INSTRUCTION MANUAL
FOR
TYPE 357 VLF RECEIVER

WATKINS—JOHNSON COMPANY
700 Quince Orchard Road
Gaithersburg, Maryland 20760

C/200/9/8/70/BK

WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Extreme caution should be exercised in working with the equipment with any of the protective covers removed.

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Table 1-1. Type 357 VLF Receiver, Specifications

Frequency Range	1 kHz to 600 kHz (Lower Band limit 500 Hz)
Types of Reception	AM, SSB, CW, MCW, and FSK
Noise Figure	Less than 5 dB
Sensitivity (at 50-ohm input impedance and 1-kHz IF bandwidth)	CW and FSK, 1 kHz to 10 kHz: 5 microvolts for 20 dB (s plus n)/n CW and FSK, 10 kHz to 600 kHz: 0.5 microvolt for 20 dB (s plus n)/n MCW and AM, 50 kHz to 600 kHz: 1 microvolt for 10 dB (s plus n)/n
Input Impedance	50 ohms or 1000 ohms, selectable by rear-panel switch
Input Attenuator	0 dB, -20 dB, -40 dB, or -60 dB, selectable by front-panel switch
Maximum Input Level	1 volt, rms, with input attenuator in -60 dB position
IF Bandwidths	150 Hz, 1 kHz, 3 kHz, or 6 kHz, selectable by front-panel switch
Image Rejection	70 dB, minimum
IF Rejection	60 dB, minimum
Dynamic Range	AGC or Manual: 55 dB, minimum
Digital AFC	Holds receiver tuning with ±100 Hz of the indicated frequency in the normal AFC mode, and within ±10 Hz in the decimal shift AFC mode
Noise Canceller	Attenuates receiver output approximately 40 dB for duration of impulse-type noise spikes. Threshold of canceller adjustable by front-panel control
BFO	Five separate BFO's: One variable ±7 kHz by front-panel control and four crystal controlled: (1) to provide zero beat with IF frequency; (2) a 5.5-kHz beat note; and (3) upper or (4) lower sideband reception of SSB signals
Incidental FM	Less than 10 Hz peak deviation
Outputs	Six: front-panel phone jack (2000 ohms, nominal); rear-apron audio, 6 milliwatts (600 ohms, balanced); local oscillator output; IF output; AM detector output; and signal monitor output
Audio Bandwidths	Normal (100 Hz to 7 kHz) or narrow (825 to 1175 Hz), selectable by front-panel switch
Input Power	115/230 Vac, 50-400 Hz
Power Consumption	Approximately 25 watts
Size	19-inches wide, 3.5-inches high, and 19.5-inches deep
Weight	20 lbs., approximately

ADDENDA

The following changes are required in the parts lists and schematic diagrams for the 357 receiver:

Type 79283 Local Oscillator Board, A4A1:

Change C3 and C4 from 510 pF to 390 pF (5%, 500V, CM05F391J03)
Change C5 from 39 pF to 33 pF (5%, 500V, CM05E330J03)

Type 12654 Inductor Board, A4A2:

Change L1 from 30312-52 to 30312-58

Type 72134 IF & BFO Assembly, A5

Change Y3 to 2001.650 kHz (91804-04)
Change Y4 to 1998.350 kHz (91804-03)

Type 79189 Counter Assembly, A11

Add C6 .01 μf (20%, 50V, 19C214A6, 56289) between E9 and E24.
Change S1 to 265757-A2, 76854
Change S2 to 263283-BA2, 76854

Type 79184 Oscillator/Divider, A11A1

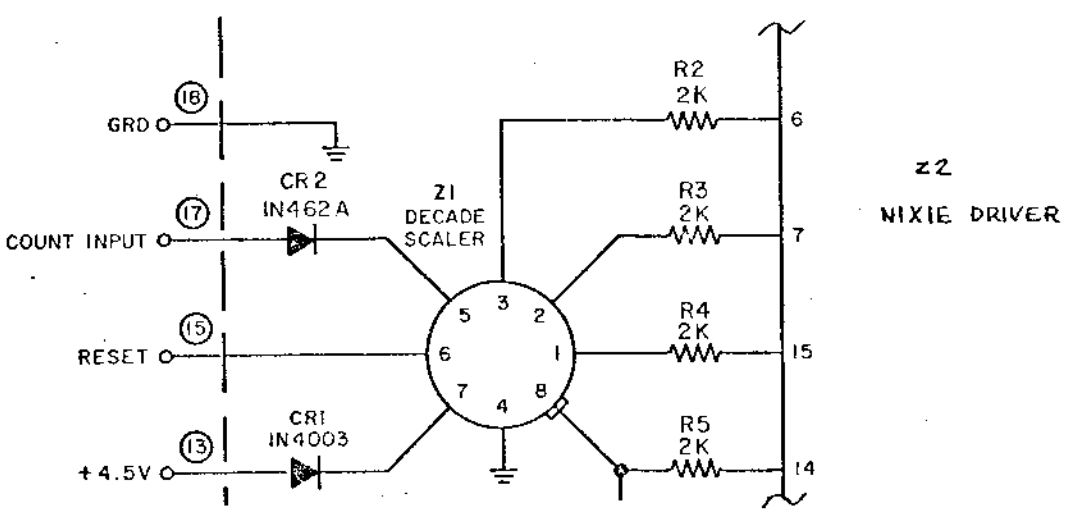
Change Z1 through Z5 to U5B995879X, 07263

