RESTRICTED

ROYAL AUSTRALIAN NAVY

ABR 5043

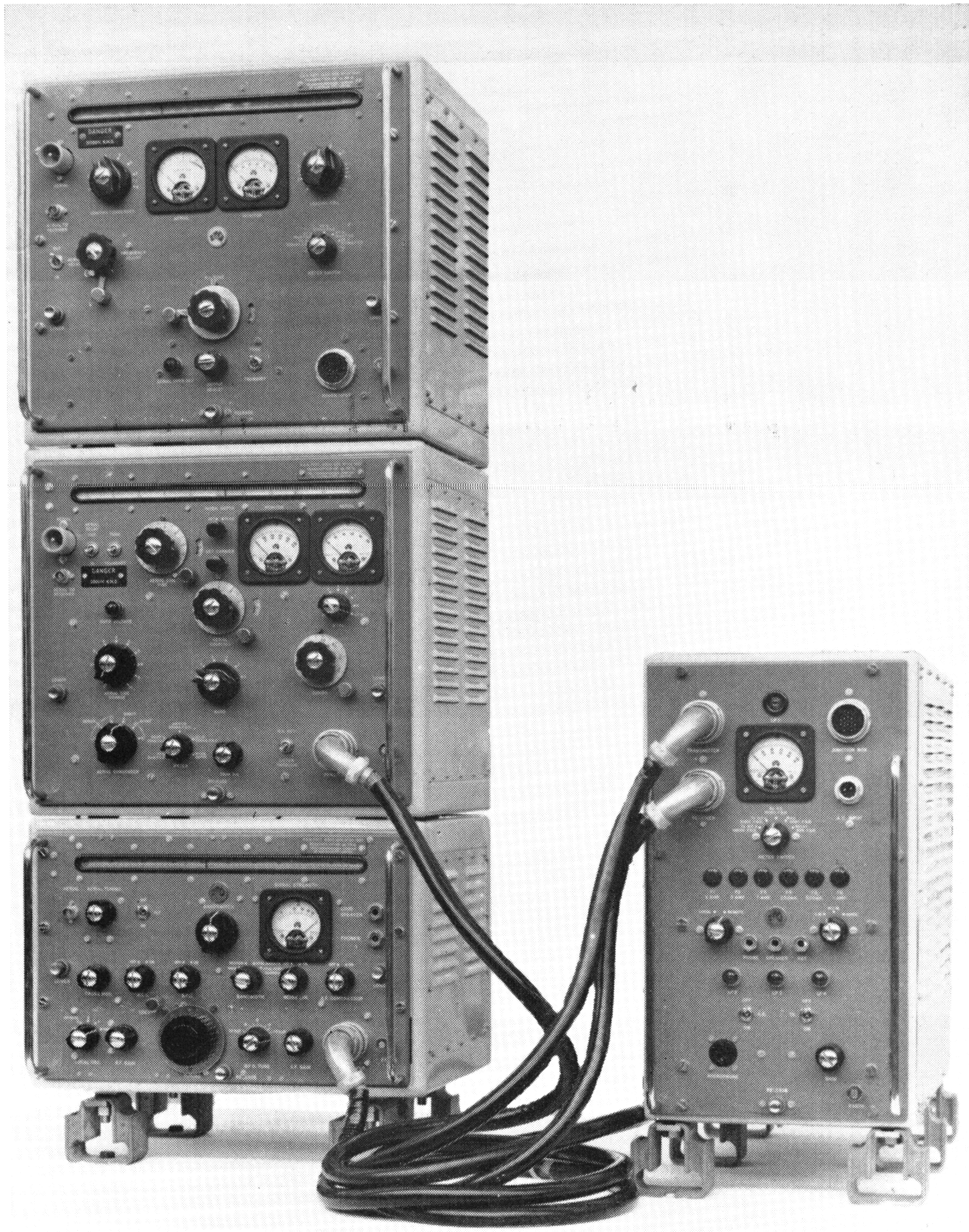
INSTRUCTION MANUAL

FOR

LOW POWER MF - HF

RADIO COMMUNICATION EQUIPMENT

TYPE A618/ACAS



Low Power MF-HF

Radio Communication Equipment

Type A618/ACAS

RAN Patt. 16303

Receiver Outfit ACAS

CONTENTS

CONTENTS (Continued)

SUMMARY OF DATA

RECEIVER OUTFIT ACAS

RAN PATTERN 16303

PURPOSE.

To provide facilities for the reception of signals or speech in the LF, MF, and HF ranges and for "listening through" operation with the associated transmitter.

TYPE OF RECEPTION.

CW, MCW, and VOICE.

FREQUENCY RANGE.

40 Kc/s to 30 Mc/s in nine bands.

PHYSICAL DATA.

Height	$12\frac{7}{8}$ in. (excluding mounting attachments).
Width	$17\frac{3}{4}$ in.
Depth	$15\frac{1}{4}$ in. (including handles).
Mounting Centres	9 in. x 12 in., four holes $\frac{1}{2}$ in. diameter.
Weight	79 lbs.

BRIEF TECHNICAL DESCRIPTION.

The receiver is a 16-valve superheterodyne designed for the reception of type A1, A2, and A3 transmission. Two stages of RF amplification precede the first mixer stage. A second mixer valve is employed on bands 3, 4, 8, and 9 for double conversion. This valve also operates to provide the first stage of IF amplification on the other bands. Two further stages of IF amplification follow. A four-position selectivity switch controls the IF transformer coupling and a crystal gate circuit. A separate AGC amplifier regulates the gain of the IF stages. A noise limiter and an AGC peak limiter are provided. There are three stages of AF amplification with very heavy negative feedback over the last two stages. An audio compressor, which controls the gain of the first AF stage, is provided to limit output changes when AGC is selected OFF.

POWER REQUIREMENTS.

Heaters	5A at 6.3V AC.
Bias	2 mA at 46V.
HT	135 mA at 245V.

CHAPTER 1 — DESCRIPTION

INTRODUCTION.

1. The Receiver Outfit ACAS Pattern 16303 is intended for Naval Service. It forms part of the Low Power MF-HF Radio Communication Equipment RAN Type A618/ACAS which also incorporates: MF Transmitter RAN Pattern 16301, Transmitter RAN Pattern 16302, and Power Supply Unit RAN Pattern 16304.

2. The outfit is an all-wave communication receiver giving continuous coverage over the range 40 Kc/s to 30 Mc/s. It can be used for the reception of A1, A2, or A3 signals. Means are provided to permit "listening through" when used in conjunction with either of the transmitters.

DATA

3. **Frequency Coverage.**

40 Kc/s to 30 Mc/s in nine bands as follows:

Band	Frequency Limits	IF
1	37 to 85 Kc/s	455 Kc/s
2	80 to 176 Kc/s	455 Kc/s
3	160 to 375 Kc/s	1500 Kc/s and 455 Kc/s
4	340 to 800 Kc/s	1500 Kc/s and 455 Kc/s
5	730 to 1710 Kc/s	455 Kc/s
6	1.54 to 3.62 Mc/s	455 Kc/s
7	3.3 to 7.8 Mc/s	455 Kc/s
8	7.0 to 16.6 Mc/s	1500 Kc/s and 455 Kc/s
9	14.8 to 33.2 Mc/s	1500 Kc/s and 455 Kc/s

4. **Class of Emission.**

A1, A2, or A3.

5. **Local Oscillator.**

Provision is made for four crystal locked positions in addition to the variable frequency oscillator.

6. **Selectivity.**

Four degrees of RF and IF selectivity are provided:

Attenuation	Degree of Selectivity			
	Wide	Intermediate	Narrow	Very Narrow
− 6 dB	$> \pm$ 4 Kc/s	$> \pm$ 1.5 Kc/s	$> \pm$ 0.4 Kc/s	—
−30 dB	$< \pm$ 12 Kc/s	$< \pm$ 6 Kc/s	$< \pm$ 2.5 Kc/s	$< \pm$ 0.8 Kc/s
−60 dB	$< \pm$ 20 Kc/s	$< \pm$ 12 Kc/s	$< \pm$ 6 Kc/s	$< \pm$ 6 Kc/s
−90 dB	$< \pm$ 35 Kc/s	$< \pm$ 25 Kc/s	$< \pm$ 20 Kc/s	$< \pm$ 20 Kc/s

7. **Image Rejection.**

40 Kc/s to 1.5 Kc/s .... 90 dB.
1.5 Mc/s to 30 Mc/s .... 55 dB.

8. **IF Breakthrough.**

40 Kc/s to 30 Mc/s .... 90 dB.

9. **Audio Output.**

(1) Separate balanced output circuits are provided for headphone or loudspeaker reception.
(2) Headphone circuit will give 2.5V RMS into 100Ω or greater.
(3) Loudspeaker circuit will give 33V into 500Ω or greater.
(4) Both headphone and loudspeaker circuits may be used simultaneously.
(5) The output voltage, with constant input and a fixed setting of the gain control, will not vary more than 15% over the full range of local impedances.

DATA (Continued).

10. **Sensitivity.**

2.5V RMS into 100Ω on headphones and 33V into 500Ω on loudspeaker will be given both with and without AGC with signal/noise ratios and input levels not worse than the following:

Frequency Range	Selectivity Setting	Signal/Noise Ratio dB	Input Level uV	
			CW	AM
40 to 160 Kc/s	Narrow	10	10	—
160 to 1500 Kc/s	Intermediate	10	10	10
1.5 to 4.0 Kc/s	Wide	10	3	10
4.0 to 10 Mc/s	Wide	20	3	10
10 to 30 Mc/s	Wide	25	10	15

11. **Automatic Gain Control.**

AGC may be switched in or out of circuit as required. It will operate on all classes of emission throughout the full frequency range.

(1) Charge time constant: Approximately 0.1 sec.

(2) Discharge time constant: Approximately 1 sec.

(3) Input/Output characteristic: With RF input level variations from 2 uV to 1V, audio output will not vary by more than 4 dB.

12. **Output Limiting.**

With AGC OFF, AF compressor ON, and receiver adjusted to give standard output (paragraph 9) on A1 input signal 20 dB above level specified in paragraph 10:

Increasing input signal by 60 dB will not increase audio output by more than 6 dB.

13. **Overall Frequency Response.**

With selectivity control in WIDE position, for any carrier frequency in range 1.5 to 30 Mc/s:

Audio output over range 300 to 2500 c/s does not vary more than 8 dB.

14. **Harmonic Distortion.**

With AGC ON and measured on either phones or loudspeaker outputs:

At 400 c/s, not greater than 5% at 30% modulation.

At 400 c/s, not greater than 10% at 80% modulation.

15. **Radiation.**

In normal service, the receiver will not produce a field exceeding 0.1 uV per metre at a distance of one nautical mile.

16. **Power Consumption.**

Heaters	5A at 6.3V AC.
Bias	2 mA at 46V.
HT	135 mA at 245V.

17. **Dimensions and Weight.**

Height	$12\frac{7}{8}$ in., plus 3-1/16 in. for shock/vibration mounts if used separately.
Width	$17\frac{3}{4}$ in.
Depth	$15\frac{1}{4}$ in.
Weight	79 lbs.

DATA (Continued).

18. **Valve Complement.**

Ref.	Commercial Type	Inter-Service Type	Circuit Function
V1	6AM6	CV4014	1st RF Amplifier
V2	6BA6	CV4009	2nd AF Amplifier
V3	ECH81	CV2128	1st Mixer and X1 Oscillator
V4	6AM5	CV4063	VF Oscillator
V5	ECH81	CV2128	IF Amplifier
V6	6BA6	CV4009	2nd Mixer and Oscillator or IF Amplifier
V7	6AB6	CV2526	AGC Amplifier
V8	6BA6	CV4009	IF Amplifier
V9	6BA6	CV4009	Beat Frequency Oscillator
V10	6AL5	CV4007	Diode 1—Signal Rectifier Diode 2—AGC Rectifier
V11	6AL5	CV4007	Diode 1—Noise Limiter Diode 2—AGC Peak Limiter
V12	OA2	CV4020	Voltage Stabiliser
V13	6BA6	CV4009	1st AF Amplifier
V14	6AV6	CV2526	Audio Compressor
V15	6AM6	CV4014	2nd AF Amplifier
V16	6AQ5	CV4019	Audio Output
MR1	OA85	CV448	AGC Clamp Diode

FRONT PANEL CONTROLS.

19. **Bandswitch.**

Rotates the turret to select one of the nine bands into which the frequency range covered by the receiver is divided. This control is also mechanically linked to switch SD which selects double or single conversion.

20. **Tuning.**

Operates C85, C89, C97, and C102 tuning capacitors. Tunes first and second RF stages, first mixer, and VF oscillator.

21. **Aerial Tuning.**

Operates C83 aerial trimmer.

22. **Selectivity.**

Operates switch SC. Controls bandwidth: WIDE, MEDIUM, NARROW, VERY NARROW.

23. **Local Osc.**

Operates switch SA. Selects any one of four crystals or variable frequency oscillator.

24. **AGC.**

Operates switch SD: ON/OFF.

25. **Cross Mod.**

Operates potentiometer RV1. Varies bias on first RF amplifier V1.

26. **RF Gain.**

Operates potentiometer RV4. Adjusts bias volts on V2, V5, and V6.

27. **AF Gain.**

Operates potentiometer RV5. Adjusts AF input to first AF amplifier.

28. **Noise Lim.**

Operates switch SE: ON/OFF.

29. **AF Compressor.**

Operates switch SG: ON/OFF.

DATA (Continued).

FRONT PANEL CONTROLS (Continued).

30. **BFO.**
Operates switch SF: ON/OFF.

31. **BFO Tune.**
Operates C170. BFO tuning control.

32. **HT (On/Off).**
Operates switch SH. Transfers HT supply from receiver to equivalent load resistor.

PRE-SET CONTROLS.

33. **Muting Control.**
Potentiometer RV3. Permits adjustment of the muting bias on V2, V5, and V6.

34. **Tuning Meter Set Zero Control.**
Potentiometer RV2. Permits correction of tuning meter zero indication.

GENERAL DESCRIPTION.

35. The receiver is a 16 valve superhet. designed for the reception of A1, A2, or A3 transmissions. It covers 40 Kc/s to 30 Mc/s in nine bands. Double conversion is used in bands 3, 4, 8, and 9. Additional facilities include amplified AGC, noise limiter, audio compressor, and a signal strength meter.

36. The coils and asociated components for each band are mounted on separate plates fixed to a turret. Each plate is secured with three screws. This method of construction facilitates servicing by permitting easy removal of any one of thirty-six circuits. It also provides maximum shielding of the tuned circuits and employs the minimum length of connecting leads.

37. Aerial connection is via the MF Transmitter RAN Pattern 16301 or the HF Transmitter RAN Pattern 16302 to give common aerial and break-through working.

38. Two stages of RF amplification are provided followed by a combined mixer and oscillator stage. The oscillator stage can be operated either as a VF or a crystal oscillator, any one of four crystals in the range of 1.5 to 12 Mc/s or the VF oscillator being selected by means of switch SA. The frequency of the crystal is chosen to be either 455 or 1500 Kc/s higher than the required input signal according to whether the receiver is operating in a single or double conversion condition. Higher frequencies can be crystal controlled by using harmonics of the crystals if some loss in sensitivity is acceptable.

39. When the receiver is used on bands 3, 4, 8, and 9, the double conversion condition is automatically selected by switch SB ganged to the turret tuner. V5 then operates as a crystal controlled mixer converting from a frequency of 1500 Kc/s to 455 Kc/s. On ranges 1, 2, 5, 6, and 7, V5 operates as the 1st IF amplifier at 455 Kc/s.

40. The IF bandwidth is adjustable between $\pm$ 170 c/s and $\pm$ 5 Kc/s, and includes two crystal gate positions plus an audio filter. Selection is by means of a four-position switch SC.

41. The various voltages required to operate the receiver are obtained from the Power Supply Unit RAN Pattern 16304. The audio output from the receiver is fed via the power supply unit for the remote connection of loudspeaker or headphones.

CIRCUIT DESCRIPTION.

42. **Aerial Circuits.**

The aerial is connected to the receiver by a coaxial socket mounted on the front panel. When it is required to use the receiver in conjunction with either of the associated transmitters, its aerial connection is made via the transmitter which incorporates a changeover relay, thus enabling the receiver and the particular transmitter in use to use the same aerial. The high speed aerial relay provides a short circuit to the receiver when the transmitter is operating.

CIRCUIT DESCRIPTION (Continued).

43. On bands 1 to 6 (40 Kc/s to 3.6 Mc/s) the receiver input circuits are designed for aerials with a capacity of 200 to 600 pF. On bands 7 to 9 (3.3 to 33 Mc/s) the circuits are designed for 75 Ω input. An aerial trimming capacitor has been provided to ensure perfect alignment irrespective of the type of aerial used.

44. The aerial primary circuits on bands 1 to 6 have been designed to resonate at 0.6 times the lowest frequency in each band. They are also heavily damped with fixed resistors. These features tend to keep the gain constant over each band and protect the aerial circuits from damage when tuned unintentionally to powerful transmitters.

45. A rejection circuit comprising C1 and L10 tuned to 455 Kc/s is included in the aerial circuit of band 5 only.

46. **RF Amplifiers.**

Two stages of RF amplification are provided to ensure good image protection on all bands. The first RF amplifier valve V1 and associated components, including the first section of the ganged tuning capacitors, are mounted on a separate sub-chassis near the aerial socket in order to prevent oscillator voltages from being coupled to the aerial circuits. The tuning capacitor is mechanically linked to the remaining three gang unit, which is fitted with an insulated shaft. A variable resistor in the first RF valve cathode circuit is provided as an adjustment to reduce cross modulation. High impedance coupling is used between V1, V2, and V3 of bands 1 to 6, and low impedance on bands 7 to 9.

