INSTRUCTION BOOK

for

RECEIVER
F3

Equipment covered by this instruction
book was manufactured by

COMMUNICATIONS EQUIPMENT CORPORATION
134 West Colorado Street
Pasadena, California

Manufactured by

WILCOX ELECTRIC COMPANY, INC.
1400 Chestnut Street
Kansas City, Missouri

TABLE OF CONTENTS

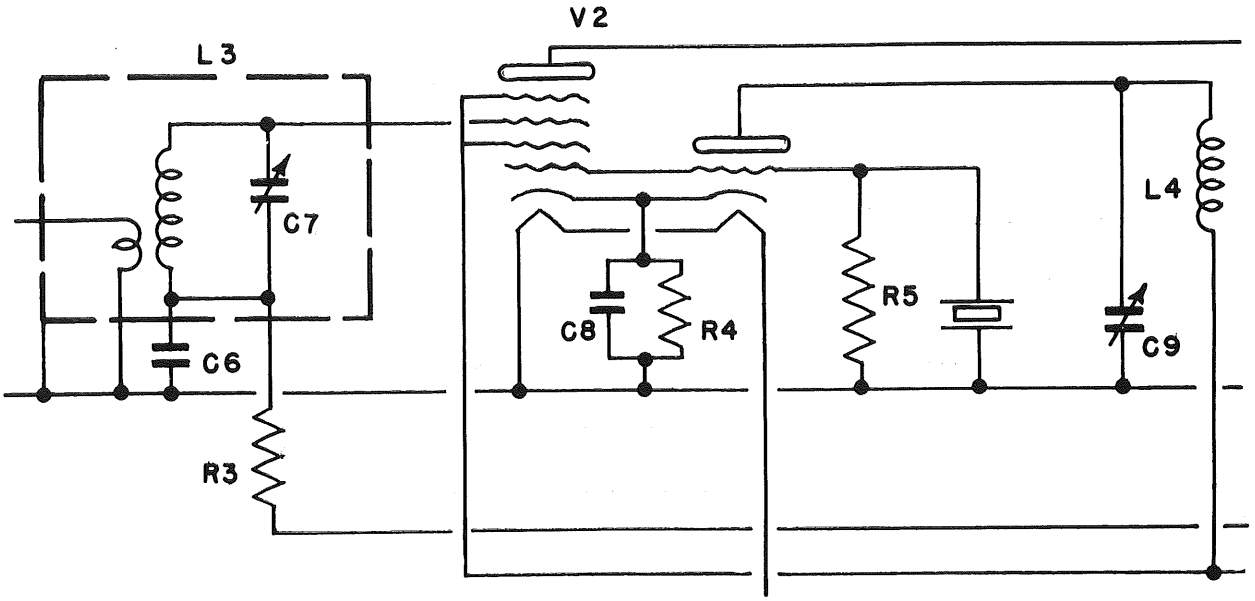
F3 RECEIVER INSTRUCTION MANUAL ADDENDUM

(1943 Final Edition)

4/3/44.

The following changes apply to Type F3 Receiver, serial No. 126, and all following.

Schematic, page 20, revised as shown below:



Page 8, section 2.15, second sentence should read "The triode section of V2 is used as a crystal oscillator employing a tuned plate circuit with the crystal connected between grid and ground."

Page 9, section 2.19, fourth sentence should read " . . . and that the network is grounded at the junction of R23 and R24."

Page 11, section 3.1, average selectivity table should read as follows:

Times Down	*Band Width*
2	9 kc.
10	17 kc.
100	27 kc.
1000	47 kc.

Change selectivity curve, page 22, to conform to above.

Page 11, section 3.4 should read "The automatic volume control will hold the receiver output within 12 db, from 0 decibel level, with a change of input level from the receiver input level to 2 volts, signal being 400 cycle, 30% modulated."

Page 12, section 5, insert the following just before section 5.1:

5.1A The crystal oscillator plate inductor, L4, is tuned to resonance at the fundamental of the crystal by means of C9. Maximum crystal output will be found to occur at a setting of capacitor C9 corresponding to a slightly higher frequency than the fundamental of the crystal. Settings of the capacitor C9 corresponding to lower frequencies than the fundamental of the crystal will be found unsatisfactory inasmuch as the crystal will not oscillate under this condition. Access to this capacitor, C9, for tuning purposes, may be had by removing the Dust Cover of the receiver. Tuning is accomplished by inserting a small screwdriver into the slotted end of the capacitor shaft which is located between the crystal socket and V3, and 6K7 I. F. Amplifier tube.

Page 13, section 5.64 should read "The circuits of L4, L3, L2, and L1 are then readjusted according to 5.1 to 5.4 inclusive."

Parts List, C9 should be "Oscillator Plate Tuning, 100 MMF., American Steel Packing, 100."

Parts List, L4 should be "Oscillator Choke, R. F. Choke, Wilcox, 95069."

LIST OF ILLUSTRATIONS

F3 RADIO RECEIVER

The Wilcox Electric Type F3 Radio Receiver is designed for use in ground station installations for the reception of signals in a point to point communication system, and for the reception of modulated wave signals from aircraft to ground. The receiver fulfills the need for a unit that does not require continuous readjustment to a given frequency. It is a complete unit requiring only external power and monitoring means. Means have been provided for operating and controlling the receiver from a remote point. The receiver is equipped with a radio frequency sensitivity control, an audio gain control, automatic volume control, and an inter-carrier noise suppressor. The audio amplifier is capable of producing zero level db output across a 500 ohm load.

1. GENERAL DESCRIPTION

The F3 Receiver is a highly selective crystal controlled superheterodyne unit operating at any fixed frequency in the band of 1900 kc to 16,500 kc. The total band is covered by means of four groups of plug-in coils. Extension of the range above or below the specified range may be had by use of special groups of plug-in coils. Plug connections are provided for 110 V, 60 cycle, AC power source and for connection of receiver output and controls to a remote point.

1.1 The receiver unit consists of a U shaped chassis attached to a standard 3½″x19″ relay rack panel. Ventilated removable side plates are placed on the U shaped chassis. A dust cover is provided for covering all radio frequency coils and vacuum tubes. The receiver chassis excluding the panel is 3⅛″ high x 5¾″ deep x 17¼″ wide. The overall depth of the unit, including the chassis and dust cover, is 11½″. Antenna termination is provided at one end of the chassis; AC power, control, and audio output at the opposite end of the chassis. The noise control, audio gain control, and sensitivity control appearing across the horizontal center line of the panel in the order mentioned.

1.2 The receiver is designed to operate over the specified frequency range with the coil groups covering the following frequencies.

Group I	1900 kilocycles	to	3600 kilocycles
Group II	3100 kilocycles	to	6100 kilocycles
Group III	5100 kilocycles	to	10,000 kilocycles
Group IV	8100 kilocycles	to	16,500 kilocycles

2. DESCRIPTION OF CIRCUITS

The F3 Receiver is a crystal controlled superheterodyne receiver consisting of a single stage radio frequency amplifier, an oscillator-mixer, a single stage intermediate frequency amplifier, a second detector and automatic volume control voltage amplifier, and an inter-carrier noise suppressor and audio output stage. The circuit arrangement of these parts is shown in the schematic. (Fig. 2)

2.11 The input plug-in Antenna Coil L1 provides coupling from a 70 ohm transmission line to the grid of V1. The primary of L1 is a low impedance center tapped winding electrostatically shielded from the secondary. The secondary is resonated by the capacity C2, which covers the specified range of the coil.

2.12 The first radio frequency amplifier, V1, type 6K7 vacuum tube, operates between the antenna coil L1 and the plate coil L2. The cathode of V1 is returned to a common sensitivity control, R20 and to the plug (P1) (2.17). The automatic volume control voltage is applied to the grid of V1 through R1 which is connected in series with R13. (2.15, 2.17, 2.19). The capacity C1 furnishes a low impedance path to ground for the radio frequency voltage developed across the tuned circuit L1, C2.

2.13 The plate circuit of V1 operates into the plate coil L2 and consists of a primary winding L2, resonated by the condenser C5, and a small winding inductively coupled to the primary. The small winding serves as a means of coupling to the Grid Coil L3. Link coupling between the plate and grid coil presents a low impedance circuit which considerably improves image rejection.

2.14 The Grid Coil L3 operates into the converter tube V2, type 6K8. Coupling from the Plate Coil L2 to the Grid Coil L3 is accomplished by a low impedance link circuit (2.13). The grid coil portion of this link is a small winding inductively coupled to the Grid Coil Secondary.

2.15 A hexode vacuum tube, V2, type 6K8, is used as a first detector and crystal oscillator harmonic generator. The triode section of V2 is used as a crystal oscillator employing the Pierce circuit. The crystal oscillator is internally connected to the mixer section of V2. The crystal oscillator is designed to produce a frequency difference of 455 kilocycles for operation into the 455 kilocycle intermediate frequency amplifier. The first, second, and third harmonic of the crystal frequency is used as the injection voltage, the individual harmonic depending on the coil groups with which the receiver is operated. Automatic volume control voltage is applied to the grid of V2 by means of R3 connected in series with R8 and R13. (2.12, 2.17, 2.19).

2.16 Frequencies falling in Coil Group I (2.15, 1.2) use the fundamental of the crystal frequency with the crystal frequency above the receiver frequency. Group II requires the crystal frequency to be below the receiver frequency and operate at the crystal fundamental frequency. Group III requires the second harmonic of the crystal frequency, the second harmonic being below the receiver frequency. Group IV requires the third harmonic of the crystal frequency, the third harmonic being below the receiver frequency.

2.17 The mixer tube, V2, operates into the intermediate frequency amplifier which consists of one stage of selective amplification operating at a frequency of 455 kilocycles. Two double tuned circuits coupled to form a band-pass filter are used as a coupling means between the first detector, the intermediate frequency amplifier and the second detector. The intermediate frequency amplifier, vacuum tube, V3, type 6K7 operates between the band-pass filter or intermediate frequency transformers L5 and L6. The cathode of V3 is connected to the sensitivity control R20 in the same manner as the cathode circuit of V1 (2.12). The automatic volume control voltage is applied to the grid of V3 through R8 (2.12, 2.15, and 2.19) which is connected in series with R13. Resistor R7 provides a means of reducing the amount of automatic volume control voltage applied to the grid of V3. Capacity C13 offers a low impedance path to ground for the intermediate frequency voltage developed across the tuned circuit consisting of L5, C14 and C15.

