistor to pin 1 of V5. Follow alignment table sequence, adjusting for maximum gain and symmetrical curves.

### AM Alignment

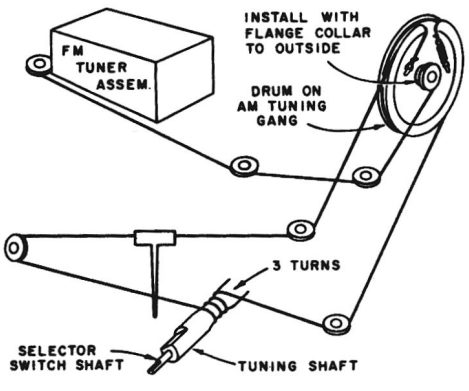
**FUNCTION SWITCH IN AM POSITION**

| Steps | Connect high side of sig. gen. to— | Sig. gen. output | Turn radio dial to— | Adjust for peak output |
|---|---|---|---|---|
| 1 | Pin No. 7 of V2 in series with .01 mfd | 455 kc. (mod.) | Quiet point at high freq. end | T6 bottom core (sec.) T6 top core (pri.) |
| 2 | | | | T5 bottom core (sec.) T5 top core (pri.) |
| 3 | Assemble front panel including ferrite antenna | | | |
| 4 | Short wire placed near loop for radiated signal | 1620 kc. (mod.) | 1620 kc. (gang fully open) | C14 (osc.) |
| 5 | | 1400 kc. (mod.) | 1400 kc. signal | C13 (ant.) |
| 6 | | 600 kc. (mod.) | 600 kc. signal | L2 (osc.) (rock gang) |
| 7 | | | | |
| 8 | Repeat steps 5, 6 and 7 until Maximum gain is obtained | | | |