47. **First Mixer and First Oscillator Circuits.**

In order to provide a complete frequency coverage of 40 Kc/s to 30 Mc/s, it is necessary to employ double conversion over part of the range, thus two mixer stages are employed. When the receiver is operating on bands 1, 2, 5, 6, or 7, the first mixer V3 converts the incoming frequency to 455 Kc/s and the output of V3 is connected to the IF transformer T28. When operating on bands 3, 4, 8, or 9, the incoming signal is first converted to 1500 Kc/s with the output of V3 connected to the IF transformer T29. Selection of either condition is by switch SBa, which is ganged to the turret tuner. The secondary windings of either T28 or T29 are coupled to the second mixer V5 via switch SBb, which is also ganged to the turret. Inductive coupling is employed between the primary and secondary windings of these transformers.

48. The triode section of V3 operates as a Pierce-Colpitts crystal oscillator when the local oscillator/crystal selector switch SA is in positions 1 to 4, providing a selection of any one of four crystals. The switch also disconnects the HT voltage from the VF oscillator valve V4 in those positions. When SA is in position 5, the output from the VF oscillator V4 is coupled via C110 and C100 in series to the oscillator grid of V3. V4 operates as a cathode coupled oscillator on all nine bands.

49. **Second Mixer Circuit.**

On bands 3, 4, 8, and 9, V5 operates as a mixer and converts the input frequency of 1500 Kc/s to 455 Kc/s. As this requires a fixed oscillator frequency of 1955 Kc/s, the triode section of V5 has been designed as a crystal controlled Pierce-Colpitts oscillator.

50. On bands 1, 2, 5, 6, and 7, V5 operates as an IF amplifier at 455 Kc/s, the anode voltage of the oscillator section of V5 being disconnected by SBc.

51. The coupling and Q factor of T28 and T29 are so designed that the gain and selectivity of the stage V5 are approximately the same irrespective of the type of operation used, i.e., amplifier or mixer.

52. **IF Stages.**

Two additional stages of IF amplification are included to provide the main part of the IF selectivity. These include the valves V6 and V8, IF transformers T30, T31, and T32, crystal XL6 (double band pass crystal with peak separation of 600 c/s) and coil L79. Selectivity is controlled by the switch SC, which has four positions: WIDE, MEDIUM, NARROW, VERY NARROW.

CIRCUIT DESCRIPTION (Continued).

53. When WIDE is selected, the transformers are overcoupled. Very symmetrical coupling has been obtained by combining inductive and capacitive coupling in equal amounts. The coupling used is (25 pF + 32 pF) in series with the coupling winding. Additional damping in the form of 100 KΩ resistors is switched across the primary and secondary circuits of T30 only to reduce the "Q."

54. When MEDIUM is selected, the coupling is reduced to 25 pF in series with the coupling winding, the 32 pF capacitor being switched to earth to avoid de-tuning the circuit. Temperature compensation is provided in the form of negative temperature co-efficient capacitors fitted across each circuit.

55. **Crystal Gate.**

The crystal gate circuit is inserted between V6 and V8 and is of the band-pass type. Two crystals in one envelope are employed, the crystal frequencies being 300 c/s either side of 455 Kc/s.

56. When NARROW is selected, the crystal input circuit is fed from the full output of T31 secondary winding, whilst the crystal output is connected to a tuned circuit comprising L79, C144, C145, and C146. C159 is required for neutralizing on the NARROW position only and is switched by SCe.

57. When VERY NARROW is selected, the crystal circuit is connected to a capacitive tap on T31 secondary, when the circuit is fed from approximately 70% of the IF secondary voltage. C152 is used for neutralizing and C142 to compensate for changes in capacity across T31. In addition to the above, C140 is provided to correct for changes in capacity when the selectivity switch is turned to the WIDE and MEDIUM positions.

58. Part of SCf is utilised to vary the bias of V8 in order to keep the IF gain approximately constant irrespective of the selectivity used.

59. **Second Detector.**

The first section of V10 is employed in the detection of the IF signal. The cathode is taken to a negative supply, to overcome distortion due to the noise limiter circuit loading the detector and thus reducing the AC/DC load ratio.

60. **Noise Limiter and AGC Peak Limiter.**

The first section of V11 is used as a series type noise limiter and will effectively reduce interference of the pulse type. The valve, under normal operation, conducts due to the cathode being held at a fixed negative bias with respect to the anode. When a large noise pulse appears across the detector load resistor, it causes an instantaneous high negative voltage to appear at the anode of the noise limiter diode. The cathode voltage will not rise due to the time constant R82 and C167, so the anode becomes negative with respect to the cathode. The valve therefore stops conducting until the anode again becomes positive, thus cutting off the signal for the duration of the noise pulse.

61. The negative bias applied to the detector cathode also sets the "threshold level" for the noise limiter. Changes in this bias vary the operating point at which the noise diode will clip, as the voltage drop across the detector diode load varies the bias on the noise limiter valve. The bias has been adjusted for noise limiting above 70% modulation. However, if a lower setting is required, it can be reduced by removing the short across R87, thus making the limiter operate from approximately 60% modulation. The noise limiter is effectively switched out of circuit by disconnecting C167 via SE.

62. The second diode section of V11 is used as an AGC peak limiter to prevent high noise pulse levels from momentarily reducing the sensitivity of the receiver. When a rapid change in AGC voltage develops from a momentary high noise pulse, this valve conducts and effectively shunts the increased AGC voltage to ground, thus reducing the undesired desensitising effect caused by these pulses.

63. **AGC Circuit.**

The AGC rectifier V10 (second section) is fed from the coupling winding L81 on T32 via the trimmer capacitor C147. The rectified output is connected to the grid of

CIRCUIT DESCRIPTION (Continued).

63. **AGC Circuit** (Continued).

the AGC amplifier V7 via the decoupling circuit R73 and C148, the time constant of which is used to provide a long discharge time of approximately one second. The cathode of V7 is connected via R67 to the negative bias supply. Thus, when the negative grid volts increase, the anode current falls and the cathode becomes more negative. The cathode supplies AGC voltage to the second mixer V5, and the IF valve V6.

64. The second diode of V7 supplies delayed AGC to the second RF valve V2. The delay voltage is obtained from a potential divider R68 and R71 connected across the negative bias supply, and delivers approximately one volt bias to the grid of V2.

65. **AGC Clamp Circuit.**

The rectifier MR1 is connected across the AGC system to prevent the possibility of a positive voltage being inadvertently applied to the AGC distribution line, due to valve failure or other causes. Should for any reason a positive voltage develop on the cathode of the AGC amplifier, this diode will conduct and provide a short circuit to earth.

66. **RF Gain Control.**

The RF gain control operates with the AGC OFF. The gain control potentiometer RV4 is part of a voltage divider chain connected across the HT supply. The controlled bias is applied to V2, V5, and V6 through the switch SD.

67. **Muting Circuit.**

The high speed muting relay RLA is operated from the transmitter keying circuit. When the transmitter is radiating, the relay connects the cathode circuits of V2, V5, and V6 to a higher positive potential which is determined by the setting of the pre-set muting control RV3, thus muting the receiver during the transmission. The muting control is part of the same voltage divider as the RF gain control and the circuit is so arranged that effective muting can be obtained irrespective of the position of the RF gain control or the AGC ON/OFF switch.

68. **Beat Frequency Oscillator.**

The BFO V9 is a cathode coupled oscillator centred on 455 Kc/s, the range of the frequency control C170 being about + 1.2 Kc/s. The circuit has been thoroughly decoupled and screened to prevent radiation. The output is fed to the signal diode via C172, and the oscillator is switched on by SF.

69. **Voltage Regulator.**

The voltage regulator V12 supplies a regulated 150 volts to various valves in the receiver, thus providing the advantages of improved AGC and oscillator stability.

70. **Audio Compressor.**

The audio compressor V14 has been designed to keep the output constant with large changes of input levels which occur with AGC selected OFF. An increase in audio level greater than a predetermined value is amplified by the triode section of the valve, detected by diode No. 2, decoupled and used to bias the first audio amplifier V13. SG is used to switch the compressor in or out of circuit.

71. **Audio Frequency Circuits and Filter.**

Three stages of audio amplification, V13, V15, and V16, are employed. The audio output voltage is held constant with varying loads by the application of very heavy negative feedback over the last two stages. The feedback voltage is taken from a separate winding on the output transformer and fed back via R120 and C198 to the cathode of V15. Feedback is applied over the first audio stage by R101 and C182.

72. Two outputs are provided, 2 watts into a load impedance of 500 Ω for loudspeaker operation, and 2.5 volts into a load impedance of 100 Ω for headphone reception.

73. The audio filter consists of a parallel tuned circuit centred on 1.0 Kc/s. It is switched across the grid circuit of the output valve V16 by the selectivity switch SCb when in the very narrow crystal position only. The filter, in addition to improving the skirt selectivity, reduces the effect of the IF trough.

CIRCUIT DESCRIPTION (Continued).

74. Tuning Meter.

A microammeter wired in series with R34 and RV2 is connected across the cathode resistor R33 of V2. It has been included primarily as a tuning aid and not as an accurate measuring meter. It has, however, been calibrated in decibels above 1 uV at an RF frequency of 1 Mc/s for convenience only. The "set-zero" control RV2 has been provided to allow for adjustment of the zero position in the absence of a signal. Re-adjustment of this control may be required after replacement of V2.

75. HT On/Off Switch.

The switch SH has been fitted as a safety precaution and for convenience in servicing. When turned to the OFF position a load resistor R108 is connected across the HT input terminal to keep the supply voltage from rising unduly.

CHAPTER 2 — OPERATING INSTRUCTIONS

PRELIMINARY OPERATIONS.

1. Connect—
   (1) Power cable from receiver to Power Supply Unit RAN Pattern 16304.
   (2) Aerial cable from receiver to either MF Transmitter RAN Pattern 16301 or HF Transmitter RAN Pattern 16302.
   (3) Receiver to earth.
2. On power supply unit, select AC ON.
3. On receiver, select HT ON.
4. Plug in headphones or loudspeaker into receiver or power supply unit as required.

CONTROL SETTING.

5. **Selectivity Switch.**

In general, when searching for a modulated signal the selectivity switch should be set to MEDIUM. However, should the wanted signal be weak or interference be of a very high order, it is possible to use the NARROW crystal gate position to obtain intelligence.

6. The VERY NARROW crystal position has been designed for the reception of A1 (CW) signals only. In this position an audio filter tuned to 1 Kc/s is also included, thus the BFO tuning control must be adjusted to give a beat note of 1 Kc/s.

7. **Cross Modulation Control.**

This control is used to reduce the gain of the first RF stage to minimise cross modulation from a strong unwanted signal. Normally, it should be left in the maximum gain position. The control may also be used to prevent overloading of the second RF stage if the unwanted signal is large. Used for either purpose, AGC may be ON or OFF.

8. **RF and AF Gain Controls.**

With AGC OFF, correct operation of the RF gain control is essential for the reception of A1 or A2 signals. If the control is turned down too far, particularly on the high frequency bands, the signal to noise ratio may suffer. If the control is turned up excessively on the low frequency bands or in the presence of large signal inputs, overloading may take place. However, when operating with normal telegraphic signals the AF gain control should be turned to maximum and the RF gain control adjusted to give a suitable listening level. This method reduces noise in the key-up position. For A3 reception, AGC should be switched on and the output adjusted with the AF gain control.

9. **AF Compressor Switch.**

The AF COMPRESSOR switch should normally be used to prevent changes in audio level with AGC OFF.

10. **Noise Limiter Switch.**

The noise limiter is most effective with the SELECTIVITY switch selected WIDE.

PRE-SET CONTROL ADJUSTMENT.

11. **Meter Set Zero Control.**

The pre-set control RV2 is provided to adjust the zero indication of the tuning meter. It is located behind the front panel between the jacks for PHONES and LOUDSPEAKER. With the receiver operating on Band 9 with no signal and the aerial removed, the meter should indicate 0 dB.

12. **Muting Control.**

The pre-set muting control RV3 is connected in series with the RF gain control in such a manner that the setting of the gain control has a very small influence on the muting. The pre-set muting control is mounted on a tag board on the underside of the chassis behind the release mechanism and should be adjusted to allow "listening through" when transmitting telegraph information at speeds up to 30 Bauds. This adjustment can be made with AGC either ON or OFF.

CRYSTAL CONTROL OF FIRST OSCILLATOR.

13. Up to four crystals can be mounted on the crystal mounting plate. Access can be obtained by removing cover marked XL 1–4. The mounting plate is located on the top left hand side of the main chassis. The local oscillator switch SA is used to select the appropriate crystal, and the main tuning control is adjusted for optimum signal strength as indicated on the tuning meter.

14. The frequency of the crystal should be chosen to be 455 Kc/s higher than the input signal on bands 5, 6, and 7, and 1500 Kc/s higher than the input signal on band 8 up to 12 Mc/s. If crystal operation is required above 12 Mc/s on band 8, or on band 9, a crystal frequency may be chosen such that its second or third harmonic is 1500 Kc/s above the input frequency. Sensitivity will, however, be reduced.

CHAPTER 3 — INSTALLATION

MOUNTING

1. The receiver may be stacked together with one or both of the associated transmitters. Alternatively, it may be independently bench-mounted. When bench-mounted, it requires six shock-vibration mounts (Admiralty Pattern 66652) and six securing clips (AP 57734). When stacked, only the bottom unit of the stack (which will always be the receiver) requires the six shock-vibration mounts and securing clips.

CONNECTION TO POWER SUPPLY.

2. Connection to the power supply and remote control circuits is via the Power Supply Unit, RAN Pattern 16304, using cable connector CR.903.449.2. Refer to Chapter 3 of Section 4 (Power Supply Unit) for details of this cable connector.

CONNECTION TO AERIAL.

3. Connection to the aerial is via the associated transmitter using coaxial cable connector CR.903.215. The associated transmitter must be either MF Transmitter RAN Pattern 16301 or HF Transmitter RAN Pattern 16302.

CHAPTER 4 — ALIGNMENT AND TEST PROCEDURE

SHIP'S STAFF

INTRODUCTION.

Ship's staff are not to attempt an alignment of RF or IF sections of the receiver except in definite emergency. The following method is to be used for normal performance checks. If alignment is suspected, the set is to be returned to Dockyard for servicing.

(i) **Test Equipment Required.**
CT82.

(ii) **Sensitivity Measurements.**
The receiver must be in the following condition:
(a) Anti-Cross Mod. to Max.
(b) AGC—OFF.
(c) BFO—OFF.
(d) Noise Limiter—OFF.
(e) Bandwidth—Narrow, Medium, and Wide.
(f) AF Compressor—OFF.
(g) RF Gain—Max.
(h) AF Gain—Max.
(i) AE disconnected.
(j) Operation—C.W.
(k) Peak AE trimmer on each frequency.
Connect phone O/P of receiver to socket A of CT82 and read O/P meter, S2 on High, Med., or Low, as required. To convert High and Medium-High add 15.5 dB—Medium add 6 dB.

(iii) **Noise Factor Measurements.**
The receiver must remain under the same conditions as in (ii) above with the exception of (e), which is switched to Narrow-Medium or Wide as required. Instructions are contained in the lid of CT82 under "Wireless Receivers."

BAND	FREQUENCY	BANDWIDTH	SENSITIVITY	NOISE FACTOR	REMARKS
1	40 Kc/s	Narrow	> 31 dB	—	Test Set CT82 gives figures in excess of 20 dB for Noise Factor
	60 Kc/s	Narrow		—	
	80 Kc/s	Narrow		—	
2	85 Kc/s	Narrow	> 31 dB	19 dB	
	125 Kc/s	Narrow		19 dB	
	165 Kc/s	Narrow		19 dB	
3	180 Kc/s	Medium	27 dB to > 31 dB	17 dB	
	262 Kc/s	Medium		18 dB	
	340 Kc/s	Medium		18 dB	
4	380 Kc/s	Medium	25 dB to > 31 dB	14 dB	
	560 Kc/s	Medium		16 dB	
	740 Kc/s	Medium		18 dB	
5	805 Kc/s	Medium	> 31 dB	14 dB	
	1180 Kc/s	Medium		15 dB	
	1560 Kc/s	Medium		18 dB	
6	1.7 Mc/s	Wide	> 31 dB	12 dB	
	2.5 Mc/s	Wide		14 dB	
	3.3 Mc/s	Wide		16 dB	
7	3.7 Mc/s	Wide	> 31 dB	4 dB	
	5.4 Mc/s	Wide		4 dB	
	7.1 Mc/s	Wide		4 dB	
8	7.7 Mc/s	Wide	> 31 dB	4.5 dB	
	11.4 Mc/s	Wide		4.0 dB	
	15.0 Mc/s	Wide		4.0 dB	
9	16 Mc/s	Wide	> 31 dB	5 dB	
	23 Mc/s	Wide		5 dB	
	28 Mc/s	Wide		5 dB	

DOCKYARD

INTRODUCTION.

1. The following test equipment was used in the factory for testing the equipment and is quoted in the text of this chapter. Whilst it is not suggested that this is the only test equipment which is suitable for this purpose, it should be pointed out that other equipment might give somewhat different results, especially meter readings with meters having different impedances.

(1) Hewlett Packard V.T.V.M. Model, 410B.
(2) Philips V.T.V.M., Type VM6005 or GM6015.
(3) Marconi Instruments Signal Generator, Type TF867.
(4) Philips Cathode Ray Oscilloscope, Type GM5653.
(5) Philips Type GM4580 Electronic Switch for noise source.