2.18 The second detector is a modified grid leak detector using the triode section of a triode-pentode vacuum tube V4, type 6F7. The second tuned circuit of the intermediate frequency amplifier L6 feeds directly into the second detector grid resistor, R10, is the second detector bias resistor. The capacity C21 is the grid blocking condenser. A low impedance path to ground for the radio frequency voltage remaining in the output of the detector is provided by means of C22. The output of the detector is fed to the audio amplifier by means of C24, R16, R17, and C25.

2.19 The automatic volume control voltage amplifier consists of the pentode section of V4. Coupling between the intermediate frequency amplifier and the automatic volume control voltage amplifier is obtained by means of C23 connected directly between the plate of V3 and the grid of the pentode section of V4. The action of this amplifier is dependent on the voltage drops along the resistor network R21 to R27 inclusive. It will be noticed that this network is across the total voltage output of the power supply, and that the network is grounded at the junction of R23 and R25. It follows, therefore, that the portion of the total power supply voltage represented by the drop across R21, R22, and R23 is negative in respect to the chassis ground. It is this portion of the voltage that is utilized by the automatic volume control voltage amplifier. The plate current of the pentode section of V4 flows through R14 and R15 (2.20) to the chassis, thence through R23 and R22, the screen voltage for V4 being the voltage developed across R23 by the total receiver plate current flowing through R23. Since the grid of the pentode section of V4 is connected to the end of R21 which is in series with R22 and R23, this network being across the negative portion of the voltage developed by the power supply it follows, therefore, that a fixed bias is applied to this grid. Upon the application of sufficient signal to the control grid by means of C23 this fixed bias is overcome producing a voltage drop across R14 and R15 which is applied to the grids of the controlled tubes. Radio frequency amplifier V1 receiving automatic volume control bias through the series combination of R13 and R1 (2.12); the mixer V2 receiving A.V.C. bias by means of the series combination of R13, R8 and R3 (2.15); the intermediate frequency amplifier V3 receiving A.V.C. bias by means of the series combination of R13 and R8 (2.17). The resistor, R7, effects a

reduction on the amount of A.V.C. bias applied to V2 and V3 with the greatest A.V.C. bias voltage being applied to V1. The resistor and capacitor R13 and C27 provides means of filtering the output of the A.V.C. amplifier.

2.20 The inter-carrier noise suppressor consists of the first triode section of a 6C8 vacuum tube, V5. A negative bias is applied to the control grid by means of a connection to R14 and R15, the A.V.C. voltage amplifier plate load (2.19). The cathode of the first triode section of V5 is connected directly to ground. One terminal of the variable resistor R24 is connected to ground while the other terminals are connected to R25 and R18. Since R18 is the plate load resistor of the first triode section of V5 a positive voltage appears on this plate with respect to its cathode and grid. Since the cathode of the audio amplifier (the second triode section of V5) is connected to the second terminal of R25 the voltage applied to the plate of triode one is negative with respect to the cathode of the triode two. The resistor R19 provides a means of applying the negative voltage on the plate of triode one to the grid of triode two, the audio amplifier. If the plate voltage on the first triode is reduced to zero by turning R24 the bias applied to the grid of the audio amplifier is reduced to normal allowing the receiver to operate. However, if R24 is turned in the opposite direction (clockwise) a voltage is applied to the plate of triode one of V5 which is in turn applied to the grid of the audio amplifier, triode two, rendering the set inoperative except in the presence of a strong carrier. A carrier strong enough to develop a bias on the control grid of the inter-carrier noise suppressor triode one of V5, will produce a voltage sufficiently negative to cut off the flow of plate current allowing the audio amplifier to again operate as the bias will return to its normal value. (2.21) The strength of the carrier required to bring about the above condition is determined by the setting of R24.

2.21 The audio amplifier consists of the second triode section of V5, a 6C8 twin triode vacuum tube. This triode operates between the resistance capacity network C24, R16, R17, and C25 and the output Transformer T1. The secondary of T1 is designed to operate into a 500 ohm load.

2.22 The power supply is completely self-contained and operates from 110 V, 60 cycles AC supply. Direct current voltages for the vacuum tubes are obtained by means of a full wave rectifier circuit consisting of a rectifier V6, type 80, and a filter circuit C28, L7, C29, and C30. The receiver circuit is protected by the Fuse F1 (See Fig. 6).

3. PERFORMANCE

The sensitivity of the receiver varies with frequency and with the groups of plug-in coils. Over the complete range the receiver varies at the lowest frequency from a sensitivity of less than 1 microvolt to less than 5 microvolts at the highest frequency. The sensitivity may be controlled by resistor R20 which appears in the cathode circuit of V1 and V3 and may be adjusted from the front panel. The cathode circuit of V1 and V3 are also brought out to terminal one of P1 for remotely controlling the sensitivity of the receiver. The sensitivity of the receiver is measured in the microvolts input

400 cycle, 30% modulation required to produce 0 decibel output level across a 500 ohm resistive load. The control R20 which appears at the front panel is directly connected to the AC power switch. This switch functions with rotation of R20.

3.1 The selectivity of the receiver is determined, primarily, by the intermediate frequency amplifier. The antenna coil and plate and grid coils contribute to the selectivity resulting in a slight variation in overall selectivity over the complete frequency range. The average selectivity, (See Fig. 4), is as follows:

Times Down	*Band Width*
2	12 kc.
10	20 kc.
100	30 kc.
1000	46 kc.

3.2 The image response of the receiver as well as all other undesired responses are at least 75 db down from the desired signal response. The image responses varies with the frequency and is down the greatest at the lower frequencies being greater than 100 db down at these frequencies.

3.3 The signal to noise natio of the receiver referred to a 400 cycle, 30% modulation carrier is at least three to one over the complete frequency band.

3.4 The automatic volume control will hold the receiver output constant within 3 db, from 0 decibel level, with a change of input between one microvolt and one volt, signal bring 400 cycle, 30% modulated.

4. INSTALLATION

The F3 Radio Receiver as supplied by the manufacturer is a complete unit that need only be connected to an antenna and a 110 V, 60 cycle AC power source to be ready for operation. A Jones receptacle, type S310 FHE may be used for connections to the receiver. Terminal one of this plug is for remote sensitivity control; terminals two and six are for audio output; terminal five ground; terminals seven and eight are for 110 V, 60 cycle power source. The antenna terminals are of the screw type and are at the left side of the receiver when the receiver is viewed from the back. (Fig. 7).

4.1 Figure 2 is a schematic of the type F3 Receiver, Figure 3 is a schematic of a typical receiver installation. In the typical installation, Figure 3, the operator is remotely located from the receiver and the operator's headset is connected to the receiver over a single pair line. The outside terminals of the antenna strip are connected to the antenna transmission line and the center terminal is connected to ground to obtain a balanced input.

4.2 The audio output of the receiver T1 is connected to a headset jack appearing at the front panel of the receiver as well as to terminals two and six of the chassis plug P1. The terminals two and six by means of the external plug, are connected to the remote line.

4.3 The terminals seven and eight of P1 on the receiver connect to 110 V, 60 cycle AC power source.

4.4 The receiver is to be installed in the standard relay rack with the power plug and output appearing at the right and left side respectively when viewed from the rear (Fig. 7).

4.5 The receivers are shipped with one set of tubes installed. The antenna coil, grid coil, plate coil, and crystal are shipped separately. The group of coils selected to cover the frequency desired must be plugged into the correct positions as noted on (Fig. 7).

4.6 The crystal shield must be used on all frequencies in order to insure proper performance. A vacuum tube shield has been provided for use on the 6K7, V3, intermediate frequency amplifier tube when glass vacuum tubes are used. In order to plug in the crystal and the antenna, grid and plate coils, the dust cover of the receiver must be removed by means of the two top screws appearing in the top of the dust cover. This cover must be replaced when the receiver is in operation. Tuning adjustments may be made through holes provided in the dust cover.

5. TUNING PROCEDURE

The F3 Radio Receiver as received from the manufacturer has been completely tested and tuned. The only normal adjustment which should have to be made is to tune the antenna, plate and grid coils.

5.1 The proper coils and crystal selected for the desired frequency should be plugged into the receiver. A signal generator capable of producing the desired frequency is necessary to properly adjust the receiver. Adjustments may be most easily made with a signal generator that contains internal 30%, 400 cycle modulation. The generator is coupled to the grid of V1 after first removing the grid lead from L1, (Fig. 7). The generator is set to the desired frequency and the output adjusted to maximum.

5.2 The grid coil L3 is tuned by means of the slotted condenser shaft appearing in the top of the coil (Fig. 7), until the 400 cycle or modulating frequency is noted in the output of the receiver. This circuit is tuned to produce a maximum output at the output of the receiver. In order to prevent the automatic volume control from functioning the input to the receiver from the signal generator should be kept low enough so that the output of the receiver, as measured by an output meter is below 0 db level or 1.73 volts.

5.3 After peaking the grid coil, L3, the plate coil, L2, is adjusted by means of the slotted condenser shaft appearing in the top of the coil (Fig. 7). The condenser is rotated until a maximum signal is noted in the output of the receiver. Care is again taken to reduce the signal generator output to prevent the A.V.C. from functioning by keeping the output of the receiver below 0 level. (5.2).

5.4 The signal generator is then removed from the grid of V1 and placed across the antenna transmission line circuit after removing the transmission line from the receiver input. The

grid cap from L1 is replaced on V1. The antenna coil, L1, is then adjusted by means of the slotted condenser shaft appearing at the top of the can (Fig. 7) until a maximum output is noted at the receiver, again being careful to keep the signal generator input reduced so as not to cause the A.V.C. to operate.

5.5 After these adjustments are made it is necessary to recheck the tuning of L1, L2 and L3. It is suggested that several repetitions of these adjustments be made. The signal generator is then removed from the antenna circuit and the transmission line connected. L1 may require a slight readjustment because of the difference of impedance between the signal generator and the transmission line. This adjustment may be made when monitoring the remote station or by using the signal generator in the field with an antenna as a signal source.

5.6 If for some reason it is necessary to completely retune the receiver the procedure should be as follows:

5.61 A modulated frequency of 455 kilocycles should be applied to the grid of the intermediate frequency amplifier tube V3. A headset or output indicator should be provided to give aural or visual indication (5.2). The output of the signal generator should be adjusted to give maximum output by observing the conditions of (5.2).

5.62 The condenser C20, (Fig. 7), is then adjusted to produce a maximum aural output or meter deflection. The condenser C17, (Fig. 7), is then adjusted to produce a maximum aural output or meter deflection. After adjusting C17 it is necessary to recheck the adjustment of C20.

