SECTION V

MAINTENANCE AND ALIGNMENT

5.1. MAINTENANCE.

5.1.1. GENERAL. This section is written to provide the operator of this equipment with suggestions and procedures for properly maintaining the KWS-1 Transmitter in good operating condition.

[redacted]

The maintenance procedures which follow are divided into two categories, electrical and mechanical. Frequent reference should be made to the photograph and diagrams included with the text of this section, and in sections VI and VII.

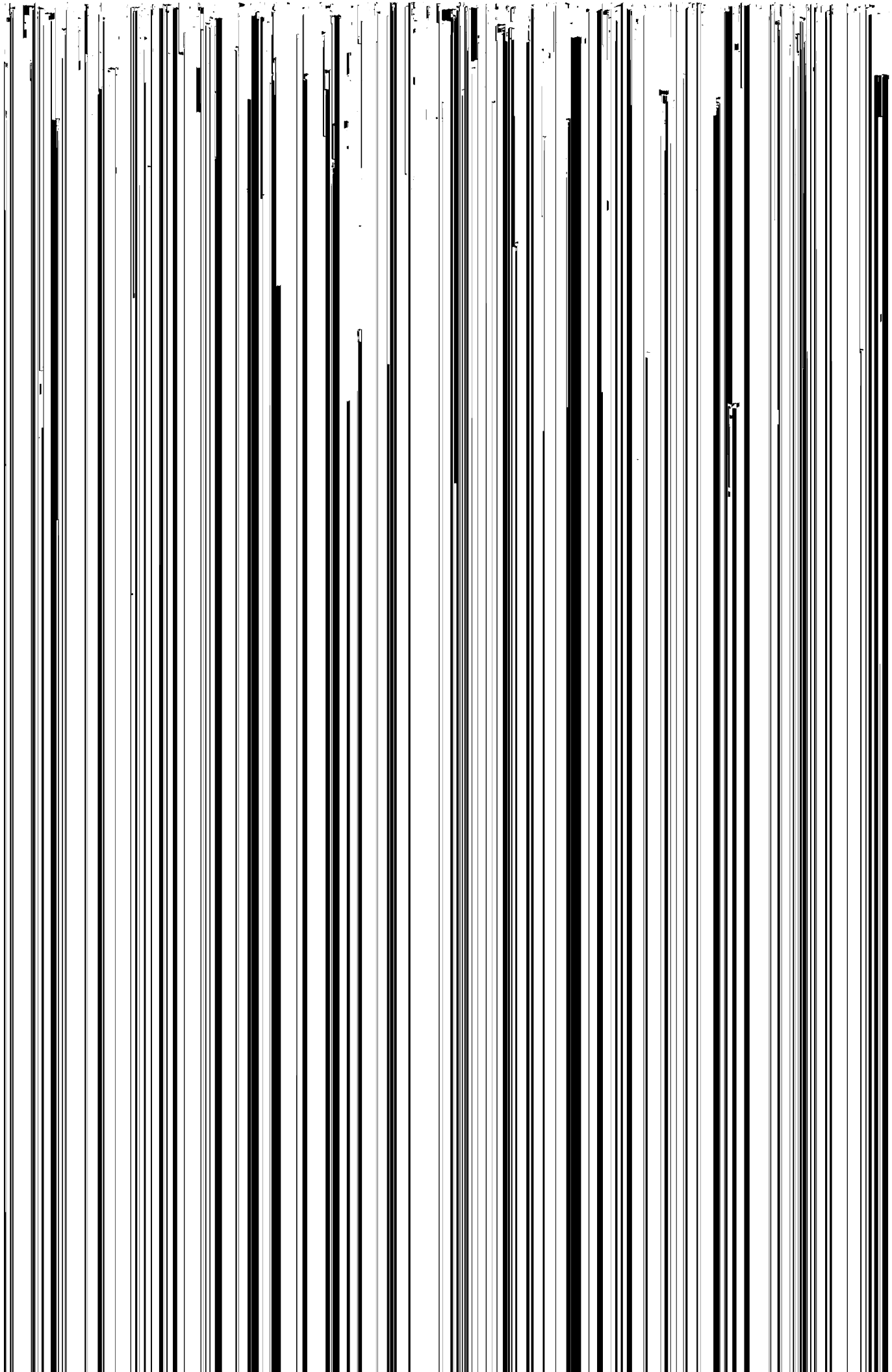
5.1.3.2. OPERATIONAL CHECK, CW.

a. Turn FILAMENT switch ON. Blower should start. Be sure blower does start, otherwise the PA tubes may become damaged. Be sure air hose is connected.

