



SERVICE BULLETIN

from: TRIO-KENWOOD COMMUNICATIONS, INC.

SUBJECT: SERVICE NOTES ON TS-820

DATE 10-25-77

TRANSMITTER (Cont'd.)

16. Low RF output on SSB without RF speech processor: Bad Q20 2SC733(y) on (X48-1150-00).
17. Large audio difference between USB and LSB: realign carrier unit per TKC specifications.
18. No loading on 40 meters: Foil path is open on RF coil pack.
19. No Tx when using send switch: Bad R-28 1K and Q-9 2SA562(y) on fix VOX (X50-1350-00).
20. Blows fuse: Check for shorted C-21, C-22 100uf 500V.
21. No drive, no Tx or bias: Open screen resistor R-6 470 ohms at reflector unit (X43-1090-02).
22. VFO intermittant: Check for cold solder at VFO power plug.
23. Audio distortion on Tx with processor: C96 may be loose on IF board (X48-1150-00)
24. Faulty LED indications: Check for loose ground screws on LED board (X54-1180-00).
25. Low output on CW: R-14 470 ohms touch to filter case on IF unit (X48-1150-00).
26. VOX operation is intermittant: Solder touch VS terminal and 14V at (50-1350-00).
27. Intermittant Tx: Make sure ground strap for 12BY7 shield is under shield.
28. Insufficient power out to drive linear amp: An increase of 5-7 watts can be obtained by paralleling R-6 on receiver unit (X43-1090-02) with 47 ohm 2 watt.
29. VFO output level is down: Q2 2SK19(y) inside VFO is bad.
30. No Tx or Rx on any band. No VCO output: Q14 2SC741 on (X50-1330-00) is bad.
31. No Tx or Rx: Loose contact VFO output terminal on fix VOX (X50-1350-00).



SERVICE BULLETIN

from: TRIO-KENWOOD COMMUNICATIONS, INC.

SUBJECT: SERVICE NOTES ON TS-820

DATE 10-25-77

TRANSMITTER

1. Mushy audio on transmit: Mic. amps. Q20 and Q21 on IF (X48-1150-00) are bad.
2. No 14V supply: Bad bridge diodes D8 - D10 on (X43-1090-02).
3. Intermittant operation of any one band: Check for loosely soldered Xtals in PD unit (X50-1340-00).
4. Mic. gain down: Cold solder joint at SSB xtal filter IF unit (X48-1150-00).
5. Self oscillation when Tx: Bad final tubes S2001-X2. Burned cathode resistors 10 ohms R2 R3 at final unit (X56-1200-00).
6. No VOX operation. No sidetone: Burned resistor R12 220 ohms at key socket.
7. No USB or LSB: Check CAR-1 X1 - X2 crystal cold soldered CAR-1 on (X50-1310-00).
8. No Tx: Check for shorted Q-1 and Q-8 balanced mixer on RF unit (X44-1150-00).
9. No ALC meter movement: Readjustment of meter amp VR-1, VR-2 on IF unit (X48-1150-00).
10. Intermittant ALC action after peaking drive: One final tube S2001-A is bad.
11. Fix lite on when in VFO position: Wire shorted terminals of function switch.
12. No loading of Tx: Cold solder joint at relay socket RL-1 antenna relay.
13. Using Sure 444 speech processor is distorted: See TRC bulletin regarding 16dB pad for mic. input.
14. No relay closure on Tx: Q9 on fix VOX (X50-1350-00) is bad.
15. Very low RF output only when using RF speech processor: Bad Q30 2SC733(y) on IF (X48-1150-00).