5.63 Replacing the grid lead from L5 to V3, the signal generator is placed across the grid of V2 to ground after removing the grid lead from L3. The condenser C11 and C15 are then adjusted in the same manner as C17 and C21 (5.62).

5.64 The circuits of L3, L2, and L1 are then readjusted according to 5.1 to 5.4 inclusive.

6. MAINTENANCE

CLEANLINESS

Ventilated dust covers are provided to cover the radio frequency coils and tubes of the receiver and to cover the chassis components. The receiver should be inspected at regular intervals. Dust and dirt collected at any point should be removed by a soft brush or blown out with a moderate compressed air jet. Care should be taken to see that leads are not disturbed as to location.

6.1 TUBE CHECKS

The vacuum tubes should be checked at regular intervals. A standard type tester that will measure mutual conductance is recommended for determining tube condition. If no tube tester is available and the output is low the tubes in the receiver may be replaced one at a

time noting the output to determine which tubes are in good condition. Each tube replaced will require retuning of the circuits between which the tube operates.

6.2 FAILURE AND POSSIBLE CAUSES

Symptom	*Cause*	*Procedure*
Receiver will not operate	No AC power input	Check line voltage into receiver
	Fuse blown	Check and replace fuse
		Check for short circuit in high voltage plate supply
		Check filter and by-pass condensers
		Check rectifier tube
Receiver will not operate. Filaments light up	Oscillator not operating	Check and replace V2
		Check crystal for operation by measuring voltage across R5
		Check for plate voltage on osc.
	No voltage on oscillator plate	Check L4 for continuity
	Check plug-in coils	See that plug-in coils are seated in sockets
	Check antenna for short circuit conditions	

PARTS LIST OF SCHEMATIC F3

Symbol	*Name or Function*	*Description*	*Manufacturer*	*Identification*
C1	RF Grid By-pass	.01 MF 400 V.	Solar	MPW 5141
C2	Ant. Coil Tuning	100 MMF Var.	American Steel A.P.C. Package	100
C3	RF Cathode By-pass	.1 MF 400 V.	Micamold	345
C4	RF Screen By-pass	.1 MF 400 V.	Micamold	345
C5	Plate Tuning	100 MMF Var.	American Steel A.P.C. Package	100
C6	Mixer Grid By-pass	.01 MF 400 V.	Solar	MPW 5141
C7	Mixer Grid Tuning	100 MMF Var.	American Steel A.P.C. Package	100
C8	Mixer Cathode By-pass	.1 MF 400 V.	Micamold	345
C9	Osc. Plate By-pass	50 MMF 400 V.	Cornell-Dubilier	5W
C10	Mixer Plate By-pass	.1 MF 400 V.	Micamold	345
C11	Plate Input I.F. Tuning	35 MMF Var.	Sickles	ATR
C12	Plate Input I.F. Fixed	100 MMF 400 V.	Solar	MOS 100
C13	I.F. Grid By-pass	.01 MF 400 V.	Solar	MPW 5141
C14	Grid Input I.F. Fixed	100 MMF 400 V.	Solar	MOS 100
C15	Grid Input I.F. Tuning	35 MMF Var.	Sickles	ATR
C16	I.F. Cathode By-pass	.1 MF 400 V.	Micamold	345
C17	Plate Output I.F. Tuning	35 MMF Var.	Sickles	ATR
C18	Plate Output I.F. Fixed	100 MMF	Solar	MOS 100
C19	Grid Output I.F. Fixed	100 MMF	Solar	MOS 100
C20	Grid Output I.F. Tuning	35 MMF Var. Dual	Sickles	ATR

PARTS LIST OF SCHEMATIC F3—(Continued)

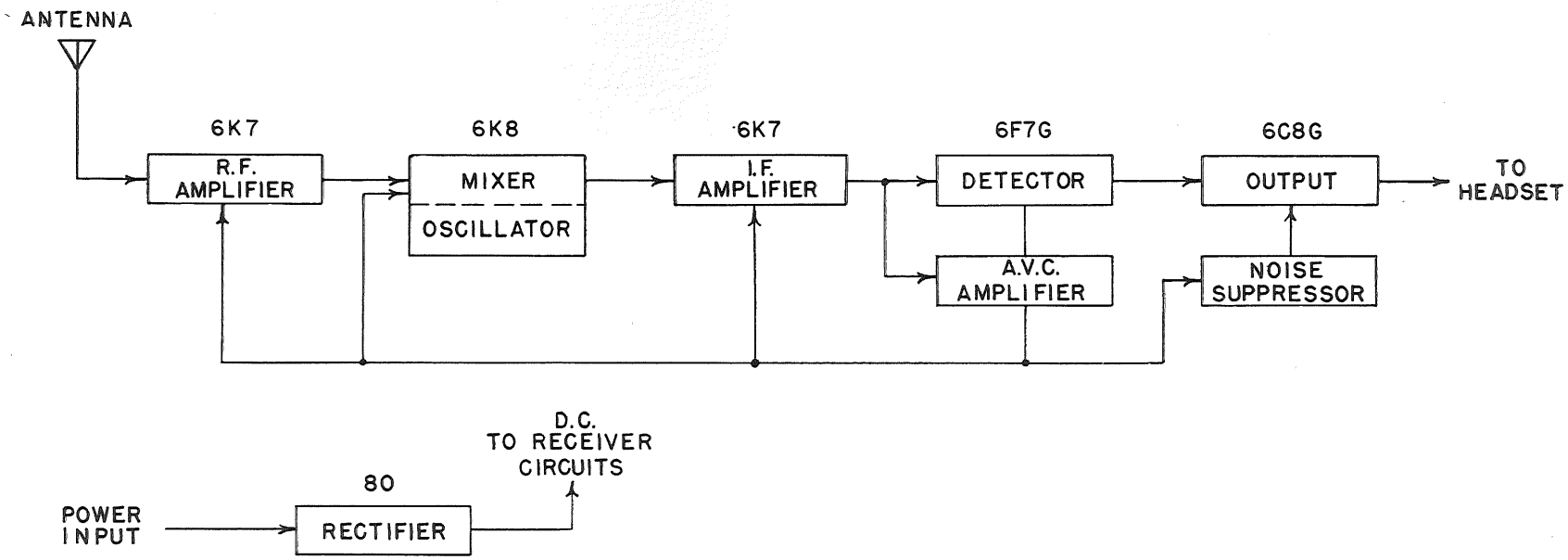
Symbol	*Name or Function*	*Description*	*Manufacturer*	*Identification*
C21	2nd Det. Grid By-pass	500 MMF 400 V.	Solar	MOS 500
C22	2nd Det. Plate By-pass	250 MMF 400 V.	Cornell-Dubilier	5W-5T25
C23	A.V.C. Coupling	50 MMF 400 V.	Cornell-Dubilier	5W-5Q5
C24	Audio Coupling	.01 MF 400 V.	Cornell-Dubilier	1W-351
C25	Audio Coupling	.01 MF 400 V.	Cornell-Dubilier	1W-351
C26	Audio Plate By-pass	.05 MF 400 V.	Micamold	345
C27	A.V.C. Filter	.1 MF 400 V.	Micamold	345
C28	Filter Cond.	8 MF 450 V.	Cornell-Dubilier	BR 845
C29	Filter Cond.	8 MF 450 V.	Cornell-Dubilier	BR 845
C30	Filter Cond.	8 MF 450 V.	Cornell-Dubilier	BR 845
C31	O. P. Cathode	20 MF 150 V.	Hammerlund Johnson	BR 2015
F1	Line Fuse	2 A 3 AG	Bussman	3 AG
J1	Antenna Terminal	3 Terminals	American Radio Hardware	1506
J2	Phone Plug	Jack	Mallory	A1
K	Osc. Crystal	Crystal	Wilcox	8OA
L1	Ant. Coil	Plug-in Coil	Wilcox	
L2	Plate Coil	Plug-in Coil	Wilcox	
L3	Grid Coil	Plug-in Coil	Wilcox	
L4	Osc. Choke	R.F. Choke	Wilcox	38512
L5	I.F. Input	I.F. Trans.	Wilcox	42503

PARTS LIST OF SCHEMATIC F3—(Continued)

Symbol	*Name or Function*	*Description*	*Manufacturer*	*Identification*
L6	I.F. Output	I.F. Trans.	Wilcox	42504
L7	Filter Choke	Choke	Thordarson	T45692
P1	A.C. In and O. P.	10 Point Plug	H. B. Jones	P310AB
R1	R.F. Grid Bias	.1 Meg. 1 W.	Allen-Bradley	GB
R2	R.F. Cathode	400 ohm 1 W.	Allen-Bradley	GB
R3	Mixer Grid	.1 Meg. 1 W.	Allen-Bradley	GB
R4	Mixer Cathode	100 ohm 1 W.	Allen-Bradley	GB
R5	Osc. Grid Bias	50M 1 W.	Allen-Bradley	GB
R6	Osc. Plate Dropping Res.	25M 1 W.	Allen-Bradley	GB
R7	I.F. Grid Res.	.5 Meg. 1 W.	Allen-Bradley	GB
R8	I.F. Mixer Grid Bias	.5 Meg. 1 W.	Allen-Bradley	GB
R9	I.F. Cathode Res.	400 ohm 1 W.	Allen-Bradley	GB
R10	2nd I.F. Grid Res.	1 Meg. 1 W.	Allen-Bradley	GB
R11	2nd I.F. Plate Res.	.25 Meg. 1 W.	Allen-Bradley	GB
R12	A.V.C. Grid Dropping	.5 Meg. 1 W.	Allen-Bradley	GB
R13	A.V.C. Plate Dropping	.5 Meg. 1 W.	Allen-Bradley	GB
R14	A.V.C. Plate Dropping	.25 Meg. 1 W.	Allen-Bradley	GB
R15	Audio Grid Bias	75M 1 W.	Allen-Bradley	GB
R16	Audio Gain	.1 Meg. Var.	Centralab	10101626
R17	Audio Grid Coupling	25M 1 W.	Allen-Bradley	GB

PARTS LIST OF SCHEMATIC F3—(Continued)