[redacted]

be inadequate or filament transformer T501 may be defective.

c. Set EMISSION switch to CW, CARRIER LEVEL to 0, TUNE-OPERATE to OPERATE, BIAS control to "O".



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Section V
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(a) Operate the EMISSION switch to SSB.

(b) A receiver antenna connection made to J201 into the 6CL6 driver plate

(c) The carrier will be heard if the is not in balance. Adjust R112, (see figure 5-1) for minimum sound of er.

(11) COLLINS MODEL 35C-2 LOW-PASS It is not likely the Collins KWS-1 Trans- ll require precautionary adjustments f TVI. However, if this problem does r some reason unique to a particular instal- a, the 35C-2 Low-Pass Filter may be in the KWS-1 antenna lead. In rare cases e difficulty, a high-pass filter may be in the TV receiver antenna lead in.

TRICAL MAINTENANCE.

EST CONDITIONS.

TEST EQUIPMENT REQUIRED. The test equipment is required to perform the procedure.

SPECIFICATIONS
30 mc.
ackard 400 C or equivalent. (Must have).
equivalent with "S" meter and Crystal r).

, or a 230-volt a-c supply at 60 cps. The
ter must be externally and internally
d to satisfy the power source.

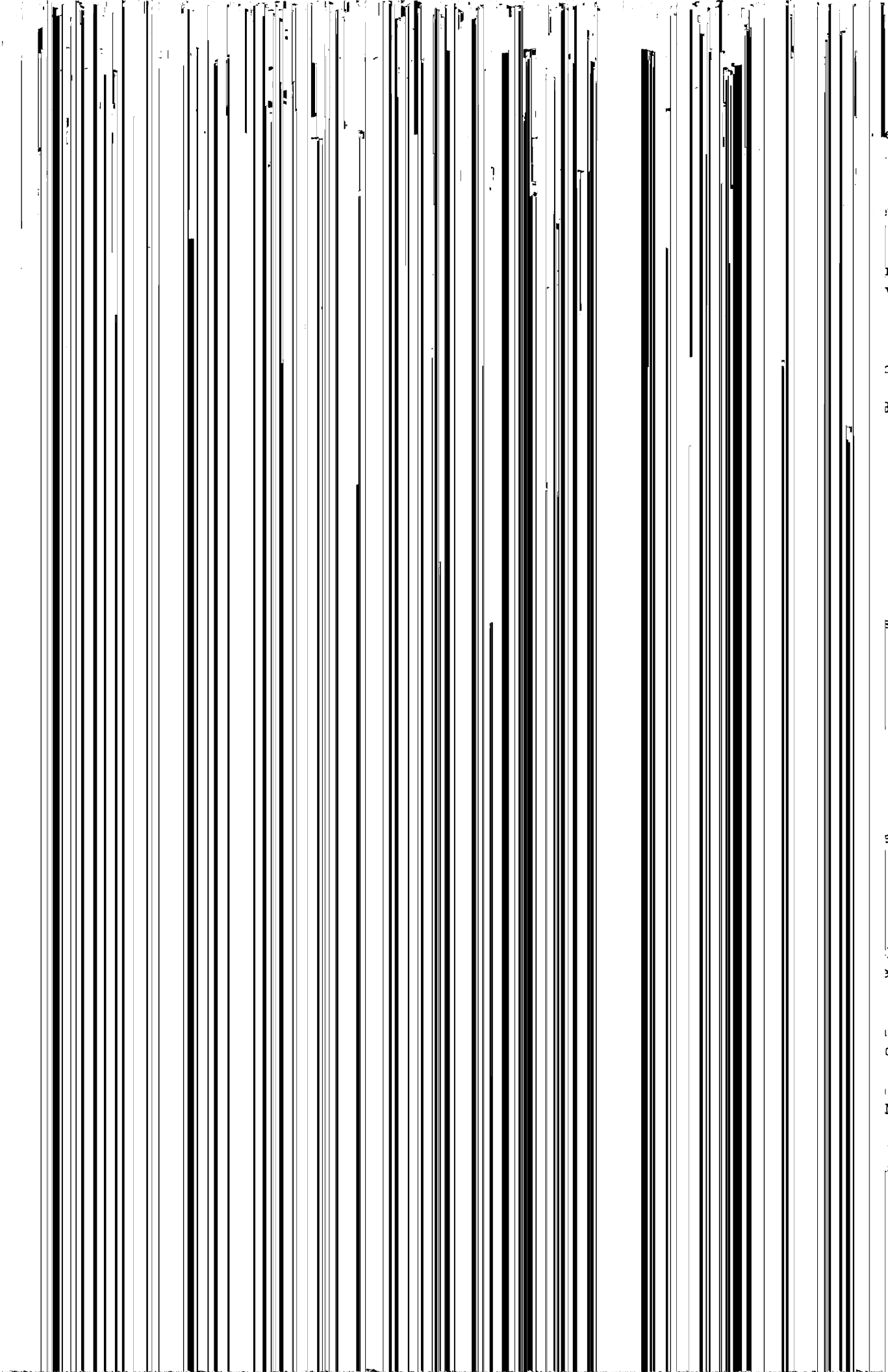
FUSES.