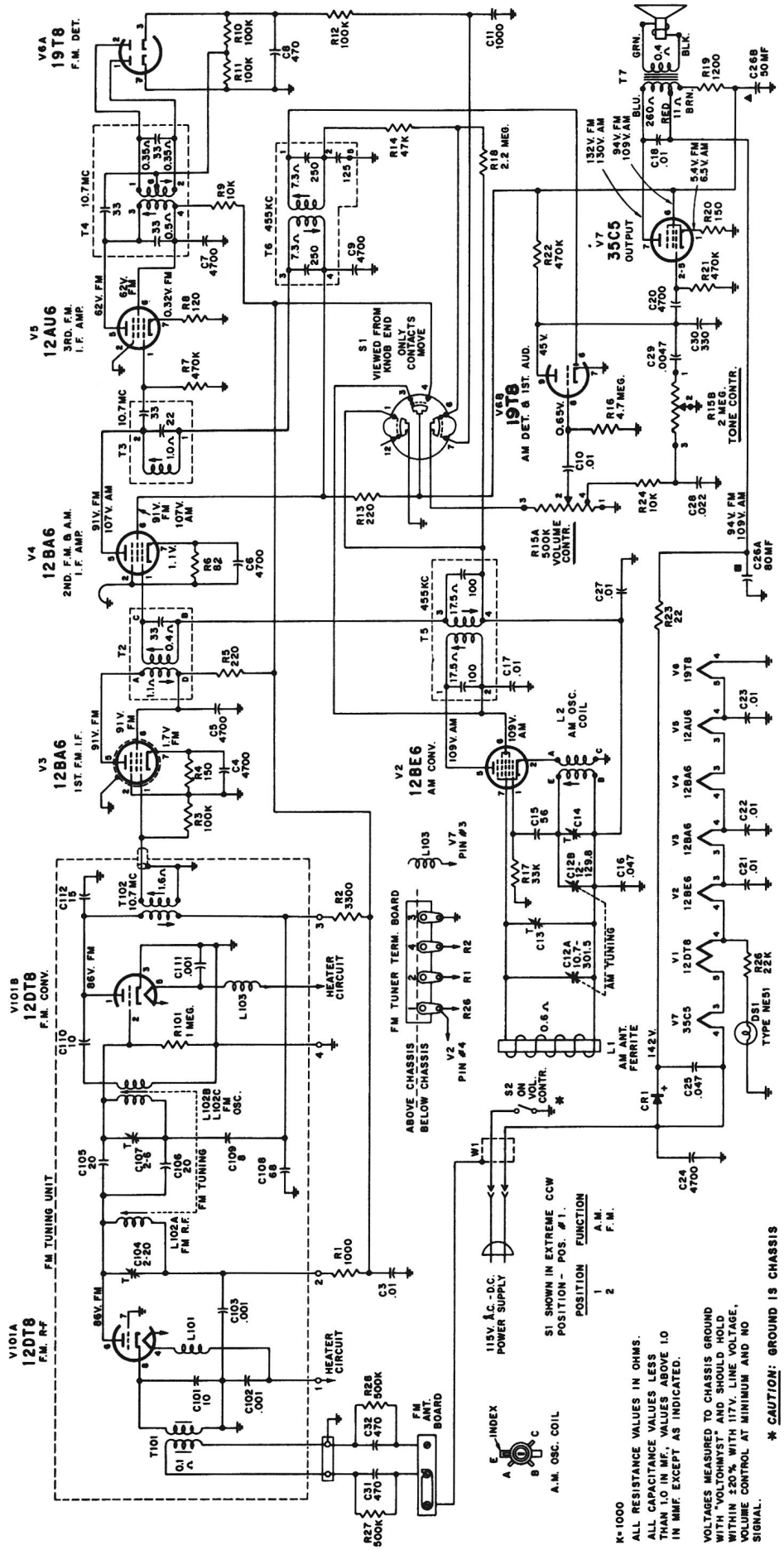



**XF-412**

*Tube and Trimmer Locations*




*Dial and Drive Cord Drive*




*Schematic Circuit Diagram*

## CRITICAL LEAD DRESS

1. Dress all bus leads short and direct as possible.
2. Dress all bypass capacitor and coupling capacitor leads short and direct as possible.
3. Dress all insulated leads down to chassis.
4. Connect resistors R10 and R11 with minimum pigtails to T4 terminal #6.
5. Dress blue lead from T3 #1 to T6 #3 down to base and away from neutralizing lead on V4 pin #2 to ground lance.
6. Dress neutralizing lead down to base.
7. Connect minimum length pigtail of R14 to T6 #2 terminal.
8. Dress twisted volume control leads down to base.