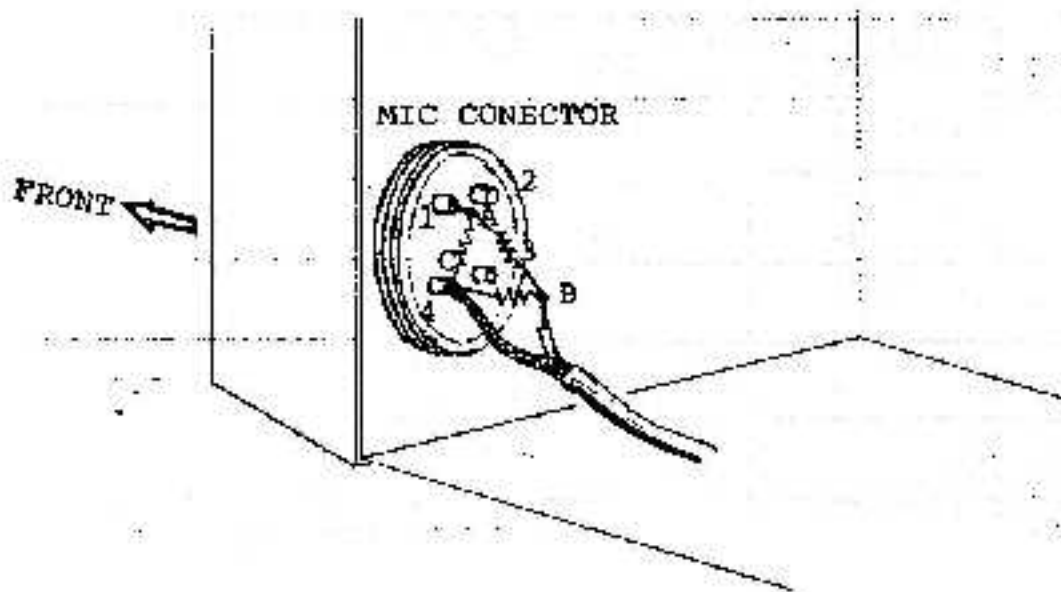
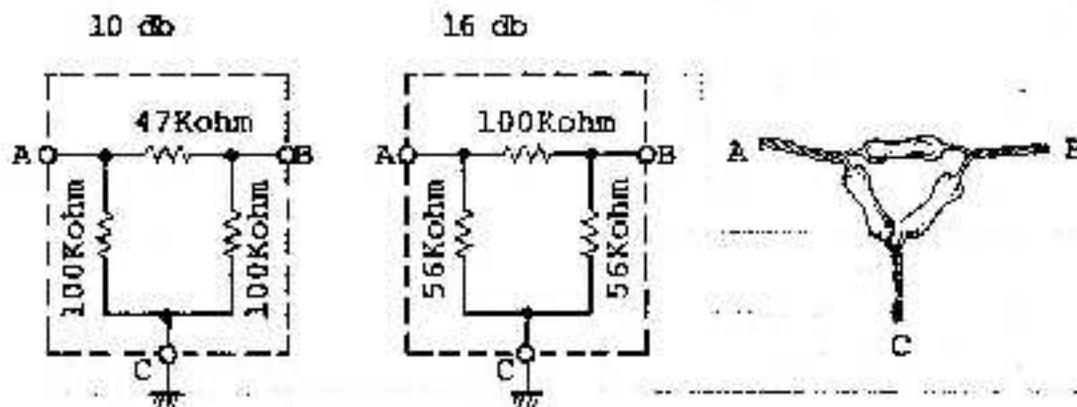
SERVICE BULLETIN

from: TRIO-KENWOOD COMMUNICATIONS, INC.

No. 14a

SUBJECT: Microphone input attenuator for TS-820 DATE 2/16/77

When using a high output microphone (i.e. Shure 444), it is very likely that there will be distortion of the transmitted audio if the processor is used. The reason the distortion occurs is because the processor is between the first microphone amplifier and the microphone gain control. The installation of one of the attenuators shown below will reduce the microphone input to a level that will not cause RF speech processor distortion. The attenuator figures are approximate.