ATING	TYPE
Amp.	Cartridge - 3AG
Amp.	Cartridge - 3AG
2 Amp.	Cartridge - Slow Blow
2 Amp.	Cartridge - Slow Blow
4 Amp.	Cartridge - 3AG
Amp.	Cartridge - High Voltage

OLTAGE (RF VOLTS)
h PA on)
ull output)
nds 40 thru 10m)
ull output)
PA on)
PA on)

t alignment before attempting to insert them
r sockets. Use a special tube pin straighten-
able for such purposes.

PA TUBES. The top cover of the
mplifier enclosure must be removed to get
A tubes (as well as the ALC rectifier V403).
cover is off, check by means of a shorting
ee that there is no charge in the hv filter
rs.



b. Select bands 40 thru 10 and adjust associated crystal oscillator tuning slug for maximum. (See table below.) A value of about 1.5 volts should be obtained on each band. The 10 and 11-meter bands will run slightly lower because the oscillator

is used as a doubler on these bands.

BAND	40	20	15	11	10 LO	10 HI

(2) Use the CARRIER LEVEL control to adjust drive.

(3) Connect the communications receiver antenna to J207. BFO OFF.

(4) Short out L701 with a short jumper (put jumper across coil - not to ground), (see

5.2.3.4. TRAP ADJUSTMENTS.

a. FIRST MIXER PLATE TRAP.

(1) Connect the communications receiver antenna input to J207.

(2) Set the BAND CHANGE switch to "80".

(3) Set the KILOCYCLES dial to 3.5 mc.

(4) Set EMISSION to CAL.

(5) Turn CARRIER LEVEL control fully counterclockwise.

(6) Tune the communications receiver until

(5) Set BAND CHANGE switch to "80" position.

(6) Set the KILOCYCLES dial at 3.1 mc and adjust L201, L203, L204, L206 and L207 for maximum indication on the receiver "S" meter (receiver tuned to 3.1 mc).

(7) Tune transmitter and receiver to 3.9 mc and adjust C202, C207, C211, C217 and C221 for maximum indication on receiver "S" meter.

NOTE

It may be necessary to reduce gain in receiver as alignment proceeds to keep the "S" meter in range. Do this by loosening the coupling to the receiver

(2) Set the BAND CHANGE switch to the 20 position.

(3) Set the transmitter and receiver dials to the 14-mc bands and adjust L218, L230 and L237 for maximum "S" meter readings.

(4) Set the receiver and transmitter dials to 14.3 mc and adjust C250, C306 and C269 for maximum "S" meter readings.

(5) Repeat steps (3) and (4) until tracking is accomplished.

d. 15-METER TRACKING.

(1) Repeat steps (1), (2), (3) and (4) of paragraph 5.2.3.5.a. above.

(2) Set the BAND CHANGE switch to the "15" position.

(3) Set the transmitter and receiver tuning dials to 21.0 mc and adjust L219, L229 and L236 for maximum "S" meter reading.

(4) Set the transmitter and receiver tuning dials to 28.9 mcs and adjust C255, C301 and C265 for maximum "S" meter readings.

(5) Repeat steps (3) and (4) until tracking is accomplished.

g. 11-METER TRACKING (See NOTE* below.)

(1) Repeat steps (1), (2), (3) and (4) of paragraph 5.2.3.5.a. above.

(2) Set the BAND CHANGE switch to the "11" position.

