

INSTRUCTION MANUAL

for

MODEL 512 RANGE RECEIVER

SIGNAL CORPS NOMENCLATURE
AN/ARR-13

Especially Designed
for Aircraft
and
Modification and Connection to
AVA-126 Power Supply

Manufactured By

SETCHELL CARLSON, INC.

SAINT PAUL

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MINNESOTA



ELECTRICAL SPECIFICATIONS

This Receiver can be operated from either a 6-volt or 12-volt filament supply by selecting either 6-volt or 12-volt tubes. No change in the receiver circuit is necessary.

Tube Complement:

For 12-Volt Operation

For 6-Volt Operation

14A7.....	RF amplifier	7A7
14J 7.....	First detector—oscillator	7J 7
14A7.....	IF amplifier	7A7
14B6.....	Second detector—first audio	7B6
14A4.....	Output amplifier	7A4

Frequency Range	195 KC to 420 KC — Dial tuning
Fixed Frequency	278 KC — Push button
IF Frequency	135 KC
RF Sensitivity	3 Microvolts for 10 Milliwatts output (For Signal-to-Noise ratio 4:1)
Output Impedance	300 to 1200 Ohms — Nominal 600 Ohms
Max. Power Output	700 Milliwatts
Volume Control	RF Gain (RF and first detector)
Filament Voltage	6 or 12 Volts
Filament Current	1.5 or .75 Amperes
"B" Voltage	200 to 265 Volts
"B" Current	13 M.A. at 250 Volts

MECHANICAL SPECIFICATIONS

Height	4"
Width	4"
Length	6 ⁵ / ₈ "
Total Weight.....	Approx. 4 pounds

GENERAL DESCRIPTION

The Model 512 Receiver is a small sized, light weight aircraft receiver that can be used with either a 6 or 12-volt filament supply source and with a "B" supply source from 200 to 265 volts at approximately 13 milliamperes.

The frequency range of this receiver is 195 to 420 KC. The dial calibration is from 200 to 400 KC. The push button located on the front panel will select either dial tuning or fixed frequency. This fixed frequency is 278 KC, which is the frequency of tower control stations. The use of a superheterodyne circuit provides good sensitivity with ample selectivity.

The antenna circuit is designed to operate with a 100 mmfd. antenna. Very good reception can be expected with some tolerance of antenna capacity.

The receiver is equipped with a 12-foot 4-conductor cable of which one conductor is used to ground the receiver and act as negative "B" and one side of the filament supply voltage. The second lead is to supply the filament voltage. The third lead is to supply the "B" voltage. The fourth lead is used to control a "B" voltage power supply. This lead is grounded when the receiver is turned "on".

DESCRIPTION OF ELECTRICAL CIRCUITS

A conventional superheterodyne circuit is employed in the Model 512 Receiver, and while the manual volume control varies the RF gain, the circuit includes AVC so as to prevent overloading on strong signals in the event that the manual volume control is not constantly reset with variation in RF

carrier. The manual volume control is in the cathode circuit of the RF amplifier and the first detector oscillator tubes.

The antenna is connected to the primary of the antenna coil through J1 and the secondary of this antenna coil is tuned and then fed to the grid of the RF amplifier tube. The plate of the RF amplifier tube is connected to the primary of the RF coil and coupled to the tuned secondary and then fed to the grid of the first detector tube. The RF signal is then mixed with the oscillator frequency, which is generated by the triode section of the 14J7 detector-oscillator tube and the beat frequency of 135 KC is then fed from the plate of this tube to the tuned primary of the first 135 KC IF coil. The tuned secondary of this IF coil is fed to the grid of the IF amplifier tube. The plate of the IF amplifier tube is fed to the tuned primary of the second 135 KC IF coil. The tuned secondary of this coil is fed to the diodes of the second detector first oscillator tube. The rectified DC voltage of this diode detector is used for automatic volume control. The audio voltage is capacitively coupled to the grid of the triode section of this second detector first audio tube. The plate of this tube is capacitively coupled to the grid of the output amplifier. The plate of the output amplifier is connected to the primary of the output transformer. This output transformer has a primary impedance of approximately 12,000 ohms and the secondary impedance of 600 ohms. Due to the fact that the output tube is a triode, the output impedance of 600 ohms need not be too closely adhered to. An impedance from 300 to 1200 ohms can be used without seriously injuring power output.