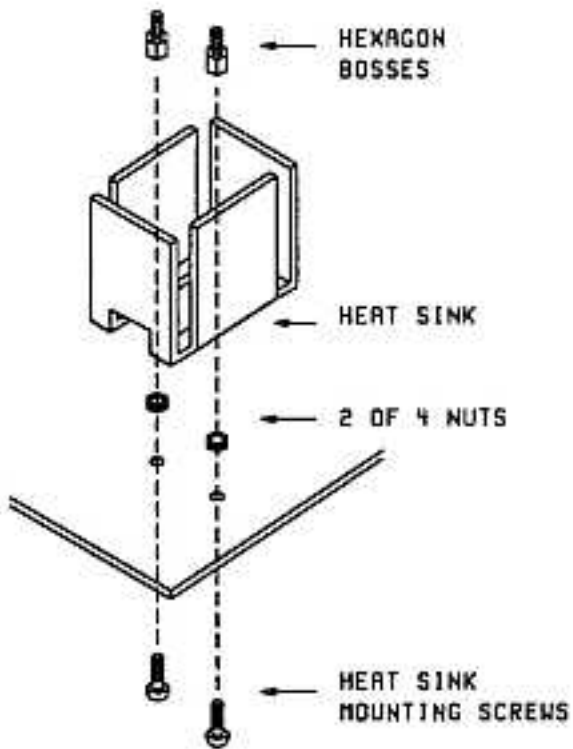


FIGURE 3

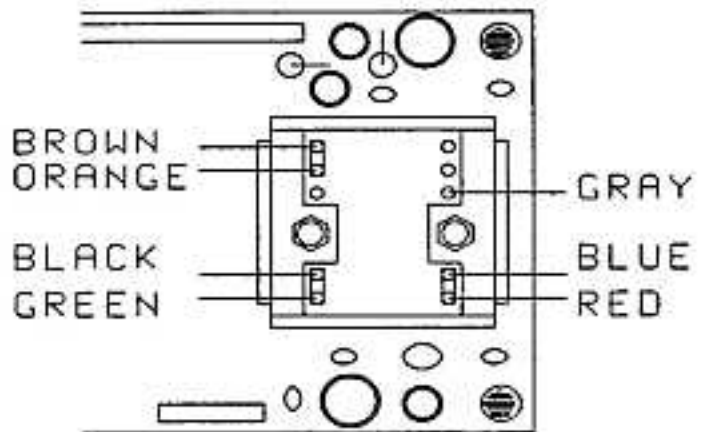


FIGURE 4

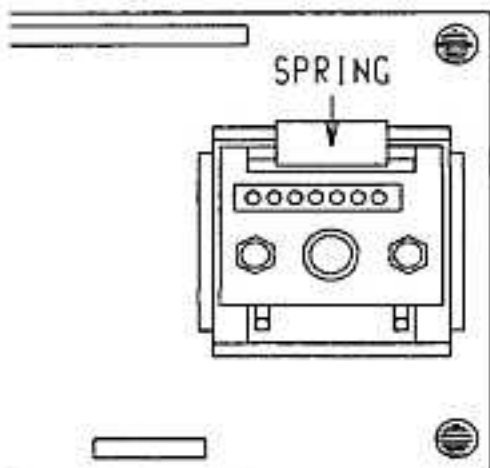


FIGURE 5

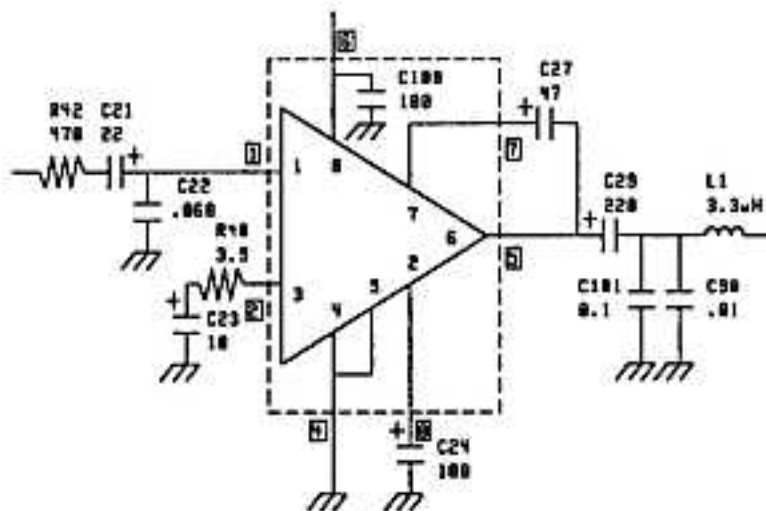


FIGURE 6



SERVICE BULLETIN

from: TRIO-KENWOOD COMMUNICATIONS, INC.