(3) Set the transmitter and receiver tuning dials to 27.1 mc and adjust C254, C302 and C266 for maximum "S" meter indications.

***NOTE**

The 10 high, 10 low, and 11 bands must be aligned in the order given above.

et CARRIER LEVEL for about 1/2
eter (PA PLATE OFF).

ving the 80-meter 6CL6 plate tuning
0, through resonance and note
meter.

djust C322, 80-meter neutralizing
minimum reaction as the plate is
esonance.

ER (V206/V207) TRACKING.

NOTE

ing exciter stages should be
all neutralizing procedures com-
re the driver plates are tracked,
ome instability may be experienced.

t VTVM set up to read r-f volts to

ISSION switch in CAL position.

CARRIER LEVEL for one-fourth
n on VTVM.

the following trimmers at the
licated with the BAND CHANGE
ıe bands indicated. Adjust for maxi-
ı on VTVM.

TABLE 5-3

ER PLATE ALIGNMENT

COIL	FREQ. (MC)	CAPACITOR	FREQ.
L701	3.10	C710	3.90
L703	7.0	C711	7.3
L702	14.0	C712	14.3
L704	21.0	C713	21.4
L705	29.5	--	--
--	--	C708	28.5
--	--	C707	27.5

igh 10, low 10, and 11 meter bands
be aligned in this order.

5.2.3.9.

MODULATOR ADJUSTMENT.

N selector switch to SSB.

munications receiver to J201.

HANGE switch to 80.

CLES dial to 3500 kc.

SELECT to LOWER.

er until the carrier is heard,
wing on "S" meter.

l C112 for minimum indication

IENT.

e vfo is calibrated and
l should require adjustment
l intervals. If the calibration
e for operation or beyond the
dial corrector (ZERO SET
the following procedure
ake correcting adjustments.

CNT REQUIRED.

requency measuring gear
50 kc and 3750 kc (or

calibrated receiver capable
3750 kc (or harmonics

5A-2, 3 or 4 calibrated at
) and at 30 mc (10-meter

frequency measuring device
bling if listening to the funda-
of the oscillator.

ansmitter to CAL emission
y measuring equipment and
or about 1 hour.

ully calibrate the frequency
ing WWV as a frequency
used, adjust calibration

oscillator against WWV then calibrate KILOCYCLES dial and bfo.)

(4) Select LOWER sideband with SIDEBAND SELECT control.

(5) Set BAND CHANGE control to 80.

(6) Turn KILOCYCLES dial to 3.0 mc (2750 kc vfo frequency). Tune for zero beat in frequency measuring equipment.

NOTE

If 75A is used, the 10th harmonic (27.5 mc) of 2750 kc should be used here and the 8th harmonic (30 mc) used at the 3750 kc point. (3 and 4 respectively on the transmitter KILOCYCLES dial.)

(7) Set the ZERO SET (fiducial) to 0 on KILOCYCLES dial (3000 kc). Note the dial reading if the fiducial cannot go to 0.

(8) Rotate the KILOCYCLES dial to 4.0 mc (3750 kc vfo frequency) and tune to exact zero beat on frequency measuring equipment (30.0 mc on 75A receivers).

NOTE

If the harmonic at 30 mc is used, it would be well to check on the 80-meter band at 3750 kc to see that a signal is actually there. This prevents the possibility of using the wrong harmonic.

Do not readjust ZERO SET control. The calibration error is then the number of dial divisions more or less than the 10 turns it should take to cover the range between the two test frequencies. Usually, the error tends to be toward more rotation of the KILOCYCLES dial than the 10 turns that should be required. To correct the error, proceed as follows:

(9) Rotate the KILOCYCLES dial towards and through dial zero (4000 kc) until a <u>total</u> of 2 times the dial division error has been counted.

(10) Engage the trimmer adjusting stud with a strong thin wire (such as a straightened-out paper clip) and turn until zero beat in the frequency measuring equipment is restored.