Note: If experience in due course indicates the necessity, the alignment procedure and readings following will be modified to conform to the use exclusively of of the Naval Common Range of Electrical Test Equipment. In this regard it is here considered that the following units of CRETE would be utilised:

(1) Voltmeter, Electronic, CT54, Patt. 943-2418.
(2) Multimeter, Model 85X, Patt. 943-1524.
(3) Signal Generator, CT218, Patt. 10S/16780.
(4) Oscilloscope, CT386A, Patt. 10S/17003 or CT414, Patt. 943-1632.
(5) Generator, Thermal Noise, CT82, Patt. 943-2415.

AUDIO AMPLIFIER.

2. Connect 500 Ω and 100 Ω loads to the loudspeaker and phone terminals, respectively. With the audio gain control at maximum and the selectivity control set WIDE, connect a tone generator via 100 KΩ resistor to the input side of C179 and adjust to 1000 c/s. Adjust the output of the tone generator to give 33 volts and 2.5 volts RMS at the loudspeaker and phone terminals measured with a VT voltmeter..

3. The following RMS voltages should give a guide to normal operation. The input differences at C179 are due to the tone generator loading the feedback circuit.

Signal Source	Input C179	V13g	V13a	V15g	V15a	V16g	V16a
Detector Output	6.0V	—	—	—	—	—	—
Tone Generator Output	0.52V	0.13V	2.55V	2.5V	18V	12V	104V

AUDIO FILTER CHECK.

4. With the same arrangement as above, but with the selectivity switch set VERY NARROW, vary the frequency of the tone generator. A peak should appear at 1000 c/s ± 100 c/s. Check that the response is:

greater than − 20 dB at − 750 c/s
greater than − 10 dB at + 750 c/s
greater than − 29 dB at + 5 Kc/s

with reference to the peak frequency.

The output load resistors and audio VTVM should be left permanently connected for the remainder of the tests.

INTERMEDIATE FREQUENCY ALIGNMENT.

5. In order to determine accurately the various frequencies used when aligning the IF, the following procedure should be used. For 455 Kc/s, a crystal oscillator should be loosely coupled to the receiver in shunt with the signal generator. The signal generator frequency is then adjusted to give a zero beat signal at the telephone output plug. In order to determine frequencies on the skirts of the IF selectivity curve,

INTERMEDIATE FREQUENCY ALIGNMENT (Continued).

connect an accurate tone generator to the X plates of a CRO, the receiver output to the Y plates, and adjust the controls to present a Lissajous pattern on the screen.

6. **Receiver Settings.**

(1) Insert crystal XL5. Turn AGC OFF. Set RF gain control to maximum position.

(2) Short out the local oscillator at C102.

(3) Short pin 1 of V10 to Earth.

(4) Connect a VTVM to the junction of R80 and R81 and adjust to read DC negative volts.

(5) Adjust turret to Band 2.

(6) Connect Marconi type TF.867 signal generator via a 0.1 uF capacitor to the first mixer gang condenser section C97 (accessible by removing the button on the condenser screening cover) and adjust output to 75Ω, e/1. When aligning the IF circuits, keep the output voltage to approximately −5V.

7. **IF Alignment with MEDIUM Selectivity.**

(1) Turn the selectivity switch to the MEDIUM position. Align T32, T31, T30, and T28 in the order given to 455 Kc/s. In each case, damp the primary with 100 pF capacitors whilst tuning the secondary, and vice versa. This procedure should be repeated twice.

(2) Turn the selectivity switch to the NARROW position. Adjust the signal generator to e/10, 75 Ω, and the attenuator dial to 100 uV.

(3) During alignment, adjust the RF gain control to give −2V at the junction of R80 and R81.

(4) Adjust input frequency to 455 Kc/s + 2 Kc/s. Adjust C159 to give a dip.

(5) Re-set the input frequency to 455 Kc/s and adjust L78 (part of T31S) and L79 (part of T43) in order to reduce the trough to a minimum.

(6) Check the off tune frequencies at −30 dB attenuation. If the response is asymmetrical, reduce L79 inductance slightly to lower output by 1—2 dB, then re-adjust C159 to obtain maximum trough or absorption at these frequencies. If the curve is still not symmetrical, repeat the above.

(7) The bandwidth at −30 dB should be approximately ± 1.7 Kc/s.

(8) The trough at 455 Kc/s should be not greater than 1.5 dB.

8. **IF Alignment with VERY NARROW Selectivity.**

(1) Adjust C142 at 455 Kc/s to produce minimum trough.

(2) Re-tune signal generator to 455 Kc/s + 900 c/s, and adjust C152 to produce a trough or absorption point.

(3) At −60 dB attenuation, re-adjust C152 to produce symmetrical response, which should be less than ± 5 Kc/s.

(4) The trough at 455 Kc/s should be less than 10 dB.

(5) Turn selectivity switch to MEDIUM and adjust C140 to give maximum output at 455 Kc/s, whilst damping T31P with a 100 pF capacitor.

9. **1500 Kc/s IF Alignment.**

(1) Switch turret to band 3.

(2) Connect VTVM to pin 7 or 9 or V5 and measure second oscillator voltage, which should be greater than 10V RMS.

(3) Adjust signal generator frequency to 1500 Kc/s peak T29 primary and secondary.

INTERMEDIATE FREQUENCY ALIGNMENT (Continued).

10. Measure response curve at 455 Kc/s and record results. Figures obtained should be better than the following:

Response	−6 dB	−30 dB	−60 dB	−90 dB
Wide	> ± 4 Kc/s	< ± 12 Kc/s	< ± 20 Kc/s	< ± 35 Kc/s
Intermediate	> ± 1 Kc/s	< ± 6 Kc/s	< ± 12 Kc/s	< ± 25 Kc/s
Narrow	> ± 0.4 Kc/s	< ± 2.5 Kc/s	< ± 6 Kc/s	< ± 20 Kc/s
Very Narrow	> ± 0.4 Kc/s	< ± 0.8 Kc/s	< ± 6 Kc/s	< ± 20 Kc/s

11. **IF Stage Gains.**

Input voltages required at various grids to give −8V at the junction of R80 and R81 are as follows:

Input Voltage	To	IF Frequency
10 uV	C97	455 Kc/s
20 uV	C97	1500 Kc/s
100 uV	V5 Grid	455 Kc/s
10 uV	V6 Grid	455 Kc/s
80 uV	V8 Grid	455 Kc/s

The effect of the trough, which appears in the VERY NARROW selectivity position is considerably reduced by the audio filter, which is switched into circuit in this position only.

12. Finally, remove short from first oscillator circuit.

BFO ALIGNMENT.

13. Put the selectivity switch on the MEDIUM position. Connect the signal generator to C97 via 0.1 uF. Input frequency 455 Kc/s. Switch on BFO. Adjust to band 2. Switch off AGC. Adjust C170 to zero position on scale. Adjust L83 coil slug to produce zero beat in telephones, and check that C170 frequency coverage is greater than ± 1.2 Kc/s.

FIRST OSCILLATOR ALIGNMENT.

14. Either of two methods may be used to adjust the oscillator sections to their correct frequencies.

(1) Check the mechanical position of the gang condenser against its pointer and the mark on the left hand side of each scale.

(2) Connect the signal generator via a 0.01 uF capacitor to the gang condenser section C97.

(3) For each band, adjust the signal generator to the appropriate ganging frequencies (see paragraph 23). Then adjust the oscillator trimming capacitors and inductor tuning slugs to give outputs at the HF and LF ends of the band, respectively.

16. **Method 2.**

Couple the first oscillator section loosely to a sensitive wave meter, or receiver, and adjust the appropriate capacitors and tuning slugs on each range until the oscillator tracking frequencies are correctly positioned on the scale.

FIRST OSCILLATOR ALIGNMENT (Continued).

17. **Typical First Oscillator Output Voltages.**
RMS voltage measured with a VTVM at pin 10 of SA.

Band	LF End of Band	HF End of Band
1	12.0V	12.0V
2	11.0V	11.0V
3	11.5V	11.7V
4	11.0V	11.0V
5	11.0V	11.0V
6	11.0V	11.0V
7	9.5V	8.2V
8	6.8V	5.6V
9	3.0V	3.4V

RF CIRCUIT ALIGNMENT.

18. All RF alignments should be carried out with MEDIUM selectivity. Connect a signal generator to the aerial plug via 13 Ω output impedance and 200 pF capacitor on bands 1 to 6, and via 75 Ω impedance on bands 7 to 9.

19. Align the input circuits at the frequencies given in the table in paragraph 23 by adjusting the trimming capacitors to give maximum output at the HF ends of each band and the inductance tuning slugs for the LF ends of each band. A CW signal should be used and an indication of maximum output can be obtained from a VTVM connected to measure negative volts at the junction of R80 and R81. Do not exceed about −5V. Adjustments must be repeated on the two frequencies of each range until no further increase in output is obtained. The RF gain control should be progressively reduced in order to avoid overloading.

20. A 455 Kc/s trap is inserted on range 5 only. This should be tuned to give minimum output at 455 Kc/s.

21. Check accuracy of calibration on all frequency scales, using the crystal check points on the signal generator.

22. Seal all trimmers and coil cores after they have been finally adjusted. Remove shorting link from pin 1 of V10 to earth. This link is only required when measuring the rectified DC detector voltage.

23.

Band	RF		FIRST OSCILLATOR		First Intermediate Frequency
	Frequency Coverage	Tracking Frequencies	Frequency Coverage	Tracking Frequencies	
1	37 to 85 Kc/s	40 Kc/s 80 Kc/s	492 to 540 Kc/s	495 Kc/s 535 Kc/s	455 Kc/s
2	80 to 176 Kc/s	85 Kc/s 165 Kc/s	535 to 631 Kc/s	540 Kc/s 620 Kc/s	455 Kc/s
3	160 to 375 Kc/s	180 Kc/s 344 Kc/s	1660 to 1875 Kc/s	1680 Kc/s 1844 Kc/s	1500 Kc/s
4	340 to 800 Kc/s	380 Kc/s 740 Kc/s	1840 to 2300 Kc/s	1880 Kc/s 2240 Kc/s	1500 Kc/s
5	730 to 1710 Kc/s	805 Kc/s 1560 Kc/s	1185 to 2165 Kc/s	1260 Kc/s 2015 Kc/s	455 Kc/s
6	1.52 to 3.62 Mc/s	1.7 Mc/s 3.3 Mc/s	1975 to 4.075 Mc/s	2.155 Mc/s 3.755 Mc/s	455 Kc/s
7	3.3 to 7.8 Mc/s	3.7 Mc/s 7.1 Mc/s	3.755 to 8.255 Mc/s	4.155 Mc/s 7.555 Mc/s	455 Kc/s
8	7.0 to 16.6 Mc/s	7.7 Mc/s 15.0 Mc/s	8.5 to 18.1 Mc/s	9.2 Mc/s 16.5 Mc/s	1500 Kc/s
9	14.8 to 33.2 Mc/s	16 Mc/s 28 Mc/s	16.3 to 34.7 Mc/s	17.0 Mc/s 30.5 Mc/s	1500 Kc/s

CIRCUIT ALIGNMENT (Continued).

24. **Tuning Meter Adjustment.**

With the receiver set for AGC operation at a frequency of 1 Mc/s, RV2 should be adjusted to read zero dB in the absence of a signal. In the presence of a signal the meter should indicate dB above 1 uV approximately at 1 Mc/s.

25. **Typical RF Gain Figure.**

The following table gives typical RF gain figures as an aid to fault finding.

Conditions: RF GAIN control ... ... Maximum.
CROSS MOD. control ... ... Maximum.
AGC switch ... ... OFF.
First Oscillator ... ... Shorted out of circuit.

Band	Frequency	Aerial Gain (dB)	First RF Gain (dB)	Second RF Gain (dB)	Input to Aerial Plug (uV)	Tuning Meter Indication (dB)
1	40 Kc/s	3.5	17	14	4	13
	80 Kc/s	6.4	12	11	4	13
2	85 Kc/s	8.5	13	12.5	4	10
	165 Kc/s	9.5	11.5	11	2.5	8
3	180 Kc/s	13	15	13	3	6
	340 Kc/s	12	12	7	5	2
4	380 Kc/s	14	19	15	3	15
	740 Kc/s	11	12	9.5	6	6
5	800 Kc/s	11	18	15.5	3	12
	1560 Kc/s	10	13	11.5	5	12
6	1.7 Mc/s	14	18.5	15.5	3	22
	3.3 Mc/s	8.3	14	12	6	12
7	3.7 Mc/s	17	19	18	2	15
	7.1 Mc/s	17.5	23	20.5	2	38
8	7.7 Mc/s	12.5	17.5	14	4	5
	15.0 Mc/s	13	22	17	6	20
9	16.0 Mc/s	12	20	15.5	8	12
	30.0 Mc/s	9	22	18	8	19

AGC ADJUSTMENT.

26. (1) Turn the CROSS MOD. control to minimum with AGC ON. Adjust turret to band 9 and frequency to 15 Mc/s.

(2) Adjust selectivity control to the MEDIUM position.

(3) Connect the signal generator to the input plug, adjusted to give 1V output. Modulation 400 c/s 30%.

(4) Connect an audio VTVM Type Philips GM60005 or GM6015 to the input side of C179.

(5) Adjust C147 to give maximum output.

(6) Measure AGC at a frequency of 1 Mc/s.

(7) A change in input level of 2 uV to 1V should not vary the output more than 4 dB.

(8) An AGC voltage of between 14 and 18 volts should be produced within a signal greater than 100 mV.

SIGNAL/NOISE MEASUREMENTS.

27. Signal/Noise measurements should be made at the two ganging points of each band, and a check only to be made at the approximate centre of each band. The figures should be better than those given in paragraph 29. In addition, a noise listening test should be carried out by tuning over each band to ensure against absorption effects.

38. Each band can be aligned, have trimmers sealed and figures recorded before proceeding with the following band. It will be necessary to align band 9 first before proceeding with the remaining bands in order to make the AGC adjustment. The signal generator should be adjusted to 400 c/s, 30% modulated signal. In order to obtain the highest signal/noise ratio for a modulated signal, turn the RF gain control to maximum and adjust the AF gain control to give the standard output. For a CW signal, turn the AF gain control to maximum and adjust the RF gain control to give the standard output.

29.

Band	Frequency	Selectivity Switch Position	30% Modulation		CW		Signal/ Noise (dB)
			AGC ON (uV)	AGC OFF (uV)	AGC ON (uV)	AGC OFF (uV)	
1	40 Kc/s	NARROW	—	—	10	10	10
	60 Kc/s	NARROW	—	—	10	10	10
	80 Kc/s	NARROW	—	—	10	10	10
2	85 Kc/s	NARROW	—	—	10	10	10
	125 Kc/s	NARROW	—	—	10	10	10
	165 Kc/s	NARROW	—	—	10	10	10
3	180 Kc/s	MEDIUM	10	10	10	10	10
	262 Kc/s	MEDIUM	10	10	10	10	10
	344 Kc/s	MEDIUM	10	10	10	10	10
4	380 Kc/s	MEDIUM	10	10	10	10	10
	560 Kc/s	MEDIUM	10	10	10	10	10
	740 Kc/s	MEDIUM	10	10	10	10	10
5	805 Kc/s	MEDIUM	10	10	10	10	10
	1180 Kc/s	MEDIUM	10	10	10	10	10
	1560 Kc/s	MEDIUM	10	10	3	3	10
6	1.7 Mc/s	WIDE	10	10	3	3	10
	2.5 Mc/s	WIDE	10	10	3	3	10
	3.3 Mc/s	WIDE	10	10	3	3	10
7	3.7 Mc/s	WIDE	10	10	3	3	10
	5.4 Mc/s	WIDE	20	20	3	3	20
	7.1 Mc/s	WIDE	20	20	3	3	20
8	7.7 Mc/s	WIDE	20	20	3	3	20
	11.4 Mc/s	WIDE	25	25	10	10	25
	15.0 Mc/s	WIDE	25	25	10	10	25
9	16.0 Mc/s	WIDE	25	25	10	10	25
	23.0 Mc/s	WIDE	25	25	10	10	25
	28.0 Mc/s	WIDE	25	25	10	10	25

30. **Crystal Operation Check.**

(1) Select a crystal in the range 1.5—12 Mc/s. For preference, choose a crystal between 10 and 12 Mc/s. The frequency of the crystal should be either 455 or 1500 Kc/s higher than the required input signal according to whether the receiver is operating in a single or double conversion condition.

(2) Insert the crystal in each of the four crystal sockets XL1 to XL4 in turn and check that there is no deterioration in the signal/noise figure.

OVERALL FREQUENCY RESPONSE.

31. Adjust the receiver selectivity control to the WIDE position and the signal generator signal to 1.5 Mc/s. Less than 8 dB variation should be obtained in audio output over the following range of frequencies:

300 c/s, 400 c/s, 600 c/s, 1 Kc/s, 2.5 Kc/s.

DISTORTION MEASUREMENT.

32. Conditions:	Frequency	1 Mc/s.
	AGC	ON.
	Modulation	400 c/s.
	Carrier Input	10 uV.
	Selectivity	MEDIUM.
Loads:	Phones	100 Ω or Infinity.
	Loudspeaker	500 Ω or Infinity.
Distortion:	At 30% Modulation	Less than 5% with and without loads.
	At 80% Modulation	Less than 10% with and without loads.

COMPRESSOR MEASUREMENT.

33. Conditions:	AGC	OFF.
	BFO	ON.
	Input	Normal CW increased by 20 dB.
	AF Compressor	ON.
	Output	Receiver adjusted to give the standard output at an RF of 1 Mc/s.
Compression:	Input Change 60 dB ...	Output change less than 7 dB.

NOISE LIMITER CHECK.

