SECTION IV

CRV-50097

INTERMEDIATE-FREQUENCY AMPLIFIER UNIT

TECHNICAL SUMMARY

ELECTRICAL CHARACTERISTICS—

Band Widths:

1st I-F System (450 KC)	15 kc
Band-Pass Filters	1, 2, 4, 6 or 10 kc
(Choice of 3 available as selected by customer—see "EQUIPMENT")	
2nd I-F System (50 KC)	12 kc
Overall I-F Gain	25,000
Input Voltage (minimum)	200 microvolts
Output Current	0.5 ma
Output Impedance	10,000 ohms

TUBE COMPLEMENT—

450-KC I-F Amplifiers	2 RCA-78
400-KC Oscillator	1 RCA-37
Converters	3 RCA-78
Isolation Tubes	3 RCA-78
50-KC I-F Amplifiers	3 RCA-78
Diode Detectors	2 RCA-37

Monitor Channel:

Coupling	1 RCA-78
Oscillator	1 RCA-37
Detector	1 RCA-78
Output	1 RCA-37

MECHANICAL SPECIFICATIONS—

Dimensions:

Panel Size	19 inches (width) x 27 31/32 inches (height)
Unit Depth	9¼ inches
Weight (net)	85 pounds

DESCRIPTION

The intermediate-frequency amplifier unit is an assembly specifically designed for use in diversity receiving equipment. Its primary purpose is to provide the selectivity required for best reception of telegraph or telephone transmission. Amplification is performed at two frequencies chosen to obtain: First, sufficiently high r-f and i-f image and harmonic-point response ratios; second, practical attainment of the required range of band width; and third, the best selectivity characteristics possible. In this unit are contained the following circuits which comprise the complete i-f system of one receiver:

1. First i-f system.
2. Frequency converter stage.
3. Band-pass filters.
4. Isolation amplifier.
5. Second i-f system.
6. Diode detector.
7. Monitor channel.
8. Auxiliary 50-kc output.

These various portions of the circuit will be treated separately in the following paragraphs:

FIRST I-F SYSTEM

The first i-f system used in this unit comprises an input circuit broadly tuned to 450 kc and two stages of band-pass filter coupled amplification. These latter operate with fixed bias and have an overall voltage gain of approximately one to one. their purpose being to provide selectivity without amplification. The nominal band width of this system is 15 kc, centering around a mid-band frequency of 450 kc.

The mid-band frequency of the system (450 kc) is high enough to give the required protection against image and harmonic-point responses when used with the r-f amplifier unit supplied in the diversity receiver. Its band width of 15 kc is slightly greater than the widest overall band width required to allow for slight variations in the frequency of the heterodyne oscillator which supplies excitation to the frequency converter stage. Sufficient selectivity is provided to give the required i-f image and harmonic-point response ratios.

FREQUENCY CONVERTER STAGE

This stage comprises a mixer (or converter) tube and a 400 kc oscillator. Frequency conversion from 450 kc to 50 kc is accomplished in the plate circuit of the mixer tube where the 450 kc signal is combined with the output of the 400 kc oscillator. The resulting 50 kc signal is fed through a band-pass filter to the input of an isolation amplifier.

The mixer tube is supplied with suitable bias and screen voltages and with the proper excitation from the 400 kc oscillator to obtain essentially linear modulator action. This means that the difference—frequency output will be directly proportional to the first i-f input and that a minimum of distortion and harmonics will be generated in this stage. The necessity for this can best be explained by means of an example.

Any signal producing a 425-kc first i-f signal out of the r-f heterodyne detector would produce a 25-kc beat with the 400-kc i-f oscillator signal. Harmonic generation in the mixer tube would give a second harmonic of this 25-kc fundamental which would be 50 kc. This latter signal would then go through the second r-f amplifier and interfere with the desired signal. Suppression of such harmonic-point responses requires a reasonable amount of discrimination against the 425-kc frequencies in the first i-f system and a low harmonic content in the output of the mixer or converter tube.

Three converter tubes are used in the frequency converter stage, one for each band-pass filter channel of the 50-kc system. The control grids of all three are supplied with the 450-kc signals from the last stage of the first i-f system. Excitation for the suppressor grid of all three is supplied by a 400-kc oscillator. The plate of each converter tube connects directly to its corresponding band-pass filter. Energizing the heater of one converter tube at a time thus results in the 50-kc signal being supplied to only the desired band-pass filter. Switching of these tube heater circuits is accomplished by means of the three-position switch located on the front panel of the unit.

BAND-PASS FILTERS

Before describing the band-pass filters and the second i-f system, it should be appreciated that these circuits work together to provide the final selectivity which determines the overall selectivity of the receiver (disregarding overloading). These circuits provide no gain; the overall losses in the band-pass filters are balanced by the conversion gain in going from 450 kc to 50 kc.

The i-f amplifier units used in this diversity receiver provide a choice of three band widths as selected by the customer from five alternatives (1, 2, 4, 6 and 10 kc) to best meet the service conditions. These band widths are determined by the band-pass filters, each of which is a complete and interchangeable sub-assembly within the unit. The 1, 2, and 4 kc filters are generally used for telegraph operation.

Each band-pass filter is a composite filter structure consisting of two "m-derived" sections combined with three inductively coupled, or tuned, transformer sections. The "m-derived" sections each have the two suppression circuits in their series arms accurately tuned to specified frequencies of maximum attenuation outside the pass band. This produces the peak cutoff shown by the frequency characteristics of Figure 1. The tuned transformers provide the additional attenuation required at frequencies outside the peak attenuation frequencies of the "m-derived" sections and also step down or up from the internal impedance of the filter to the desired terminal impedance. Since the various filters all have the same value of terminal impedance and each filter contains its own terminating resistors, the filters are electrically interchangeable.

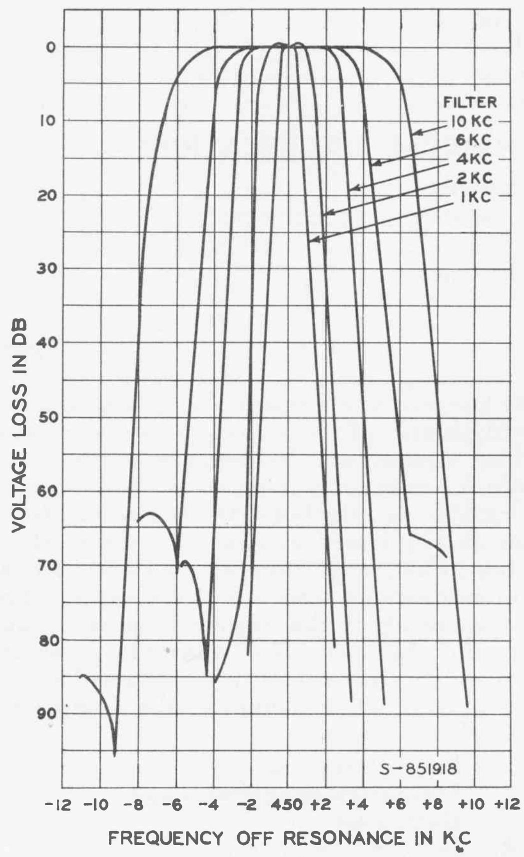


Figure 1—Type CRV-50097 Intermediate-Frequency Amplifier Unit (Overall Selectivity Characteristics, S-851918—Sub. 0)

ISOLATION AMPLIFIER

In order to maintain proper terminal impedance at the output of the band-pass filters each of these filters feeds into a tube which is called an isolation amplifier. Since only one of these tubes can be active at any given time, their plate circuits are connected in parallel. The position of the "BAND WIDTH" switch controls the connection to the heater circuits of the isolation amplifier and mixer stage tubes, only one of each being energized at any given time.

SECOND I-F SYSTEM

The second intermediate-frequency (50 kc) amplifier system follows the isolation amplifier stage. Three transformer-coupled amplifier stages, having a nominal band-width of 12 kc, are used in this system. Each stage in the system provides a gain of slightly more than ten. The overall gain may be manually adjusted to the desired level by means of the "GAIN" control which is located adjacent to the "BAND WIDTH" switch at the upper left of the front panel.

be obtained from a single diode. Successful filtering of the output is then much more easily accomplished than would be possible at 50 kc. The diode driver transformer works from the third 50-kc amplifier into two type 37 tubes connected as diodes in a push-pull circuit. The bifilar construction of the secondary coil which supplies the diodes insures well-balanced operation of the push-pull arrangement. This system is designed to work into a 10,000- to 13,000-ohm resistance load and to deliver a normal output current of 1.2 milliamperes maximum. This corresponds to 100 per cent. modulation of the normal 0.5 to 0.6-milliampere rectified output on the carrier of a phone signal. The average frequency-response characteristics of the band-pass filters are shown in Figure 2.

MONITOR CHANNEL

This channel provides an audible signal for monitoring purposes. Such purposes include tuning, checking interference on all types of transmission, and aural copy of telegraph signals. The system consists of (1) a coupling tube and transformer, (2) a heterodyne detector, (3) a 50 kc oscillator, and (4) an audio-frequency output stage.

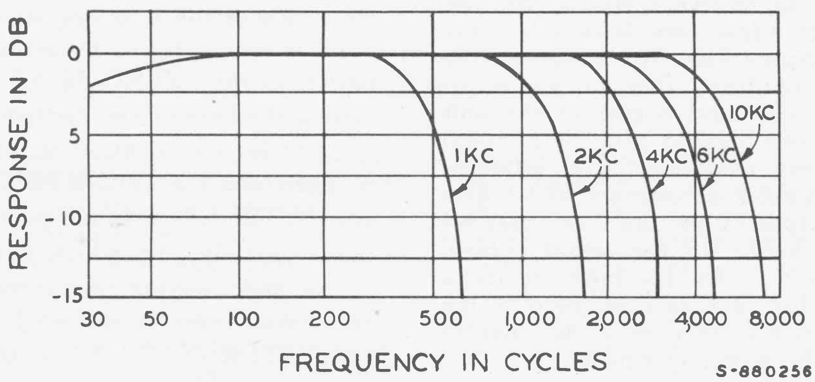


Figure 2—Type CRV-50097 Intermediate-Frequency Amplifier Unit (Overall Fidelity Characteristics, S-880256—Sub. 0)

DIODE DETECTOR

Final detection of the second (50 kc) i-f signal is accomplished by the use of diode rectifiers (triodes connected as diodes). The input output characteristic provides for a rectified output which is proportional to the signal input except at very low values of input and at values above the overloading point. As a result, there is negligible distortion of modulation. Diversity receiving equipment must often handle modulation frequencies up to 5,000 cycles at a second intermediate frequency of 50 kc. The ripple on the rectified output must be smoothed or filtered out if the receivers are to be used in diversity combination with entire freedom from beat-notes between the i-f signals of the three receivers. The use of a push-pull connection of two diodes reduces this filtering problem since the resulting ripple frequency has a fundamental twice that which would

Signal voltage at 50 kc is taken from the diode circuit, passed to a coupling tube called the auxiliary output amplifier and thence goes to the heterodyne detector. The purpose of the coupling tube is to prevent any audio-frequency voltage present in the diodes, or in their output circuit, from getting through to the monitor output. This is necessary when receivers are to be used in diversity combination.

At the heterodyne detector this monitoring output is mixed with the output of the 50 kc monitor oscillator. The frequency of this oscillator should be accurately adjusted to the mid-band frequency of the second intermediate-frequency system so that when zero beat with the desired signal is obtained an indication that the latter is properly centered in the pass-band of the intermediate-frequency amplifier unit is obtained. Two fixed settings of the monitor oscillator frequency are provided, one for zero beat adjustment for centering the signal and the other shifted approximately one kc to obtain an audible beat-note signal for monitoring and all copying. Oscillator switching may be affected by operation of the "AF-BEAT", "ZERO BEAT" toggle switch which extends through an opening near the bottom of the front panel.

The circuit design, filtering, and shielding of such a system must be such as to prevent any possibility of interference from either the beat oscillator or the beat-note output signals with the main signal output. The design followed in this unit insures freedom from such cross-talk whether used in single receivers or in receivers of one or more diversity receiver groups.

Audio output from the monitor detector tube is obtained across an audio choke connected in its plate circuit. Monitor volume may be adjusted by operation of the "MONITOR OUTPUT" control, the knob of which extends through the front panel.

The monitor output tube is transformer-coupled to a 600 ohm line which leads to the appropriate jacks on the signal control panel.

AUXILIARY 50-KC OUTPUT

Provision has been made for obtaining a 50-kc output signal from the coupling stage of the monitor channel. This signal is available at terminals on the rear of the unit and can be used to supply various sorts of auxiliary devices, such as equipments for providing automatic control of frequency of either the r-f or first i-f heterodyne oscillator. This output is not used in the standard diversity receiving equipment.

OPERATION

Operation of the i-f amplifier unit has been covered in fairly complete detail under Section I which describes the operation of the entire system. In setting up to receive a signal, the first and most important adjustment is to select the most suitable band-pass filter by means of the "BAND WIDTH" control. This control is located in the upper left-hand corner of the unit and has three positions marked with the nominal widths of the filters available. The adjacent "GAIN" control enables adjustment of i-f gain and thus of the output of the unit, as observed on the associated meter on the signal control panel (see Section V). On the latter panel, a meter is provided for each receiver used in the diversity group, and it is very important that all three meters shall be swinging equally.

The only other controls on the i-f amplifier unit are associated with the monitor channel and are located near the bottom of the front panel. Centering of the incoming signal within the pass-band is accomplished by setting the small toggle switch in the "ZERO BEAT" position and adjusting the heterodyne oscillator of the r-f amplifier unit for zero beat, using a pair of headphones plugged into the "MONITOR" jack. The opposite "AF-BEAT" position provides a beat-note of approximately 1 kc, which may be used for monitoring and copying. Convenient adjustment of the aural level is afforded by means of the "MONITOR OUTPUT" control.

SERVICE

In the case of failure within the i-f amplifier unit, reference should first be made to "Maintenance" in Section I. The proper method for location of the defective part is outlined therein and the following paragraphs therefore will cover only instructions for replacement and subsequent adjustment.

REPLACEMENTS

As a general rule, replacement of defective parts should be made only with spares that are electrically equivalent to the original parts. Where such spares are not available, however, emergency repairs should be effected in the best manner possible. Access to all a-f and i-f filtering, power-supply circuits and terminals, and input and output terminals is from the rear of the unit. An important operating precaution is that the screws which fasten the shield cans and by-pass capacitors in place shall be kept tight. It is advisable to check the tightness of such screws when other work is being done on the chassis.

Tuned Circuit Assemblies: Removal of tuned transformers, or other similar assemblies, from their rectangular shielding cans is accomplished as follows: In the rear of the unit, unsolder all wires that pass through the chassis from the can in question. Then, from the front of the unit, remove the four screws at the corner of the can cover. A "U" shaped can cover puller is attached to the interior of the intermediate-frequency amplifier case by means of clips. Using this device (if necessary) remove the cover and the attached assembly from the can. To replace the assembly, a six-inch piece of varnished cambric tubing (spaghetti) is first slipped on to each group of wires that pass through a hole in the bottom of the can. The necessary spaghetti is attached to the interior of the intermediate-frequency amplifier by means of clips. After the wires have been passed through the hole or holes in the bottom of the can the spaghetti should be removed and the wires connected to the proper terminals.

Band-Pass Filters: To detach any band-pass filter, it is merely necessary to unsolder three connections and remove four screws, all at the rear of the unit. The complete assembly may then be lifted out from the front.

Litz Coils: Litz coils used in tuned transformers, band-pass filters and oscillator circuits seldom develop trouble. When suspected, their resistance should be checked with a resistance bridge or an accurate ohmmeter. If the resistance differs from the specified value by more than ten per cent., the coils can safely be considered defective. The most common cause of trouble is broken strands at the soldered ends.

Litz wire must be very carefully cleaned before soldering. A small piece of very fine emery cloth may be used to clean off the silk and enamel insulations. Care must be exercised, however, not to use enough pressure as to break the fine strands. Replacement of defective Litz coils must be made only with spares of the correct type as specified in the parts list.

ADJUSTMENTS

The method of checking frequency characteristics and realigning described under "Maintenance" (Selectivity and Overall Fidelity) in Section I is the only one that can be used by most stations. It is chiefly useful as a check on the overall performance of the i-f amplifier unit and in tuning the input circuit of the unit. As a method for realignment of a complete i-f amplifier unit, it is not recommended. It can, however, be used successfully for realigning a single tuned transformer which is known to be out of adjustment, or which requires retuning because of repairs or replacement of coils or capacitors.

Trimmer capacitors on all tuned circuits are of the locking type. The locknuts on the shaft bushing must be loosened before an attempt is made to adjust the condensers. After readjustment, the locknuts should again be tightened.

Input Circuit: This assembly is located in the rear of the i-f amplifier unit. It must be tuned when the equipment is first installed and also whenever the unit is used with a different r-f amplifier unit. For this purpose a steady carrier signal, preferably from a test oscillator or signal generator, should be tuned in through the complete receiver. With the signal adjusted for zero beat in the i-f monitor output, the input circuit assembly should be tuned to obtain maximum rectified output.

First I-F (450-KC) Transformers: The tuning of these double transformers ordinarily should not be disturbed unless equipment is available for definitely checking the frequency characteristics, or in the event that repairs are necessitated by failure of coils or other parts. Failure of coils while the equipment is in normal service will be a rare occurrence. If it should be necessary to replace a coil, it is preferable to install a complete new assembly of two coils on their supporting rods rather than to attempt to replace a single coil on the original assembly. The reason for this recommendation is that accurate determination of proper coil spacing is a factory or laboratory job. The tuning of one of these double transformers in the field can be accomplished by any of the following four methods:

(a) In the first and general method, disconnect the questionable transformer from the circuit by removing the preceding tube and connecting its grid-lead to the tube of the following stage. The overall frequency characteristic is then taken under this condition. The questionable stage is then replaced in the circuit and the overall frequency characteristic again checked. The tuning of the questionable transformer is adjusted to give an overall characteristic which is at least as symmetrical and selective as that obtained without this transformer in the circuit. This method is the simplest but the least satisfactory.

(b) An alternative method is to convert the tube position immediately following the transformer under test for use as a vacuum-tube voltmeter by supplying it with bias from an external source and connecting a 0 to 50 microammeter in its plate circuit. A type 77 tube should be used in this position. Input signals must then be supplied from a signal generator or other calibrated oscillator which has essentially uniform output over the frequency range of 435 to 465 kc. The transformer tuning adjustments, one in each end of the transformer shielding can, are set to obtain a characteristic of output versus frequency which is symmetrical around the mid-band frequency of 450 kc and which is reasonably flat-topped and of the required width of 15 kc. In making this test, care must be taken not to overload the tube.

(c) The arrangement of method (b) may be used to supply a cathode-ray oscillograph, the 450-kc test oscillator being equipped with a motor-driven variable condenser with which there is associated a sweep voltage generator. This method is more rapid but less accurate than that of (b).

(d) An auxiliary amplifier with a mid-band frequency of 450 kc and a flat band width of at least 30 kc is substituted for the transformer in the plate circuit of the tube following the transformer under test. This auxiliary amplifier may supply either a vacuum-tube voltmeter (bias or diode type) or a cathode-ray tube, or both. The use of such an auxiliary amplifier with diode voltmeter is to be recommended if there is sufficient test work of this sort to warrant its construction.

Band-Pass Filters: The only occasion for disturbing the band-pass filters is to substitute another assembly, for one of the units originally furnished, to obtain a different band width. These filters have been permanently adjusted at the factory with special shielding fixtures and test equipment. Repair or retuning should not be attempted.

Second I-F (50-KC) Transformers: The tuning of these transformers ordinarily should not be disturbed unless suitable equipment is available for definitely checking the frequency characteristics; or in the event that repairs are necessitated by the failure of coils or other parts. Replacement of coils preferably should be made only be replacing the entire coil and magnetic core assembly with a complete new assembly, since correct adjustment of coil spacing is generally either a factory or laboratory job. In retuning one of these transformers, the use of a cathode-ray oscillograph (with a sweep oscillator) is recommended only as an aid in obtaining the initial adjustment.

The method for retuning one of these transformers is as follows: Test signals should be supplied from a calibrated oscillator or signal generator having substantially constant output over the frequency range of 40 to 60 kc. The output circuit of this source should preferably be a resistance network having an output impedance of not more than 600 ohms. This should be connected through a mica blocking condenser of at least 0.01 mfd. capacitance to the grid of the tube preceding the transformer to be tested. The grid lead from the transformer under test is connected to the grid of the last 50-kc stage tube (diode driver). The frequency of the test signal is best determined with reference to that of the 50-kc heterodyne oscillator in the i-f monitor system by determining the frequency of the beat-note heard in the i-f monitor output. This is done by comparing it with tone from a calibrated a-f or beat-frequency oscillator. The frequency characteristic of the transformer under test is then determined in terms of output (for constant input) versus kilocycles above and below mid-band. If the signal generator is equipped with calibrated output meter and attenuator, it is better to make final test by adjusting the input to give standard ouput of 0.5 milliampere in a diode load of 10,000 ohms resistance. Transformer tunings are adjusted to give a symmetrical and flat-top characteristic.