24

SUBJECT: GENERAL NOTES ON TS-820

DATE 10-25-77

1. No output Tx: SG switch is "off".
2. No Tx, Rx, or VFO: There is not a 9P plug installed.
3. Low Rx sensitivity, no Tx: The transverter switch is "on".
4. S meter full deflection when first turned on: Make sure RF gain is not fully CCW.
5. If digital display does not count: Make sure DH is not "on".
6. If there is no DG display: Make sure you are not in remote VFO with no remote VFO.
7. When intermittent in any circuit:
 - a. Check for loose black jumper from point to point on circuit board.
 - b. Check for broken foil path.
 - c. Check for component that has been pulled out or loosely soldered.
 - d. Check for solder splash across foil path.
 - e. Check for loose pins.
 - f. Check for component leads touching to metal IF cans.
 - g. Check for wire not soldered at function switch or at any switch or control.
 - h. When checking FET, check for excessive voltage at can top usually source, or same G-1, G-2 voltage.
 - i. Check for loose Molex mini connector or any foreign substance on pins.
8. Complaint of frequency shift when Tx - CW: This is normal. 800 Hz.
9. Not proper PLL action: Make sure PLL slide switch is in NOR not TUNE.
10. Receiver audio self oscillation at high level: Make sure audio board mounting screws are tight.



SERVICE BULLETIN

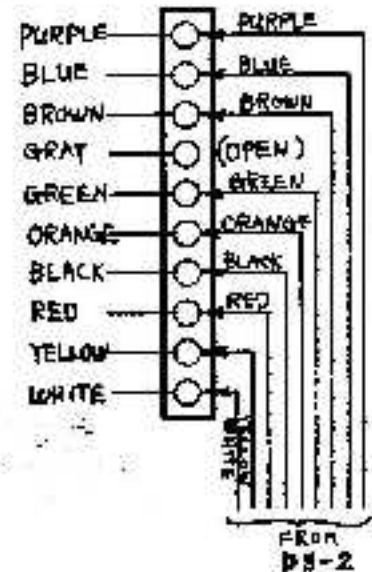
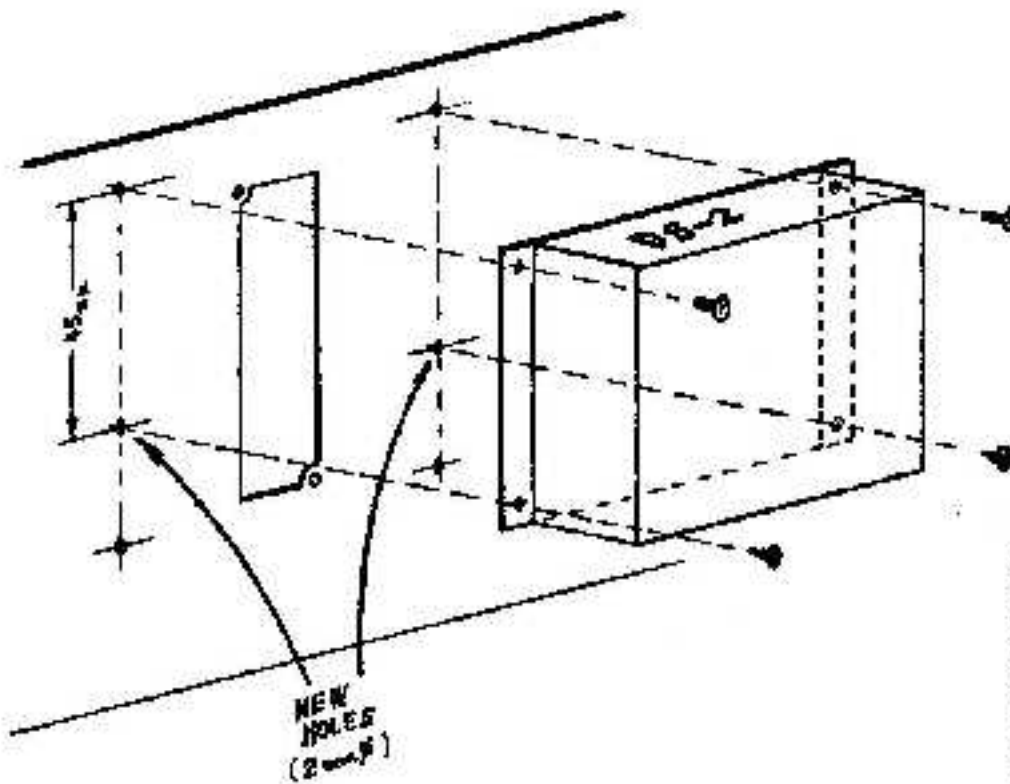
from: TRIO-KENWOOD COMMUNICATIONS, INC.