The Model 512 Receiver is equipped with a push-pull switch which connects either the 3-gang tuning condenser or the 3 mica trimmer condensers. When the button is in the "in" position the tuning gang is connected and the receiver will then tune from 195 to 420 KC. When the button is in the "out" position the receiver is then automatically tuned to the pre-determined frequency according to the adjustment of the trimmers. This setting is usually 278 KC which is the traffic control frequency and is used for landing and take-off instructions, etc.

The filament circuit is filtered by 2 No. 16 wire "A" filter chokes and 1 .25 mfd. condenser. This filtering circuit is incorporated so as to isolate the filament supply and choke out filament line interference.

INSTALLATION INSTRUCTIONS

The Model 512 Receiver can be mounted in any position. While the receiver is equipped with a 4-conductor cable, of which one conductor is grounded, it may be necessary that a short, low resistance ground be added to eliminate or lessen interference, such as ignition, generator noise, etc.

The lead connecting from the antenna jack of the receiver to the antenna should be as short as possible and should not run adjacent to any other wiring of the equipment. This precaution will lessen interference.

Two common methods for mounting the Receiver are described below:

First, the front panel construction of this receiver is arranged so that it may be mounted in a standard $3\frac{1}{8}$ " instrument opening. The mounting screws for installation are the four screws located in the front panel of the receiver.

Second, a metal strap of sufficient length should be drawn tightly around the receiver case and fastened securely in the location desired. All tubes are of the indirect heated type and of loctal design and will stand much shock and vibration without endangering their life, therefore, shock mounting is ordinarily not required.

ELECTRICAL CONNECTIONS

RECEIVER			Connection to AVA-126 Power Supply	
Lead	Terminal No.	Function	Terminal No.	Board
Black	1	Filament, Negative B, Ground	5	B
White	2	Power Supply Control	4	B
Green	3	Filament, Negative or Positive	1	A
Red	4	Positive "B"	3	B