Oscillators: To check or readjust the frequency of either oscillator in the i-f amplifier unit, an accurate frequency standard should be used. If such a standard is not available, the questionable oscillator should be checked against one known to be satisfactory in another i-f unit. If possible, three such checks on different units should be made and the average used. This method should be quite reliable.

The best way to check the frequencies of these oscillators is by the use of an auxiliary test oscillator, the frequency of which can be accurately adjusted to either 50 or 450 kc. After the 50-kc oscillator in the monitor system of the i-f unit has been checked and adjusted, the 400-kc oscillator may be checked by use of the 450-kc test signal. Excitation supplied to the frequency converter and heterodyne detector tubes can be measured only with a vacuum-tube voltmeter having a low value of input capacity. The excitation should be from 14 to 18 volts peak value and adjustment can be accomplished only by changing the spacing (coupling) between the outer coils of a three-coil assembly used in the oscillator circuit. Any such change will require subsequent readjustment of the frequency. In case it is necessary to remove or replace an oscillator coil assembly or coil, care must be taken to maintain the original direction of winding and polarity of connection of the plate and grid coils. If this is not done, proper performance and output of the oscillator will not be obtained.

DIODE DRIVER AND AUXILIARY OUTPUT (T50A) TRANSFORMERS

These two transformers are electrically identical except for values and arrangement of the terminating resistors. Corresponding components, parts and sub-assemblies of both therefore can be used interchangeably.

NOTICE OF ALTERNATE CONSTRUCTION

In some equipments the 65-100 mmfd trimmer capacitors (C301 to C304 in T450-1, C305 to C308 in T450-2, C362 in the diode driver circuit, and C367 in T50-A) are in a unit assembly; in other equipments the necessary fixed and variable capacitance is obtained by connecting a silvered mica capacitor (47 mmfd ±10%, RCA Dwg. P-722000-565) in parallel with a variable capacitor (50 mmfd, RCA Dwg. M-417042-7). The electrical circuits and the functioning of the equipment are the same in either case.

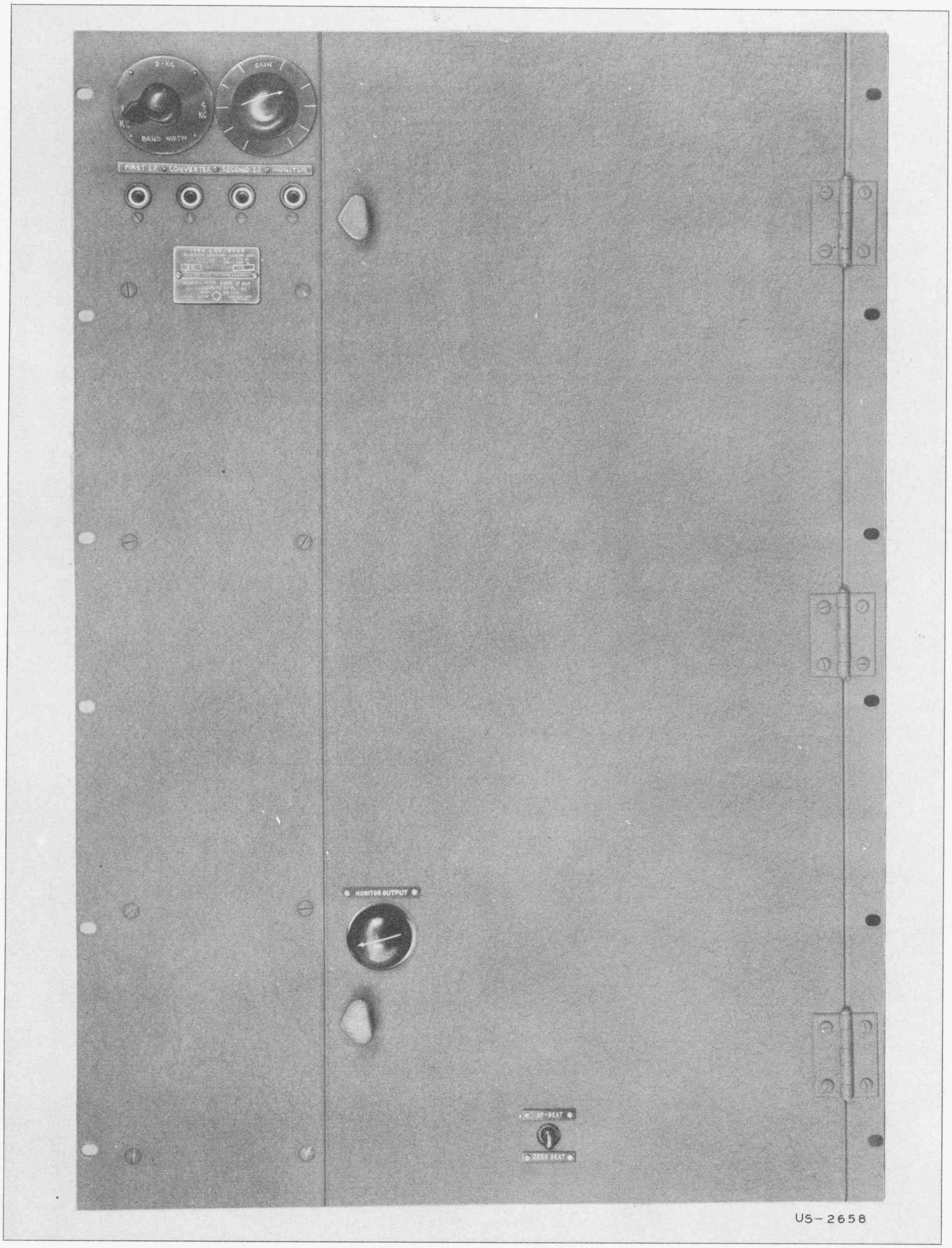


Figure 3—Type CRV-50097 Intermediate-Frequency Amplifier Unit (Front View, Tube Access Door Closed)

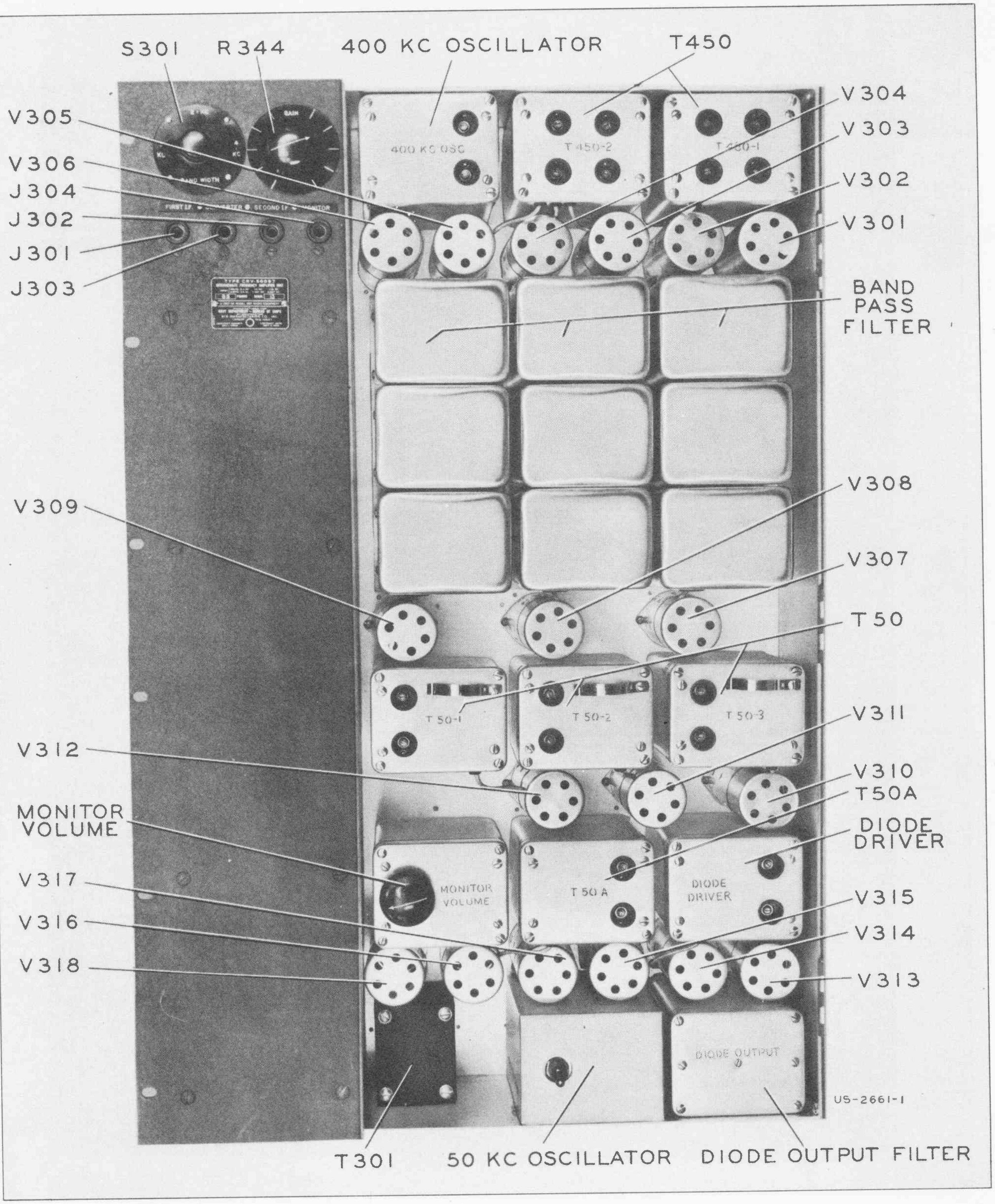


Figure 4—Type CRV-50097 Intermediate-Frequency Amplifier Unit (Front View, Tube Access Door Open)

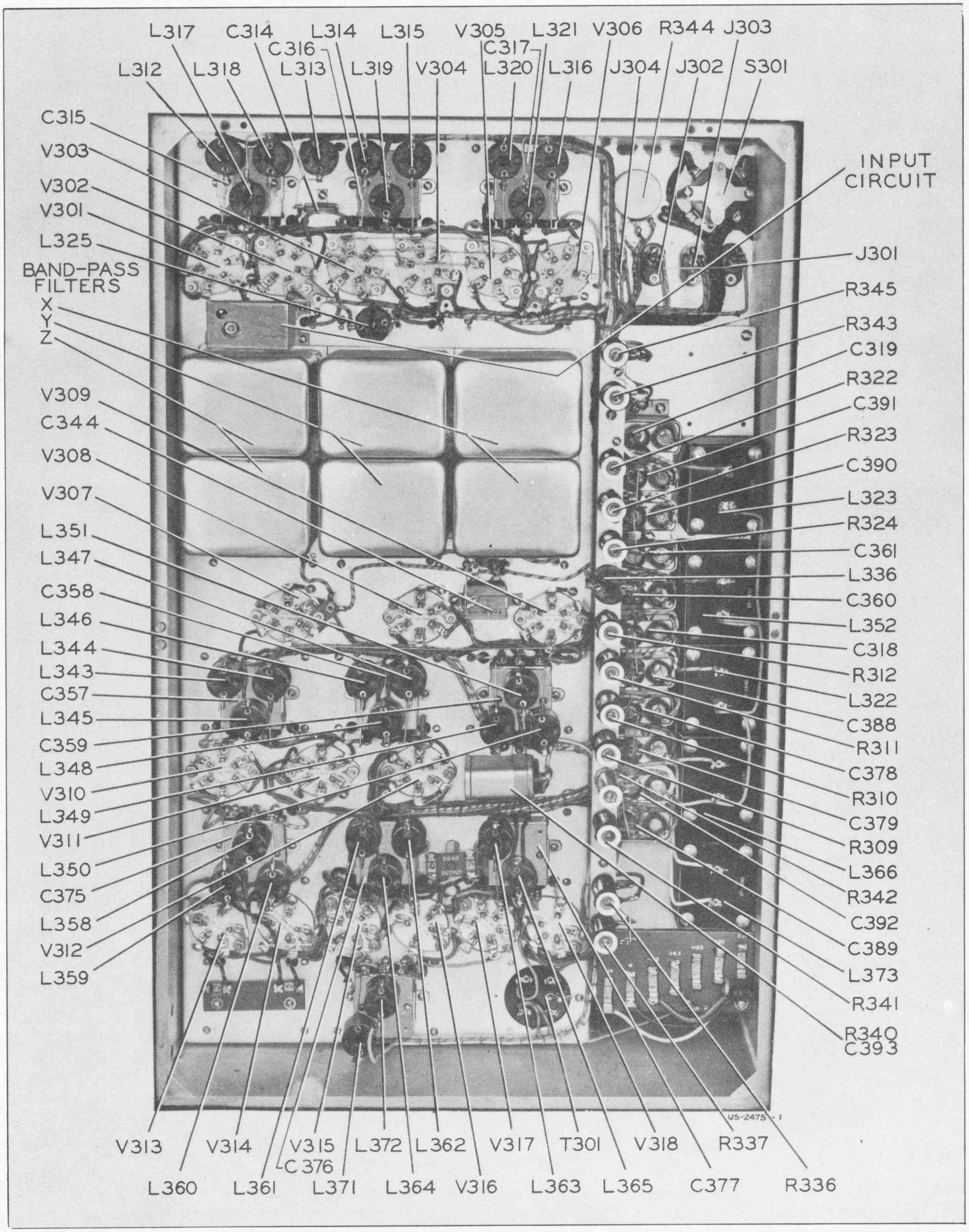


Figure 5—Type CRV-50097 Intermediate-Frequency Amplifier Unit (Rear View, Cover Removed)

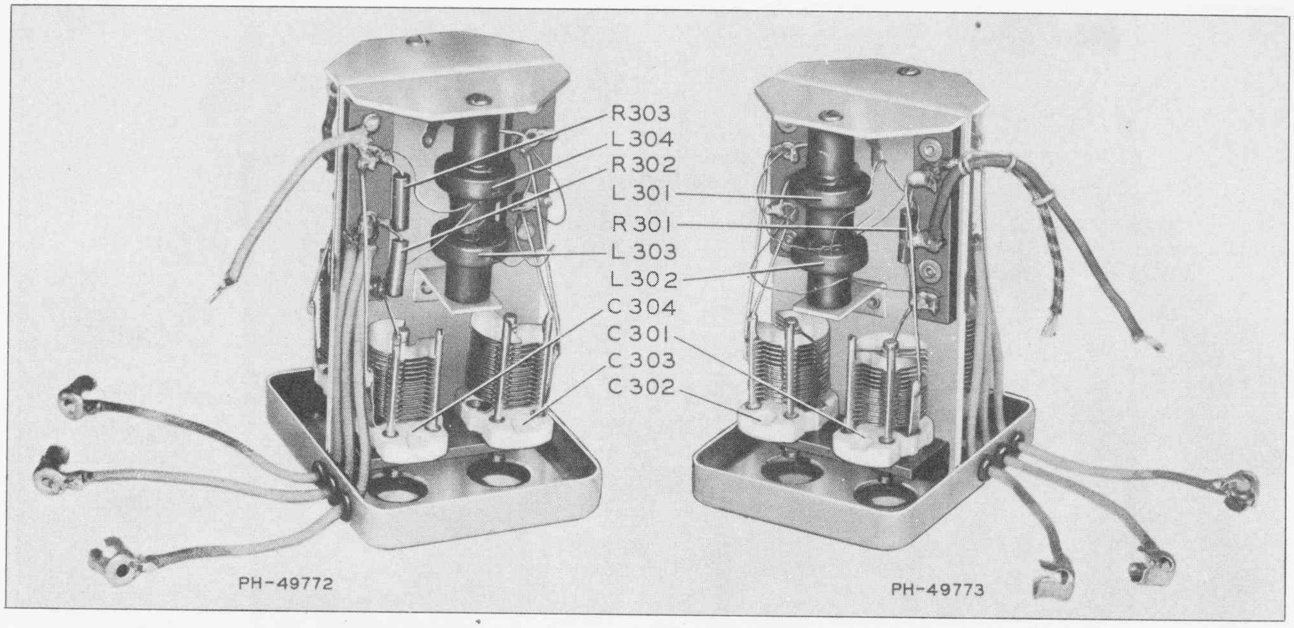


Figure 6—Typical Circuit Assembly (First Stage, 450 KC Section, Front and Rear Views)

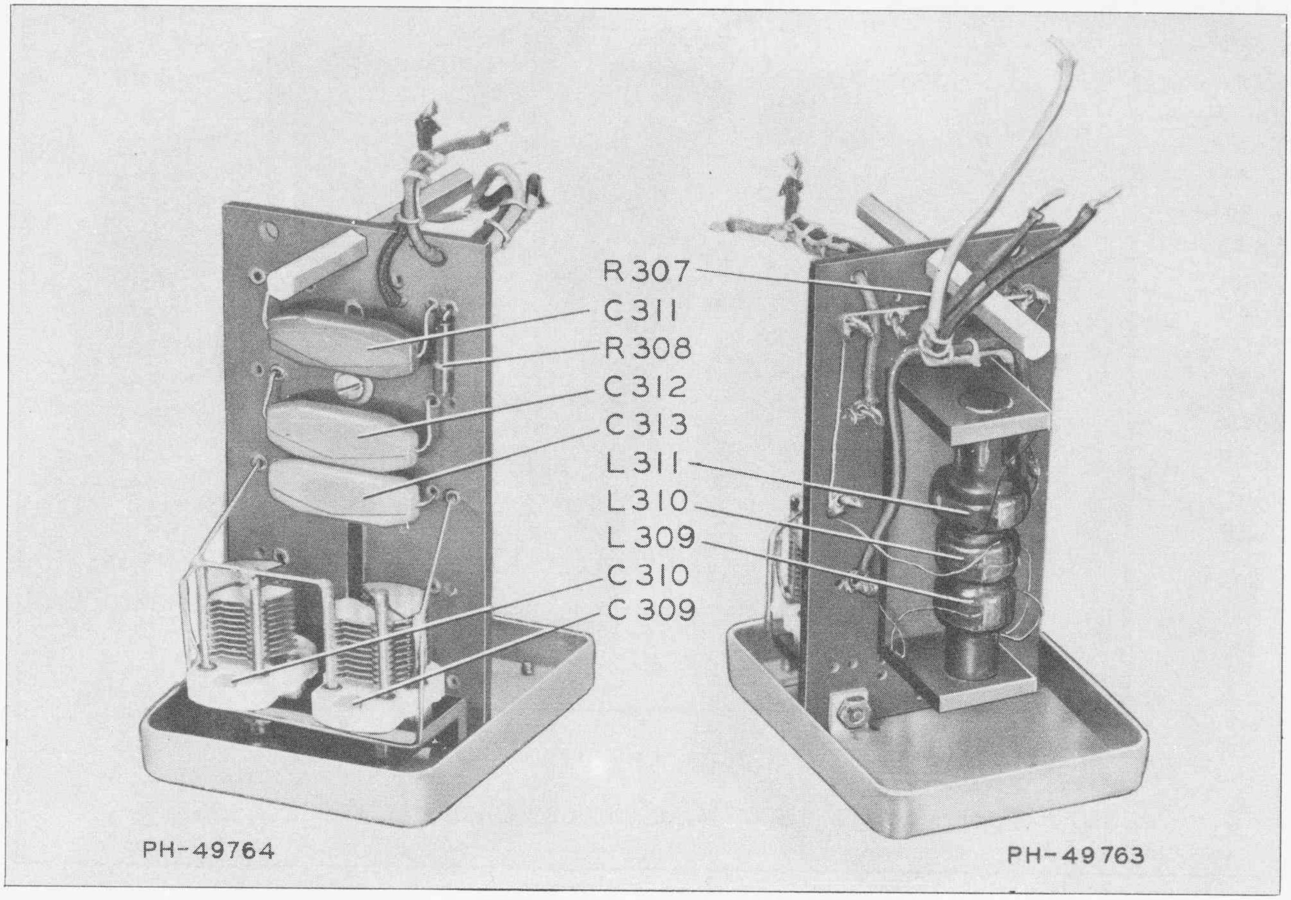
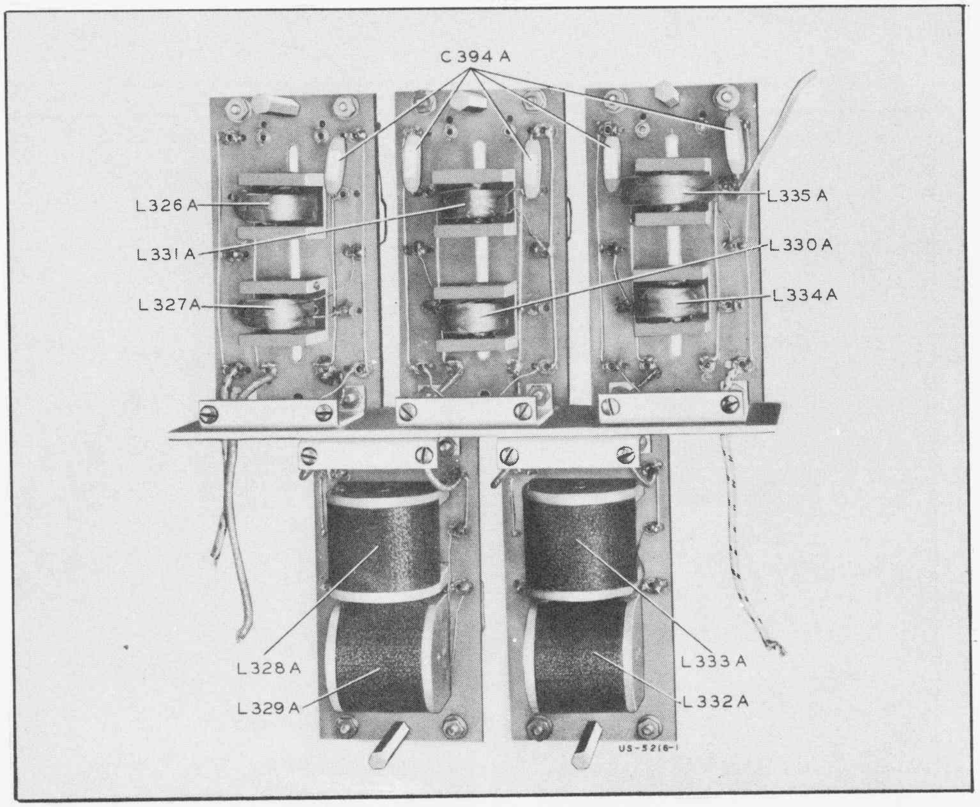