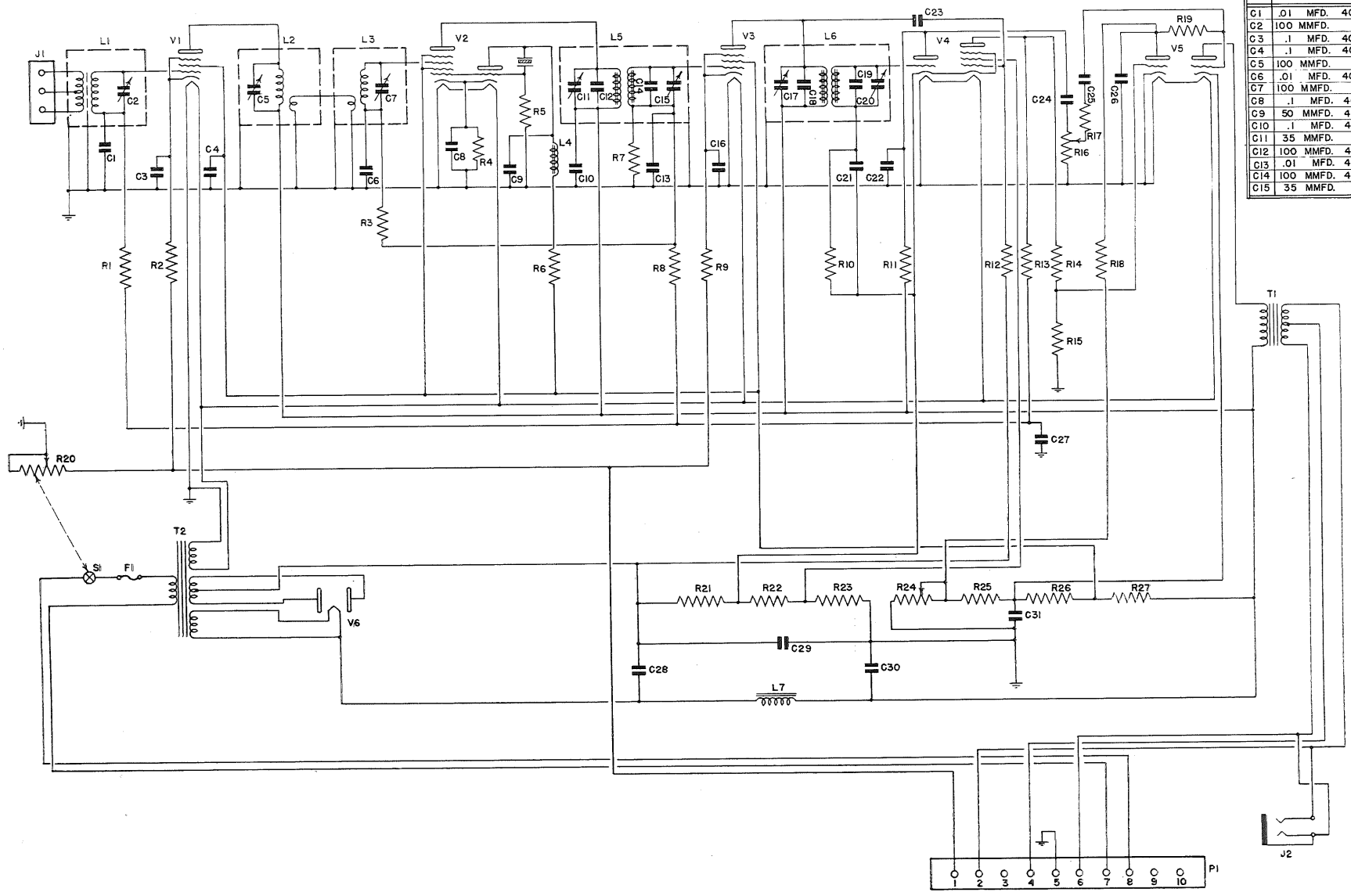
Symbol	*Name or Function*	*Description*	*Manufacturer*	*Identification*
R18	Audio Noise Plate	.5 Meg. 1 W.	Allen-Bradley	GB
R19	Audio Gain Cont.	.1 Meg. 1 W.	Allen-Bradley	GB
R20	Sens. Control	5M pot.	Centralab	22011004
R21	A.V.C. Dropping Res.	500 ohm 10 W.	Clarostat	10 AF
R22	A.V.C. Dropping Res.	.1M 10 W.	Clarostat	10 AF
R23	A.V.C. Dropping Res.	.3M 10 W.	Clarostat	10 AF
R24	Noise Control	5M Var.	Centralab	21010028
R25	Audio Cathode Res.	250 ohm 1 W.	Allen-Bradley	GB
R26	Voltage Divider	10M 10 W.	Clarostat	10 AF
R27	Voltage Divider	5M 10 W.	Clarostat	10 AF
S1	Power Switch	Part of R1	Centralab	10
T1	Output Transformer	Output	Thordarson	T43970
T2	Power Transformer	Filament & Plate Supply	Jefferson	463-1780
V1	R.F. Tube	6K7	National Union	
V2	Mixer Tube	6K8	National Union	
V3	I.F. Tube	6K7	National Union	
V4	2nd Det. A.V.C.	6F7 Tube	National Union	
V5	Audio Amp. & Noise	6C8 Tube	National Union	
V6	Rectifier	80 Tube	National Union	



FUNCTIONAL CIRCUIT DIAGRAM
F3 RECEIVER

FIG. 1

REVISIONS:			WILCOX ELECTRIC KANSAS CITY	
			DR. BY G.E.S.	DATE 8-30-43
1.	3.	5.	CHKD. C.H.L.	SHEET
2.	4.	6.	SCALE ———	DR. NO. C325



PARTS LIST	
NO.	VALUE
C1	.01 MFD. 400V.
C2	100 MMFD.
C3	.1 MFD. 400V.
C4	.1 MFD. 400V.
C5	100 MMFD.
C6	.01 MFD. 400V.
C7	100 MMFD.
C8	.1 MFD. 400V.
C9	50 MMFD. 400V.
C10	.1 MFD. 400V.
C11	35 MMFD.
C12	100 MMFD. 400V.
C13	.01 MFD. 400V.
C14	100 MMFD. 400V.
C15	35 MMFD.

PARTS LIST	
NO.	VALUE
C16	.1 MFD. 400V.
C17	35 MMFD.
C18	100 MMFD. 400V.
C19	100 MMFD. 400V.
C20	35 MMFD.
C21	500 MMFD. 400V.
C22	250 MMFD. 400V.
C23	50 MMFD. 400V.
C24	.01 MFD. 400V.
C25	.01 MFD. 400V.
C26	.05 MFD. 400V.
C27	.1 MFD. 400V.
C28	8 MFD. 450V.
C29	8 MFD. 250V.
C30	8 MFD. 450V.
C31	20 MFD. 150V.
F1	2 AMP.
J1	1506
J2	A1
L1	ANTENNA COIL
L2	PLATE COIL
L3	GRID COIL
L4	R.F. CHOKE
L5	INPUT I.F.
L6	OUTPUT I.F.
L7	FILTER CHOKE
P1	P310AB
R1	.1 MEG. OHM 1W.
R2	400 OHMS 1W.
R3	.1 MEG. OHM 1W.
R4	100 OHMS 1W.
R5	50M OHMS 1W.
R6	25M " 1W.
R7	.5 MEG. OHM 1W.
R8	.5 " " 1W.
R9	400 OHMS 1W.
R10	1 MEG. OHM 1W.
R11	.25 " " 1W.
R12	.5 " " 1W.
R13	.5 " " 1W.
R14	.25 " " 1W.
R15	75 M OHMS 1W.
R16	.1 MEG. OHM
R17	25M OHMS
R18	.5 MEG. OHM 1W.
R19	.1 " " 1W.
R20	.5M OHMS
R21	500 " 10W.
R22	1M " 10W.
R23	3M " 10W.
R24	5M "
R25	250 " 1W.
R26	10M " 10W.
R27	5M " 10W.
S1	10
T1	T43970
T2	463-1780
V1	6K7
V2	6K8
V3	6K7
V4	6F7
V5	6C8
V6	80

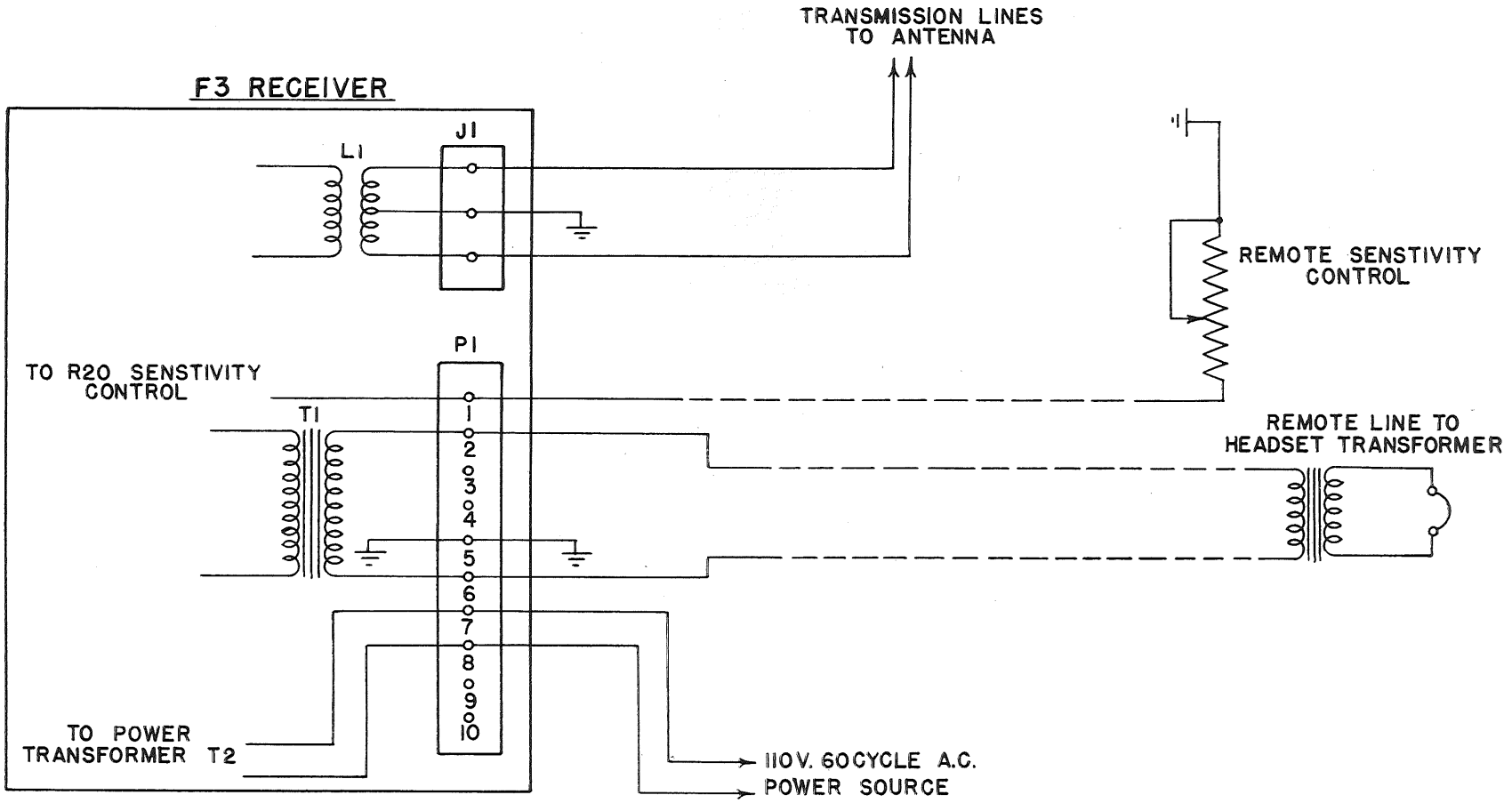
F3 RECEIVER

FIG. 2

WILCOX ELECTRIC	
KANSAS CITY	
DR. BY P.E.S.	DATE 9-3-43
CHKD. C.H.K.	SHEET
SCALE ———	DR. NO. E146

REVISIONS:

1.	3.	5.
2.	4.	6.