34. Connect an oscilloscope to the input side of C179 via a 10 : 1 attenuator. Connect a Philips Electronic Switch Type GB4580 or other suitable noise source to the receiver input via a small capacitor. Turn AGC OFF and switch NOISE LIM. ON. Inject an RF signal of 500 Kc/s, modulated at 1000 c/s. Increase the modulation control of the signal generator until the negative modulation peaks just start to flatten; this should occur between 70% and 80% modulation.

MUTING CONTROL CHECK.

35. Adjust the receiver to give the standard output and connect either phones or loudspeaker to appropriate plug. Connect 24V to terminals C and H of PLA. This should operate RLA. Vary the pre-set muting control RV3 throughout its range and check that the signal can be varied from normal output to zero output.

CHAPTER 5 — MAINTENANCE

ACCESS.

1. Withdrawal of the Receiver from Its Case.

(1) Unscrew six difficult access screws (slotted hexagonal heads) situated at the sides of the front panel.

(2) Press the RELEASE button (centre bottom of the front panel) and withdraw the receiver from its case on the horizontal runners until it locks in the withdrawn position.

(3) To return the receiver to its case, press the RELEASE button and slide the receiver into the case. Then re-tighten the six difficult access screws.

2. Access to Components Under the Chassis.

(1) Withdraw the receiver from its case.

(2) Lift the front of the receiver chassis by its handles to where it locks in place tilted about 60 deg. from the horizontal.

(3) To return it to the horizontal position, grip the handles and pull down, press the LOWER buttons and allow the weight of the receiver to carry it down to the horizontal position.

3. Removal of the Receiver from Its Case.

Note: Two men are required—one to support the weight of the receiver while the other unscrews the two pivot screws.

(1) Withdraw and tilt the receiver.

(2) Locate the two pivot screws (large round slotted head, $\frac{5}{8}$ in. diameter) holding the receiver to the tilt supports.

()3) Slacken the grub screws locking the pivot screws.

(4) Support the weight of the receiver and remove the pivot screws.

(5) Move the receiver slightly forward to bring the rear guide pins clear of the slides.

(6) Lift the receiver vertically clear of the case and the slides.

(7) When replacing, remember to tighten the grub screws to lock the pivot screws in position.

4. Removal of the Turret.

Caution: DO NOT MOVE THE BANDSWITCH DURING THIS OPERATION AS IT MIGHT OVER-STRAIN THE DRIVE CORD.

(1) Unscrew four screws holding the turret clamps and remove the clamps.

Note: The use of a screw-holding screwdriver simplifies the removal of the front two screws.

(2) Remove the turret by lifting the rear end upwards and backwards to clear the rear frame.

(3) When replacing the turret, make sure that it is in the correct band location and that the indexing arm is correctly engaged in the index plate on the front of the turret. Ensure that the pinion teeth mesh correctly in the rack when lowering the rear end.

5. Access to the Crystal Holders.

Unscrew the two knurled-head screws securing the cover box on top of the first mixer unit and remove the cover.

ACCESS (Continued).

6. **Access to the Second Mixer.**

   (1) Remove the receiver from its case.

   (2) Remove the four screws securing the cover plate at the rear of the receiver and remove the plate.

7. **Access to the BFO.**

   (1) Remove the four screws securing the BFO cover box.

   (2) Slacken the rear screw holding the bakelite protection plate to the audio amplifier. Unscrew it enough to allow the BFO cover box to clear the end of the screw. Lift off the BFO cover box.

   (3) Loosen the rear grub screws in the flexible coupling.

   (4) Remove the four screws securing the BFO box to the chassis and remove the box.

   (5) On re-assembly, ensure that the BFO tuning condenser is in the correct position relative to the BFO TUNE knob.

REPLACEMENT OF DRIVE CABLES.

Note: Refer to Figure 3.3.

8. **Band Selector Drive.**

   (1) Set the turret and the BANDSWITCH to band 1.

   (2) Remove the turret (see paragraph 4).

   (3) Thread the plain end of the replacement cable CR.903.324 through the hole in the cable drum on the turret base assembly and terminate it with the ferrule SPZ.2677, squeezing the ferrule flat.

   (4) Pull the cable so that the ferrule is drawn into the cable drum. Then wind approximately 1½ turns of the cable on to the drum.

   (5) Rotate the dial roller three turns anti-clockwise (viewed from the cable drum end) to load the spring.

   (6) Secure the other end of the replacement drive cable in the slot in one flange of the dial roller cable drum.

   (7) Pull the cable to draw the terminating ferrule up to the flange, then slowly release the dial roller and allow the cable to wind on to the drum.

   (8) Pull on the cable and pass it round the pulley on the adjusting plate.

   (9) Re-set the adjusting plate as necessary to frame the scale for band 1 in the dial window.

   (10) Replace the turret.

9. **Tuning Drive.**

   (1) Set the tuning cursor to the right hand end of the tuning scale.

   (2) Set the tuning capacitors C85, 89, 97, 102 to maximum capacity.

   (3) Attach replacement cable CR.903.323 to the cursor carrier so that the tensioning spring is just to the left of the carrier (see Figure 3.3).

   (4) Thread the replacement cable round the pulleys as indicated in Figure 3.3, securing it to the driving pulley with a loop round the bollard on the pulley.

REPLACEMENT OF DRIVE CABLES (Continued).

10. BFO Tuning Drive.

(1) Set the BFO tuning capacitor C170 to maximum capacity.

(2) Set the driving pulley so that the grub screw in the pulley is located against the stop bracket on the front panel.

(3) Fit the replacement cable CR.903.325 so that the tensioning spring is near the bottom of the driven pulley (see Figure 3.3). Pass two turns of the cable round each pulley, securing it to them with a loop round the bollard as shown in Figure 3.3.

ADJUSTMENT OF RACKS.

11. All racks are provided with slotted sub-mounting plates which provide adjustment for the correct mashing of teeth.

VALVE PIN VOLTAGES.

12. The voltages given in the following table are quoted as a guide to fault location. They are typical figures obtained on the prototype equipment; a fairly wide tolerance is allowable on most readings.

13. The readings were taken with a Hewlett Packard Model 410B vacuum utbe voltmeter with the receiver in the following condition:

(1) No signal.

(2) AGC ON.

(3) BFO OFF.

(4) CROSS MOD. control set to maximum.

(5) AF GAIN control set to minimum.

Valve No.	VALVE PIN VOLTAGES								
	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
1	0	0.9	6.3 AC	0	224	0.9	130	—	—
2	−0.9	0.9	6.3 AC	0	215	105	0.9	—	—
3	95	N	2	6.3 AC	0	225	N	N	N
4	N	N	6.3 AC	0	135	N	135	—	—
5	63	0.5	1.5	6.3 AC	0	227	−6.3	—	—
6	0.6	1.4	6.3 AC	0	219	60	1.35	82	−6.3
7	−0.1	0.6	6.3 AC	0	−0.9	0.62	240	—	—
8	0	13	6.3 AC	0	232	190	13	—	—
9	HT = 130V at Junction of R92 and BFO box tag.								
10	−17	0	6.3 AC	0	0.64	N	−17.2	—	—
11	−7	−0.5	6.3 AC	0	0.02	N	−7.7	—	—
12	145	N	N	N	145	N	0	—	—
13	0	3.6	6.3 AC	0	143	34	3.6	—	—
14	−2.2	0	6.3 AC	0	−0.5	0	17	—	—
15	0	2.4	6.3 AC	0	82	2.4	127	—	—
16	0.02	11	6.3 AC	0	235	240	0.02	—	—

N = Not readily accessible.

CHAPTER 6 — ELECTRICAL PARTS LISTS

For circuit reference see Schematic Diagram (Figure 3.4).

1. RESISTORS.

Circuit Ref.	Value	Description	Code No.	Remarks
R1	100KΩ	¼W 10% Carbon	Z.223.037	Part of T1
R2	47KΩ	¼W 10% Carbon	Z222.214	Part of T2
R3	33KΩ	¼W 10% Carbon	Z.222.193	Part of T3
R4	4.7KΩ	¼W 10% Carbon	Z.222.088	Part of T4
R5	2.7KΩ	¼W 10% Carbon	Z.222.058	Part of T5
R6	2.2KΩ	¼W 10% Carbon	Z.222.046	Part of T6
R7	470Ω	¼W 10% Carbon	Z.221.193	Part of T10
R8	220Ω	¼W 10% Carbon	Z.221.151	Part of T11
R9	220Ω	¼W 10% Carbon	Z.221.151	Part of T12
R10	330Ω	¼W 10% Carbon	Z.221.172	Part of T13
R11	680Ω	¼W 10% Carbon	Z.221.214	Part of T14
R12	1.5KΩ	¼W 10% Carbon	Z.222.025	Part of T15
R13	68KΩ	¼W 10% Carbon	Z.223.016	Part of T12
R14	100KΩ	¼W 10% Carbon	Z.223.037	Part of T13
R15	470Ω	¼W 10% Carbon	Z.221.193	Part of T19
R16	220Ω	¼W 10% Carbon	Z.221.151	Part of T20
R17	220Ω	¼W 10% Carbon	Z.221.151	Part of T21
R18	330Ω	¼W 10% Carbon	Z.221.172	Part of T22
R19	680Ω	¼W 10% Carbon	Z.221.214	Part of T23
R20	1.5KΩ	¼W 10% Carbon	Z.222.025	Part of T24
R21	68KΩ	¼W 10% Carbon	Z.223.016	Part of T21
R22	100KΩ	¼W 10% Carbon	Z.223.037	Part of T22
R23	470KΩ	¼W 10% Carbon	Z.223.121	
R24	47Ω	¼W 10% Carbon	Z.221.067	
R25	10KΩ	½W 10% Carbon	Z.222.132	
R26	100Ω	½W 10% Carbon	Z.221.111	
R28	2.2KΩ	½W 10% Carbon	Z.222.048	
R29	470KΩ	¼W 10% Carbon	Z.223.121	
R30	100KΩ	½W 10% Carbon	Z.223.039	
R31	47Ω	¼W 10% Carbon	Z.221.067	
R32	10KΩ	½W 10% Carbon	Z.222.132	
R33	68Ω	½W 10% Carbon	Z.221.090	
R34	6.8KΩ	½W 10% Carbon	Z 222.111	
R35	2.2KΩ	½W 10% Carbon	Z 222.048	
R36	10KΩ	½W 10% Carbon	Z 222.132	
R37	470KΩ	¼W 10% Carbon	Z 223.121	
R38	220Ω	½W 10% Carbon	Z.221.153	
R39	10KΩ	½W 10% Carbon	Z222.132	
R40	33KΩ	¼W 10% Carbon	Z222.193	
R41	470Ω	½W 10% Carbon	Z.221.195	
R42	27KΩ	¼W 10% Carbon	Z.222.184	
R43	2.2KΩ	½W 10% Carbon	Z.222.048	
R44	1.5KΩ	½W 10% Carbon	Z.222.027	
R46	470KΩ	¼W 10% Carbon	Z.223.121	
R47	10KΩ	¾W 10% Carbon	Z.222.241	
R48	150Ω	½W 10% Carbon	Z.221.132	
R49	6.8KΩ	½W 10% Carbon	Z.222.111	
R50	47KΩ	¼W 10% Carbon	Z.222.214	
R51	4.7KΩ	½W 10% Carbon	Z.222.090	
R52	100KΩ	½W 10% Carbon	Z.223.039	
R53	2.2KΩ	½W 10% Carbon	Z.222.048	
R54	47KΩ	¼W 10% Carbon	Z.222.214	
R55	100KΩ	¼W 10% Carbon	Z.223.037	
R56	100KΩ	¼W 10% Carbon	Z.223.037	
R57	100KΩ	½W 10% Carbon	Z.223.039	
R58	100KΩ	½W 10% Carbon	Z.223.039	4-100K Used in Parallel
R60	3.3KΩ	½W 10% Carbon	Z.222.069	
R63	47KΩ	½W 10% Carbon	Z.222.216	
R64	680KΩ	½W 10% Carbon	Z.223.144	
R65	47KΩ	½W 10% Carbon	Z.222.216	

1. **RESISTORS** (Continued).

Circuit Ref.	Value	Description	Code No.	Remarks
R66	150Ω	½W 10% Carbon	Z.221.132	
R67	100KΩ	½W 10% Carbon	Z.223.039	
R68	100KΩ	½W 10% Carbon	Z.223.039	
R69	2.2KΩ	½W 10% Carbon	Z.222.048	
R70	470KΩ	½W 10% Carbon	Z.223.123	
R71	2.2KΩ	½W 10% Carbon	Z222.048	
R72	33KΩ	½W 10% Carbon	Z.222.195	
R73	470KΩ	½W 10% Carbon	Z.223.123	
R74	2.2MΩ	½W 10% Carbon	Z.223.207	
R75	2.2MΩ	¼W 10% Carbon	Z.223.205	
R76	1KΩ	½W 10% Carbon	Z.222.006	
R77	1.5KΩ	½W 10% Carbon	Z.222.027	
R78	2.2KΩ	½W 10% Carbon	Z.222.048	
R79	220KΩ	¼W 10% Carbon	Z.223.079	
R80	47KΩ	½W 10% Carbon	Z.222.216	
R81	150KΩ	½W 10% Carbon	Z.223.060	
R82	330KΩ	½W 10% Carbon	Z.223.102	
R83	470KΩ	½W 10% Carbon	Z.223.123	
R84	47KΩ	½W 10% Carbon	Z.222.216	
R85	47KΩ	¼W 10% Carbon	Z 222.214.	
R86	470KΩ	½W 10% Carbon	Z.223.123	
R87	39KΩ	½W 10% Carbon	Z.222.207	
R88	150KΩ	½W 10% Carbon	Z.223.060	
R89	120KΩ	½W 10% Carbon	Z.223.051	
R90	1MΩ	½W 10% Carbon	Z.223.165	
R91	47KΩ	½W 10% Carbon	Z.222.216	
R92	3.3KΩ	½W 10% Carbon	Z.222.069	
R94	100KΩ	½W 10% Carbon	Z.223.039	
R95	4.7KΩ	½W 10% Carbon	Z.222.090	
R97	3KΩ	WW 5% 4.5W	Z.113.498	RWV/4K Wire Terminations
R98	100KΩ	½W 10% Carbon	Z.223.039	
R99	150KΩ	½W 10% Carbon	Z.223.060	
R100	100KΩ	½W 10% Carbon	Z.223.039	
R101	2.2MΩ	½W 10% Carbon	Z.223.207	
R102	10KΩ	½W 10% Carbon	Z.222.132	
R103	820KΩ	½W 10% Carbon	Z.223.156	
R104	47KΩ	½W 10% Carbon	Z.222.216	
R105	470KΩ	½W 10% Carbon	Z.223.123	
R106	100KΩ	½W 10% Carbon	Z.223.039	
R107	220KΩ	½W 10% Carbon	Z.223.081	
R108	10KΩ	WW 5% 10W	CZ.011.440.CJ	RWV/1J Ferrule Terminations and Mounting Brackets
R109	470KΩ	½W 10% Carbon	Z.223.123	
R110	470KΩ	¼W 10% Carbon	Z.223.121	
R111	220KΩ	½W 10% Carbon	Z.223.081	
R112	100KΩ	½W 10% Carbon	Z.223.039	
R113	470KΩ	½W 10% Carbon	Z.223.123	
R114	6.8KΩ	½W 10% Carbon	Z.222.111	
R115	1MΩ	½W 10% Carbon	Z.223.165	
R116	1MΩ	½W 10% Carbon	Z.223.165	
R117	220KΩ	½W 10% Carbon	Z.223.081	
R118	100KΩ	½W 10% Carbon	Z.223.039	
R119	470Ω	½W 10% Carbon	Z.221.195	
R120	1.5KΩ	½W 10% Carbon	Z.222.027	
R121	330Ω	½W 10% Carbon	Z.221.174	
R122	220KΩ	½W 10% Carbon	Z.223.081	2-470Ω Used in Parallel
R123 to R128	0.5 MΩ to 1.0 MΩ	½ Watt 10% Carbon		These Resistors may be added across Primary and Secondary Windings of T30, T31, and T32 IF Transformers for fine adjustment of Q.
RV1	5KΩ	WW Potentiometer	CZ.028.211	CLR 1501/264 Style RVW2, Spindle Length 1".
RV2	5KΩ	WW Potentiometer	Z.272.005	Style RAC Spindle Length ⅝" Screwdriver Slot

1. RESISTORS (Continued).

Circuit Ref.	Value	Description	Code No.	Remarks
RV3	5KΩ	WW Potentiometer	Z.272.005	Style RAC Spindle Length ⅝" Screwdriver Slot
RV4	5KΩ	WW Potentiometer	Z.272.006	Style RAD Spindle Length 1"
RV5	2.5MΩ	Carbon Potentiometer	CZ.029.603	Type Z Curve C to Inter-Service Spec. Spindle Length 1"

2. CAPACITORS.

C1	270 pF	Silver Mica 500VW	CZ.066.169.9AA	Type SS 2½% Part of T5
C2	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T1
C3	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T2
C4	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T3
C5	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T4
C6	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T5
C7	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T6
C8	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T7
C9	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T8
C10	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T9
C11	33 pF	Ceramic Disc 500VW	CZ.096.534.1AA	Style C 5% NPO Part of T9
C12	.0047 uF	Silver Mica 500VW	CZ.068.118.AA	Type SM 10% Part of T10
C13	.0047 uF	Silver Mica 500VW	CZ.068.118.AA	Type SM 10% Part of T11
C14	.0022 uF	Silver Mica 500VW	CZ.068.119.AA	Type SM 10% Part of T12
C15	680 pF	Silver Mica 500VW	CZ.066.518.9AA	Type SS 10% Part of T13
C16	150 pF	Silver Mica 500VW	CZ.066.512.9AA	Type SS 10% Part of T14
C17	10 pF	Silver Mica 500VW	CZ.064.928.8AA	Type MS 10% Part of T15
C18	10 pF	Ceramic Disc 500VW	CZ.096.202.1AA	Style A 10% NPO Part of T10
C19	22 pF	Ceramic Disc 500VW	CZ.096.644.AA	Style B 10% NPO Part of T11
C20	15 pF	Ceramic Disc 500VW	CZ.096.645.AA	Style B 10% NPO Part of T12
C21	10 pF	Ceramic Disc	CZ.096.202.1AA	Style A 10% NPO Part of T13
C22	15 pF	Ceramic Disc 500VW	CZ.096.645.AA	Style B 10% NPO Part of T16
C23	22 pF	Ceramic Disc 500VW	CZ.096.644.AA	Style B 10% NPO Part of T17
C24	15 pF	Ceramic Disc 500VW	CZ.096.645.AA	Style B 10% NPO Part of T18
C25	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T10
C26	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T11
C27	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T12
C28	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T13
C29	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T14
C30	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T15
C31	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T16
C32	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T17
C33	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T18
C34	.0047 uF	Silver Mica 500VW	CZ.068.118.AA	Type SM 10% Part of T19
C35	.0047 uF	Silver Mica 500VW	CZ.068.118.AA	Type SM 10% Part of T20
C36	.0022 uF	Silver Mica 500VW	CZ.068.119.AA	Type SM 10% Part of T21
C37	680 pF	Silver Mica 500VW	CZ.066.518.9AA	Type SS 10% Part of T22

2. **CAPACITORS** (Continued).