Figure 7—400 KC Oscillator (Front and Rear Views)



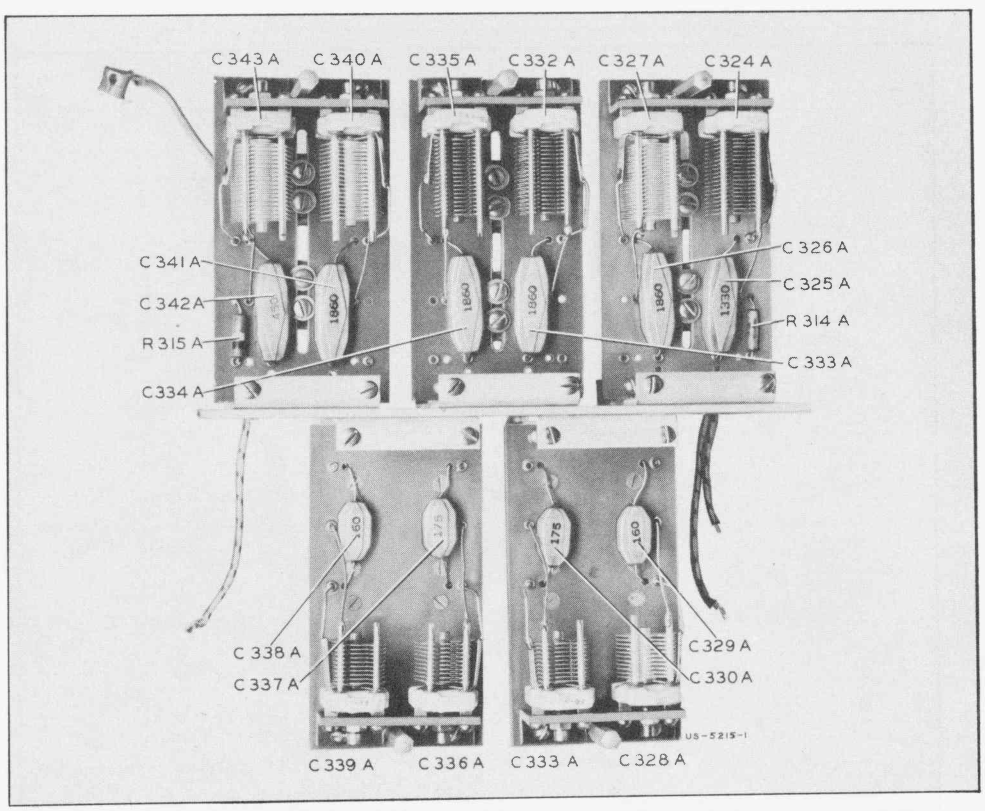
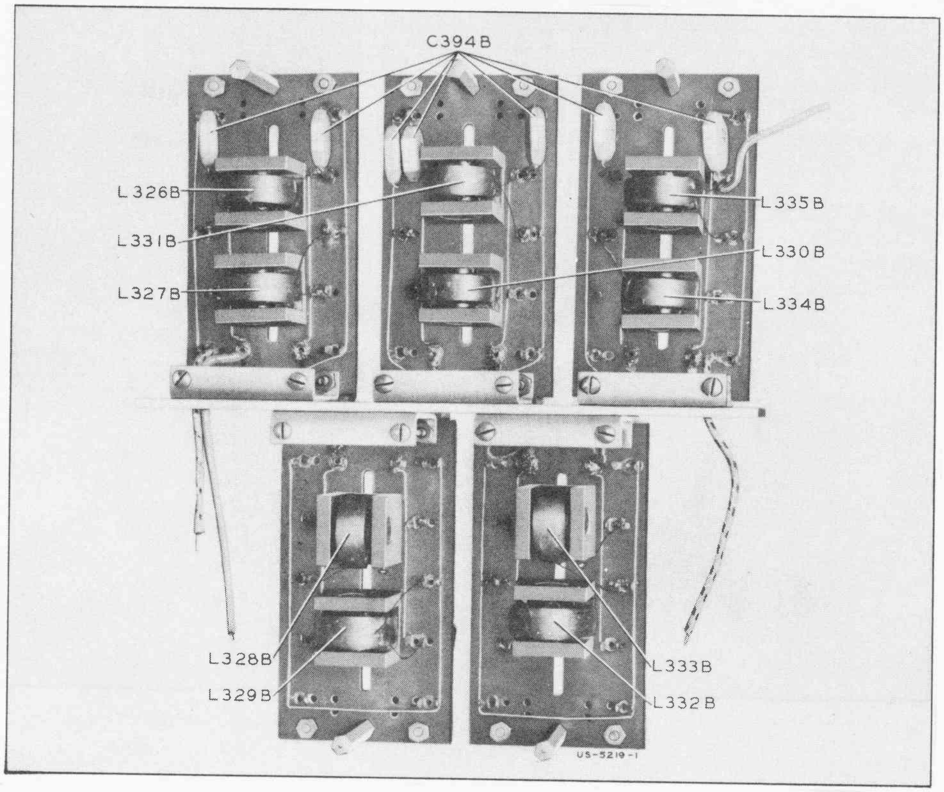


Figure 8—1 KC Band-Pass Filter
(Front and Rear Views)



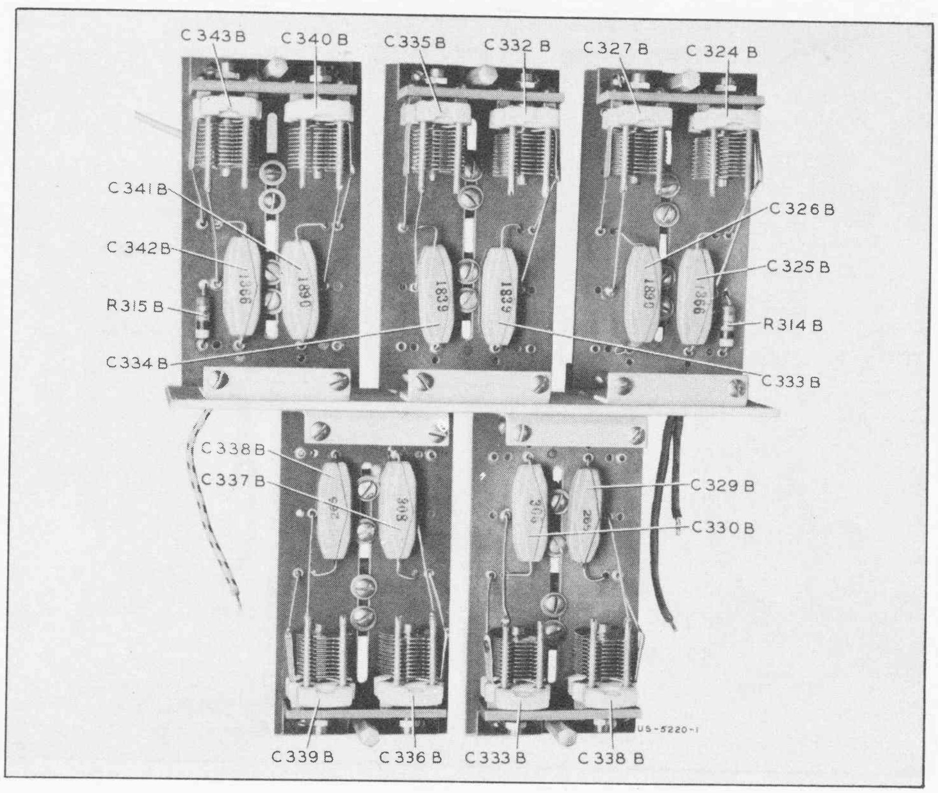
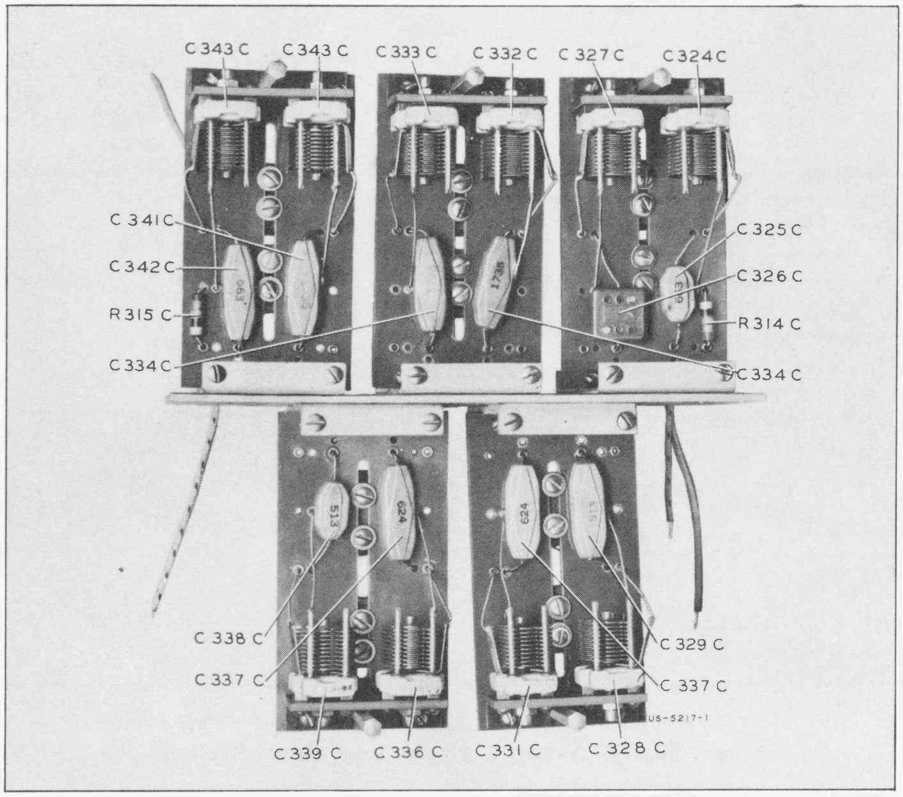


Figure 9—2 KC Band-Pass Filter
(Front and Rear Views)



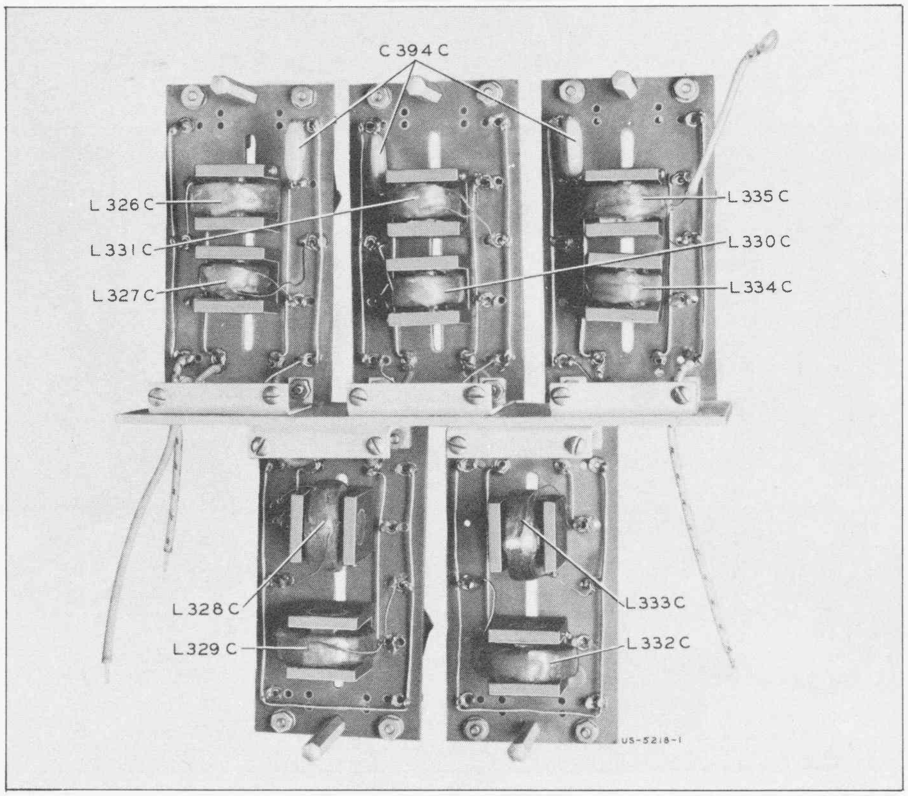


Figure 10—4 KC Band-Pass Filter
(Front and Rear Views)

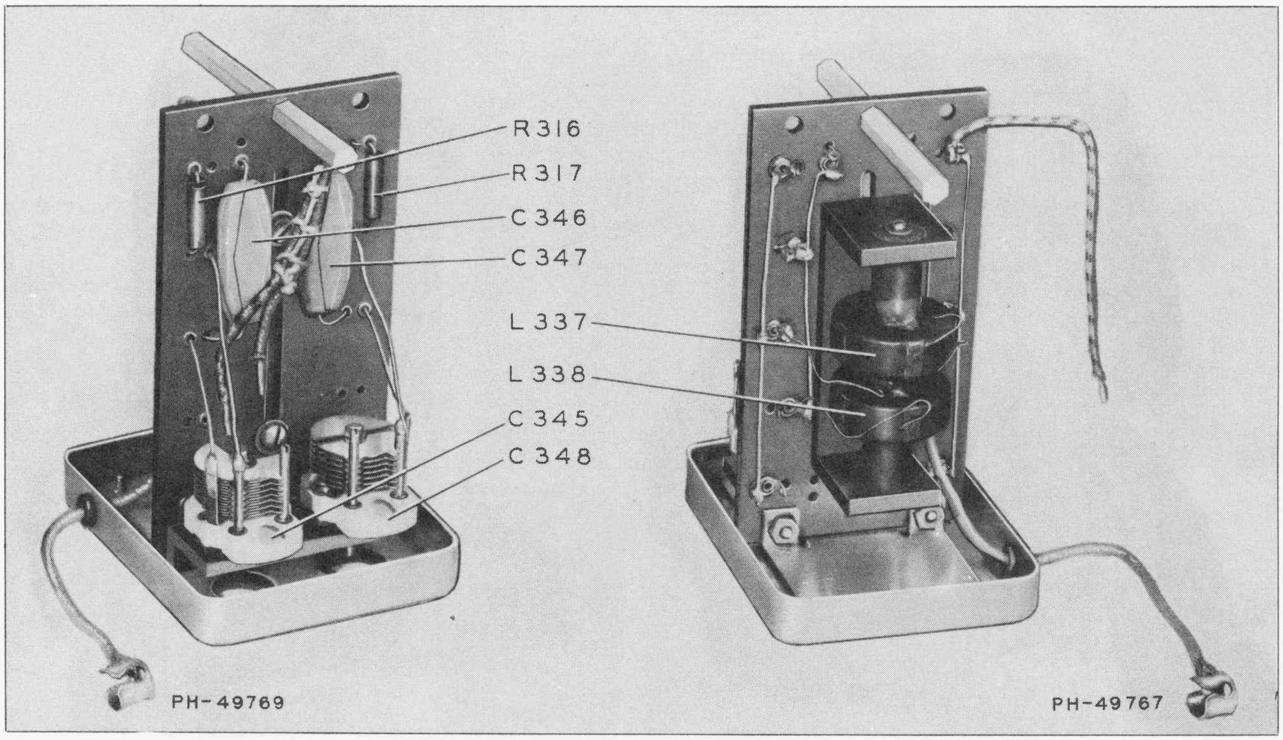


Figure 11—Typical Circuit Assembly (Third Stage, 50 KC Section, Front and Rear Views)

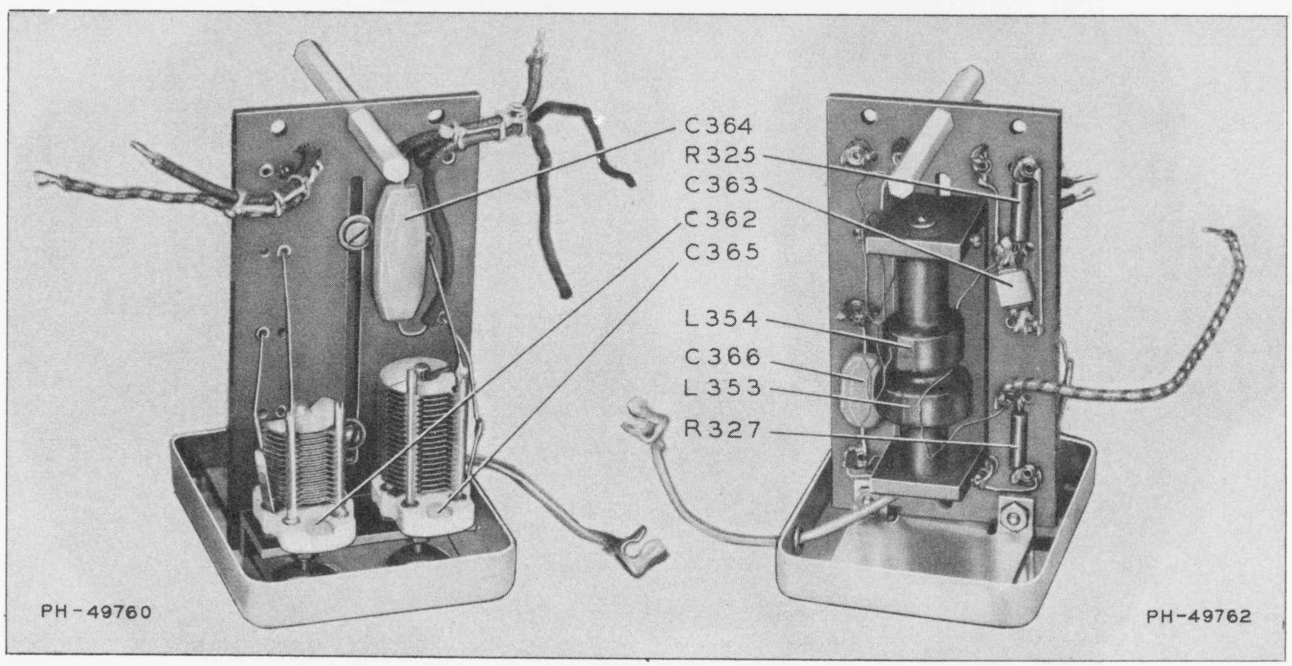


Figure 12—Diode Driver Stage (Front and Rear Views)