# REPLACEMENT PARTS LIST

**Insist on Genuine Factory Tested Parts, which are readily identified and may be purchased from Authorized Dealers.**

| SYMBOL | STOCK NO. | DESCRIPTION |
|---|---|---|
| | | **CHASSIS ASSEMBLY** |
| C-3 | | Capacitor-ceramic 0.01 mf. +100% -0% 500V |
| C-4 to C-7 | | Capacitor-ceramic 4700 mmf +100% -0% 500V |
| C-8 | | Capacitor-ceramic 470 mmf 20% 500V |
| C-9 | | Capacitor-ceramic 4700 mmf +100% -0% 500V |
| C-10 | | Capacitor-paper 0.01 mf 20% 400V |
| C-11 | | Capacitor-paper 0.001 mf 10% 400V |
| C-12, C-12B | *S-23097+ | Capacitor-variable tuning (includes C-13, C-14) |
| C-13, C-14 | | Capacitor-included with C-12A, C-12B |
| C-15 | | Capacitor-ceramic 56 mmf 10% 500V, coef. -750 |
| C-16 | | Capacitor-paper 0.047 mf 20% 400V |
| C-17 | | Capacitor-ceramic 0.01 mf. +100% -0% 500V |
| C-18 | | Capacitor-paper 0.01 mf 10% 400V |
| C-20 | | Capacitor-ceramic 4700 mmf +100% -0% 500V |
| C-21 to C-23 | | Capacitor-ceramic 0.01 mf +100% -0% 500V |
| C-24 | | Capacitor-paper 4700 mf 20% 600V |
| C-25 | | Capacitor-paper 0.047 mf 20% 600V |
| C-26A, C-26B | 73520 + | Capacitor-electrolytic 80/50 mf, 150/150V |
| C-27 | | Capacitor-ceramic 0.01 mf +100% -0% 500V |
| C-28 | | Capacitor-paper 0.022 mf 20% 400V |
| C-29 | | Capacitor-paper 0.0047 mf 20% 400V |
| C-30 | | Capacitor-ceramic 330 mmf 20% 500V |
| C-31 | S-23094 + | Capacitor-Circuit printed component circuit including 500,000 ohm, 1/4 w resistor and 470 mmf, 500v capacitor |
| C-101 | | Capacitor-ceramic 10 mmf, ± 1 mmf, 500V, coef. N750 |
| C-102 | | Capacitor-ceramic 0.001 mmf, +50% -20% 500V |
| C-104 | | Capacitor-trimmer 2-10 mmf |
| C-106 | | Capacitor-ceramic 20 mmf, 500V coef. 0 |
| C-107 | | Capacitor-trimmer, 2-6 mmf |
| C-108 | | Capacitor-ceramic 68 mmf 5% 500V coef. N750 |
| C-109 | | Capacitor-ceramic 8.2 mmf, ± 1 mmf, 500V coef. P100 |
| C-110 | | Capacitor-ceramic 10 mmf, ± 1 mmf, 500V coef. N470 |
| C-111 | | Capacitor-ceramic 0.001 mmf +50% -20% 500V |
| C-112 | | Capacitor-ceramic 15 mmf 10% 500V coef. 0 |
| CR1 | 77519 + | Rectifier-selenium rectifier |
| L-1 | 107050 + | Antenna-ferrite rod antenna |
| L-2 | S-20981 + | Coil-Oscillator coil |
| L-101 to L-103 | Pt. of S23098 | Coil-FM RF/Osc. tuning coil assembly |
| R-1 | | Resistor-1,000 ohm 10% 1/2w |
| R-2 | | Resistor-3,300 ohm 10% 1/2w |
| R-3 | | Resistor-100,000 ohm 10% 1/2w |
| R-4 | | Resistor-150 ohm 10% 1/2w |
| R-5 | | Resistor-220 ohm 10% 1/2w |
| R-6 | | Resistor-82 ohm 10% 1/2w |
| R-7 | | Resistor-470,000 ohm 10% 1/2w |
| R-8 | | Resistor-120 ohm 10% 1/2w |
| R-9 | | Resistor-10,000 ohm 10% 1/2w |
| R-10 | | Resistor-100,000 ohm 10% 1/2w |
| R-11, R-12 | | Resistor-100,000 ohm 10% 1/2w |
| R-13 | | Resistor-220 ohm 10% 1/2w |
| R-14 | | Resistor-47,000 ohm 10% 1/2w |
| R-15A, R-15B | *S-23096+ | Resistor-Control dual volume and tone control with "on-off" switch (S2) |
| R-16 | | Resistor-4.7 megohm 20% 1/2w |
| R-17 | | Resistor-33,000 ohm 20% 1/2w |
| R-18 | | Resistor-2.2 megohm 20% 1/2w |
| R-19 | | Resistor-1200 ohm 10% 2w |
| R-20 | | Resistor-150 ohm 10% 1/2w |
| R-21, R-22 | | Resistor-470,000 ohm 10% 1/2w |
| R-23 | | Resistor-22 ohm 10% 1w |
| R-24 | | Resistor-10,000 ohm 10% 1/2w |
| R-26 | | Resistor-22,000 ohm 10% 1/2w |
| R-27, R-28 | *S-23094+ | Resistor-Circuit printed component circuit including 500,000 ohm, 1/4 w resistor and 470 mmf, 500V capacitor |
| R-101 | | Resistor-Fixed composition 1 megohm 10% 1/4w |
| S-1 | *S-23095+ | Switch-AM/FM function switch |
| S-2 | | Included with R-15 |
| T-2 | 77513 + | Transformer-2nd FM IFt transformer |
| T-3 | 77512 + | Transformer-3rd FM IF transformer |
| T-4 | 77511 + | Transformer-FM discriminator transformer |
| T-5 | 77416 + | Transformer-1st AM IF transformer |
| T-6 | 76328 + | Transformer-2nd AM IF transformer |
| T-7 | *S-23100+ | Transformer-Output transformer |
| T-101 | Pt. of S-23098 | Transformer-Antenna transformer |
| T-102 | | Transformer-1st FM IF transformer |
| | *S-23098 § | Tuner-FM tuner assembly-less tube |
| | | **SPEAKER ASSEMBLY** |
| | 107006 + | Speaker - 4" x 6" PM speaker |
| | | **MISCELLANEOUS ASSEMBLY** |
| | *S-23225 § | Ass'y-Dial back plate ass'y |
| | *S-23264 § | Cabinet-Cabinet back -Gray |
| | *S-23263 § | Cabinet-Cabinet back -Green |
| | *S-23262 § | Cabinet-Cabinet back -Maple |
| | *S-23260 § | Cabinet-Cabinet front -White |
| | *S-23261 § | Cabinet-Cabinet front -Gray |
| | S-4313 + | Cord-Dial cord (Loop to loop 43") |
| | 107009 + | Knob-AM FM function knob |
| | 107010 + | Knob-Tone control knob |
| | 107008 + | Knob-Tuning knob |
| | 107007 + | Knob-Volume control knob |
| | 91749 + | Lamp-Neon pilot lamp |
| | | Manual-Customer instruction manual |
| | S-22237 § | Nut-Speaker retainer nut |
| | *S-23104 § | Pointer-Dial pointer |
| | *S-23099 § | Ring-FM tuner retaining ring |
| | 73584 § | Shield-Tube shield for V-3 |
| | S-20592 + | Socket-7 pin miniature socket for V-2, V-3, V-4, V-5 and V-7 |
| | *S-23101 + | Socket-9 pin miniature socket for V- |
| | *S-23093 + | Socket-Pilot lamp socket and lead ass'y |
| | *S-23265 § | Window-Dial window |
| | *S-23103 § | Ass'y-Bracket & pulley ass'y |
| | *S-23102 § | Ass'y-Bracket & pulley ass'y |

* Indicates New Stock Items.
\+ Indicates Parts Stocked at Branches at Manager's Option.
§ Indicates Parts Stocked at Replacement Parts Cote de Liesse Only. Order on Demand.

**Only items listed under stock numbers are available as Replacement Parts.**
**All parts subject to change or withdrawal without notice.**