Circuit Ref.	Value	Description	Code No.	Remarks
C38	150 pF	Silver Mica 500VW	CZ.066.512.9AA	Type SS 10% Part of T23
C39	10 pF	Silver Mica 500VW	CZ.064.928.AA	Type MS 10% Part of T24
C40	10 pF	Ceramic Disc 500VW	CZ.096.202.1AA	Style A 10% NPO Part of T19
C41	22 pF	Ceramic Disc 500VW	CZ.096.644.AA	Style B 10% NPO Part of T20
C42	15 pF	Ceramic Disc 500VW	CZ.096.645.AA	Style B 10% NPO Part of T21
C43	22 pF	Ceramic Disc 500VW	CZ.096.644.AA	Style B 10% NPO Part of T22
C44	15 pF	Ceramic Disc 500VW	CZ.096.645.AA	Style B 10% NPO Part of T23
C45	15 pF	Ceramic Disc 500VW	CZ.096.645.AA	Style B 10% NPO Part of T25
C46	22 pF	Ceramic Disc 500VW	CZ.096.644.AA	Style B 10% NPO Part of T26
C47	10 pF	Ceramic Disc 500VW	CZ.096.202.1AA	Style A 10% NPO Part of T27
C48	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T19
C49	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T20
C50	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T21
C51	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T22
C52	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T23
C53	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T24
C54	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T25
C55	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T26
C56	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T27
C57	10 pF	Ceramic Disc 500VW	CZ.096.202.1AA	Style A 10% NPO Part of T24
C58	27 pF	Silver Mica 500VW	CZ.064.532.8AA	Type MS ± 1 pF Part of T34
C59	60 pF	Silver Mica 500VW	CZ.064.513.8AA	Type MS 2½% Part of T35
C60	30 pF	Ceramic Disc 500VW	CZ.096.556.AA	Style C 5% NPO Part of T35
C61	45 pF	Silver Mica 500VW	CZ.064.533.8AA	Type MS ± 1 pF Part of T36
C62	33 pF	Ceramic Disc 500VW	CZ.096.534.1AA	Style C 5% NPO Part of T36
C63	107 pF	Silver Mica 500VW	CZ.066.162.9AA	Type SS 2½% Part of T37
C64	47 pF	Ceramic Disc 500VW	CZ.096.538.AA	Style C 5% NPO Part of T37
C65	490 pF	Silver Mica 500VW	CZ.066.160.9AA	Type SS 2½% Part of T38
C66	22 pF	Ceramic Disc 500VW	CZ.096.557.AA	Style B 5% NPO Part of T38
C67	1040 pF	Silver Mica 500VW	CZ.067.734.AA	Type SM 2½% Part of T39
C68	30 pF	Ceramic Disc 500VW	CZ.096.556.AA	Style C 5% NPO Part of T39
C69	1510 pF	Silver Mica 500VW	CZ.067.741.AA	Type SM 2½% Part of T40
C70	22 pF	Ceramic Disc 500VW	CZ.096.557.AA	Style B 5% NPO Part of T40
C71	1670 pF	Silver Mica 500VW	CZ.067.742.AA	Type SM 2½% Part of T41
C72	33 pF	Ceramic Disc 500VW	CZ.096.534.1AA	Style C 5% NPO Part of T41
C73	47 pF	Ceramic Disc 500VW	CZ.096.538.AA	Style C 5% NPO Part of T42
C74	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T34
C75	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T35
C76	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T36
C77	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T37
C78	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T38
C79	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T39
C80	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T40
C81	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T41
C82	25 pF	Variable	CZ.113.709.AA	Type 82755/25E Insul Rotor Part of T42
C83	3-30 pF	Variable Trimmer	CZ.113.711	Cat. No. 185.30 Type 185
C84	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B 5% N750

2. **CAPACITORS** (Continued).

Circuit Ref.	Value	Description	Code No.	Remarks
C85	13-320 pF	Single Gang Variable	C.002.DC/320E	
C86	.1 uF	Paper ± 20% 350VW	Z.115.095	
C87	.1 uF	Paper ± 20% 350VW	Z.115.095	
C88	.1 uF	Paper ± 20% 350VW	Z.115.095	
C89	13-320 pF	Triple Gang Variable	C.002.ZZ.54	
C90	.1 uF	Paper ± 20% 350VW	Z.115.095	
C91	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B 5% N750
C92	.01 uF	Ceramiseal Paper 500VW	CZ.074.504.3D	CSM/M511 20%
C93	.1 uF	Paper ± 20% 350VW	Z.115.095	
C94	.1 uF	Paper ± 20% 350VW	Z.115.095	
C95	.1 uF	Paper ± 20% 350VW	Z.115.506	
C96	.1 uF	Paper ± 20% 350VW	Z.115.631	
C97		Part of Gang (See C89)		
C98	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B 5% N750
C99	.1 uF	Paper ± 20% 200VW	Z.115.631	
C100	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B 5% N750
C101	330 pF	Silver Mica 500VW	CZ.066.135.8AA	Type MS 5%
C102		Part of Gang (See C89)		
C103	22 pF	Ceramic Tubular 500VW	CZ.096.558.AA	Style B NPO 5%
C104	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B N750 5%
C105	.01 uF	Paper 25% 200VW	Z.115.627	
C106	22 pF	Ceramic Tubular 500VW	CZ.096.558.AA	Style B NPO 5%
C107	22 pF	Ceramic Tubular 500VW	CZ.096.558.AA	Style B NPO 5%
C108	.01 uF	Paper 25% 350VW	Z.115.625	
C109	22 pF	Ceramic Tubular 500VW	CZ.096.558.AA	Style B NPO 5%
C110	330 pF	Silver Mica 500VW	CZ.066.135.8AA	Type MS 5%
C111	.01 uF	Paper ± 20% 350VW	Z.115.552	
C112	470 pF	Silver Mica 500VW	CZ.066.150.9AA	Type SS 2½%
C113	470 pF	Silver Mica 500VW	CZ.066.150.9AA	Type SS 2½%
C114	470 pF	Silver Mica 500VW	CZ.066.150.9AA	Type SS 2½%
C115	470 pF	Silver Mica 500VW	CZ.066.150.9AA	Type SS 2½%
C116	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B 5% N750
C117	.01 uF	Paper ± 25% 200VW	Z.115.627	
C118	.01 uF	Paper ± 25% 200VW	Z.115.627	
C119	.01 uF	Paper ± 25% 200VW	Z.115.627	
C120	.01 uF	Paper ± 25% 200VW	Z.115.627	
C121	.01 uF	Paper ± 25% 200VW	Z.115.627	
C122	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B 5% N750
C123	150 pF	Silver Mica 500VW	CZ.066.172.8AA	Type MS 2½%
C124	30 pF	Silver Mica 500VW	CZ.064.534.8AA	Type MS 5%
C125	.01 uF	Paper ± 25% 350VW	Z.115.625	
C126	80 pF	Ceramic Disc 500VW	CZ.096.546.AA	Style C N750 2% } Part of T30P
C127	390 pF	Silver Mica 500VW	CZ.066.171.9AA	Type SS 2½% } Part of T30P
C128	.01 uF	Paper ± 25% 350VW	Z.115.625	
C129	25 pF	Ceramic Disc 500VW	CZ.096.559.AA	Style B NPO ± 1 pF } Part of T30S
C130	32 pF	Ceramic Disc 500VW	CZ.096.560.AA	Style C NPO ± 1 pF } Part of T30S
C131	330 pF	Silver Mica 500VW	CZ.066.124.9AA	Type SS 2½% } Part of T30S
C132	80 pF	Ceramic Disc 500VW	CZ.096.546.AA	Style C N750 5% } Part of T30S
C133	.01 uF	Silver Mica 500VW	CZ.067.710.3AA	Type SM 5%
C134	1.0 uF	Tropicap Paper 150VW	CZ.078.003.EH	Type W49 25% PVC Sleeve
C135	.01 uF	Ceramiseal Paper 500VW	CZ.074.504.3D	CSM/M511 20%
C136	.1 uF	Paper ± 20% 350VW	Z.115.095	
C137	220 pF	Silver Mica 500VW	CZ.066.526.8AA	Type MS 10%
C138	.01 uF	Ceramiseal Paper 500VW	CZ.074.504.3D	CSM/M511 20%
C139	80 pF	Ceramic Disc 500VW	CZ.096.546.AA	Style C N750 2% Part of T31P
C140	25 pF	Variable	CZ.113.709	Type 82755/25E Insul Rotor
C142	25 pF	Variable	CZ.113.709	Type 82755/25E Insul Rotor
C143	390 pF	Silver Mica 500VW	CZ.066.171.9AA	Type SS 2½% Part of T31P
C144	1000 pF	Silver Mica 500VW	CZ.065.718.9AA	Type SS 1%
C145	10 pF	Ceramic Tubular 500VW	CZ.096.202.5AA	Style A NPO ±1 pF
C146	1000 pF	Silver Mica 500VW	CZ.065.718.9AA	Type SS 1%
C147	25 pF	Variable	CZ.113.709	Type 82755/25E Insul Rotor
C148	.1 uF	Paper ± 20% 350VW	Z.115.095	Two .1 uF Used in Parallel
C149	25 pF	Ceramic Disc 500VW	CZ.096.559.AA	Style B NPO ± 1 pF Part of T31S

2. CAPACITORS (Continued).

Circuit Ref.	Value	Description	Code No.	Remarks
C150	5 pF	Ceramic Tubular 500VW	CZ.096.328.AA	Style A NPO ± 1 pF
C151	32 pF	Ceramic Disc 500VW	CZ.096.560.AA	Style C NPO ± 1 pF Part of T31S
C152	10 pF	Variable	CZ.113.508	Type 82755/10E Insul Rotor
C153	.01 uF	Ceramiseal Paper 500VW	CZ.074.504.3D	CSM/M511 20%
C154	70 pF	Ceramic Disc 500VW	CZ.096.545.AA	Style C N750 2% Part of T31S
C155	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B N750 5%
C156	1000 uF	Silver Mica 500VW	CZ.066.151.9AA	Type SS 2½% } Part of T31S
C157	490 pF	Silver Mica 500VW	CZ.066.160.9AA	Type SS 2½% } Part of T31S
C158	.1 uF	Paper ± 20% 350VW	Z.115.095	
C159	10 pF	Variable	CZ.113.508	Type 82755/10E Insul Rotor
C160	.01 uF	Ceramiseal Paper 500VW	CZ.074.504.3D	CSM/M511 20%
C161	80 pF	Ceramic Disc 500VW	CZ.096.546.AA	Style C N750 2% } Part of T32P
C162	390 pF	Silver Mica 500VW	CZ.066.171.9AA	Type SS 2½% } Part of T32P
C163	25 pF	Ceramic Disc 500VW	CZ.096.559.AA	Style B NPO ± 1 pF } Part of T32S
C164	32 pF	Ceramic Disc 500VW	CZ.096.561.AA	Style B NPO ± 1 pF } Part of T32S
C165	330 pF	Silver Mica 500VW	CZ.066.124.9AA	Type SS 2½% } Part of T32S
C166	80 pF	Ceramic Disc 500VW	CZ.096.546.AA	Style C N750 2% } Part of T32S
C167	.1 uF	Paper ± 20% 200VW	Z.115.631	
C168	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B N750 5%
C169	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B N750 5%
C170	3-30 pF	Variable	CZ.113.710	Cat. No. 185.30 Type 185
C171	.002.uF	Silver Mica 500VW	CZ.067.703.2AA	Type SM 2½% Part of T44
C172	12 pF	Ceramic Tubular 500VW	CZ.096.646.AA	Style A NPO ± 1 pF
C173	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B N750 5 %
C174	.002 uF	Silver Mica 500VW	CZ.068.104.2AA	Type SM 10%
C175	.01 uF	Paper ± 25% 200VW	Z.115.627	
C176	.1 uF	Paper ± 20% 350VW	Z.115.095	
C177	.01 uF	Paper ± 25% 200VW	Z.115.627	
C178	.01 uF	Paper ± 25% 200VW	Z.115.627	
C179	390 pF	Silver Mica 500VW	CZ.066.531.9AA	Type SS 10%
C180	.1 uF	Paper 20% 350VW	Z.115.095	
C181	1.0 uF	Paper 20% 350VW	Z.115.632	
C182	.01 uF	Silver Mica 500VW	CZ.067.710.3AA	Type SM 5%
C183	.1 uF	Paper 20% 350VW	Z.115.506	
C184	.01 uF	Silver Mica 500VW	CZ.067.710.3AA	Type SM 5%
C185	.1 uF	Paper 20% 350VW	Z.115.506	
C186	16 uF	Electrolytic 450VW	Z.145.507	
C187	.1 uF	Paper 20% 350VW	Z.115.506	
C188	100 pF	Ceramic Tubular 500VW	CZ.096.500.2AA	Style B N750 5%
C189	.01 uF	Silver Mica 500VW	CZ.067.710.3AA	Type SM 5%
C190	.01 uF	Silver Mica 500VW	CZ.067.710.3AA	Type SM 5%
C191	.01 uF	Paper 20% 350VW	Z.115.552	
C192	.01 uF	Paper 20% 350VW	Z.115.552	
C193	.1 uF	Paper 20% 350VW	Z.115.506	
C194	.1 uF	Paper 20% 350VW	Z.115.506	
C195	.01 uF	Silver Mica 500VW	CZ.067.710.3AA	Type SM 5%
C196 C190	.01 uF	Silver Mica 500VW	CZ.067.303.1AA	Type SM 1% Two .01 uF Used in Parallel
C197	.01 uF	Silver Mica 500VW	CZ.067.710.3AA	Type SM 5%
C198	1.0 uF	Tropicap Paper 150VW	CZ.078.003.EH	Type W49 25% PVC Sleeve
C199	.01 uF	Paper 25% 350VW	Z.115.625	
C200	22 pF	Ceramic Disc 500VW	CZ.096.644.AA	Style B 10% NPO Part of T34

3. AERIAL COILS.

T1		Band 1	CZ.320.047.2	
T2		Band 2	CZ.320.048.1	
T3		Band 3	CZ.320.049.1	
T4		Band 4	CZ.320.050.1	
T5		Band 5	CZ.320.051.2	
T6		Band 6	CZ.320.052.1	

3. **AERIAL COILS** (Continued).