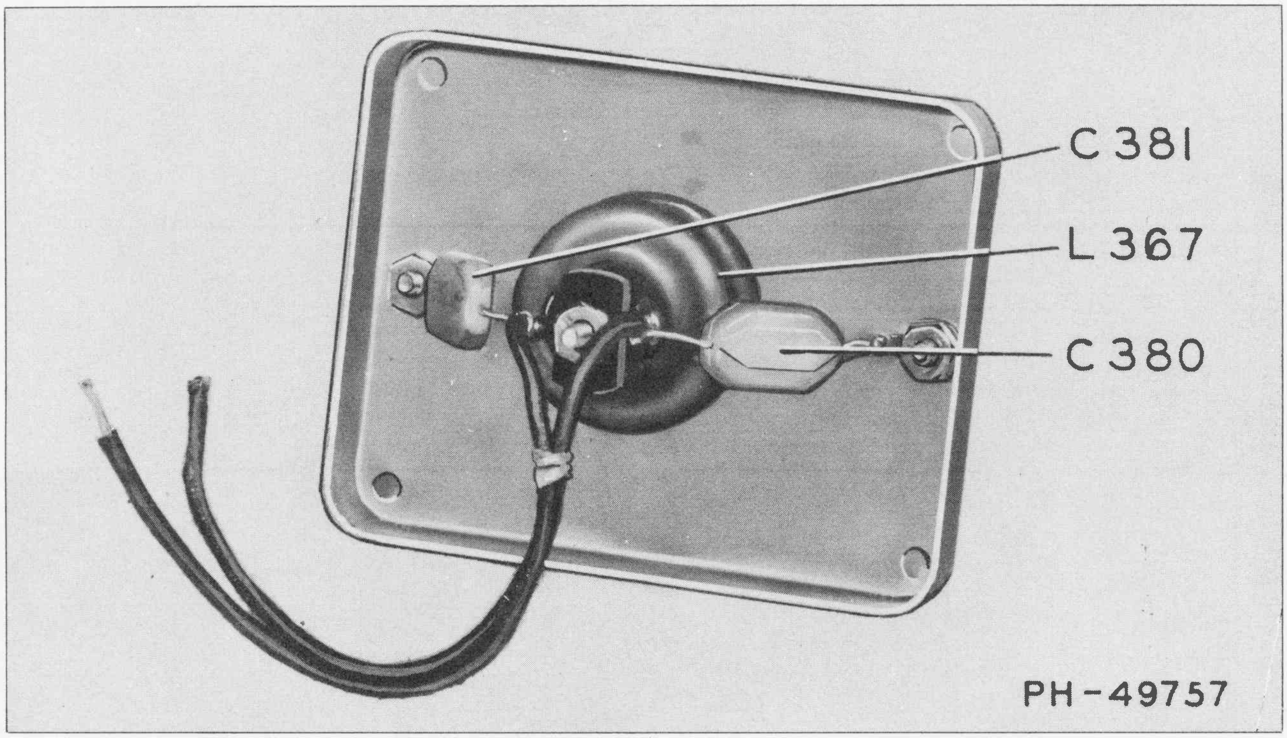


Figure 13—Diode Output Filter
(Interior View)

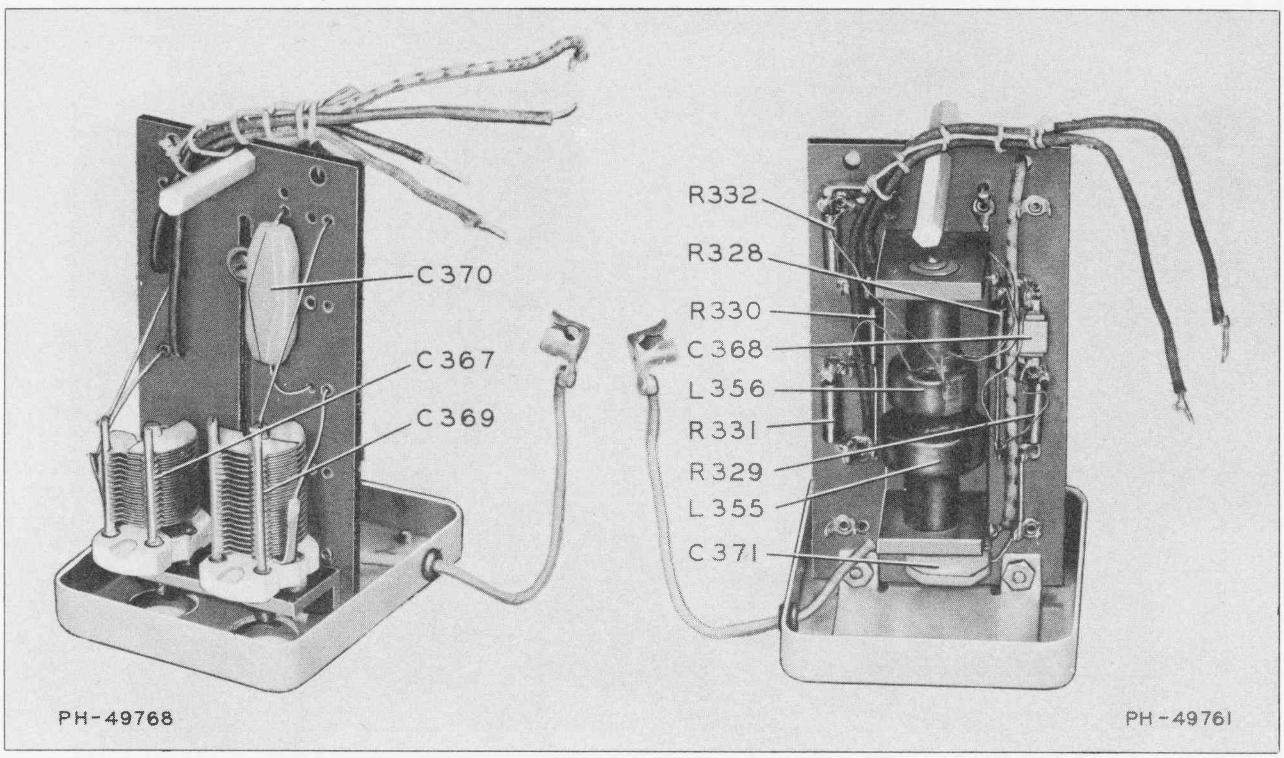


Figure 14—Monitor Channel, 50 KC Amplifier
(Front and Rear Views)

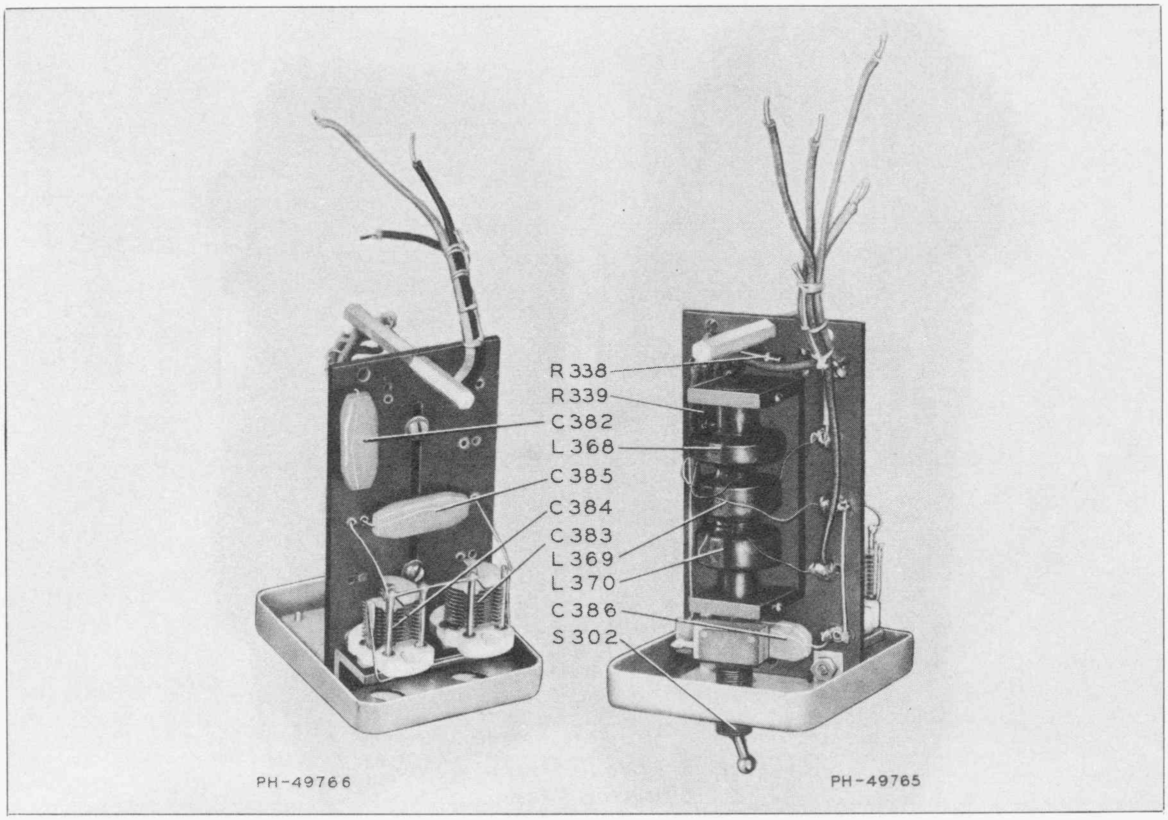


Figure 15—*Monitor Channel,* 50 *KC Oscillator*
(*Front and Rear Views*)

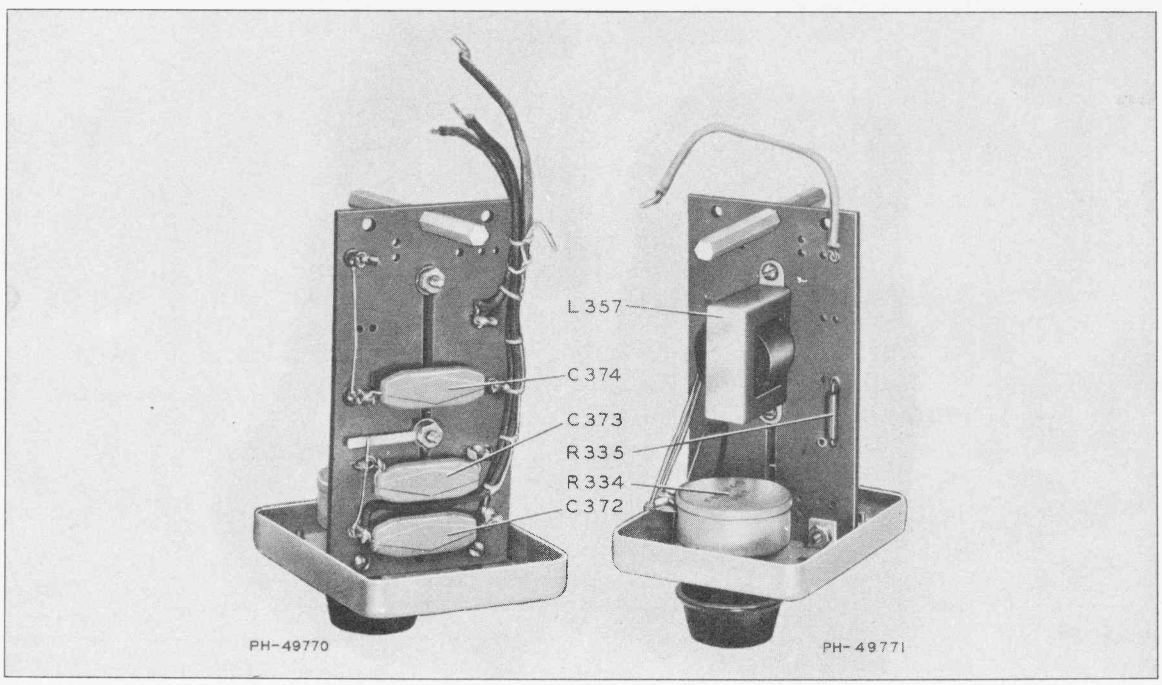
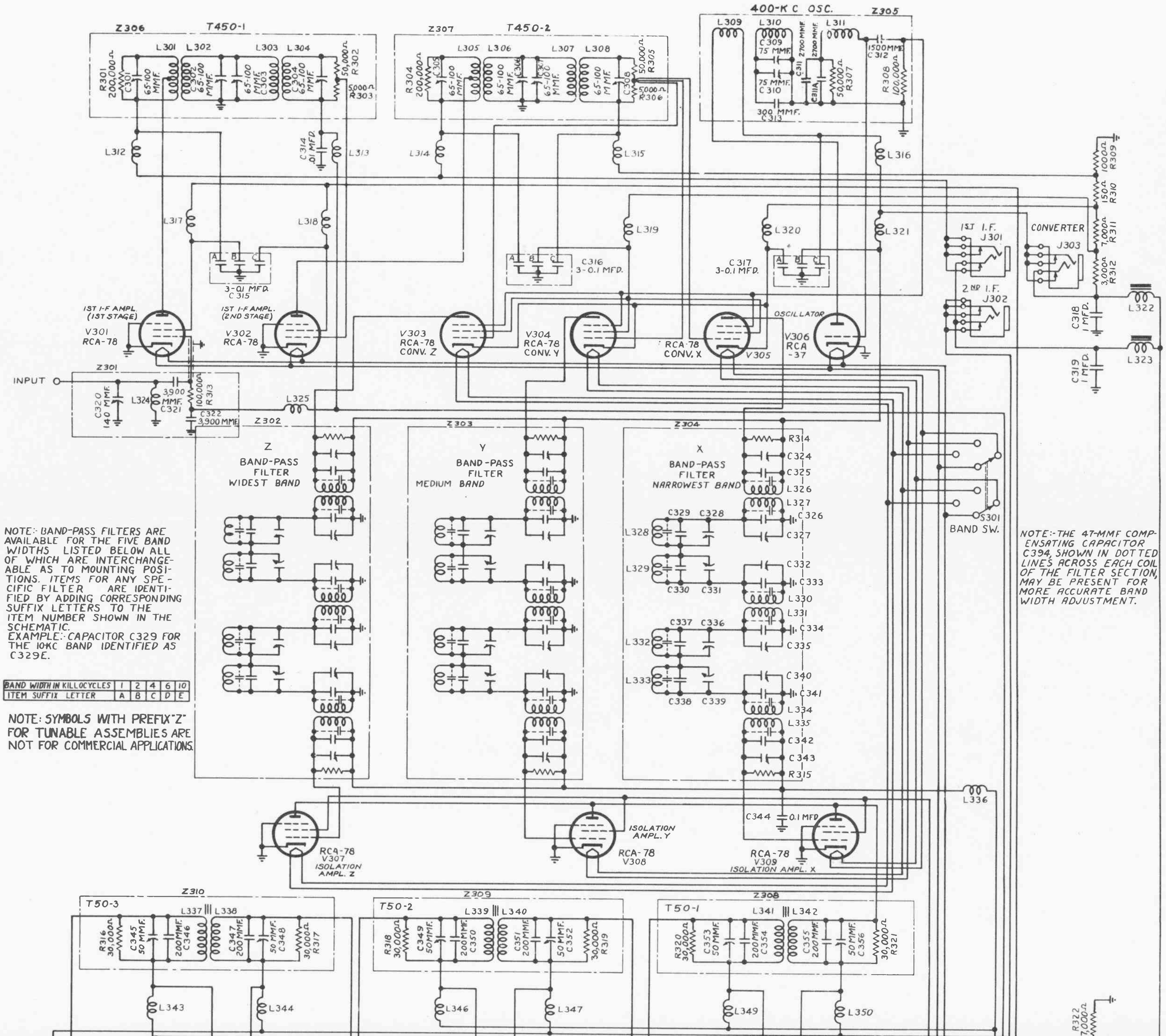


Figure 16—*Monitor Channel, Volume Control*
(*Front and Rear Views*)



NOTE: BAND-PASS FILTERS ARE AVAILABLE FOR THE FIVE BAND WIDTHS LISTED BELOW ALL OF WHICH ARE INTERCHANGEABLE AS TO MOUNTING POSITIONS. ITEMS FOR ANY SPECIFIC FILTER ARE IDENTIFIED BY ADDING CORRESPONDING SUFFIX LETTERS TO THE ITEM NUMBER SHOWN IN THE SCHEMATIC.
EXAMPLE: CAPACITOR C329 FOR THE 10KC BAND IDENTIFIED AS C329E.

BAND WIDTH IN KILLOCYCLES	1	2	4	6	10
ITEM SUFFIX LETTER	A	B	C	D	E

NOTE: SYMBOLS WITH PREFIX "Z" FOR TUNABLE ASSEMBLIES ARE NOT FOR COMMERCIAL APPLICATIONS.

NOTE:- THE 47-MMF COMPENSATING CAPACITOR C394, SHOWN IN DOTTED LINES ACROSS EACH COIL OF THE FILTER SECTION, MAY BE PRESENT FOR MORE ACCURATE BAND WIDTH ADJUSTMENT.