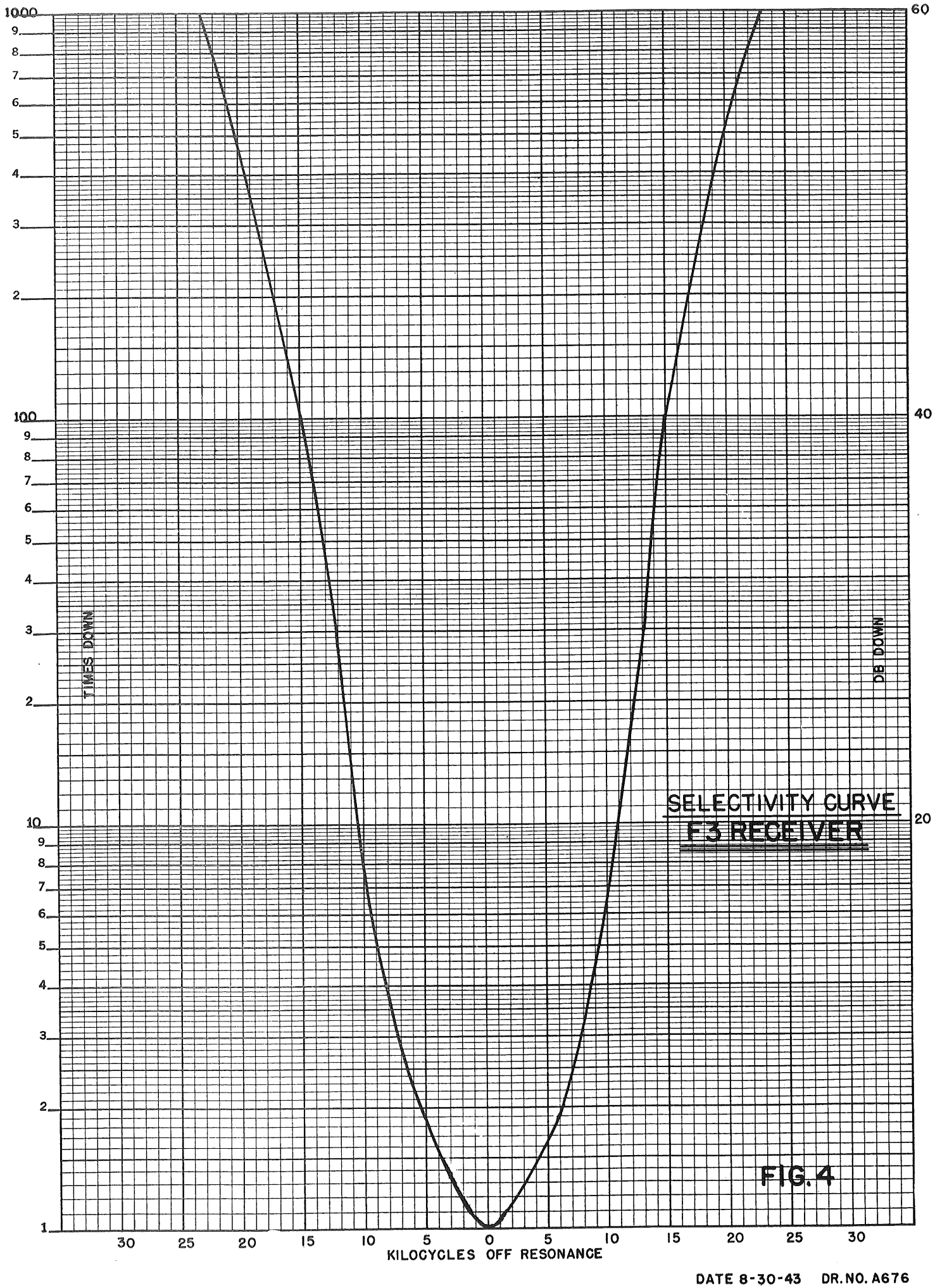
TYPICAL INSTALLATION
F3 RECEIVER

FIG. 3

WILCOX ELECTRIC KANSAS CITY	
DR. BY RCS.	DATE 9-1-43
CHKD. C.H.R.	SHEET
SCALE ———	DR. NO. C326

REVISIONS:

1.	3.	5.
2.	4.	6.