Circuit Ref.	Value	Description	Code No.	Remarks
T7		Band 7	CZ.320.053.1	
T8		Band 8	CZ.320.054.2	
T9		Band 9	CZ.320.055.1	
{ L1		Band 1 Primary	CZ.320.070	Part of T1 } On One Former
{ L2		Band 1 Secondary		
L3		Band 1 Primary	CZ.320.071	Part of T1
{ L4		Band 2 Primary	CZ.320.072	Part of T2 } On One Former
{ L5		Band 2 Secondary		
{ L6		Band 3 Primary	CZ.320.073	Part of T3 } On One Former
{ L7		Band 3 Secondary		
{ L8		Band 4 Primary	CZ.320.074	Part of T4 } On One Former
{ L9		Band 4 Secondary		
L10	455 Kc/s	IF Filter Coil	CZ.320.734	Part of T5
{ L11		Aerial Coil Band 5 Pri.	CZ.320.075	Part of T5 } On One Former
{ L12		Aerial Coil Band 5 Sec.		
{ L13		Aerial Coil Band 6 Pri.	CZ.320.076	Part of T6 } On One Former
{ L14		Aerial Coil Band 6 Sec.		
{ L15		Aerial Coil Band 7 Pri.	CZ.320.077	Part of T7 } On One Former
{ L16		Aerial Coil Band 7 Sec.		
{ L17		Aerial Coil Band 8 Pri.	CZ.320.078.1	Part of T8 } On One Former
{ L18		Aerial Coil Band 8 Sec.		
{ L19		Aerial Coil Band 9 Pri.	CZ.320.079	Part of T9 } On One Former
{ L20		Aerial Coil Band 9 Sec.		
{ L21		1st RF Coil Band 1 Pri.	CZ.320.353	Part of T10 } On One Former
{ L22		1st RF Coil Band 1 Sec.		
{ L23		1st RF Coil Band 2 Pri.	CZ.320.354	Part of T11 } On One Former
{ L24		1st RF Coil Band 2 Sec.		
{ L25		1st RF Coil Band 3 Pri.	CZ.320.337	Part of T12 } On One Former
{ L26		1st RF Coil Band 3 Sec.		
{ L27		1st RF Coil Band 4 Pri.	CZ.320.338	Part of T13 } On One Former
{ L28		1st RF Coil Band 4 Sec.		
{ L29		1st RF Coil Band 5 Pri.	CZ.320.339	Part of T14 } On One Former
{ L30		1st RF Coil Band 5 Sec.		
{ L31		1st RF Coil Band 6 Pri.	CZ.320.340	Part of T15 } On One Former
{ L32		1st RF Coil Band 6 Sec.		
{ L33		1st RF Coil Band 7 Pri.	CZ.320.341	Part of T16 } On One Former
{ L34		1st RF Coil Band 7 Sec.		
{ L35		1st RF Coil Band 8 Pri.	CZ.320.342.1	Part of T17 } On One Former
{ L36		1st RF Coil Band 8 Sec.		
{ L37		1st RF Coil Band 9 Pri.	CZ.320.343	Part of T18 } On One Former
{ L38		1st RF Coil Band 9 Sec.		
{ L39		2nd RF Coil Band 1 Pri.	CZ.320.344	Part of T19 } On One Former
{ L40		2nd RF Coil Band 1 Sec.		
{ L41		2nd RF Coil Band 2 Pri.	CZ.320.345	Part of T20 } On One Former
{ L42		2nd RF Coil Band 2 Sec.		
{ L43		2nd RF Coil Band 3 Pri.	CZ.320.346	Part of T21 } On One Former
{ L44		2nd RF Coil Band 3 Sec.		
{ L45		2nd RF Coil Band 4 Pri.	CZ.320.347	Part of T22 } On One Former
{ L46		2nd RF Coil Band 4 Sec.		
{ L47		2nd RF Coil Band 5 Pri.	CZ.320.348	Part of T23 } On One Former
{ L48		2nd RF Coil Band 5 Sec.		
{ L49		2nd RF Coil Band 6 Pri.	CZ.320.349	Part of T24 } On One Former
{ L50		2nd RF Coil Band 6 Sec.		
{ L51		2nd RF Coil Band 7 Pri.	CZ.320.350	Part of T25 } On One Former
{ L52		2nd RF Coil Band 7 Sec.		
{ L53		2nd RF Coil Band 8 Pri.	CZ.320.351.1	Part of T26 } On One Former
{ L54		2nd RF Coil Band 8 Sec.		
{ L55		2nd RF Coil Band 9 Pri.	CZ.320.352	Part of T27 } On One Former
{ L56		2nd RF Coil Band 9 Sec.		
L57		Osc. Coil Band 1	CZ.321.047	Part of T34
L58		Osc. Coil Band 2	CZ.321.048	Part of T35
L59		Osc. Coil Band 3	CZ.321.049	Part of T36
L60		Osc. Coil Band 4	CZ.321.050	Part of T37
L61		Osc. Coil Band 5	CZ.321.051	Part of T38
L62		Osc. Coil Band 6	CZ.321.052	Part of T39

3. AERIAL COILS (Continued).

Circuit Ref.	Value	Description	Code No.	Remarks
L63		Osc. Coil Band 7	CZ.321.053	Part of T40
L64		Osc. Coil Band 8	CZ.321.054	Part of T41
L65		Osc. Coil Band 9	CZ.321.055	Part of T42
L66		RF Choke	CZ.321.903	
L67	455 Kc/s	1st IF Tr. Primary	CZ.320.722	Part of T28 } On One Former
L68		1st IF Tr. Coupling		
L69	455 Kc/s	1st IF Tr. Secondary	CZ.320.723	Part of T28
L70	1500 Kc/s	1st RF Tr. Primary	CZ.320.724	Part of T29 } On One Former
L71		1st IF Tr. Coupling		
L72	1500 Kc/s	1st IF Tr. Secondary	CZ.320.725	Part of T29
L73		2nd IF Tr. Primary	CZ.320.726	Part of T30P } On One Former
L74		2nd IF Tr. Coupling		
L75		2nd IF Tr. Secondary	CZ.320.730	Part of T30S
L76		3rd IF Tr. Primary	CZ.320.726	Part of T31P } On One Former
L77		3rd IF Tr. Coupling		
L78		3rd IF Tr. Secondary	CZ.320.730	Part of T31S
L79	455 Kc/s	Bandpass XL Coil	CZ.320.730	Part of T43
L80		4th IF Tr. Primary	CZ.320.726	Part of T32P } On One Former
L81		4th IF Tr. Coupling		
L82		4th IF Tr. Secondary	CZ.320.730	Part of T32S
L83		BFO Coil	CZ.320.733	Part of T44
L84		Fil. RF Choke	CZ.321.904	
L85		Audio Filter Coil	CZ.324.054.1	

4. FIRST RF COILS.

T10		Band 1	CZ.320.308.1	
T11		Band 2	CZ.320.309.1	
T12		Band 3	CZ.320.310.1	
T13		Band 4	CZ.320.311.1	
T14		Band 5	CZ.320.312.1	
T15		Band 6	CZ.320.313.1	
T16		Band 7	CZ.320.314.1	
T17		Band 8	CZ.320.315.1	
T18		Band 9	CZ.320.316.1	

5. SECOND RF COILS.

T19		Band 1	CZ.320.317.1	
T20		Band 2	CZ.320.318.1	
T21		Band 3	CZ.320.319.1	
T22		Band 4	CZ.320.320.1	
T23		Band 5	CZ.320.321.1	
T24		Band 6	CZ.320.322.1	
T25		Band 7	CZ.320.323.1	
T26		Band 8	CZ.320.324.1	
T27		Band 9	CZ.320.325.1	
T28		1st IF Transformer 455 Kc/s	CZ.320.452	
T29		1st IF Transformer 1500 Kc/s	CZ.320.453	
T30P		2nd IF Transformer 455 Kc/s Primary	CZ.320.454	
T30S		2nd IF Transformer 455 Kc/s Secondary	CZ.320.455	
T31P		3rd IF Transformer 455 Kc/s Primary	CZ.320.454	
T31S		3rd IF Transformer 455 Kc/s Secondary	CZ.320.456	
T32P		4th IF Transformer, 455 Kc/s Primary	CZ.320.454	
T32S		4th IF Transformer 455 Kc/s Secondary	CZ.320.455	
T33		Audio Output Transformer	CZ.349.170	

6. OSCILLATOR COILS.

Circuit Ref.	Value	Description	Code No.	Remarks
T34		Band 1	CZ.321.026.1	
T35		Band 2	CZ.321.027.1	
T36		Band 3	CZ.321.028.1	
T37		Band 4	CZ.321.029.1	
T38		Band 5	CZ.321.030.1	
T39		Band 6	CZ.321.031.1	
T40		Band 7	CZ.321.032.1	
T41		Band 8	CZ.321.033.1	
T42		Band 9	CZ.321.034	
T43	455 Kc/s	Bandpass XL Coil Assy.	CZ.320.457	
T44		BFO Transformer Assy.	CZ.321.035	

7. MISCELLANEOUS.

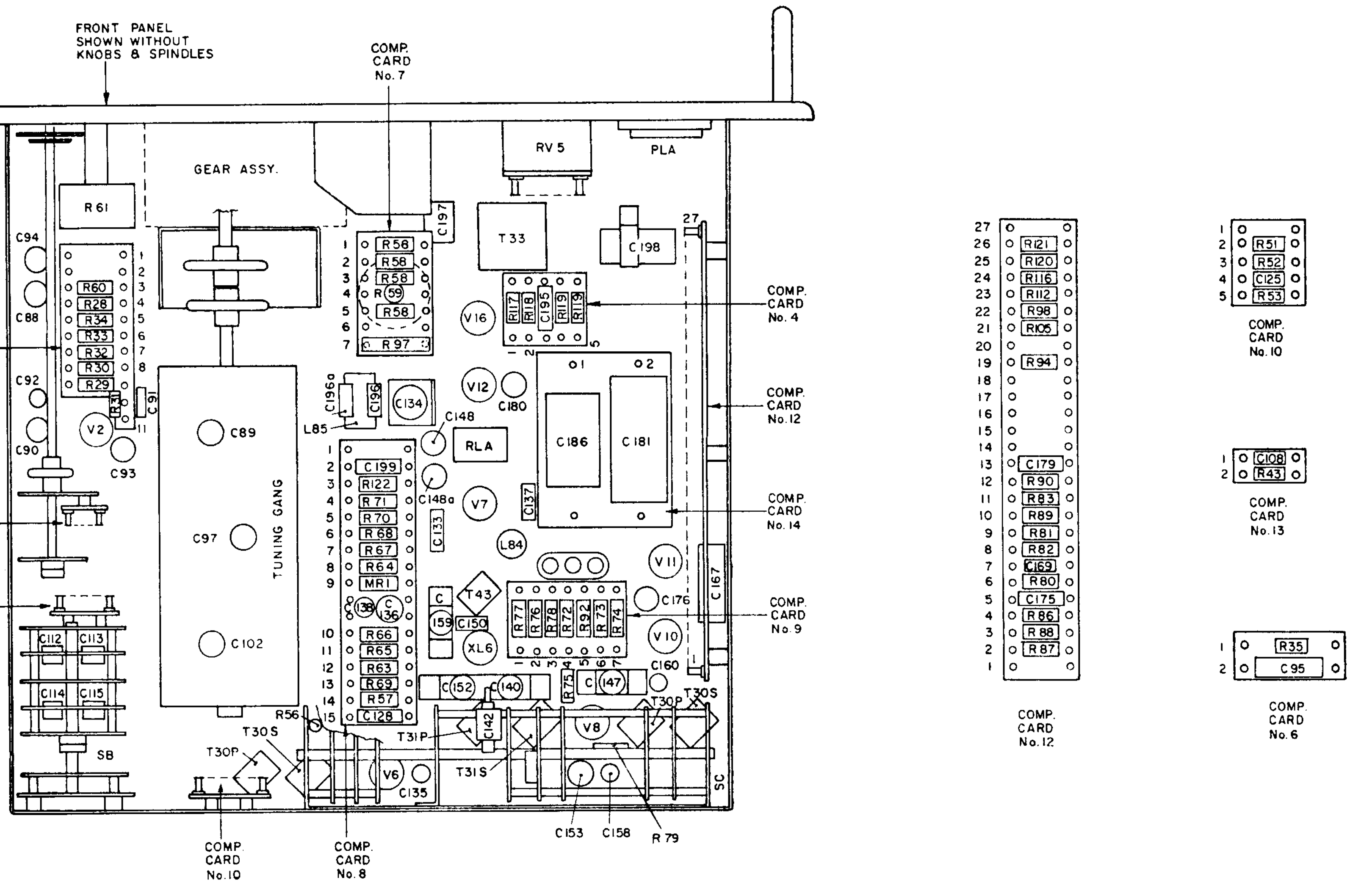
RLA		High Speed Relay	Z.530.039	SEG ME H96D
SKA		Coaxial Socket Reop.	CZ.369.923	Type L604S
PLA		18-Pole Plug	Z.560.191	P4 XF3/18/1
JKA		Switchboard Jack	CZ.367.015	APO Type 300 B6/N Cat. No. TP1103 Code—AGLOW.
JKA		Switchboard Jack	CZ.367.015	APO Type 300 B6/N Cat. No. TP1103 Code—AGLOW
XL1-4	2-12 Mc/s	Crystal		Not supplied Type D
XL5	1955 Kc/s	Crystal		Type D
XL6	455 Kc/s	Double Crystal		Type QR290 f1-f2 = 600 c/s ± 50 c/s Inductance 30 HY
M1	0-100 uA	Meter	CZ.291.530	

8. SWITCHES.

SA		Osc.-XL Selector Switch	CZ.200.816	Oak "H" Type Wafer
SBa	455-1500 Kc/s	Changeover Switch	CZ.200.815	Oak "H" Type
SBb	455-1500 Kc/s	Changeover Switch	CZ.200.815	Oak "H" Type
SBc	455-1500 Kc/s	Changeover Switch	CZ.200.815	Oak "H" Type
SD		AVC Off/On Switch	CZ.200.098	Oak "H" Type Wafer
SE		Noise Lim. Off/On Switch	CZ.200.087	Oak Series 20 Type 23
SF		BFO Off/On Switch	CZ.200.087	Oak Series 20 Type 23
SG		Compressor Off/On Switch	CZ.200.088	Oak Series 20 Type 22
SH		DPDT Toggle Switch	Z.510.304	
SCa		IF Selectivity Switch	CZ.200.439	Oak "H" Type Wafer
SCb		IF Selectivity Switch	CZ.200.817	Oak "H" Type Wafer
SCc.d		IF Selectivity Switch	CZ.200.818	Oak "H" Type Wafer
SCe		IF Selectivity Switch	CZ.200.520	Oak "H" Type Wafer
SCf		IF Selectivity Switch	CZ.200.817	Oak "H" Type Wafer

9. VALVES

Circuit Ref.	Value	Description	Code No.	Remarks
V1		CV 4014		1st RF Amplifier
V2		CV 4009		2nd RF Amplifier
V3		CV 2128		1st Mixer and Crystal Oscillator
V4		CV 4063		Local Oscillator
V5		CV 2128		2nd Mixer and Osc. or IF Amp.
V6		CV 4009		IF Amplifier
V7		CV 2526		AGC Amplifier
V8		CV 4009		IF Amplifier
V9		CV 4009		BFO Amplifier
V10		CV 4007		AGC Detector
V11		CV 4007		AGC Peak Lim. and Noise Lim.
V12		CV 4020		150V Regulator
V13		CV 4009		Audio Amplifier
V14		CV 2526		Audio Compressor
V15		CV 4014		Audio Amplifier
V16		CV 4019		Audio Amplifier
MR1		CV 448 Germanium Diode		AVC Clamp