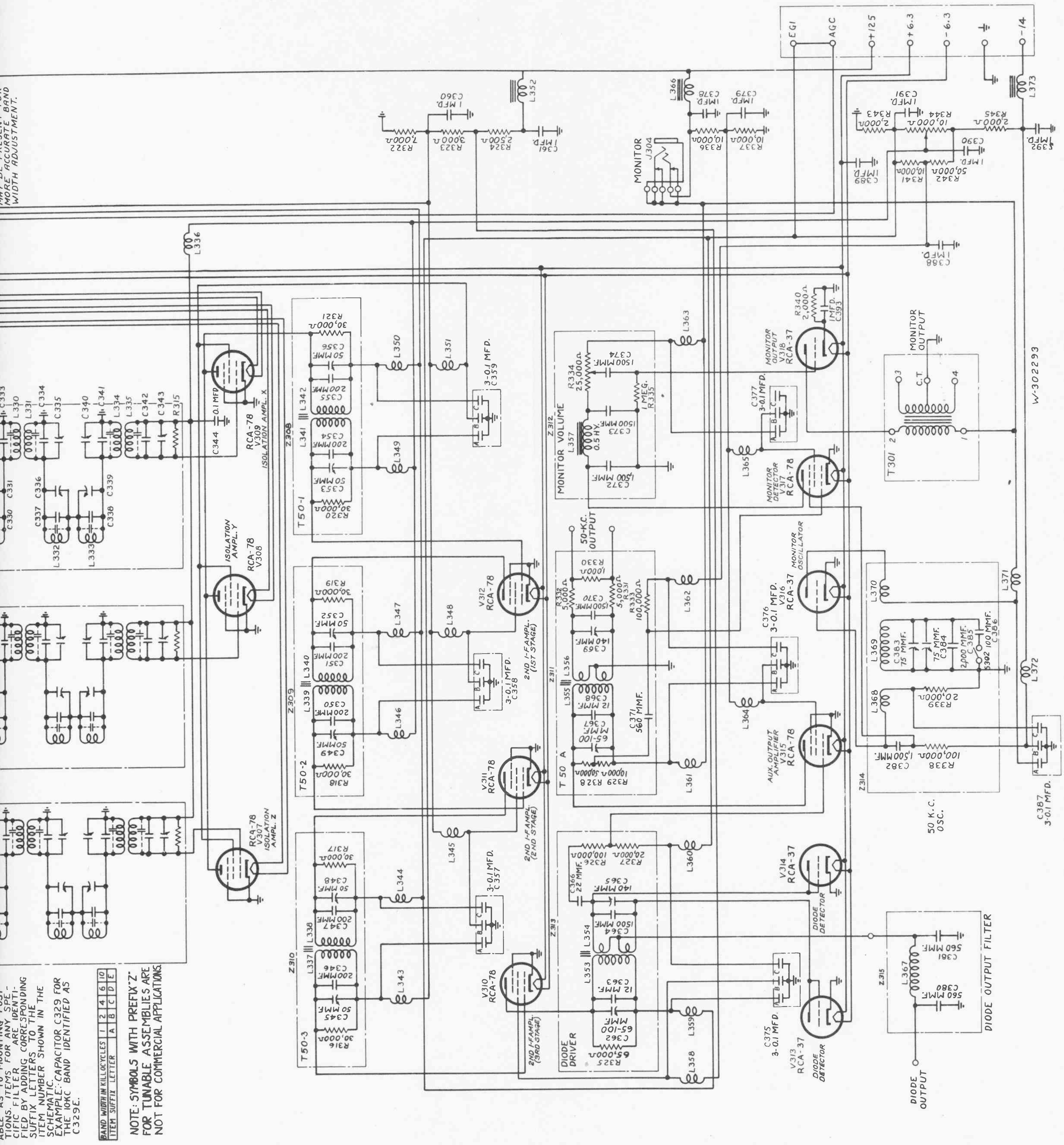
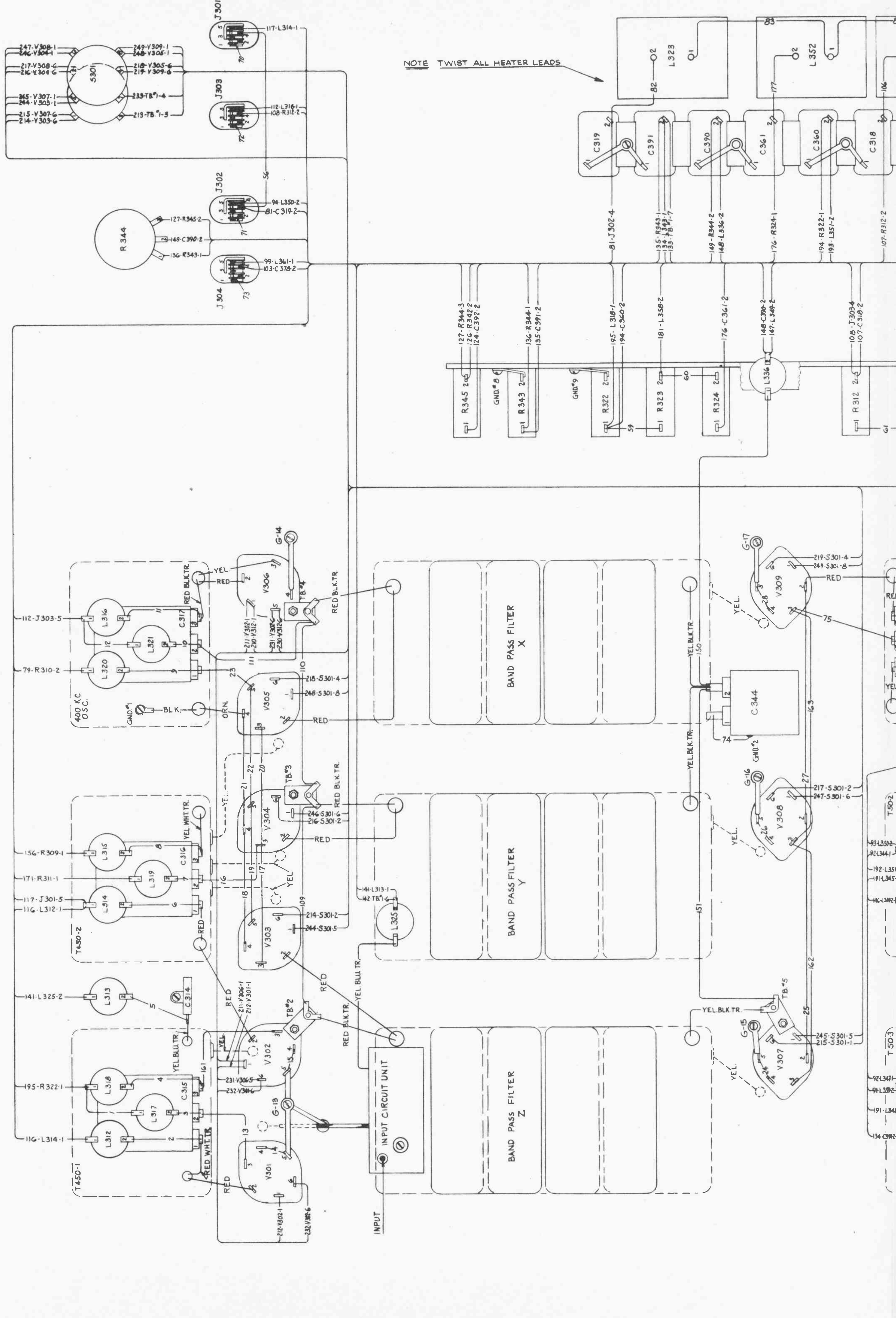


Figure 17—Type CRV-50097 Intermediate-Frequency Amplifier Unit (Schematic, W-302293—Sub. 4)



NOTE TWIST ALL HEATER LEADS
BAND PASS FILTER X
BAND PASS FILTER Y
BAND PASS FILTER Z
INPUT CIRCUIT UNIT
INPUT
400 KC OSC.
T450-1
T450-2
S301
R 344
J301
J302
J303
J304
L323
L352
C319
C391
C390
C361
C360
C318
R345
R343
R322
R323
R324
L336
R312
C344
V301
V302
V303
V304
V305
V306
V307
V308
V309
L312
L313
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L321
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C314
C315
C316
C317
T502
T503

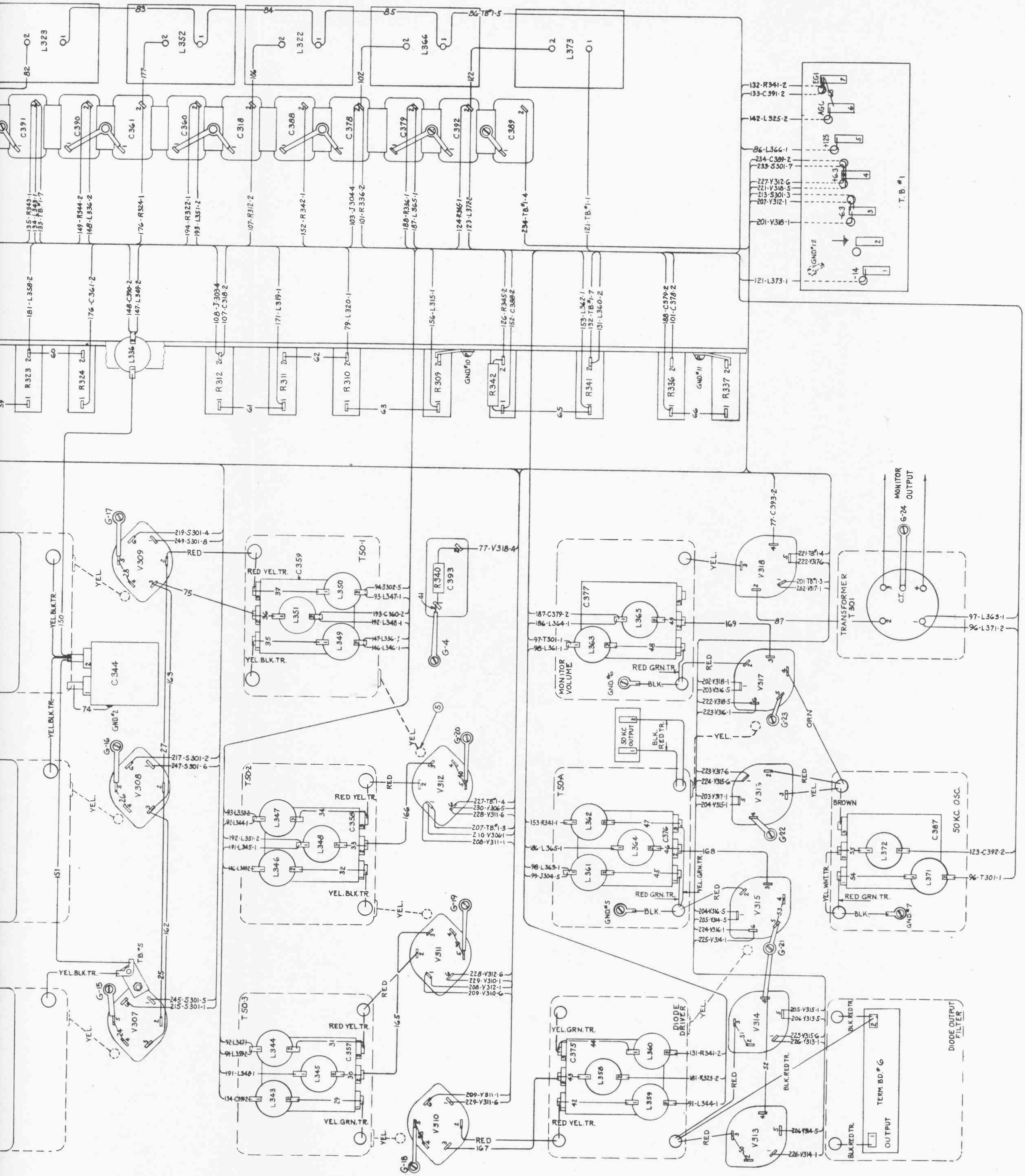
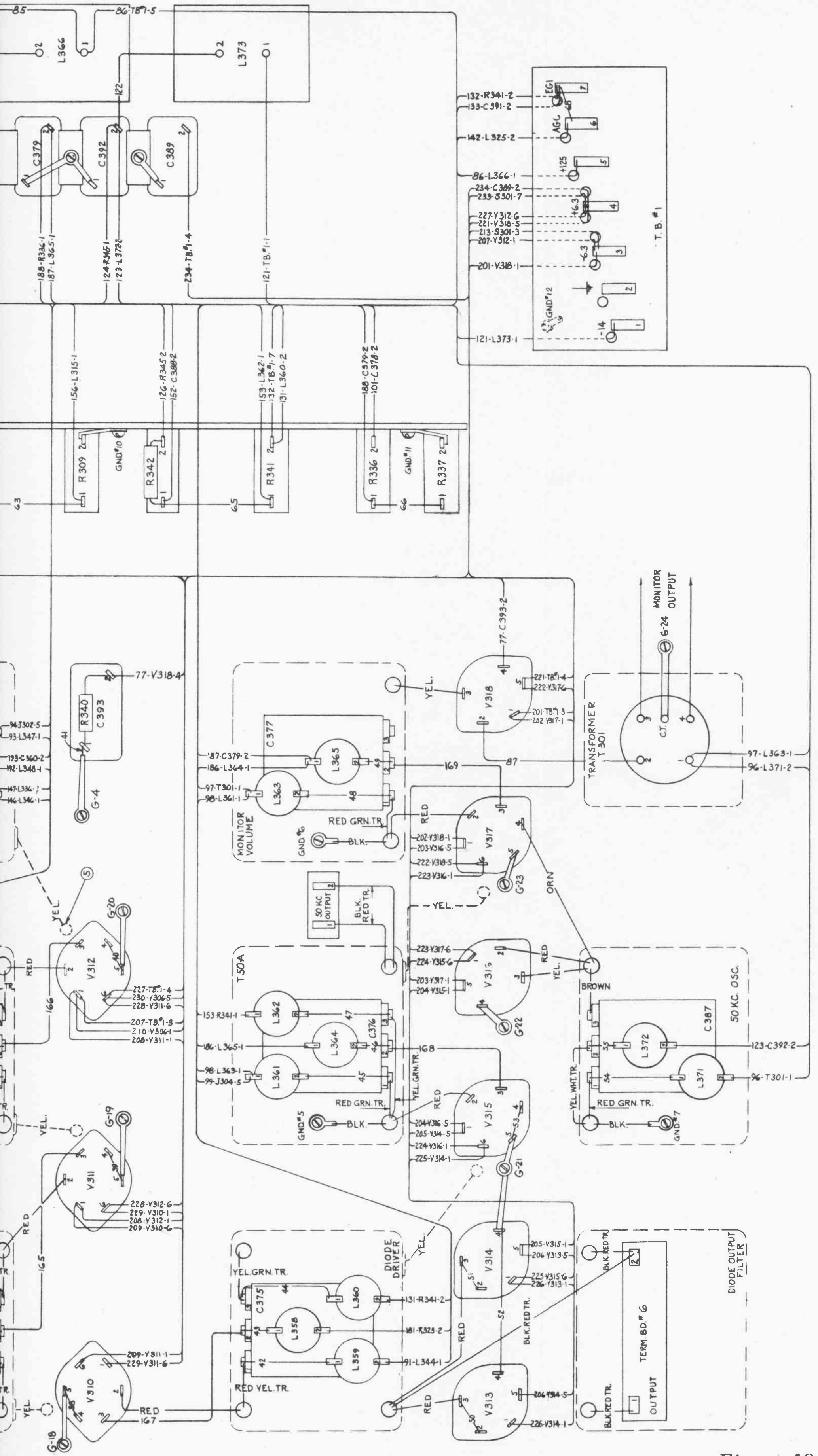


Figure 18—T
Frequency



WIRE DESIGNATION		
PART NO.	WIRE NO.	DESCRIPTION
6	1-36, 39-63, 65, 66, 68, 70-74, INCL.	.0508 DIA. BUS P.S. 105
7	77	WHITE
8	79	WHT. RED TR.
9	81 TO 87 INCL.	RED
10	91 TO 94 INCL.	RED YEL. TR.
11	96 TO 99 INCL.	RED GRN. TR.
12	101 TO 103 INCL.	RED BLU. TR.
13	106 TO 112 INCL.	RED BLK. TR.
14	116 & 117	RED WHT. TR.
15	121 TO 124 INCL.	YELLOW
16	126 & 127	YEL. RED TR.
17	131 TO 136 INCL.	YEL. GRN. TR.
18	141 & 142	YEL. BLU. TR.
19	146 TO 153 INCL.	YEL. BLK. TR.
20	156	YEL. WHT. TR.
21	161 TO 169 INCL.	GREEN
22	171	GRN. RED TR.
23	176 & 177	GRN. YEL. TR.
24	181	GRN. BLU. TR.
25	186 TO 188 INCL.	GRN. BLK. TR.
26	191 TO 195 INCL.	GRN. WHT. TR.
27	201 TO 219 INCL.	BLUE
28	221 TO 234 INCL.	BLU. RED TR.
29	244 TO 249 INCL.	BLU. YEL. TR.

Figure 18—Type CRV-50097 Intermediate-Frequency Amplifier Unit (Connections, W-305723—Sub. 1)

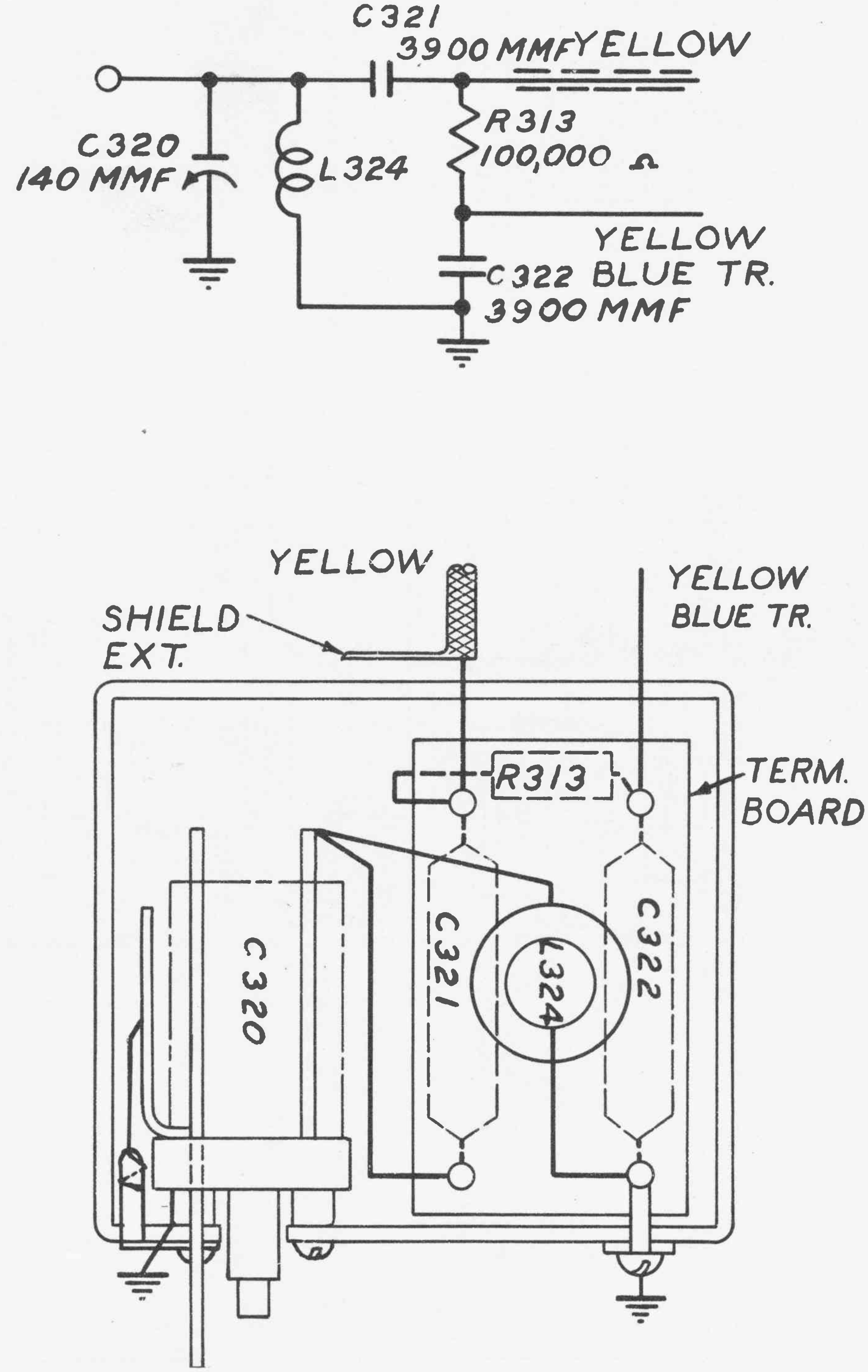
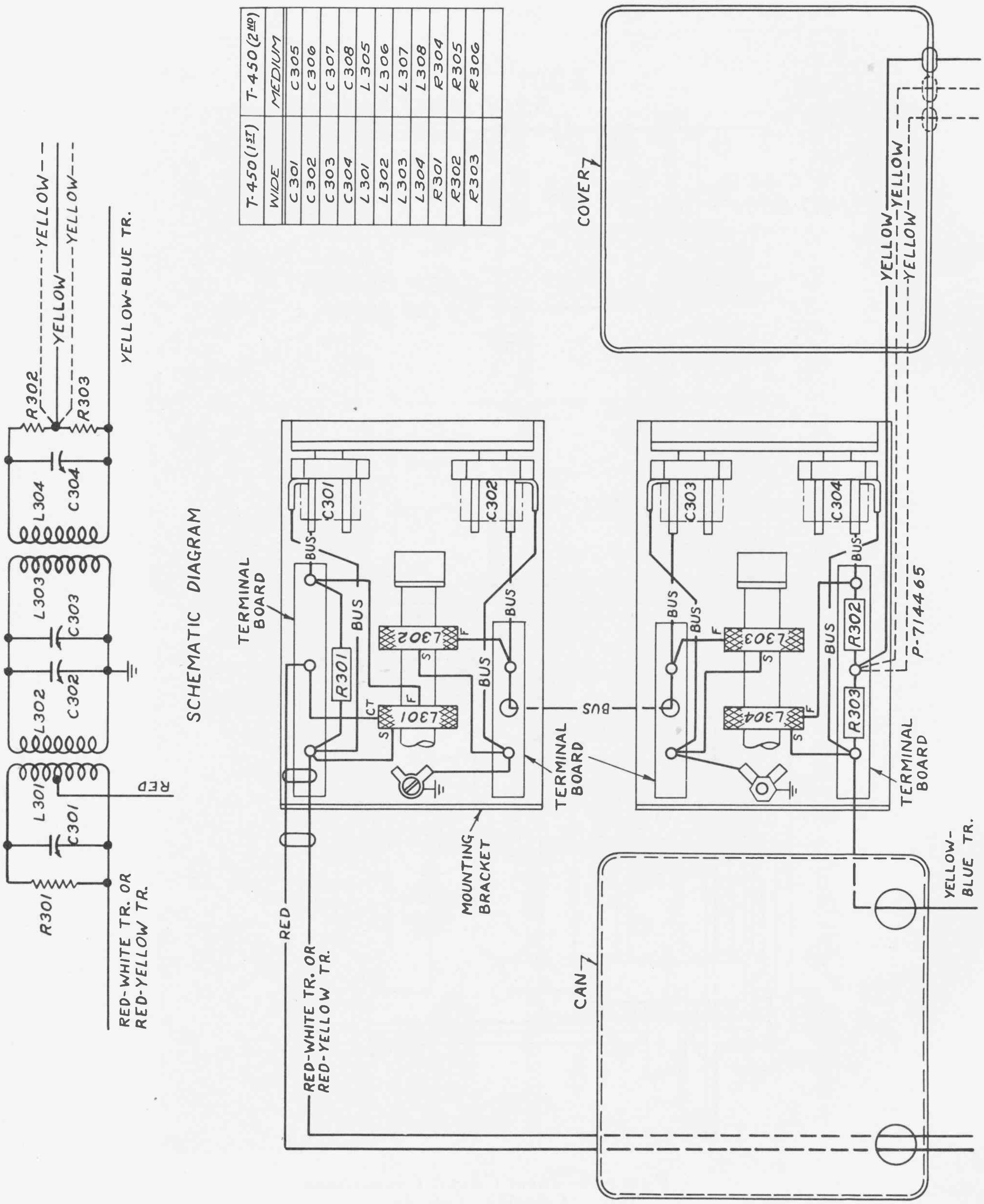