Type 79186 Amplifier and Gate, A11A2

Change R32 to 3.9k, (5%, 1/4W, CB3925, 01121)
Delete C14

Type 79247 Readout Scaler and Nixie Driver, A11A3 through A11A6

Change Z1 to U5B995879X, 07263
Change Z2 to U6B996079X, 07263
Add R2 through R5, (2k, 1/4W, 5%, CB2025, 01121)
and CR2 (1N462A, 07688) as shown in the diagram below.



Type 79219/1 AGC AMP/Power Supply, Ref Desig Prefix A6: (Serial No. 117 and above)

Change C1 to 47 μF, 20%, 10V, 109D476X0010C2, 56289

Main Chassis Parts List and Schematic Diagram

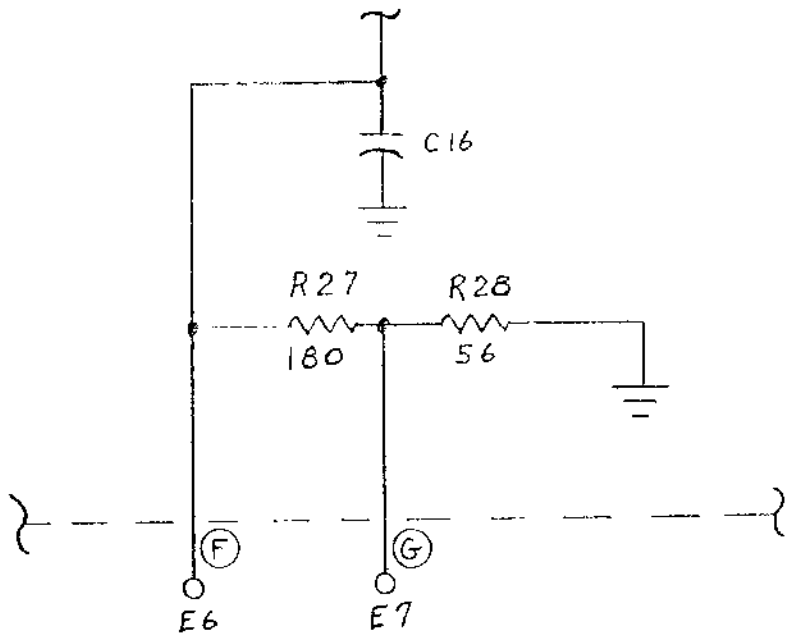
Change P8 to part No. 44950
Add C10, 22 μF, 10%, 35V (150D226X9035R2, 56289) from A6 pin 10 to ground (negative terminal to ground).

Part 12876 Input Amplifier and Balanced Mixer, Ref., A3A1 (Serial numbers 177 and above)

Change R16, R23, R26, and R28 to 750 Ω, 5%, 1/4 W (CB7515, 01121)
Change R19 and R27 to 200 Ω, 10%, 3/4W (150, 200 Ω, 10%, 75042)

Part 11937 IF Amplifier and AM Detector, A5A3 (Serial Number 177 and above)

Add R27, 180 Ω, 1/4W, 5% (CB1815, 01121) and R28, 56 Ω, 1/4W, 5% (CB5605, 01121) as shown in the sketch below.



Type 76101 Compensated ±4.5V Power Supply, (Serial Number 297 and above)

Change CR1, CR2 to 1N4998, 07688

Part 12879/1 BFO and Product Detector, (Serial Number 60 and above)

Change R8 to 10Ω, 5%, 1/4W, (CB1005. 01121)

Part 12654 Inductor Board (A4A1A2) Change L2 from 9220-28; 76493 to 2500-28; 99800

Part 11937/3 IF Amplifier and AM Detector (A5A3) Change C4 from 0.1 μF to 150 pF, 5%, 500V; CM05FE151J03 on the parts list and schematic, Figure 6-7. Add at C4 an asterisk (*), add as final entry of the parts list: *Nominal value, final value factory selected. Add to Figure 6-7 at C4: (NOTE 3). Add NOTE 3 as follows: Nominal value, final value factory selected.

Type 76101 Compensated ±4.5V Power Supply (A13) Change R12 from 500 Ω to 1 kΩ (10%, 1/2W; 3067P-1-102) on the parts list and schematic Figure 6-19.