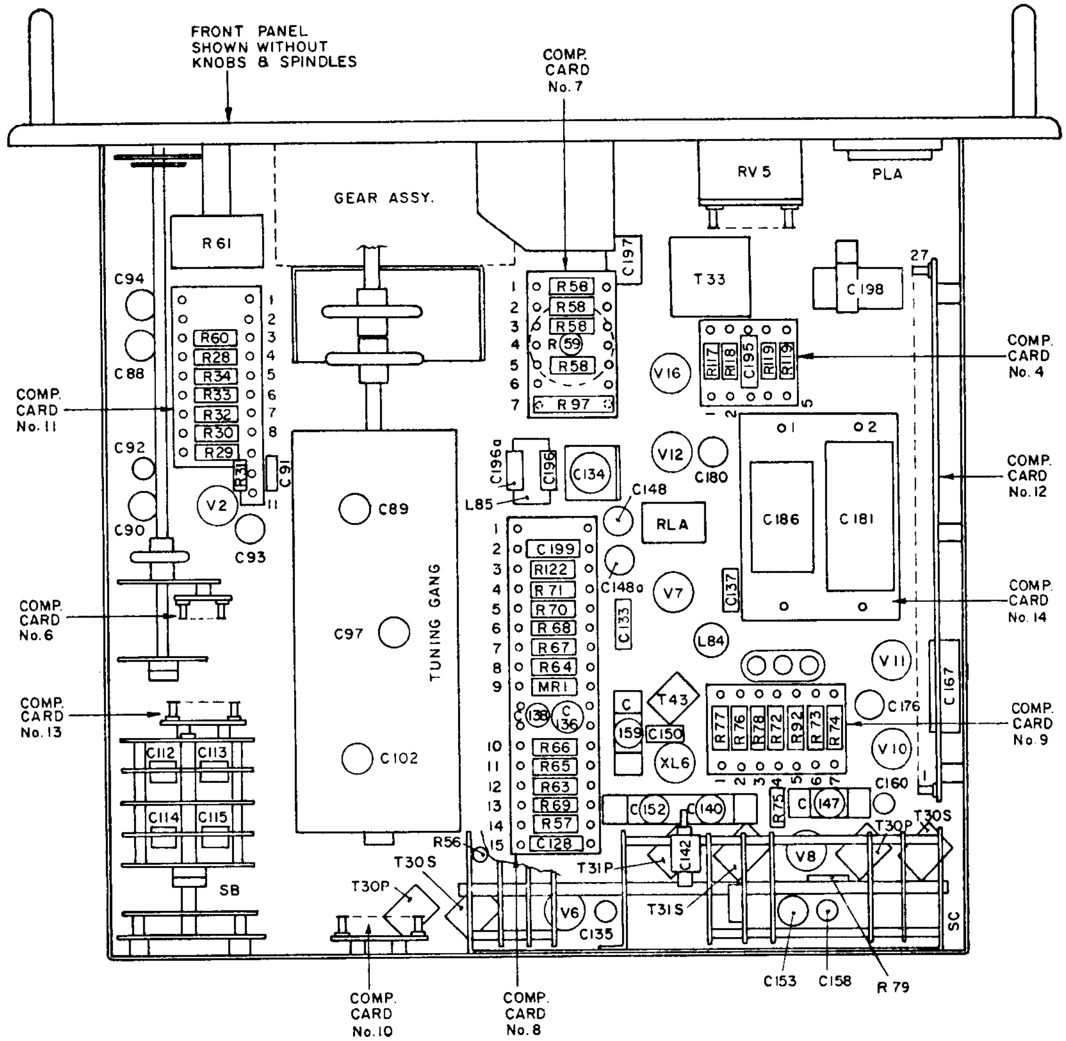


BOTTOM VIEW

RAN Patt. 16303
Receiver Outfit ACAS

Component Layout
Bottom View

Fig. 3.1

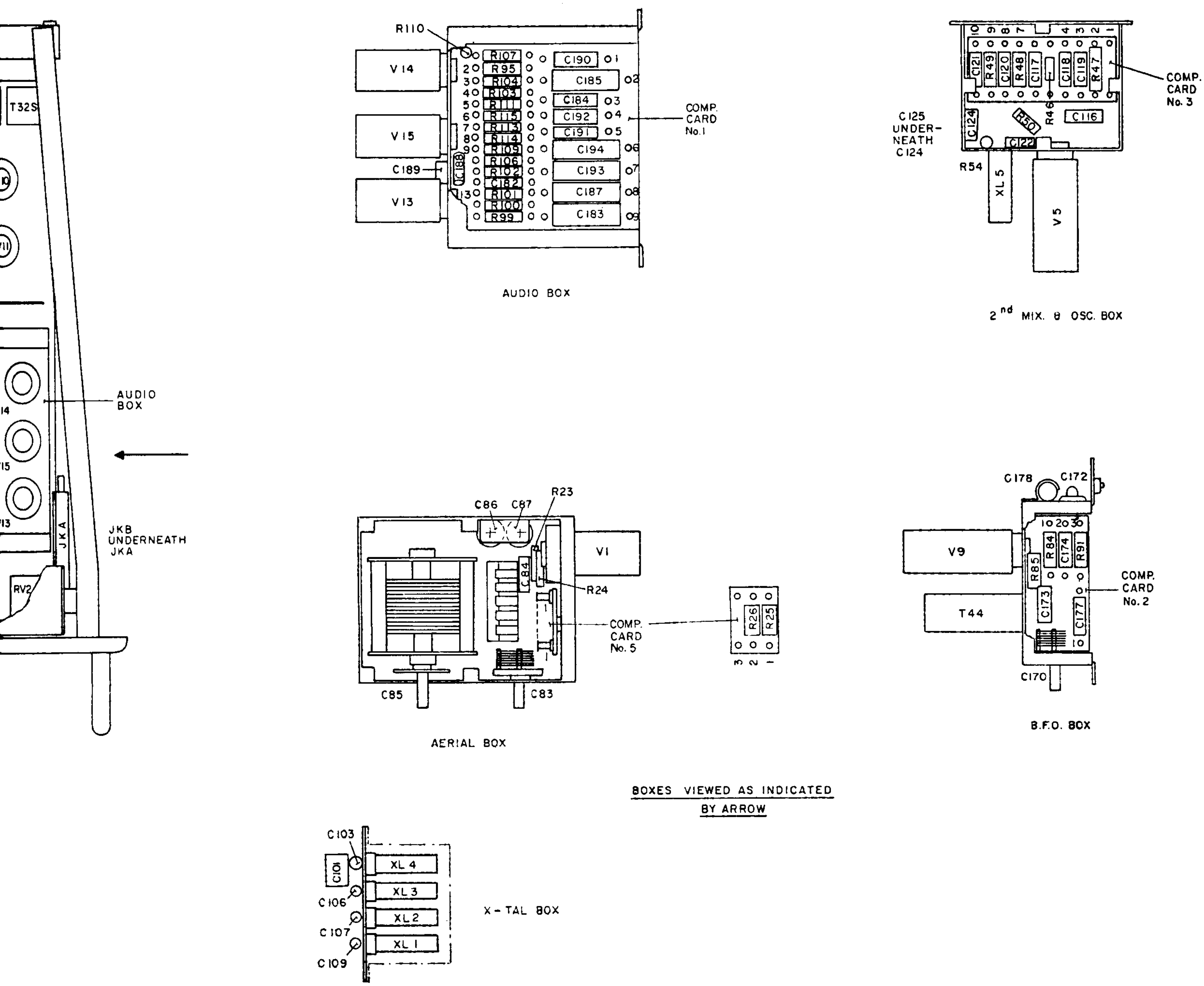


BOTTOM VIEW

R

Rec

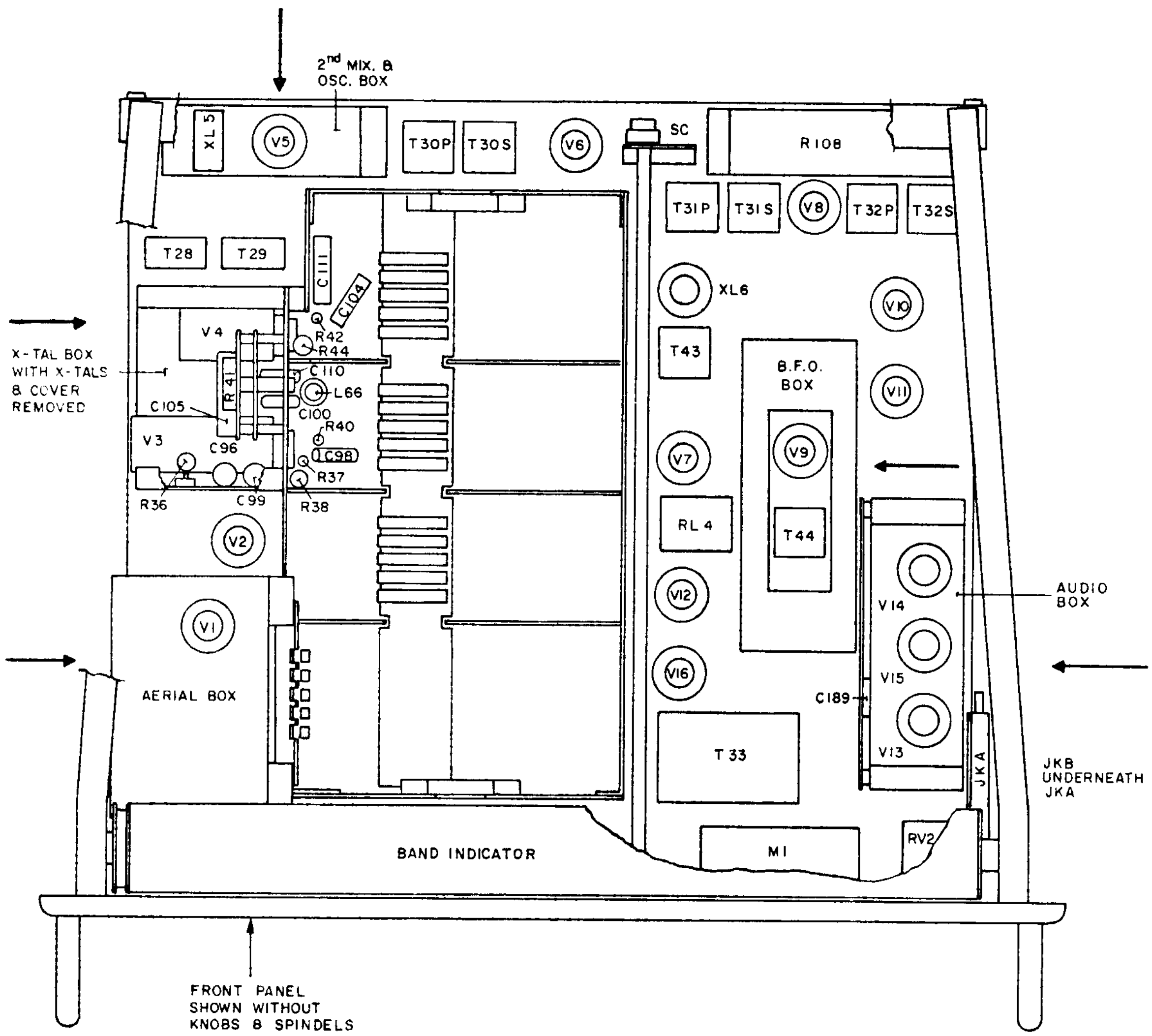
Co



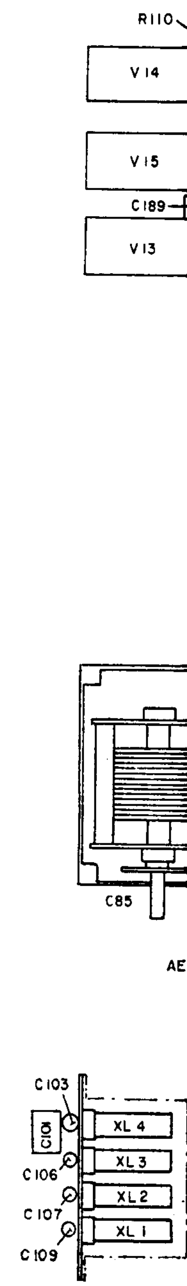
RAN Patt. 16303
Receiver Outfit ACAS

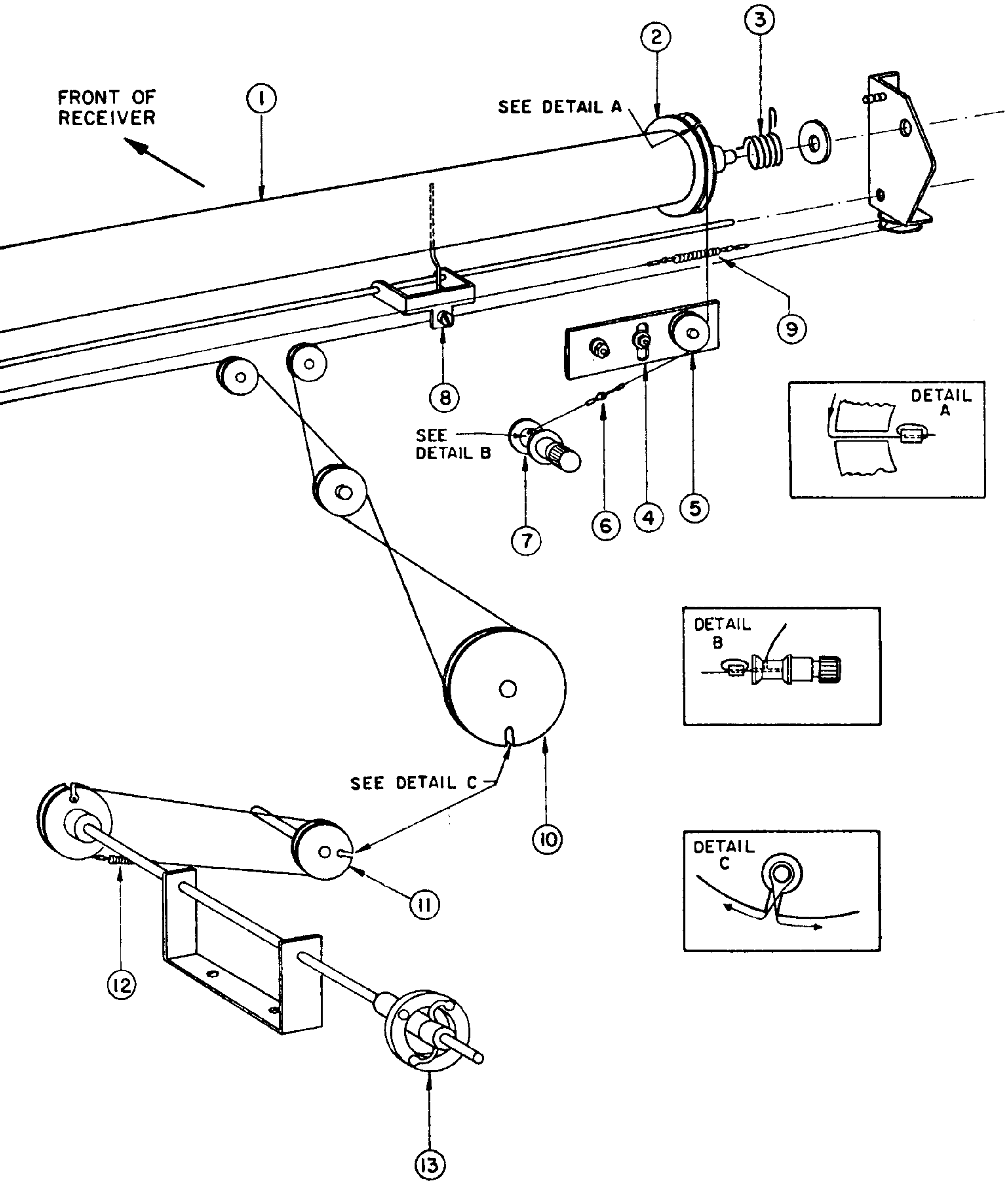
Component Layout
Top View

Fig. 3.2



TOP VIEW WITH TURRET REMOVED





BAND SELECTOR DRIVE

1 DIAL ROLLER
2 CABLE DRUM
3 LOCKING SPRING
4 ADJUSTING PLATE
5 PULLEY
6 INSULATING FERRULE
7 CABLE DRUM ON TURRET BASE

TUNING DRIVE

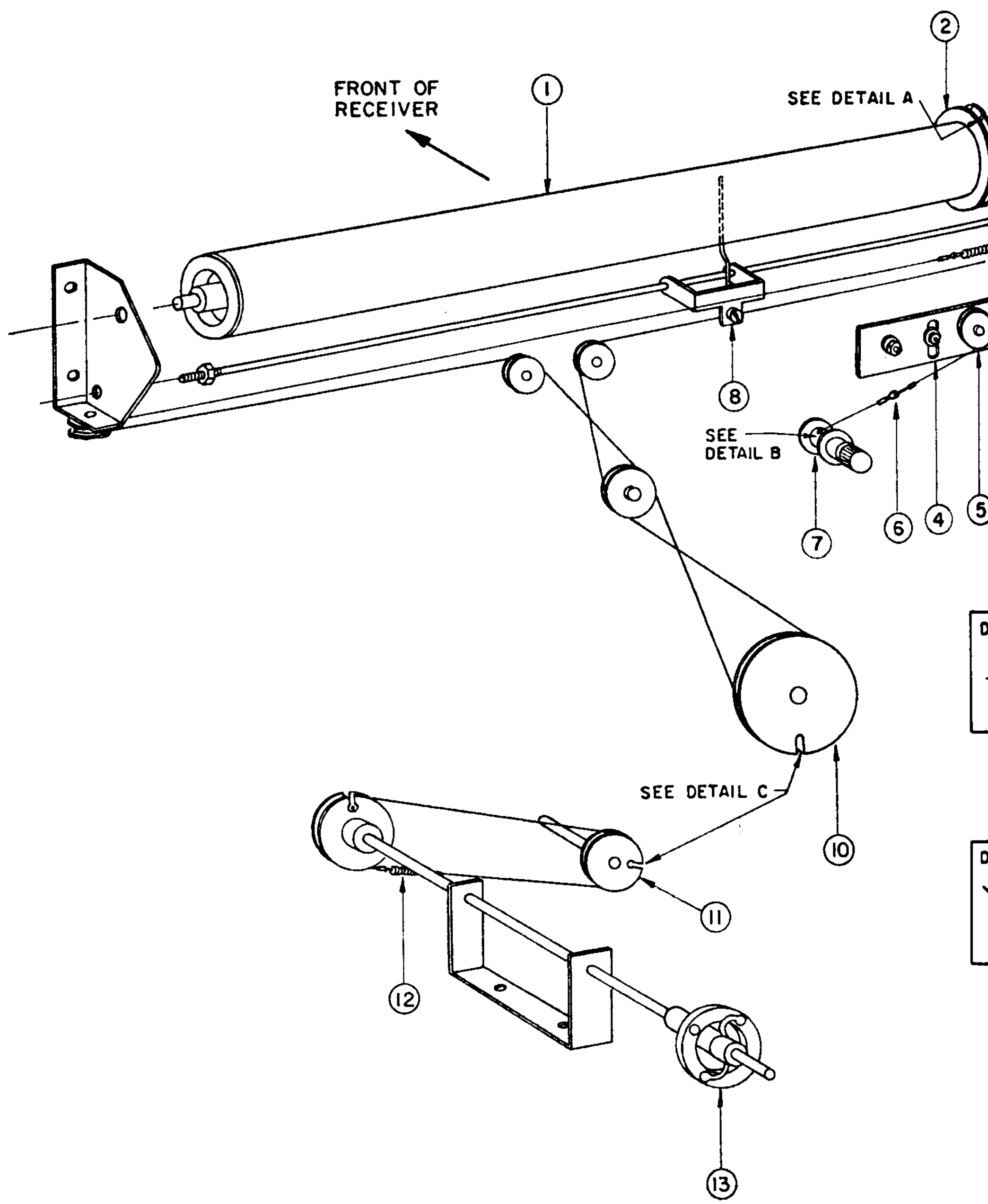
8 TUNING CURSOR CARRIER
9 TENSIONING SPRING
10 DRIVING PULLEY