Figure 19—*Input Circuit Connections*
(*K*-844533—*Sub.* 2)



T-450 (1ST)	T-450 (2ND)
WIDE	MEDIUM
C301	C305
C302	C306
C303	C307
C304	C308
L301	L305
L302	L306
L303	L307
L304	L308
R301	R304
R302	R305
R303	R306

Figure 20—450 KC Tuned Circuit Connections
(P-714465—Sub. 1)

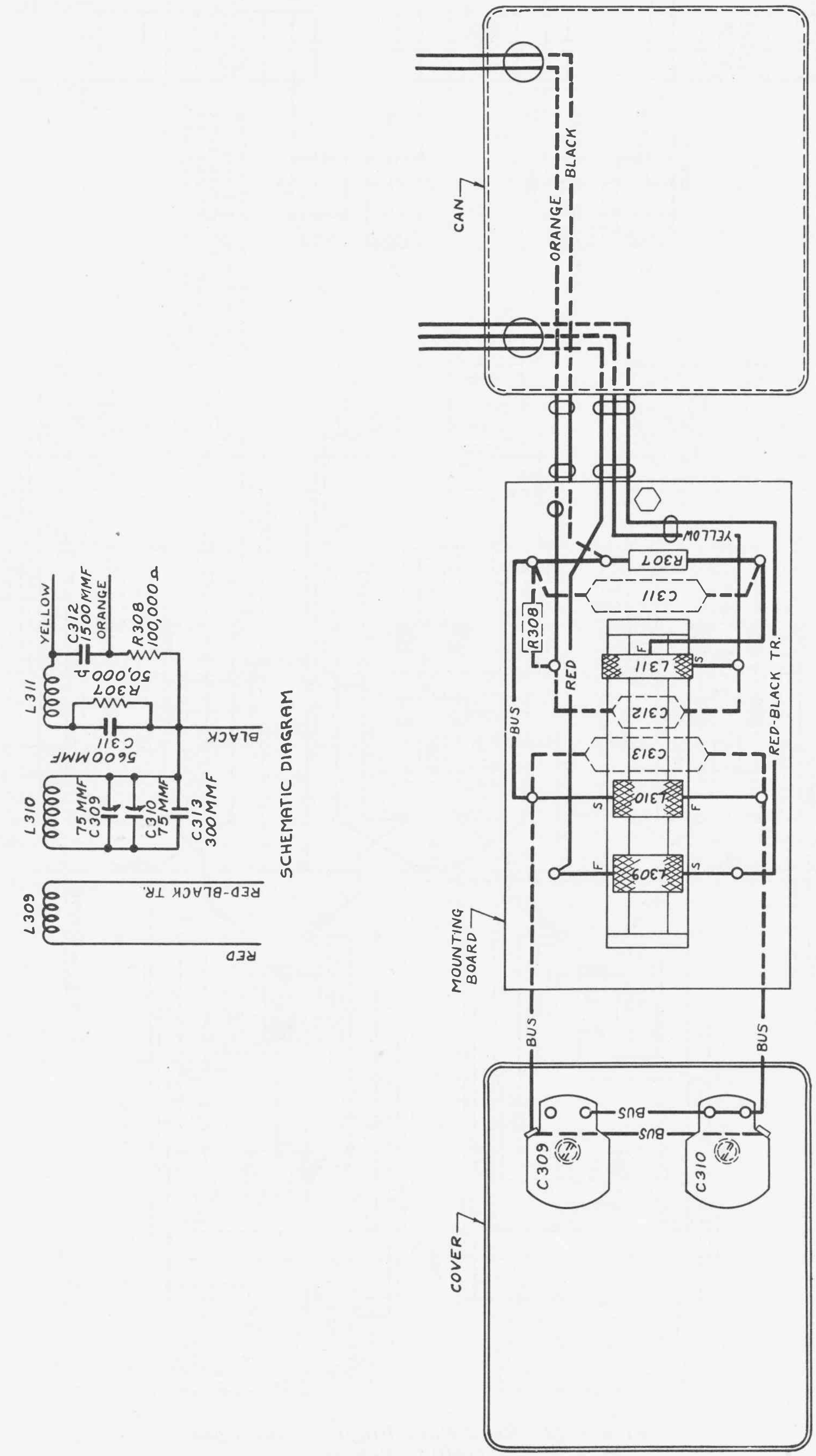


Figure 21—400 *KC Oscillator Connections*
(*P*-714466—*Sub.* 0)

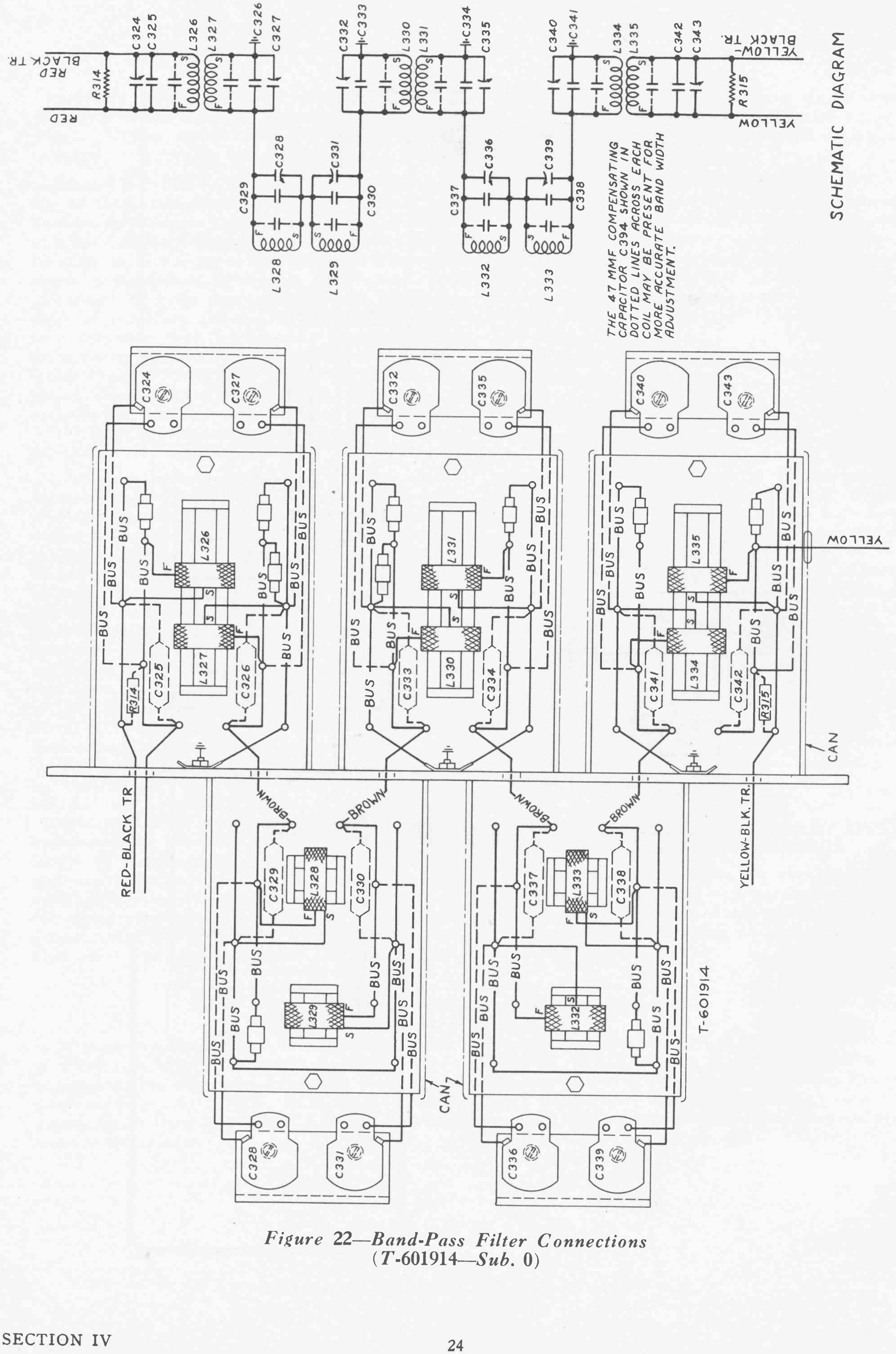


Figure 22—Band-Pass Filter Connections
(T-601914—Sub. 0)

10 KC. BAND		
DESIGN CONSTANTS		
ʄ1 ∞	FREQUENCY OF PEAK ATTENUATION	40,850 ~
ʄ1	NOMINAL LOWER CUT OFF FREQUENCY	43,000 ~
ʄm	MEAN FREQUENCY ($\sqrt{f_1 f_2}$)	49,508 ~
ʄ2	NOMINAL UPPER CUT OFF FREQUENCY	57,000 ~
ʄ2 ∞	FREQUENCY OF PEAK ATTENUATION	60,000 ~
"M"	FOR "M DERIVED" SECTIONS	0.6822
R	NOMINAL INTERNAL IMPEDANCE	10,900 Ω
ℛ	NOMINAL TERMINAL IMPEDANCE	34,800 Ω

CIRCUIT ELEMENTS

INDUCTANCES MH. MEASUREMENTS MADE AT 1000 ~

SYMBOL	ON CORE IN SHIELD	ON CORE NO SHIELD	NO CORE NO SHIELD	CORE LENGTH
L 326E	31.83	32.5	12.84	3 IN.
L 327E	6.04	6.35	2.5	3 IN.
L 328E	10.25	10.35	5.22	1 IN.
L 329E	15.06	15.45	8.25	1 IN.
L 330E	5.93	6.25	2.35	3 IN.
L 331E	5.93	6.25	2.35	3 IN.
L 332E	15.06	15.45	8.25	1 IN.
L 333E	10.25	10.35	5.22	1 IN.
L 334E	6.04	6.35	2.5	3 IN.
L 335E	31.83	32.5	12.84	3 IN.

6 KC. BAND		
DESIGN CONSTANTS		
ʄ1 ∞	FREQUENCY OF PEAK ATTENUATION	44,328 ~
ʄ1	NOMINAL LOWER CUT OFF FREQUENCY	45,800 ~
ʄm	MEAN FREQUENCY ($\sqrt{f_1 f_2}$)	50,052 ~
ʄ2	NOMINAL UPPER CUT OFF FREQUENCY	54,700 ~
ʄ2 ∞	FREQUENCY OF PEAK ATTENUATION	56,500 ~
"M"	FOR "M DERIVED" SECTIONS	0.6813
R	NOMINAL INTERNAL IMPEDANCE	17,161 Ω
ℛ	NOMINAL TERMINAL IMPEDANCE	34,800 Ω

CIRCUIT ELEMENTS

INDUCTANCES MH. MEASUREMENTS MADE AT 1000 ~

SYMBOL	ON CORE IN SHIELD	ON CORE NO SHIELD	NO CORE NO SHIELD	CORE LENGTH
L 326D	19.72	21.1	10.00	3 IN.
L 327D	5.82	6.09	2.36	3 IN.
L 328D	10.85	11.00	5.6	1 IN.
L 329D	13.824	14.2	7.68	1 IN.
L 330D	5.776	6.1	2.4	3 IN.
L 331D	5.776	6.1	2.4	3.IN
L 332D	13.824	14.2	7.68	1 IN.
L 333D	10.85	11.00	5.6	1 IN.
L 334D	5.82	6.09	2.36	3 IN.
L 335D	19.72	21.1	10.00	3 IN.

4 KC. BAND	
DESIGN CONSTANT	
ʄ1 ∞	FREQUENCY OF PEAK ATTEN
ʄ1	NOMINAL LOWER CUT OFF FR
ʄm	MEAN FREQUENCY ($\sqrt{f_1}$
ʄ2	NOMINAL UPPER CUT OFF FRE
ʄ2 ∞	FREQUENCY OF PEAK ATTEN
"M"	FOR "M DERIVED" SECTION
R	NOMINAL INTERNAL IMP
ℛ	NOMINAL TERMINAL IMPE

CIRCUIT ELEMENT

INDUCTANCES MH. M M

SYMBOL	ON CORE IN SHIELD	ON CORE NO SHIELD	N N
L 326C	13.44	14.0	7
L 327C	5.55	5.73	2
L 328C	15.23	15.45	8
L 329C	18.31	19.5	1
L 330C	5.53	5.6	2
L 331C	5.53	5.6	2
L 332C	18.31	19.5	1
L 333C	15.23	15.45	
L 334C	5.55	5.73	
L 335C	13.44	14.0	

COUPLINGS				
BETWEEN SYMBOLS	%K		MUTUAL IND.-MH.	
	IN SHIELD	NO SHIELD	IN SHIELD	NO SHIELD
L326E L327E	21.2	25.0	3.005	3.66
L328E L329E	0			
L330E L331E	19.7	23.45	1.2	1.479
L332E L333E	0			
L334E L335E	21.2	25.0	3.005	3.66

CAPACITANCES – mmf.				
SYMBOL	THEORETICAL TOTAL	FIXED		TRIMMER RANGE
		NOMINAL	TOLERANCE	
C325E C324E	327	240	±17	4.5–75
C326E C327E	1,755	1,668	±17	4.5–75
C329E C328E	686	650	±17	4.5–75
C330E C331E	1,008	970	±17	4.5–75
C333E C332E	1,755	1,668+94	±17	4.5 –75
C334E C335E	1,755	1,668+94	±17	4.5–75
C337E C336E	1,008	970	±17	4.5–75
C338E C339E	686	650	±17	4.5–75
C341E C340E	1,755	1,668	±17	4.5–75
C342E C343E	327	240	±17	4.5–75

COUPLINGS				
BETWEEN ITEMS	%K		MUTUAL IND.-MH.	
	IN SHIELD	NO SHIELD	IN SHIELD	NO SHIELD
L326D L327D	13.5	17.05	.42	1.945
L328D L329D	0			
L330D L331D	10.6	13.41	.605	.823
L332D L333D	0			
L334D L335D	13.5	17.05	1.42	1.945

CAPACITANCES – mmf.				
SYMBOL	THEORETICAL TOTAL	FIXED		TRIMMER RANGE
		NOMINAL	TOLERANCE	
C325D C324D	513.8	427+47	±17	4.5–75
C326D C327D	1,752	1665+47	±17	4.5–75
C329D C328D	731.4	695	±17	4.5–75
C330D C331D	931.8	895	±17	4.5–75
C333D C332D	1,752	1,665+47	±17	4.5–75
C334D C335D	1,752	1,665+94	±17	4.5–75
C337D C336D	931.8	895	±17	4.5–75
C338D C339D	731.4	695	±17	4.5–75
C341D C340D	1,752	1,665+94	±17	4.5–75
C342D C343D	513.8	427	±17	4.5–75

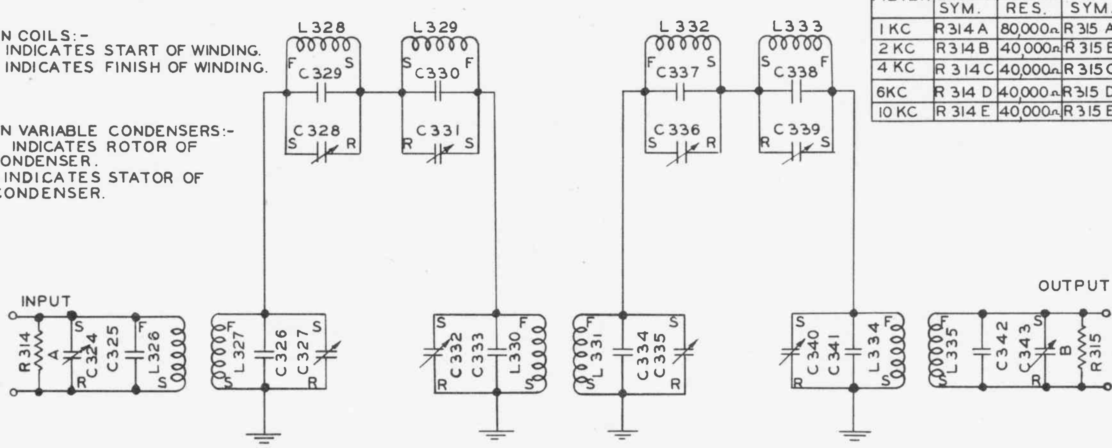
CO	
BETWEEN SYMBOLS	INS
L326C L327C	9.1
L328C L329C	0
L330C L331C	6.
L332C L333C	0
L334C L335C	9

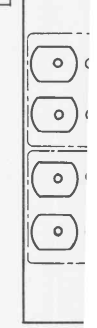
C.	
SYMBOL	THE T
C325C C324C	7.
C326C C327C	1,
C329C C328C	5
C330C C331C	6
C333C C332C	1
C334C C335C	1
C337C C336C	
C338C C339C	
C341C C340C	1
C342C C343C	

FILTER	INPUT		OUTPUT	
	SYM.	RES.	SYM.	RES.
1 KC	R314 A	80,000 Ω	R315 A	200,000 Ω
2 KC	R314 B	40,000 Ω	R315 B	40,000 Ω
4 KC	R314 C	40,000 Ω	R315 C	40,000 Ω
6 KC	R314 D	40,000 Ω	R315 D	40,000 Ω
10 KC	R314 E	40,000 Ω	R315 E	40,000 Ω

ON COILS:-
S INDICATES START OF WINDING.
F INDICATES FINISH OF WINDING.

ON VARIABLE CONDENSERS:-
R INDICATES ROTOR OF CONDENSER.
S INDICATES STATOR OF CONDENSER.





SCHEMATIC DIAGRAM

ISTANTS	
ATTENUATION	44,328 ~
FREQUENCY	45,800 ~
$\sqrt{f_1 f_2}$)	50,052 ~
FREQUENCY	54,700 ~
TENUATION	56,500 ~
IONS	0.6813
PEDANCE	17,161 Ω
PEDANCE	34,800 Ω

4 KC. BAND

DESIGN CONSTANTS

$f_{1\infty}$	FREQUENCY OF PEAK ATTENUATION	45,740 ~
f_1	NOMINAL LOWER CUT OFF FREQUENCY	47,200 ~
f_m	MEAN FREQUENCY ($\sqrt{f_1 f_2}$)	50,160 ~
f_2	NOMINAL UPPER CUT OFF FREQUENCY	53,300 ~
$f_{2\infty}$	FREQUENCY OF PEAK ATTENUATION	55,000 ~
"M"	FOR "M DERIVED" SECTIONS	0.7519
R	NOMINAL INTERNAL IMPEDANCE	25,090 Ω
R	NOMINAL TERMINAL IMPEDANCE	34,800 Ω

2 KC. BAND

DESIGN CONSTANTS

$f_{1\infty}$	FREQUENCY OF PEAK ATTENUATION	47,340 ~
f_1	NOMINAL LOWER CUT OFF FREQUENCY	48,800 ~
f_m	MEAN FREQUENCY ($\sqrt{f_1 f_2}$)	50,370 ~
f_2	NOMINAL UPPER CUT OFF FREQUENCY	52,000 ~
$f_{2\infty}$	FREQUENCY OF PEAK ATTENUATION	53,600 ~
"M"	FOR "M DERIVED" SECTIONS	0.8594
R	NOMINAL INTERNAL IMPEDANCE	47,820 Ω
R	NOMINAL TERMINAL IMPEDANCE	34,800 Ω

1 KC. BAND

DESIGN CONSTANTS

$f_{1\infty}$	FREQUENCY OF PEAK ATTENUATION	48,400 ~
f_1	NOMINAL LOWER CUT OFF FREQUENCY	49,400 ~
f_m	MEAN FREQUENCY ($\sqrt{f_1 f_2}$)	50,195 ~
f_2	NOMINAL UPPER CUT OFF FREQUENCY	51,000 ~
$f_{2\infty}$	FREQUENCY OF PEAK ATTENUATION	52,000 ~
"M"	FOR "M DERIVED" SECTIONS	0.9274
R	NOMINAL INTERNAL IMPEDANCE	95,460.
R	NOMINAL TERMINAL IMPEDANCE	INPUT + 69,600 OUTPUT + 174,000

ELEMENTS

MEASUREMENTS MADE AT 1000 ~

NO CORE NO SHIELD	CORE LENGTH
10.00	3 IN.
2.36	3 IN.
5.6	1 IN.
7.68	1 IN.
2.4	3 IN.
2.4	3. IN
7.68	1 IN.
5.6	1 IN.
2.36	3 IN.
10.00	3 IN.