SELECTIVITY CURVE
F3 RECEIVER

FIG. 4

DATE 8-30-43 DR. NO. A676

FIG. 5
FRONT PANEL CONTROL LOCATION

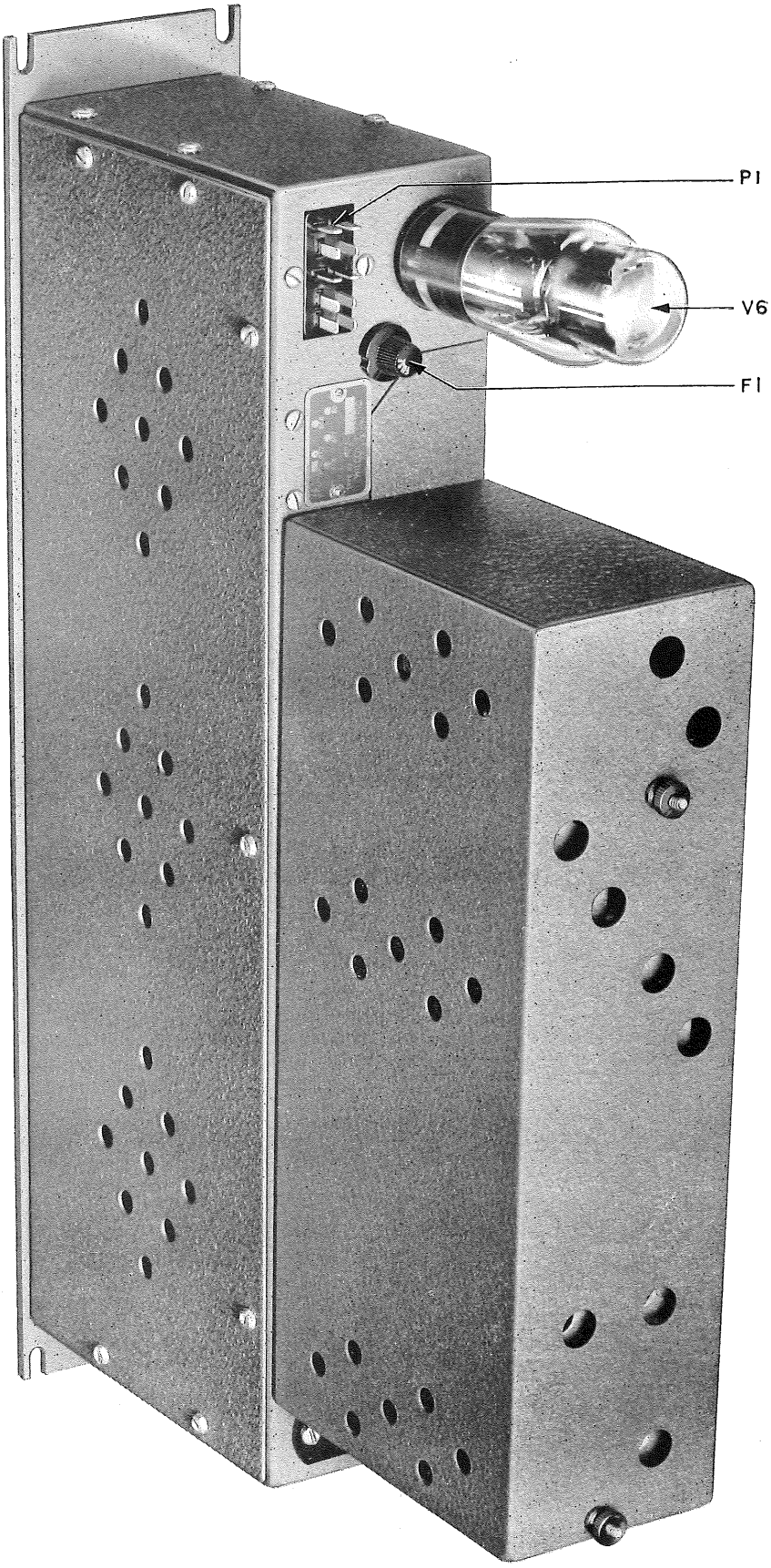


FIG. 6
REAR VIEW

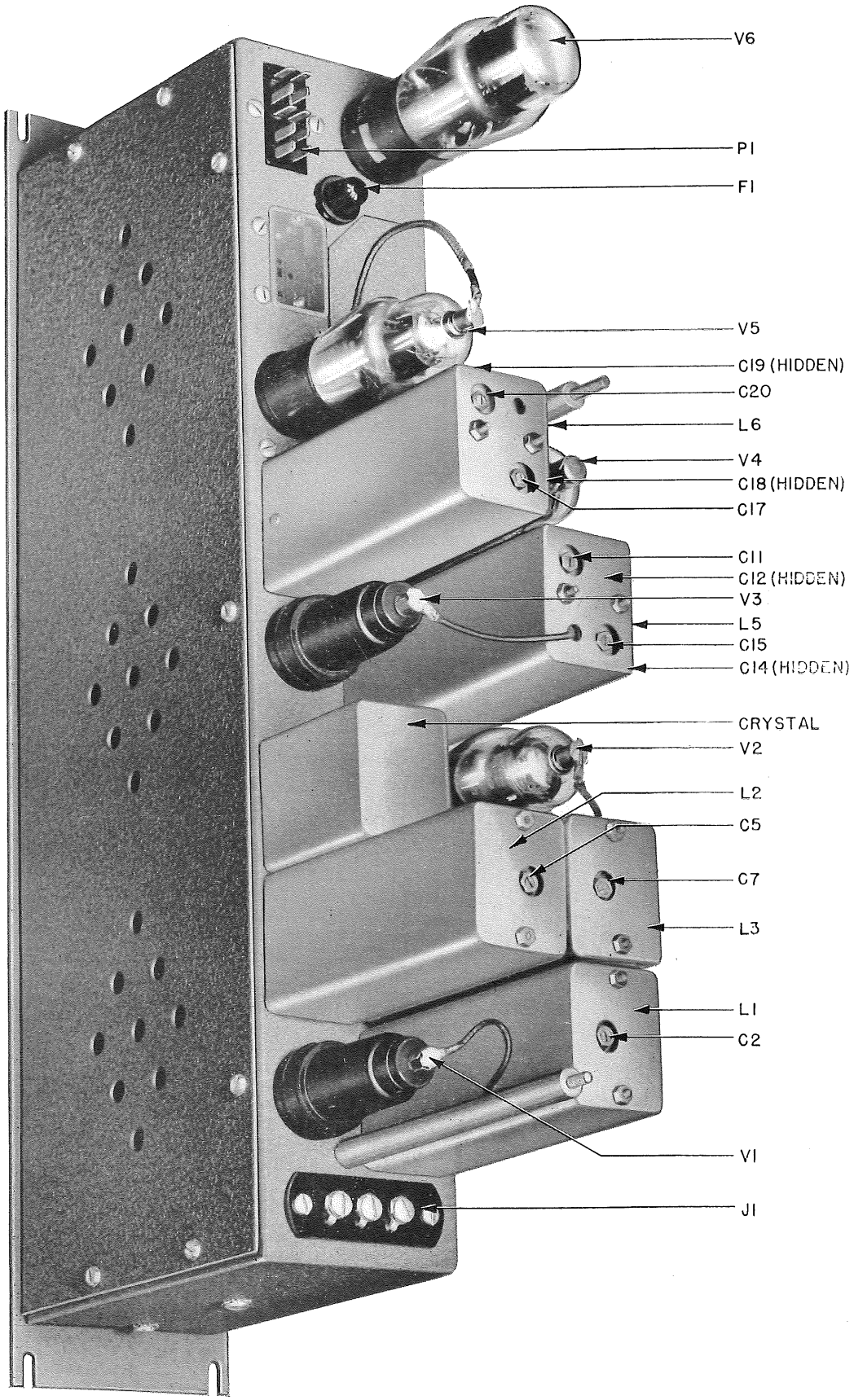


FIG. 7
REAR VIEW, DUST COVER REMOVED

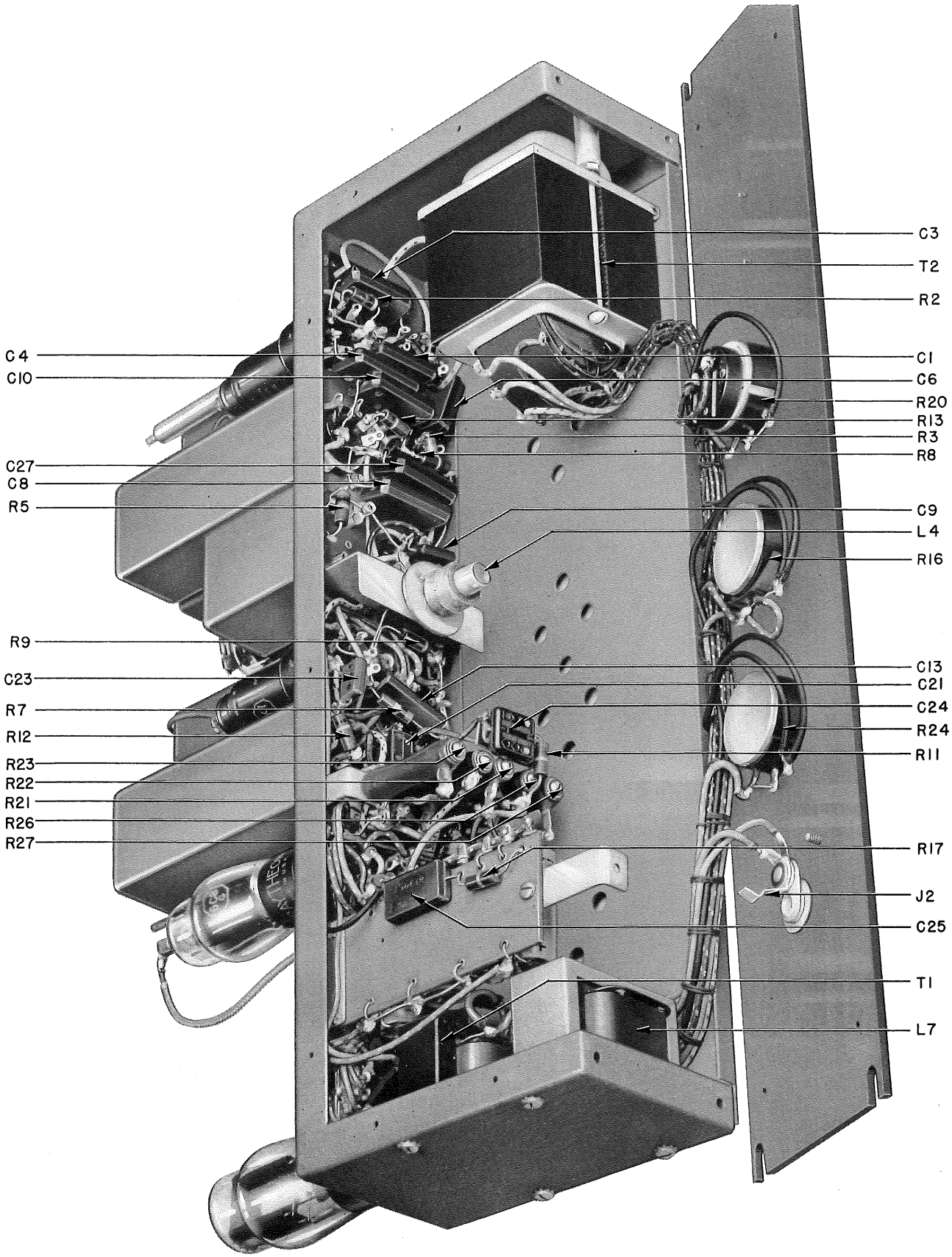


FIG. 8
TOP INTERIOR

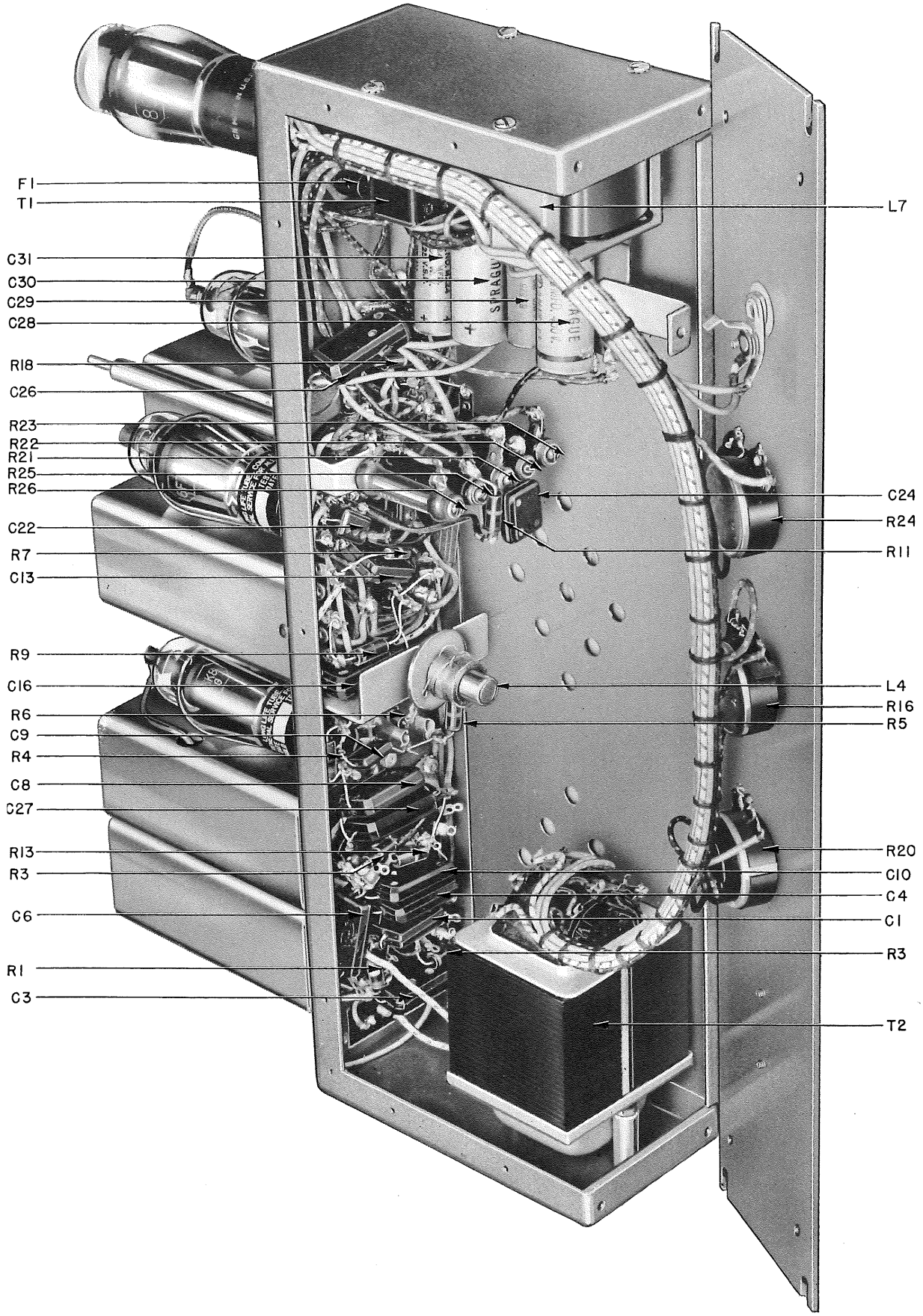


FIG. 9
BOTTOM INTERIOR

INSTRUCTION BOOK

for

RECEIVER BAY
113A

Manufactured by

WILCOX ELECTRIC COMPANY, INC.