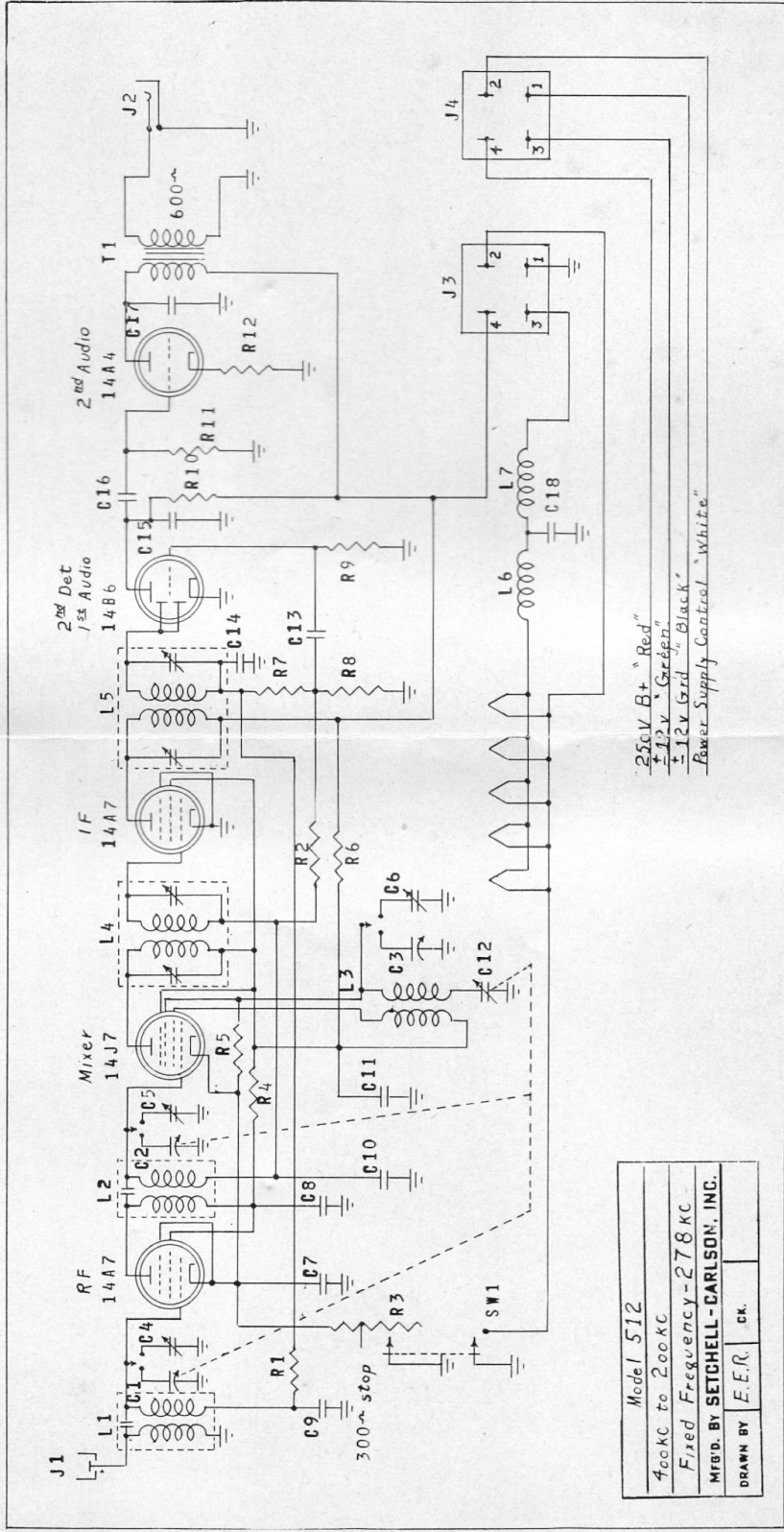
ALIGNMENT PROCEDURE

Adjustment	Connecting Point for Test Oscillator	Alignment Frequency	Dummy Antenna in Series with Test Oscillator
IF Trans.	Mixer Grid Gang No. 3	135 KC	100 Mmfd.
Antenna, RF and Oscillator Trimmers	Antenna Jack	400 KC	100 Mmfd.
Oscillator Padder	Antenna Jack	210 KC	100 Mmfd.
Fixed Frequency Trimmers	Antenna Jack	278 KC	100 Mmfd.

PARTS LIST—MODEL 512

Circuit Reference	Description	Value and Tolerance	Rating
R1	Resistor	1 Megohm 10%	1/3 W
R2	Resistor	1 Megohm 10%	1/3 W
R3	Resistor—Variable	25,000 Ohms 10%	1/3 W
R4	Resistor	1,200 Ohms 10%	1/3 W
R5	Resistor	50,000 Ohms 10%	1/3 W
R6	Resistor	50,000 Ohms 10%	1 W
R7	Resistor	500,000 Ohms 10%	1/3 W
R8	Resistor	200,000 Ohms 10%	1/3 W
R9	Resistor	15 Megohms 10%	1/3 W
R10	Resistor	200,000 Ohms 10%	1/3 W
R11	Resistor	500,000 Ohms 10%	1/3 W
R12	Resistor	1,200 Ohms 10%	1/3 W
C1	Variable Condenser	} Tuning Gang	
C2	Variable Condenser		
C3	Variable Condenser		
C4	Mica Condenser	3 Plate	
C5	Mica Condenser	3 Plate	
C6	Mica Condenser	3 Plate	
C7	Condenser	25 mfd. +40 —10	200 V
C8	Condenser	05 mfd. +40 —10	400 V
C9	Condenser	05 mfd. +40 —10	200 V
C10	Condenser	05 mfd. +40 —10	200 V
C11	Condenser	05 mfd. +40 —10	400 V
C12	Var. Mica Condenser	100-450 mmfd.	400 V
C13	Mica Condenser	0005 +10 —10	400 V
C14	Mica Condenser	0003 +10 —10	400 V
C15	Mica Condenser	0003 +10 —10	400 V
C16	Condenser	006 mfd. +40 —10	400 V
C17	Condenser	006 mfd. +40 —10	400 V
C18	Condenser	25 mfd. +40 —10	200 V
L1	Antenna Coil	} Assembly AB-501	
L2	RF Coil		
L3	Oscillator Coil—(with C12, Assembly CC-501)		
L4	135 KC, IF Coil		
L5	135 KC, IF Coil		
L6	"A" Filter Choke		
L7	"A" Filter Choke		
T1	Output Transformer, Prim. Imp. 12,000 Ohms, Sec. Imp. 6,000 Ohms		
J1	Antenna Socket—Accommodates Std. Littlefuse bayonet plug		
J2	Output Jack—Accommodates Std. single circuit plug		
J3	4-Prong Plug—P-304		
J4	4-Contact Socket—S-304-FHT		
SW1	SPST Switch—Off-on switch attached to R3		

Schematic Diagram Model 512



Model 512
 400KC to 200KC
 Fixed Frequency-278 KC
 MFGD. BY SETHCHELL-CARLSON, INC.
 DRAWN BY E.E.R. CK.

250V B+ "Red"
 12V "Green"
 12V Grid "Black"
 Power Supply Control "White"

Fig. 1