CIRCUIT ELEMENTS (4 KC. BAND)

INDUCTANCES MH. — MEASUREMENTS MADE AT 1000 ~

SYMBOL	ON CORE IN SHIELD	ON CORE NO SHIELD	NO CORE NO SHIELD	CORE LENGTH
L326C	13.44	14.0	7.17	1 IN.
L327C	5.55	5.73	2.56	1 IN.
L328C	15.23	15.45	8.3	1 IN.
L329C	18.31	19.5	10.58	1 IN.
L330C	5.53	5.6	2.5	1 IN.
L331C	5.53	5.6	2.5	1 IN.
L332C	18.31	19.5	10.58	1 IN.
L333C	15.23	15.45	8.3	1 IN.
L334C	5.55	5.73	2.56	1 IN.
L335C	13.44	14.0	7.17	1 IN.

CIRCUIT ELEMENTS (2 KC. BAND)

INDUCTANCES MH. — MEASUREMENTS MADE AT 1000 ~

SYMBOL	ON CORE IN SHIELD	ON CORE NO SHIELD	NO CORE NO SHIELD	CORE LENGTH
L326B	6.96	7.15	3.3	1 IN.
L327B	5.17	5.33	2.35	1 IN.
L328B	29.58	30.3	15.12	1 IN.
L329B	33.49	34.5	17.6	1 IN.
L330B	5.17	5.33	2.35	1 IN.
L331B	5.17	5.33	2.35	1 IN.
L332B	33.49	34.5	17.6	1 IN.
L333B	29.58	30.3	15.12	1 IN.
L334B	5.17	5.33	2.35	1 IN.
L335B	6.96	7.15	3.3	1 IN.

CIRCUIT ELEMENTS (1 KC. BAND)

INDUCTANCES MH. — MEASUREMENTS MADE AT 1000 ~

SYMBOL	ON CORE IN SHIELD	ON CORE NO SHIELD	NO CORE NO SHIELD	CORE LENGTH
L326A	7.152	7.42	3.63	1 IN.
L327A	5.005	5.23	2.31	1 IN.
L328A	42.49	43.35	17.9	1 IN.
L329A	45.61	46.72	19.5	1 IN.
L330A	5.005	5.23	2.31	1 IN.
L331A	5.005	5.23	2.31	1 IN.
L332A	45.61	46.72	19.5	1 IN.
L333A	42.49	43.35	17.9	1 IN.
L334A	5.005	5.23	2.31	1 IN.
L335A	17.88	18.81	11.7	1 IN.

OUPLINGS

% K NO SHIELD	MUTUAL IND.-MH. IN SHIELD	MUTUAL IND.-MH. NO SHIELD
17.05	.42	1.945
13.41	.605	.823
17.05	1.42	1.945

COUPLINGS (4 KC. BAND)

BETWEEN SYMBOLS	% K IN SHIELD	% K NO SHIELD	MUTUAL IND.-MH. IN SHIELD	MUTUAL IND.-MH. NO SHIELD
L326C L327C	9.16	11.4	.797	1.043
L328C L329C	0			
L330C L331C	6.93	8.91	.382	.51
L332C L333C	0			
L334C L335C	9.16	11.4	.797	1.043

COUPLINGS (2 KC. BAND)

BETWEEN SYMBOLS	% K IN SHIELD	% K NO SHIELD	MUTUAL IND.-MH. IN SHIELD	MUTUAL IND.-MH. NO SHIELD
L326B L327B	4.6	6.3	.2775	.395
L328B L329B	0			
L330B L331B	3.4	4.89	.1775	.262
L332B L333B	0			
L334B L335B	4.6	6.3	.2775	.395

COUPLINGS (1 KC. BAND)

BETWEEN SYMBOLS	% K IN SHIELD
L326A L327A	2.3
L328A L329A	0
L330A L331A	1.65
L332A L333A	0
L334A L335A	2.3

PACITANCES - mmf.

FIXED NOMINAL	FIXED TOLERANCE	TRIMMER RANGE
427+47	±17	4.5-75
1665+47	±17	4.5-75
695	±17	4.5-75
895	±17	4.5-75
1,665+47	±17	4.5-75
1,665+94	±17	4.5-75
895	±17	4.5-75
695	±17	4.5-75
1,665+94	±17	4.5-75
427	±17	4.5-75

CAPACITANCES - mmf. (4 KC. BAND)

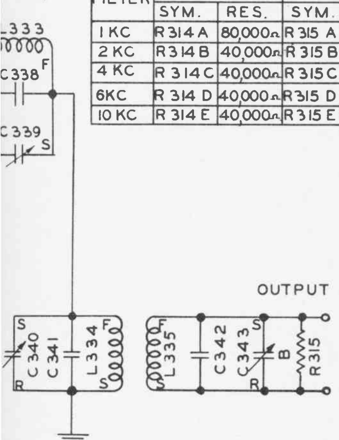
SYMBOL	THEORETICAL TOTAL	FIXED NOMINAL	FIXED TOLERANCE	TRIMMER RANGE
C325C C324C	750	663	±17	4.5-75
C326C C327C	1,822	1,735	±17	4.5-75
C329C C328C	550	513	±17	4.5-75
C330C C331C	661	624	±17	4.5-75
C333C C332C	1,822	1,735+47	±17	4.5-75
C334C C335C	1,822	1,735+94	±17	4.5-75
C337C C336C	661	624	±17	4.5-75
C338C C339C	550	513	±17	4.5-75
C341C C340C	1,822	1,735+94	±17	4.5-75
C342C C343C	750	663	±17	4.5-75

CAPACITANCES - mmf. (2 KC. BAND)

SYMBOL	THEORETICAL TOTAL	FIXED NOMINAL	FIXED TOLERANCE	TRIMMER RANGE
C325B C324B	1,429	1,366+47	±17	4.5-75
C326B C327B	1,934	1,890	±17	4.5-75
C329B C328B	298	265	±17	4.5-75
C330B C331B	337.5	308	±17	4.5-75
C333B C332B	1,934	1,839+94	±17	4.5-75
C334B C335B	1,934	1,839+47	±17	4.5-75
C337B C336B	337.5	308	±17	4.5-75
C338B C339B	298	265	±17	4.5-75
C341B C340B	1,934	1,890	±17	4.5-75
C342B C343B	1,429	1,366+47	±17	4.5-75

CAPACITANCES - mmf. (1 KC. BAND)

SYMBOL	THEORETICAL TOTAL
C325A C324A	1,429
C326A C327A	2008
C329A C328A	220
C330A C331A	236
C333A C332A	2008
C334A C335A	2008
C337A C336A	236
C338A C339A	220
C341A C340A	2008
C342A C343A	572



FILTER	INPUT SYM.	INPUT RES.	OUTPUT SYM.	OUTPUT RES.
1 KC	R314 A	80,000 Ω	R315 A	200,000 Ω
2 KC	R314 B	40,000 Ω	R315 B	40,000 Ω
4 KC	R314 C	40,000 Ω	R315 C	40,000 Ω
6 KC	R314 D	40,000 Ω	R315 D	40,000 Ω
10 KC	R314 E	40,000 Ω	R315 E	40,000 Ω

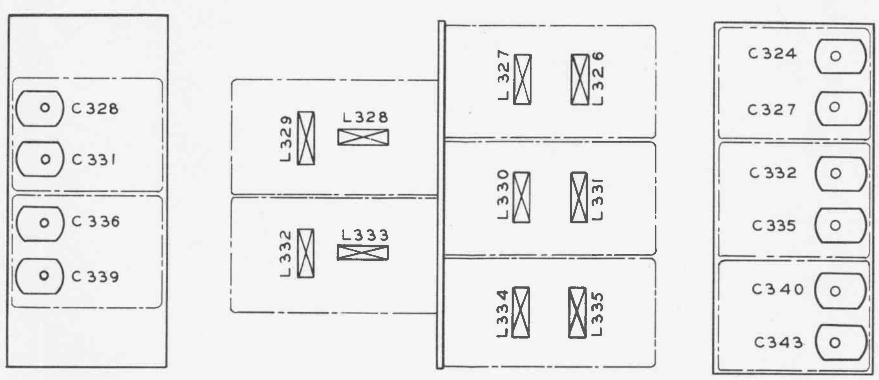
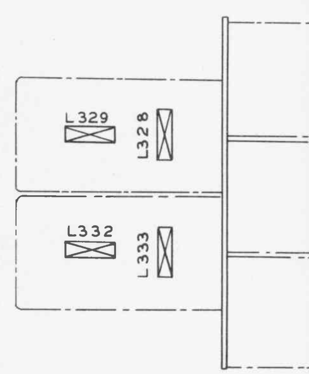


FIG. 1
MECHANICAL LAYOUT
SHOWING RELATIVE POSITIONS OF COILS & CONDENSERS
(FOR 10 KC., 6 KC., 4 KC., & 2 KC. BANDS)



FI
EXCEPT FOR ARRA
L328, L329, L332&
1KC. BAND, OTHER

Figure

2 KC. BAND		
DESIGN CONSTANTS		
$f_{1\infty}$	FREQUENCY OF PEAK ATTENUATION	47,340 ~
f_1	NOMINAL LOWER CUT OFF FREQUENCY	48,800 ~
f_m	MEAN FREQUENCY ($\sqrt{f_1 f_2}$)	50,370 ~
f_2	NOMINAL UPPER CUT OFF FREQUENCY	52,000 ~
$f_{2\infty}$	FREQUENCY OF PEAK ATTENUATION	53,600 ~
"M"	FOR "M DERIVED" SECTIONS	0.8594
R	NOMINAL INTERNAL IMPEDANCE	47,820 Ω
ℛ	NOMINAL TERMINAL IMPEDANCE	34,800 Ω

CIRCUIT ELEMENTS				
INDUCTANCES MH.		MEASUREMENTS MADE AT 1000~		
MBOL	ON CORE IN SHIELD	ON CORE NO SHIELD	NO CORE NO SHIELD	CORE LENGTH
6B	6.96	7.15	3.3	1 IN.
27B	5.17	5.33	2.35	1 IN.
28B	29.58	30.3	15.12	1 IN.
29B	33.49	34.5	17.6	1 IN.
30B	5.17	5.33	2.35	1 IN.
31B	5.17	5.33	2.35	1 IN.
32B	33.49	34.5	17.6	1 IN.
33B	29.58	30.3	15.12	1 IN.
34B	5.17	5.33	2.35	1 IN.
35B	6.96	7.15	3.3	1 IN.

1 KC. BAND		
DESIGN CONSTANTS		
$f_{1\infty}$	FREQUENCY OF PEAK ATTENUATION	48,400~
f_1	NOMINAL LOWER CUT OFF FREQUENCY	49,400~
f_m	MEAN FREQUENCY ($\sqrt{f_1 f_2}$)	50,195~
f_2	NOMINAL UPPER CUT OFF FREQUENCY	51,000~
$f_{2\infty}$	FREQUENCY OF PEAK ATTENUATION	52,000~
"M"	FOR "M DERIVED" SECTIONS	0.9274
R	NOMINAL INTERNAL IMPEDANCE	95,460
ℛ	NOMINAL TERMINAL IMPEDANCE	INPUT + 69,600 OUTPUT + 174,000

CIRCUIT ELEMENTS				
INDUCTANCES MH.		MEASUREMENTS MADE AT 1000~		
SYMBOL	ON CORE IN SHIELD	ON CORE NO SHIELD	NO CORE NO SHIELD	CORE LENGTH
L326A	7.152	7.42	3.63	1 IN.
L327A	5.005	5.23	2.31	1 IN.
L328A	42.49	43.35	17.9	1 IN.
L329A	45.61	46.72	19.5	1 IN.
L330A	5.005	5.23	2.31	1 IN.
L331A	5.005	5.23	2.31	1 IN.
L332A	45.61	46.72	19.5	1 IN.
L333A	42.49	43.35	17.9	1 IN.
L334A	5.005	5.23	2.31	1 IN.
L335A	17.88	18.81	11.7	1 IN.

NOTE 1.–SYMBOLS REFER TO ELECTRICAL PARTS LIST K-882058-501.

NOTE 2.–UNDER COLUMNS "ON CORE-IN SHIELD" FOR SYMBOL L326 TO L335 INCL. OF ALL BAND WIDTHS; ALL VALUES LISTED ARE MEASURED AT 1000~ WITH COIL IN POSITION OF USE INSIDE SHIELDING CAN AND ARE WITHIN ± ½ OF 1 %.

NOTE 3.–NOMINAL FIXED CAPACITY VALUES OF 2KC. BAND ARE EXPERIMENTAL VALUES AND DIFFER SLIGHTLY FROM THEORETICAL.

NOTE 4.–IN NOMINAL FIXED CAPACITY 47 OR 94 MMFD. MAY OR MAY NOT BE ADDED TO EXTEND TRIMMER RANGE AS PER CONDITIONS OF TEST, THIS CAPACITOR MAY BE USED WHERE 47 OR 94 APPEARS IN TABULATED DATA.

NOTE 5.–MANUFACTURING INFORMATION FOR COILS LISTED ON THIS DRAWING IS SHOWN ON T-607811.

NOTE 6.–SYMBOLS L328A L329A L332A & L333A ON 1 KC. BAND, ON CORE, NO SHIELD, ARE AS MEASURED IN MAGNETITE SHELL.

UAL IND.-MH.	
IELD	NO SHIELD
7	1.043
2	.51
	1.043

COUPLINGS				
BETWEEN SYMBOLS	% K		MUTUAL IND.-MH.	
	IN SHIELD	NO SHIELD	IN SHIELD	NO SHIELD
L326B L327B	4.6	6.3	.2775	.395
L328B L329B	0			
L330B L331B	3.4	4.89	.1775	.262
L332B L333B	0			
L334B L335B	4.6	6.3	.2775	.395

COUPLINGS				
BETWEEN SYMBOLS	% K		MUTUAL IND.-MH.	
	IN SHIELD	NO SHIELD	IN SHIELD	NO SHIELD
L326A L327A	2.3			
L328A L329A	0			
L330A L331A	1.65			
L332A L333A	0			
L334A L335A	2.3			

m m f.	
ANCE	TRIMMER RANGE
	4.5-75
	4.5-75
	4.5-75
	4.5-75
	4.5-75
	4.5-75
	4.5-75
	4.5-75
	4.5-75
	4.5-75

CAPACITANCES – m m f.				
SYMBOL	THEORETICAL TOTAL	FIXED		TRIMMER RANGE
		NOMINAL	TOLERANCE	
C325B C324B	1,429	1,366+47	±17	4.5-75
C326B C327B	1,934	1,890	±17	4.5-75
C329B C328B	298	265	±17	4.5-75
C330B C331B	337.5	308	±17	4.5-75
C333B C332B	1,934	1,839+94	±17	4.5-75
C334B C335B	1,934	1,839+47	±17	4.5-75
C337B C336B	337.5	308	±17	4.5-75
C338B C339B	298	265	±17	4.5-75
C341B C340B	1,934	1,890	±17	4.5-75
C342B C343B	1,429	1,366+47	±17	4.5-75

CAPACITANCES – m m f.				
SYMBOL	THEORETICAL TOTAL	FIXED		TRIMMER RANGE
		NOMINAL	TOLERANCE	
C325A C324A	1,429	1,330	±17	6.5-140
C326A C327A	2008	1,860	±17	6.5-140
C329A C328A	220	160	±17	4.5-75
C330A C331A	236	175	±17	4.5-75
C333A C332A	2008	1,860+47	±17	6.5-140
C334A C335A	2008	1,860+94	±17	6.5-140
C337A C336A	236	175	±17	4.5-75
C338A C339A	220	160	±17	4.5-75
C341A C340A	2008	1,860+47	±17	6.5-140
C342A C343A	572	450+94	±17	6.5-140

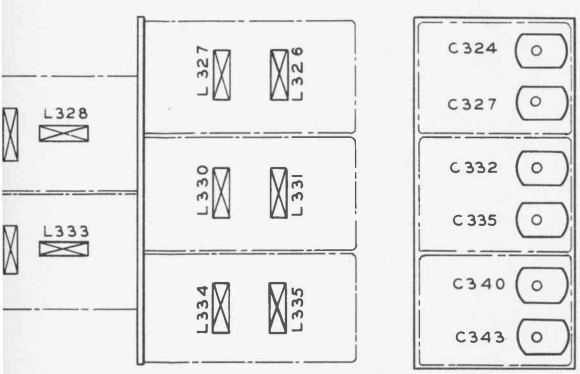


FIG. 1
MECHANICAL LAYOUT
HOWING RELATIVE POSITIONS OF COILS & CONDENSERS
(FOR 10 KC., 6KC., 4 KC., & 2KC. BANDS)

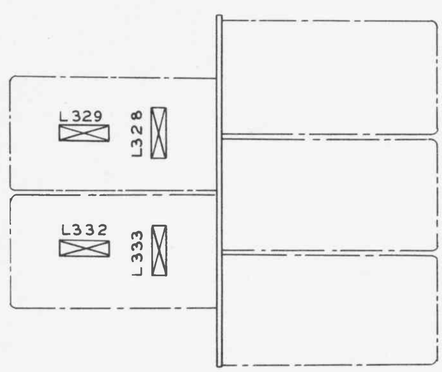
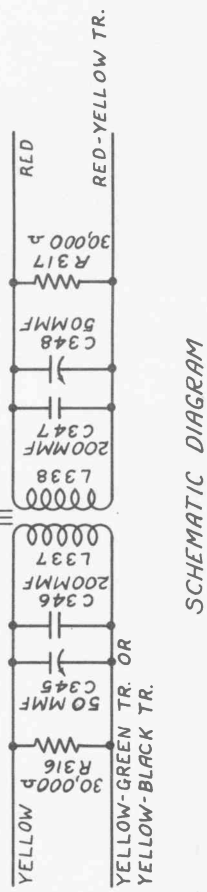
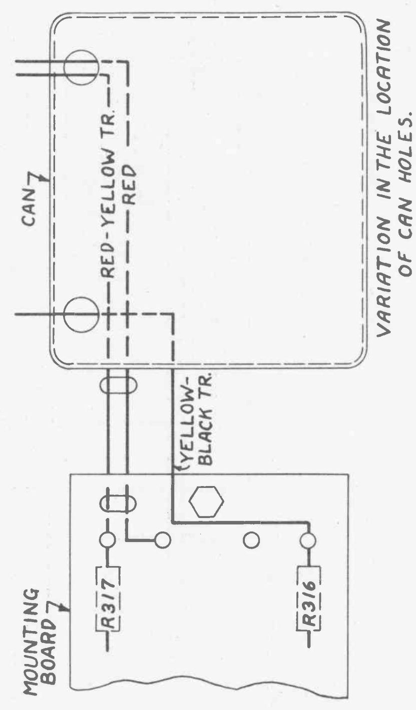


FIG. 2
EXCEPT FOR ARRANGEMENT OF COILS L328, L329, L332 & L333, AND FOR 1KC. BAND, OTHERWISE SAME AS FIG. 1.