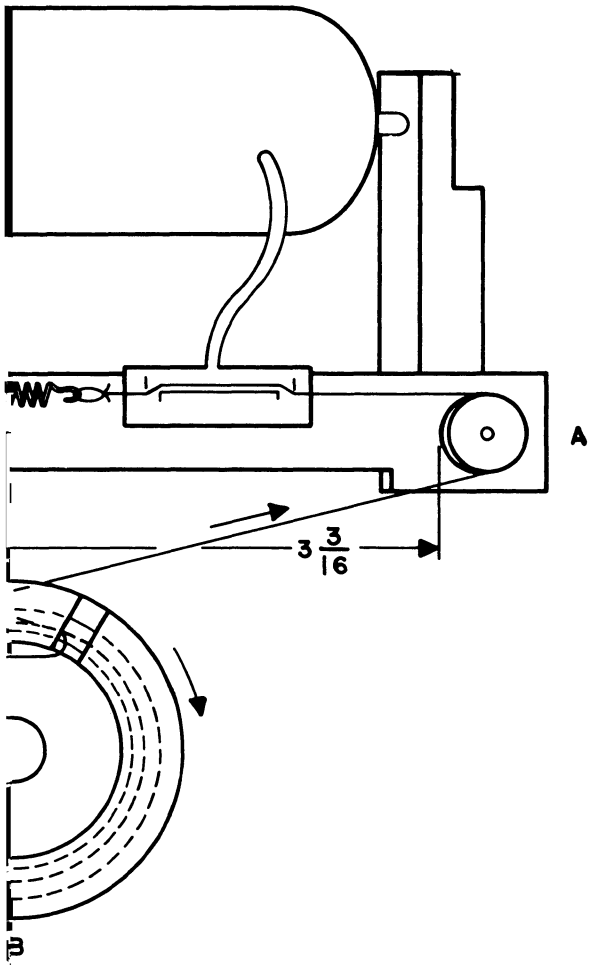
(11) The ZERO SET (fiducial) can now be adjusted until it is set at dial zero (4000 kc).

(12) This completes the procedure in most cases. To check, retune the KILOCYCLES dial and frequency measuring equipment to the 2750 kc end of the range and check the dial division error. If the adjustments have been done carefully, less than 1/2 division error will be found. The above procedure can be repeated until satisfactory results are obtained. This endpoint adjustment restores factory accuracy to the intermediate points, also.

(3) See figure 5-2. Turn the KILOCYCLES tuning shaft to the clockwise stop.

(4) Start at point X in the drawing with the cord hooked to one end of the spring (Collins Part Number of this spring is 503 1240 001).

(5) Bring cord around pulley C to pulley B.



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UND

M
) Meter Band

6	7	8	9
88	0	-	-
25	0	+1.7	6.3 AC
75	0	+.75	6.3 AC
85	0	+9.3	6.3 AC
85	+11	+50	6.3 AC
IC	0	-	-
IC	+108	-	-
NC	-.6	-	-
NC	+36	+36	NC
00	-0.4 -25	+2.1	6.3 AC
30	2.8-3.3	-	-
40	+3.1	-	-
85	0	+2.15	6.3 AC
40	+7.8	-	-
85	0	+215	-3.8 -28
85	0	+215	-3.8 -28
47	0	-	-
60	+5	-	-

TABLE 5-5

TUBE PIN RESISTANCES TO GROUND

Readings taken with VTVM
Set in CALIBRATE - No Carrier - 40 Meter Band

TUBE \ PIN	1	2	3	4	5	6	7	8	9
V001	82K	0	60K	60K	12.6K	62K	0.1 Ω	-	-
V101	240K	100K	680	0	0	85K	470K	1000	.05 Ω
V102	37K	720K	4500	0	0	115K	0-880K	330	.05 Ω
V103	100K	1M	330	0	0	23K	0	680	.05
V104	52K	470K	0	0	0	9K	500K	4900	.05
V105	∞	0	IC	0	∞	IC	0	-	-
V106	11K	∞	IC	∞	11K	IC	∞	-	-
V107	100K	100K	0	.05	860K	NC	860K	-	-
RT101	NC	58K	58K	NC	NC	NC	58K	58K	NC
V201	18.2K	100K	220	0	0	18.2K	60K	220	.05
V202	920K	220-320	0	.05	10K	19K	220-320	-	-
V203	930K	220	0	.05	9.8K	19.8K	220	-	-
V204	19K	100K	220	0	0	19K	100K	220	.05
V205	27	220	0	.05	13K	13K	220	-	-
V206	7.5	22K	13.5K	0	.05	9K	0	13.5K	22K
V207	7.5	22K	13.5K	0	.05	9K	0	13.5K	22K
V208	100K	0	0	.05	13.5K	480K	7.5	-	-
V209	0.3	390	0	.05	9.6K	19.5K	390	-	-

NOTES