1400 Chestnut Street

Kansas City, Missouri

113A RECEIVER BAY

The Wilcox Electric 113A Receiver Bay is a single relay rack cabinet containing eight (8) Wilcox Electric CW3 or F3 Crystal Control Receivers. The unit contains antenna terminals, audio output, and power input connectors.

1. GENERAL DESCRIPTION

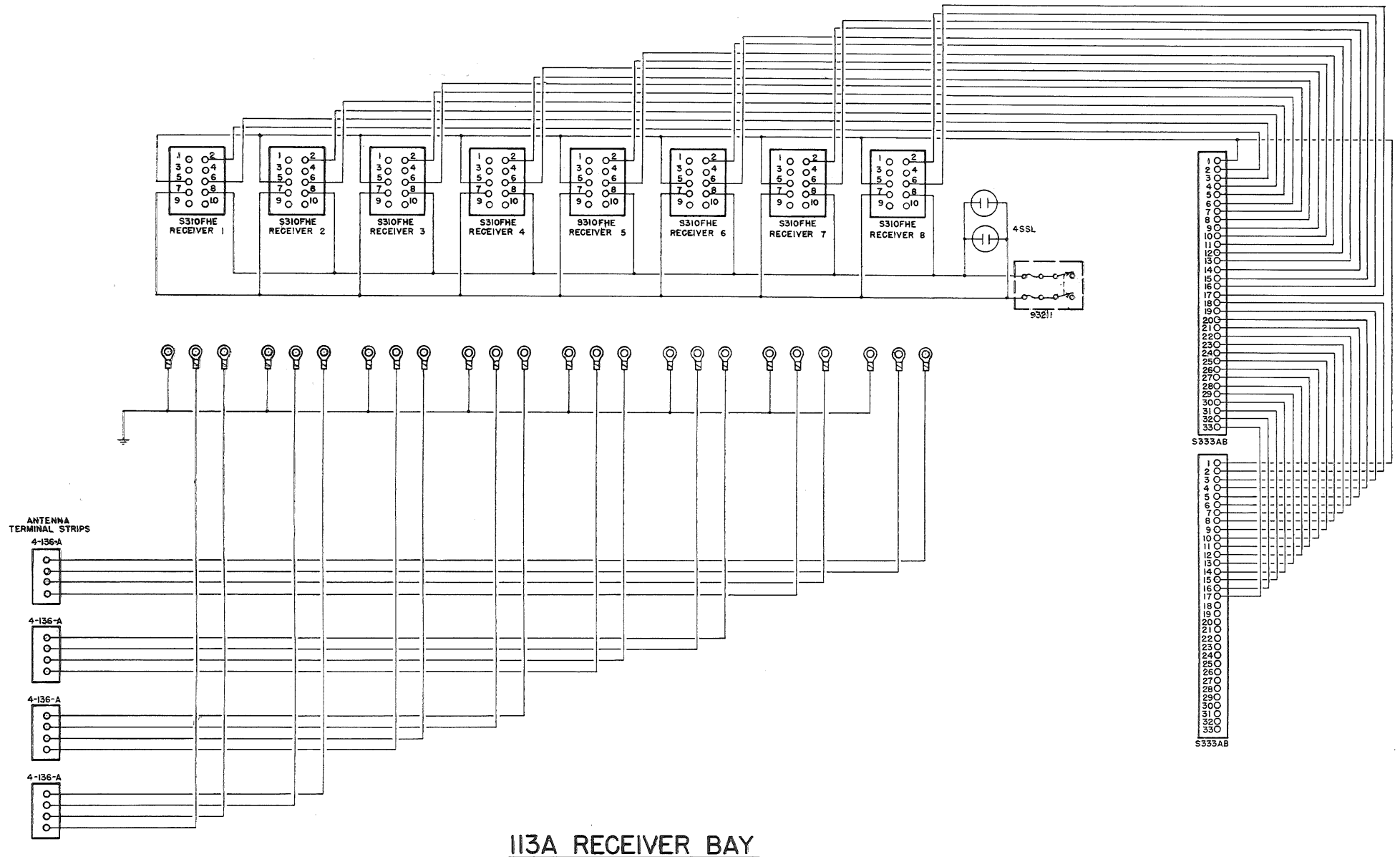
Mechanically the 113A Receiver Bay consists of metal cabinet 72″ high x 24″ wide and 17″ deep. It is designed to carry standard relay rack panels between two vertical mounting strips. Complete access to units mounted in the relay rack is possible by means of a rear access door. An air filter box and blower unit is attached to the access door. The antenna terminals are located across the top of the cabinet and are of the screw type. The audio output and control circuits are located in a Jones Plug appearing at the lower right hand rear corner of the cabinet. An additional Jones Plug is located in the lower left hand rear corner of the cabinet for connection of an additional receiver bay. The cabinet is completely wired to accept eight (8) Wilcox Electric Company CW3 Receivers or F3 Receivers. Transmission lines are provided from each receiver to the antenna terminal strip at the top of the cabinet.

2. DESCRIPTION OF CIRCUITS

The audio output of each receiver is connected to the Jones Plug by means of two wires. A common ground wire is carried from the Jones Plug to all receivers and to the antenna terminal strip. The 110 volt AC Power required is fed into the unit through a bushing in the lower rear plate of the cabinet. The AC input operates into a switch and fuse box located in the lower left hand side of the unit when viewed from the front. All AC voltage to the receivers is distributed from this fuse and switch box. A parallel wire transmission line connects each receiver to the antenna terminal strip. The antenna transmission line is located inside the cabinet on the left side of the cabinet when viewed from the rear with the access door open. The antenna transmission lines are provided with lugs for connection to the receiver. The AC power and audio output leads are connected into a Jones Plug for connection to each receiver.

3. INSTALLATION

The relay rack is provided with eight (8) 3½″ blank panels and one (1) 8¾″ blank panel. The blank panels are installed between receivers and at the top of the relay rack so as to provide adequate circulation of air between all receivers. A 3½″ panel is installed at the top of the cabinet. The receiver bay may be bolted in place by means of the four (4) holes appearing in the corners of the base plate of the cabinet. The Receiver Bay operates in conjunction with the 118A Wall Terminal Box. This box provides connection to the lines from the operators position (see Wilcox Electric CS390 Control Position Instruction Book). The Jones Plug from the 118A Wall Terminal Box is plugged into the Receiver Bay. With the lines connected it is necessary to provide 110 volt 60 cycle AC power to the cabinet and antennas for each receiver. The Receiver Bay is then ready for operation.

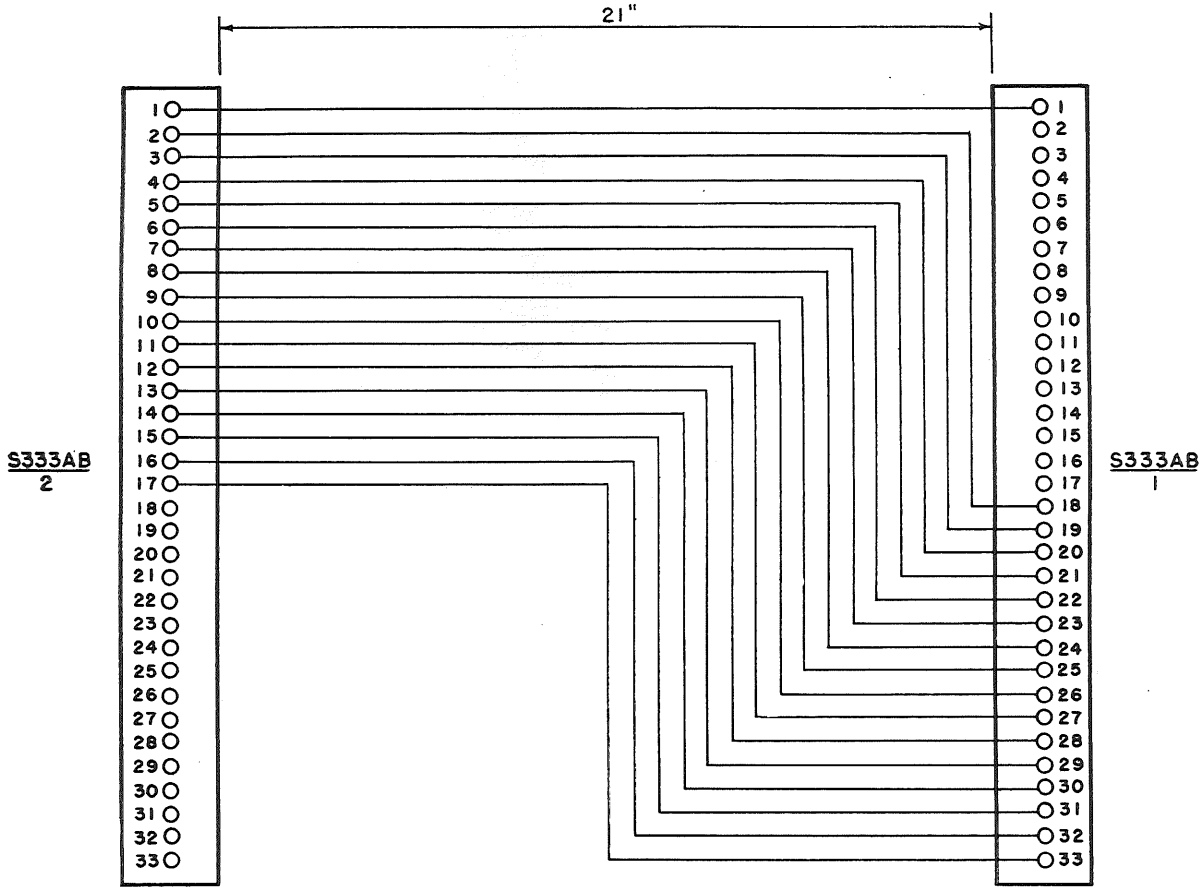


113A RECEIVER BAY

WILCOX ELECTRIC KANSAS CITY	
DR.BY. P.C.S.	DATE 8-26-43
CHKD. A.B.	SHEET
SCALE ———	DR.NO. E144

REVISIONS:

1.	3.	5.
2.	4.	6.