Figure 23—Band-Pass Filter Design Data (T-621146—Sub. 1)

T-50 (3RD)	T-50 (2ND)	T-50 (1ST)
WIDE BAND	MEDIUM BAND	NARROW BAND
C 345	C 349	C 353
C 346	C 350	C 354
C 347	C 351	C 355
C 348	C 352	C 356
L 337	L 339	L 341
L 338	L 340	L 342
R 316	R 318	R 320
R 317	R 319	R 321





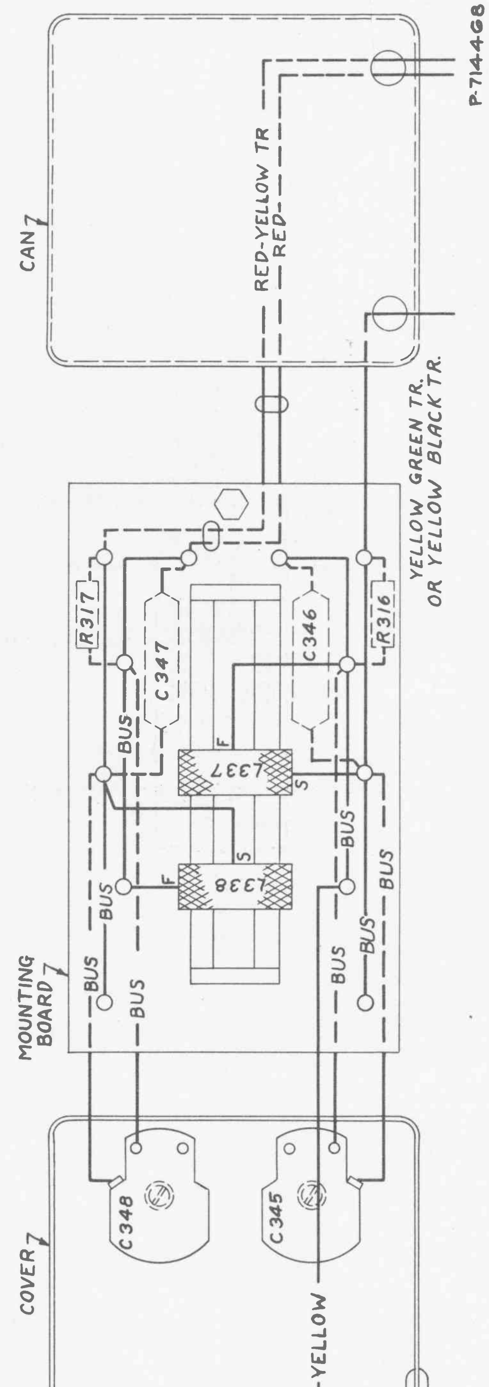


Figure 24—50 KC Tuned Circuit Connections
(P-714468—Sub. 1)

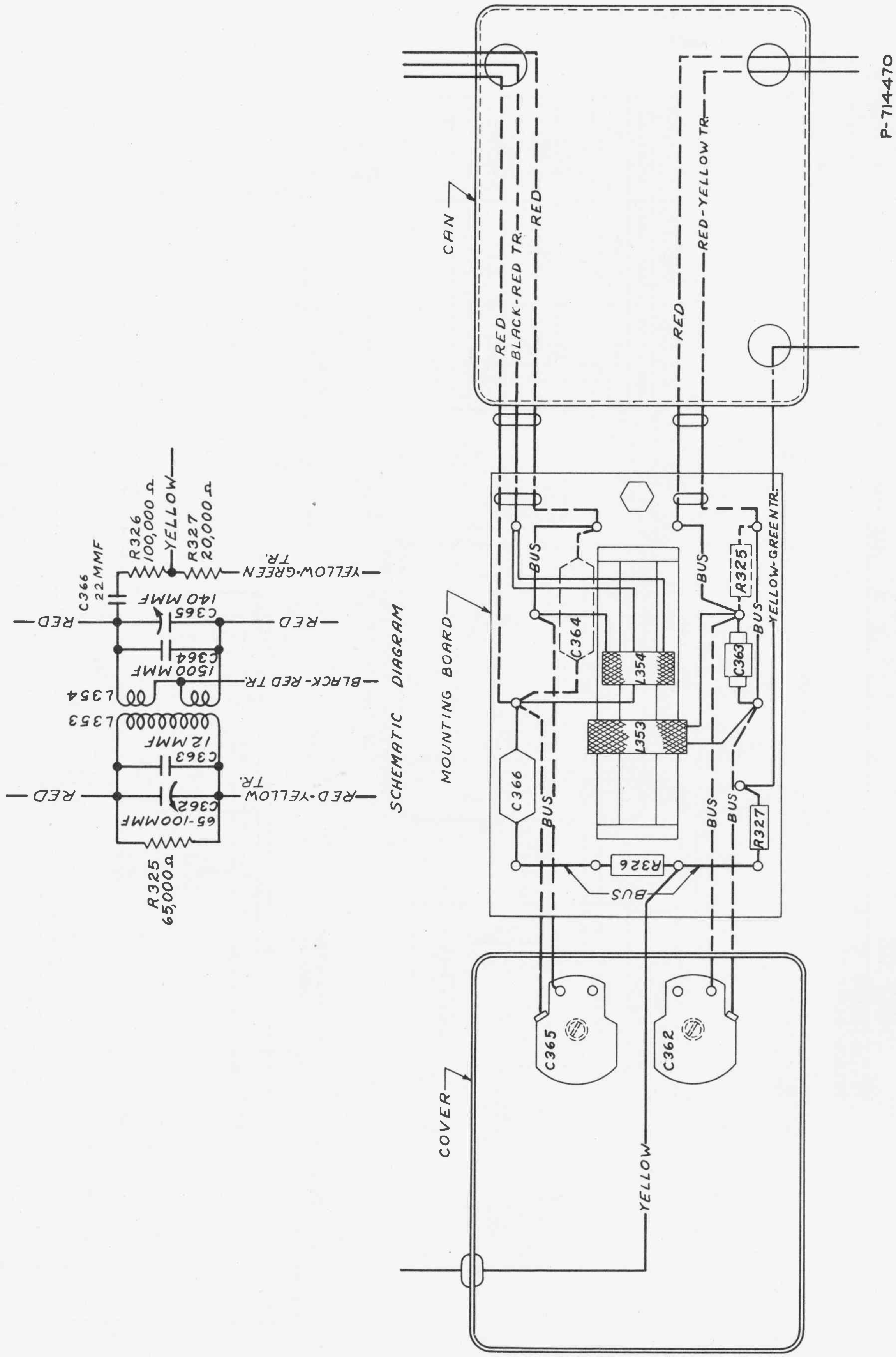


Figure 25—Diode Driver Circuit Connections
(*P*-714470—*Sub.* 1)

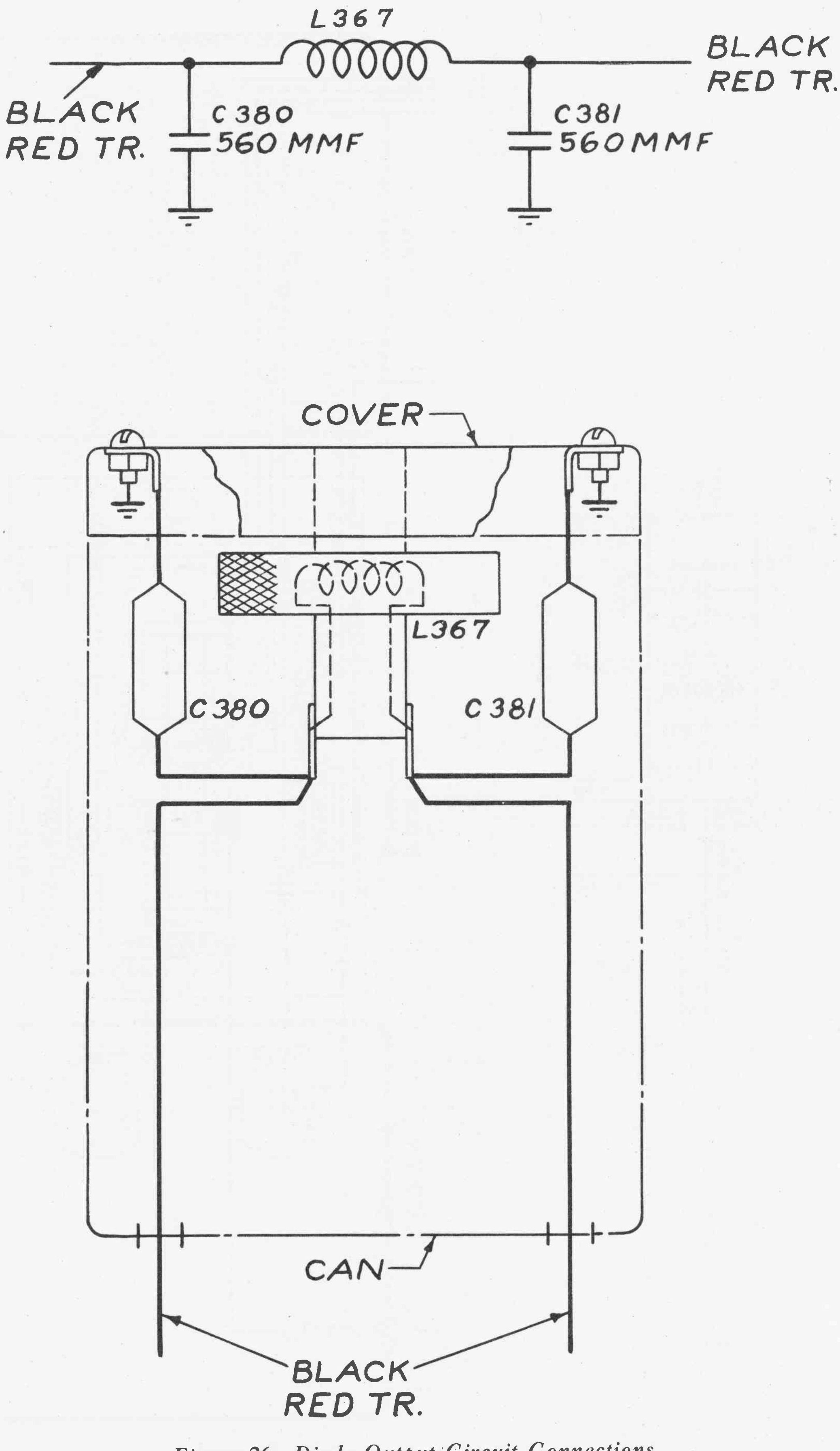


Figure 26—Diode Output Circuit Connections
(K-844529—Sub. 1)

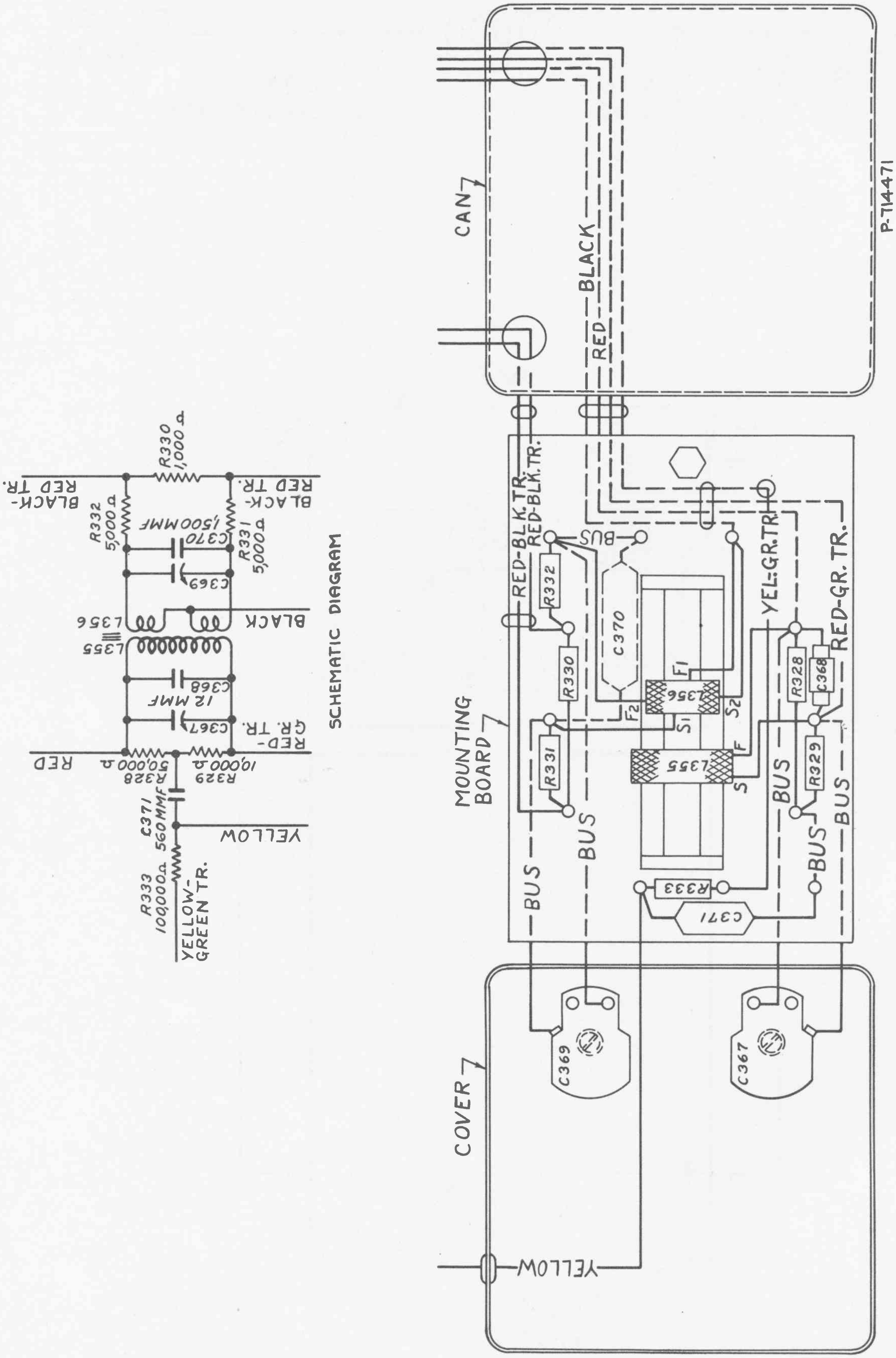


Figure 27—Monitor Coupling Circuit Connections (P-714471—Sub. 1)

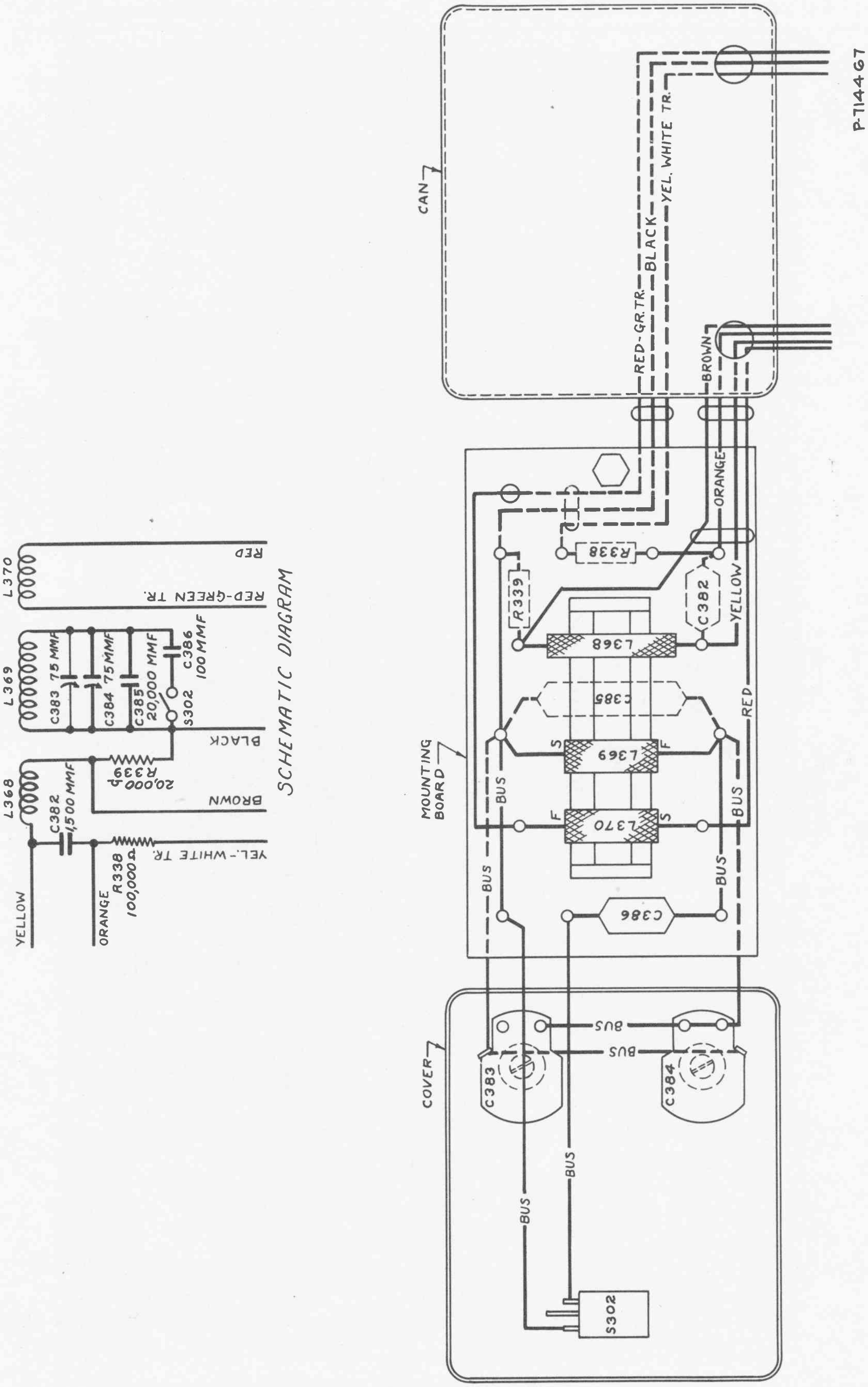


Figure 28—Monitor 50 KC Oscillator Circuit Connections (P-714467—Sub. 0)

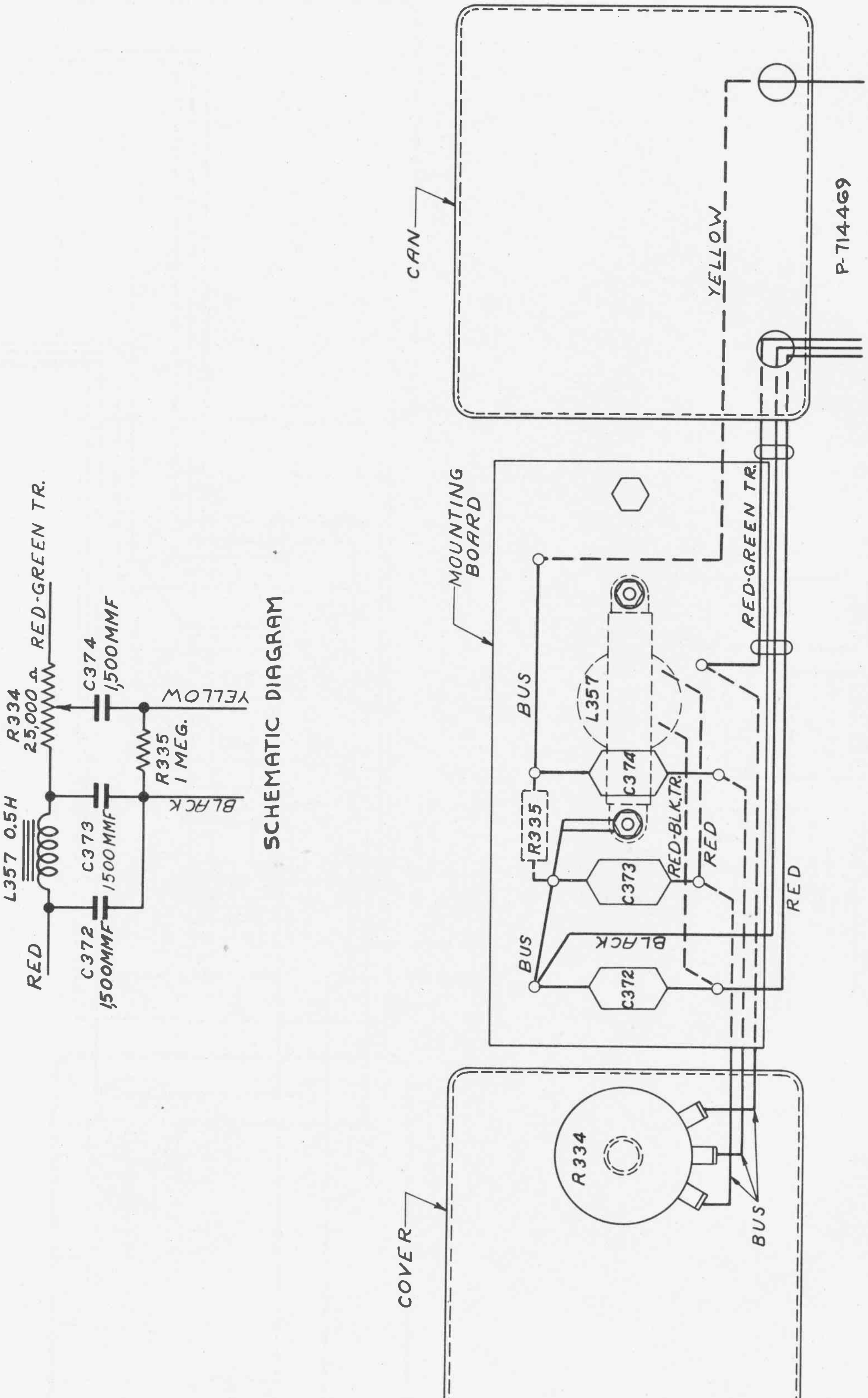


Figure 29—Monitor Volume Control Circuit Connections (P-714469—Sub. 0)