BFO DRIVE

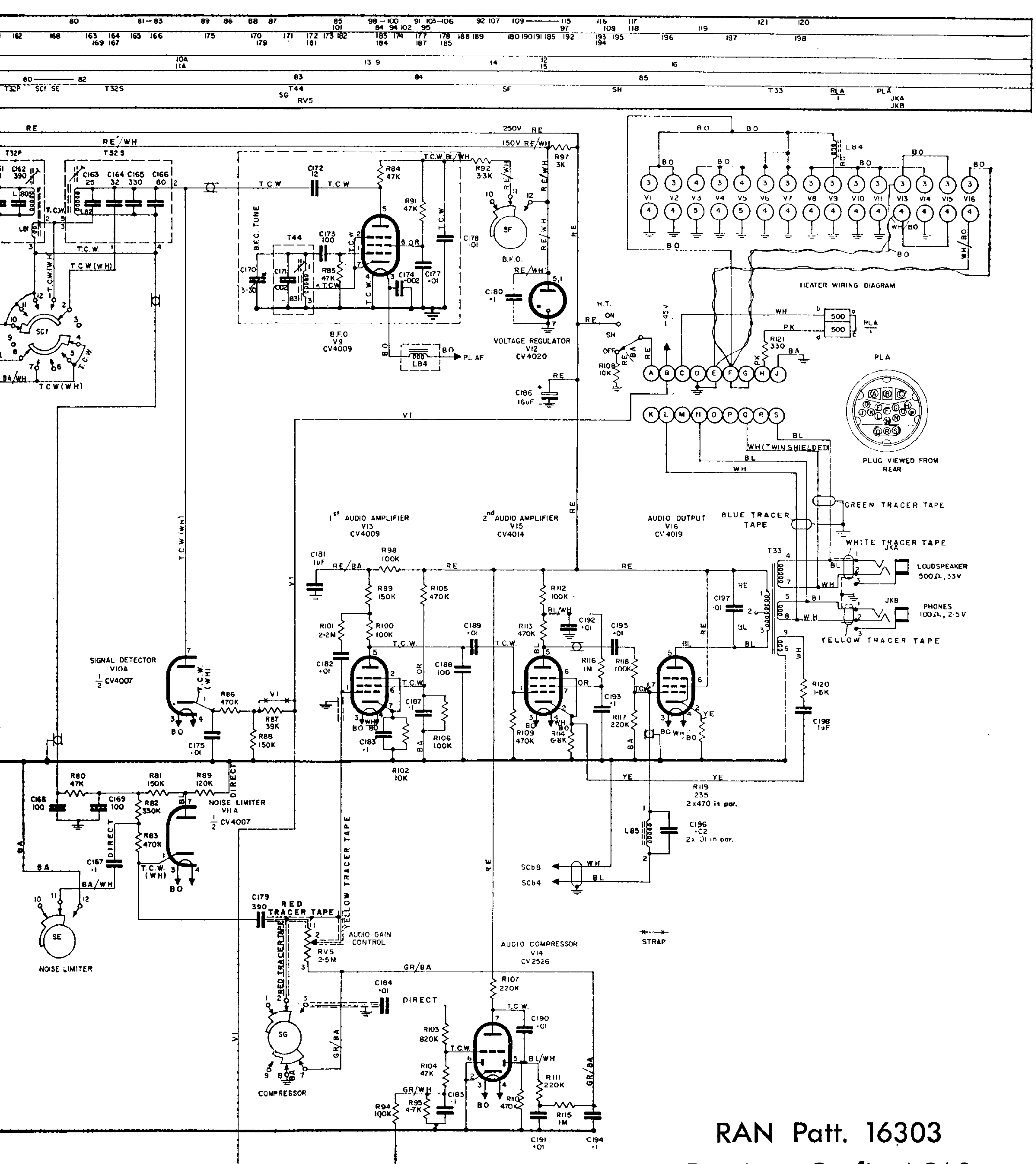
11 DRIVING PULLEY
12 TENSIONING SPRING
13 FLEXIBLE COUPLING TO C170

RAN Patt. 16303
Receiver Outfit ACAS
Exploded View of Drive Cables

Fig. 3.3



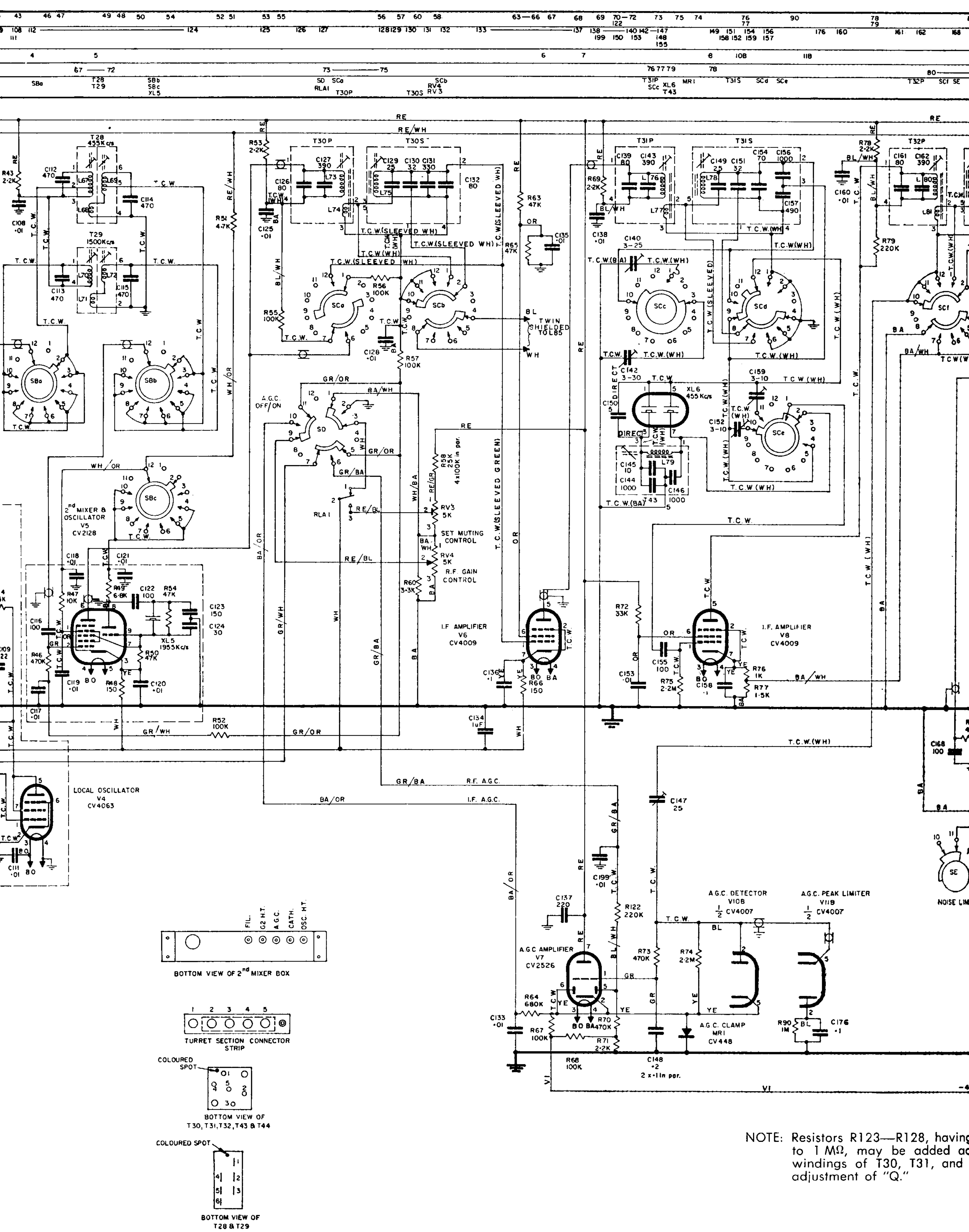
FRONT OF RECEIVER
1
2
SEE DETAIL A
8
SEE DETAIL B
7
6
4
5
SEE DETAIL C
10
11
12
13



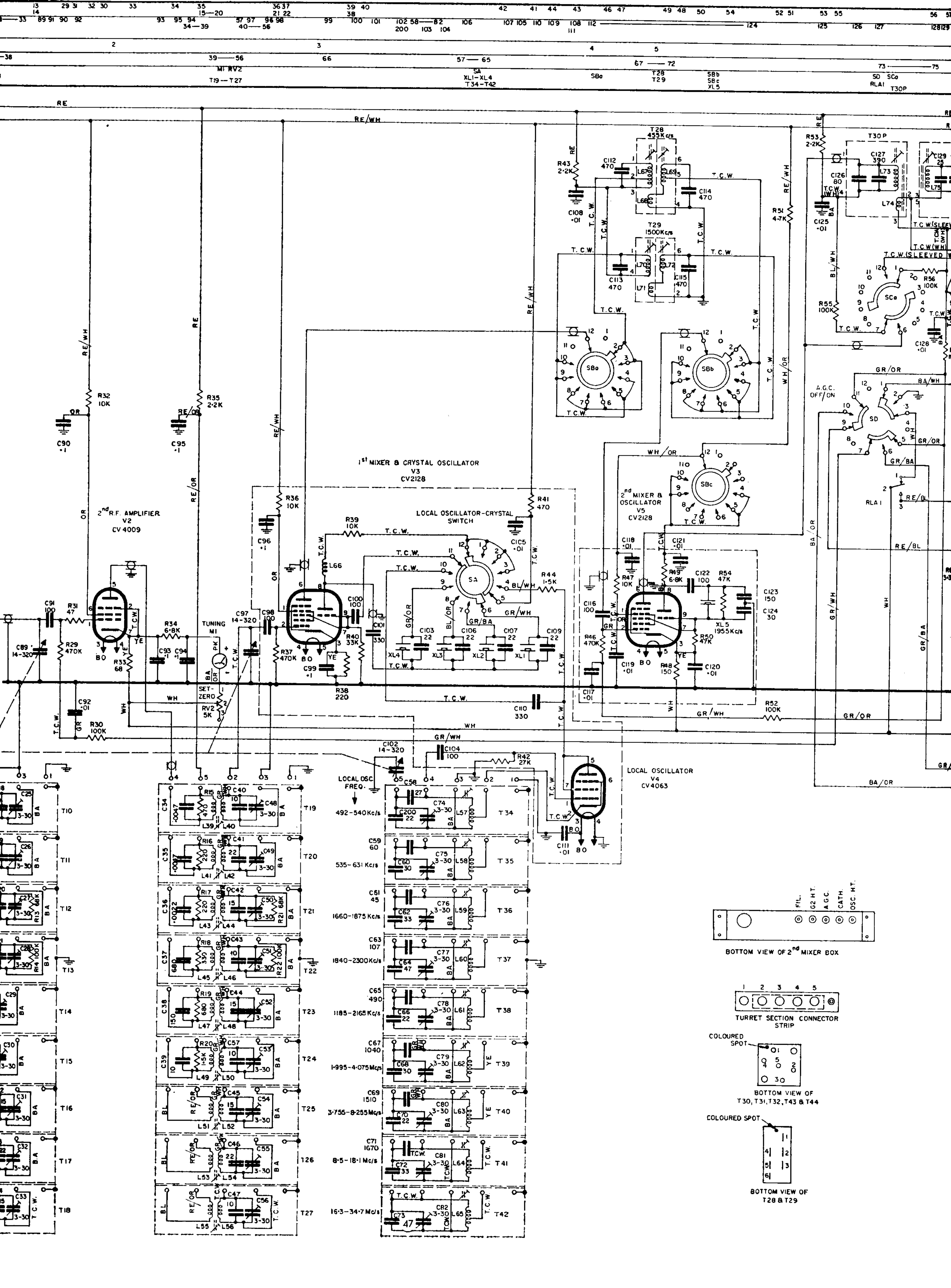
R128, having values in the range 500 KΩ
e added across primary and secondary
, T31, and T32 IF transformers for fine
."

RAN Patt. 16303
Receiver Outfit ACAS
Circuit Diagram

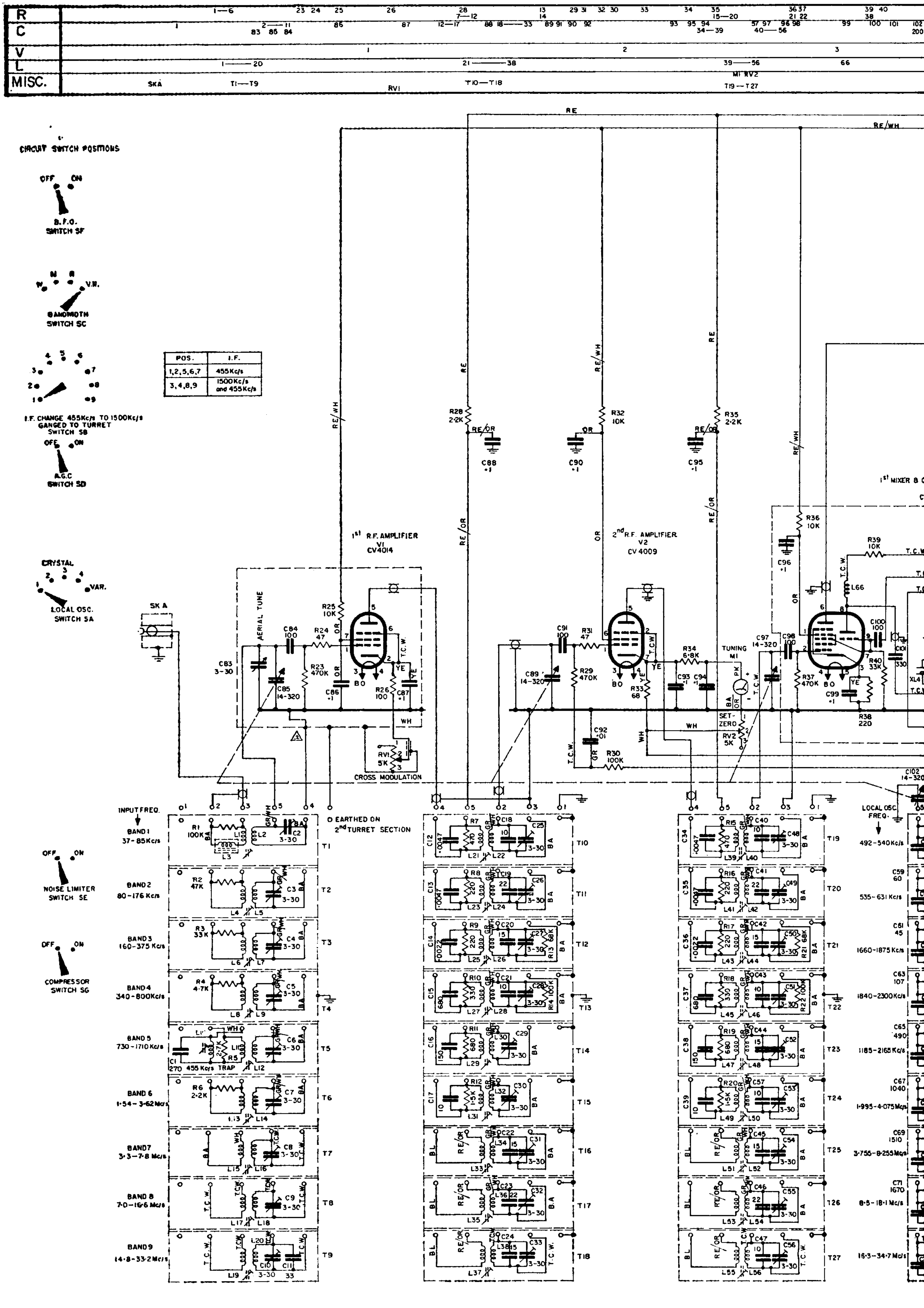
Fig. 3.4



NOTE: Resistors R123—R128, having
to 1 MΩ, may be added ac
windings of T30, T31, and
adjustment of "Q."



2nd R.F. AMPLIFIER V2 CV4009
1st MIXER & CRYSTAL OSCILLATOR V3 CV2128
LOCAL OSCILLATOR-CRYSTAL SWITCH
2nd MIXER & OSCILLATOR V5 CV2128
LOCAL OSCILLATOR V4 CV4063
T28 455Kc/s
T29 1500Kc/s
TUNING M1
SET-ZERO RV2 5K
A.G.C. OFF/ON
LOCAL OSC FREQ.
492-540Kc/s
535-631 Kc/s
1660-1875 Kc/s
1840-2300Kc/s
1185-2165 Kc/s
1·995-4·075Mc/s
3·755-8·255Mc/s
8·5-18·1 Mc/s
16·3-34·7 Mc/s
FIL. G2 H.T. A.G.C. CATH. OSC. H.T.
BOTTOM VIEW OF 2nd MIXER BOX
TURRET SECTION CONNECTOR STRIP
COLOURED SPOT
BOTTOM VIEW OF T30, T31, T32, T43 & T44
COLOURED SPOT
BOTTOM VIEW OF T28 & T29



R
C
V
L
MISC.
CIRCUIT SWITCH POSITIONS
OFF ON
B.F.O. SWITCH SF
W N R V.N.
BANDWIDTH SWITCH SC
I.F. CHANGE 455Kc/s TO 1500Kc/s GANGED TO TURRET SWITCH SB
POS. I.F.
1,2,5,6,7 455Kc/s
3,4,8,9 1500Kc/s and 455Kc/s
A.G.C SWITCH SD
CRYSTAL
VAR.
LOCAL OSC. SWITCH SA
SK A
1st R.F. AMPLIFIER V1 CV4014
2nd R.F. AMPLIFIER V2 CV 4009
1st MIXER
AERIAL TUNE
CROSS MODULATION
TUNING M1
SET-ZERO RV2 5K
EARTHED ON 2nd TURRET SECTION
INPUT FREQ.
BAND 1 37-85Kc/s
BAND 2 80-176 Kc/s
BAND 3 160-375 Kc/s
BAND 4 340-800Kc/s
BAND 5 730-1710Kc/s
455 Kc/s TRAP
BAND 6 1·54-3·62Mc/s
BAND 7 3·3-7·8 Mc/s
BAND 8 7·0-16·6 Mc/s
BAND 9 14·8-33·2Mc/s
NOISE LIMITER SWITCH SE
COMPRESSOR SWITCH SG
LOCAL OSC. FREQ.
492-540Kc/s
535-631 Kc/s
1660-1875 Kc/s
1840-2300Kc/s
1185-2165 Kc/s
1·995-4·075Mc/s
3·755-8·255Mc/s
8·5-18·1 Mc/s
16·3-34·7Mc/s