CABINET INTER-CONNECTING CABLE
113A RECEIVER BAY

REVISIONS:			WILCOX ELECTRIC KANSAS CITY	
			DR. BY E. J. W.	DATE 8-26-43
1.	3.	5.	CHKD. Q.P.S.	SHEET
2.	4.	6.	SCALE ———	DR. NO. C320

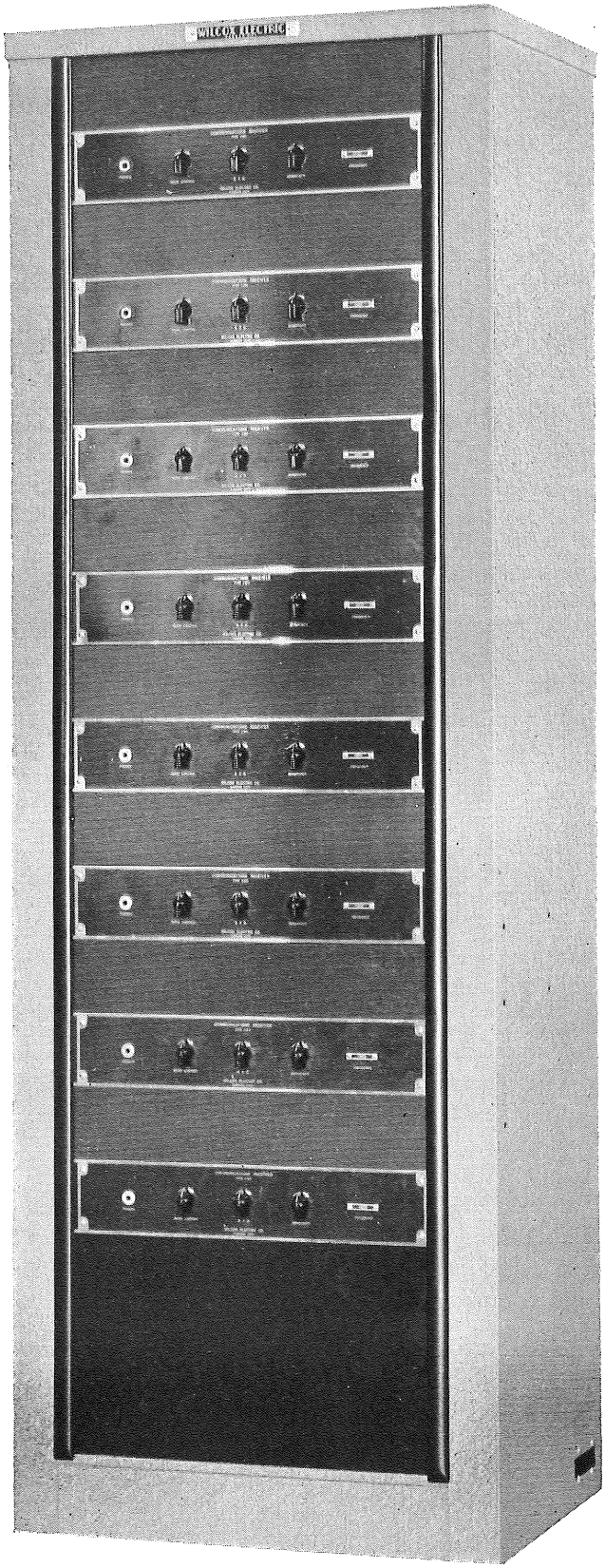


Fig. 12
113A RECEIVER BAY—FRONT VIEW

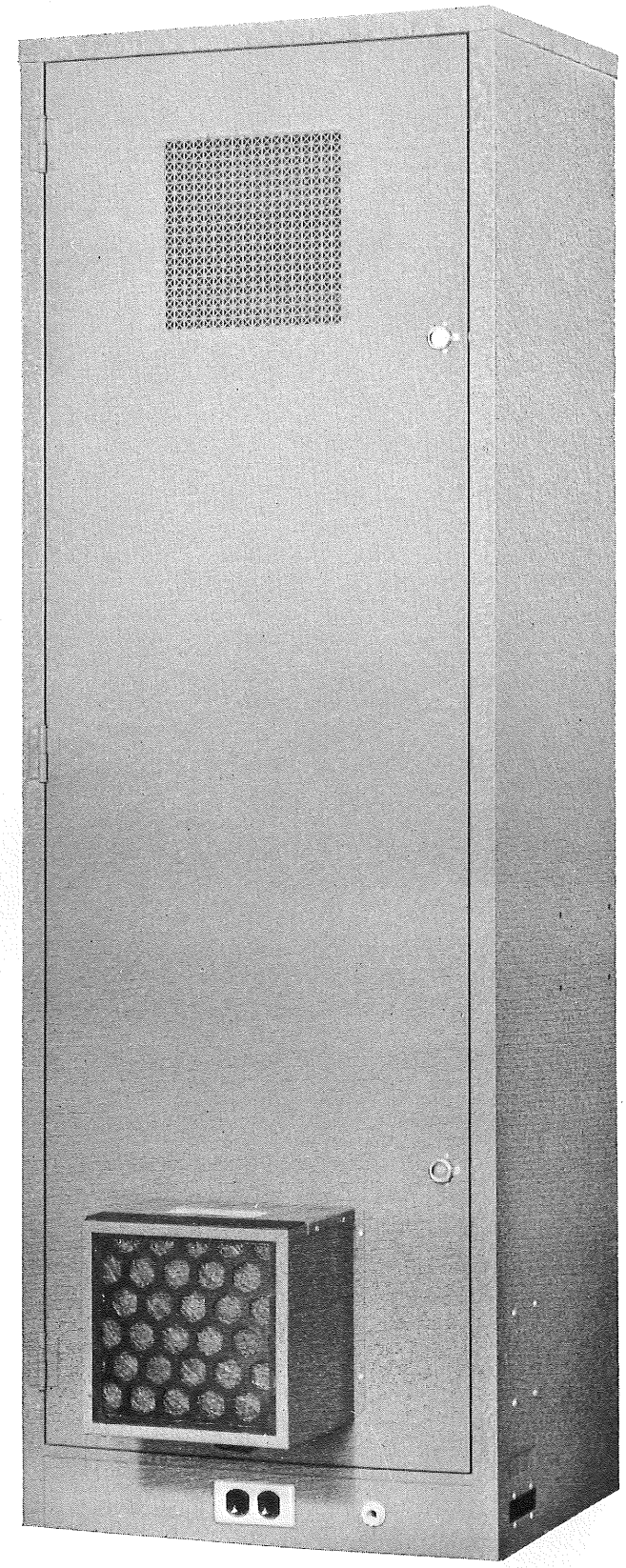


Fig. 13
113A RECEIVER BAY—REAR VIEW

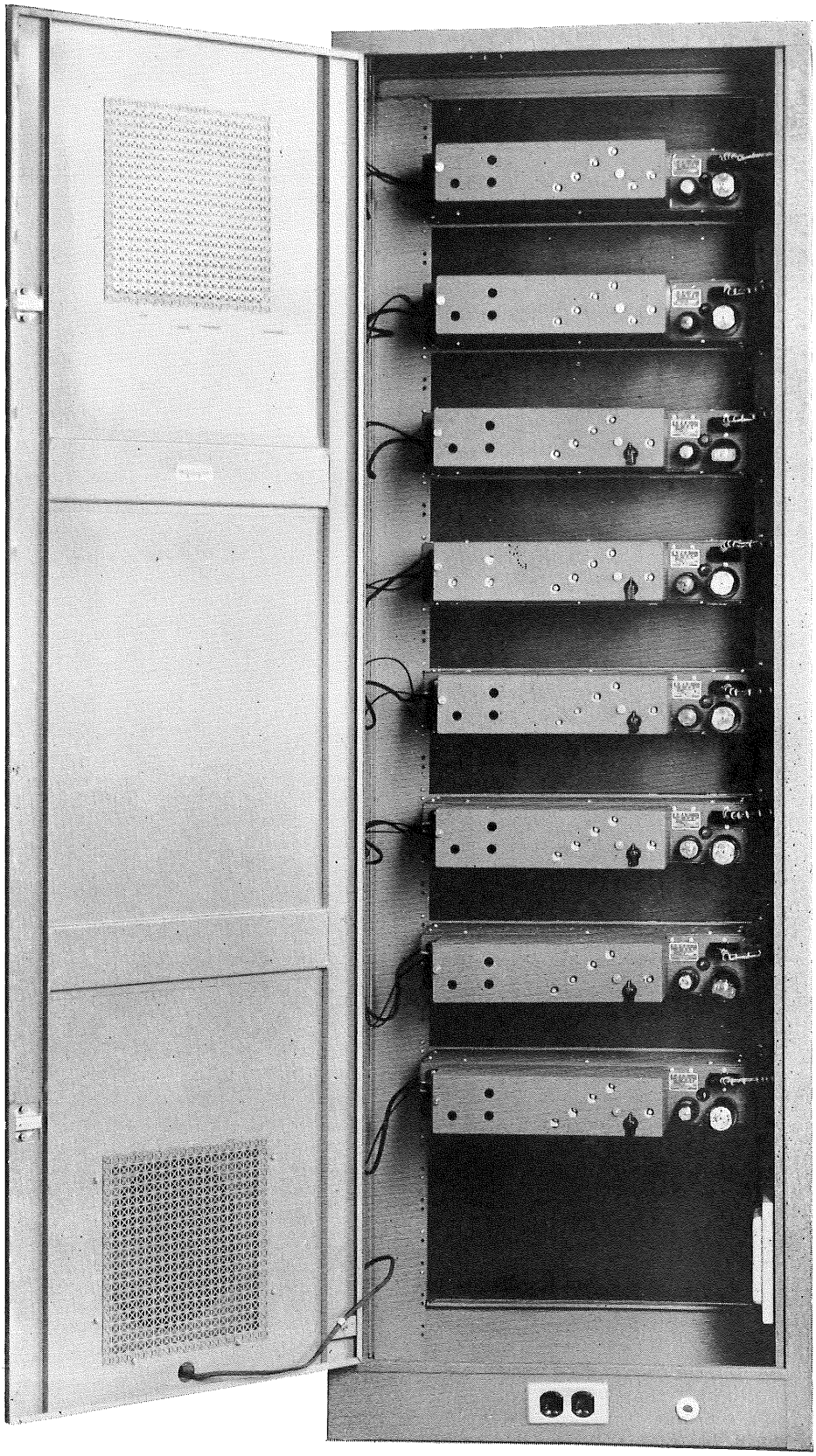


Fig. 14
113A RECEIVER BAY—INTERIOR