TS-520/S, TS-820/S #842

SUBJECT: DS-2 Replaces DS-1A DC-DC Converter

DATE 01/26/81

The DS-1A DC-DC converter for the TS-820 series and TS-520/S has been replaced by a new model, the DS-2. Wiring color code is the same. Physical size is smaller. Two additional mounting holes must be drilled in the transceiver rear panel.



JEB/jeb



SERVICE BULLETIN

from: TRIO-KENWOOD COMMUNICATIONS, INC.

No-9

SUBJECT: TS-820 Speech Processor Alignment

DATE 11/17/76

The following alignment procedure may be used in lieu of the one in the Service Manual.

Test equipment required:

Audio signal generator
Audio VTVM
Oscilloscope or RF VTVM

1. Preliminary control settings:

Screen grid switch off
Mode switch to USB
Comp level to Max (CW)
Processor sw to Pull "on"
Meter switch to "Comp"

Send/Rec switch to "Send" as required when making adjustments.

2. Apply 1500Hz audio signal to the mic jack at 10 mv level. Connect RF VTVM or scope to TP-2. Adjust T-11, 12, 13, for maximum level on the S-meter. Adjust T-14 for maximum level on scope or VTVM at TP-2.
3. Turn compression level to min, (CCW)
Reduce audio sig at mic jack to 0.3 mv
Adjust TC-4 (freq response for speech processor) so that level at TP-2 is not changed when changing audio gen from 400Hz to 2000Hz.
4. Turn compression level to max, (CW)
Set audio gen to 1500Hz at 0.3 mv.
Adjust TC-3 and VR-6 (carrier bal for speech proc) for maximum level at TP-2.
5. Set audio gen to 10 mv 1500Hz
Send/Rec switch to send
Adjust VR-7 (comp level for speech processor) so that the level at TP-2 is not changed when turning the processor on and off. VR-7 should be adjusted for the particular microphone the customer will be using with his TS-820.
6. Finally check for non distortion of signal, and that comp level of 20 to db can be obtained at full comp on.



SERVICE BULLETIN

From: TRIO-KENWOOD COMMUNICATIONS, INC.

No. 12

DATE 1/19/77

SUBJECT: Installing AUX band in TS-820
(receive only)

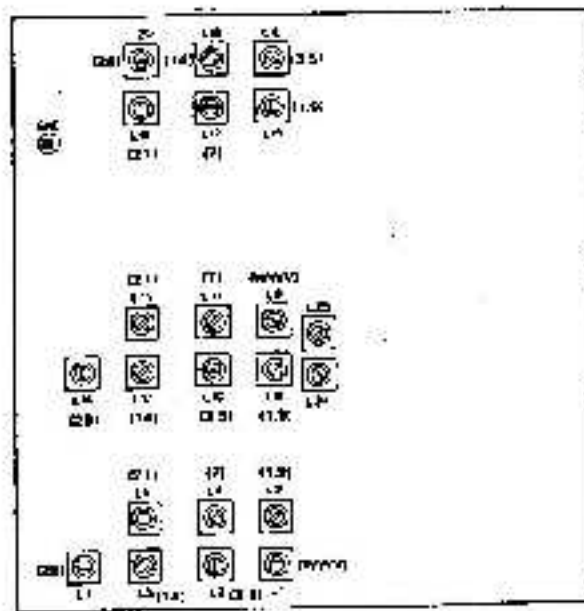
The following information is for the installation and alignment of the AUX band in the TS-820. This extra band will be for receive only. Reference will be made to schematics and board layouts as shown in the Service Manual.

INSTALLATION

1. Remove top and bottom covers.
2. Remove the connectors from the PLL Assembly X60-1010-00.
3. Remove the PLL Assembly X60-1000-30 and set it aside.
4. Use the board layout of the Coil Pack X44-1140-00 to locate the positions for the ANT and MIX coils on the Coil Pack X44-1140-00.
5. Install the ANT and MIX coils on the Coil Pack X44-1140-00.
6. Remove both covers from the PLL Assembly X60-1010-00.
7. Remove the 5 phillips screws holding the PD Unit X50-1340-00 in the PLL Assembly X60-1010-00 and carefully remove the PD Unit.
8. Use the board layout of the PD Unit X50-1340-00 to locate Q11.
9. Install R01, R02, C01, C02, and X01 as needed for the band desired.
10. Locate terminals AUX, B1, B2, B3, and B4 on the PD Unit X50-1340-00.
11. Install a jumper from the AUX terminal to the B terminal for the band desired. B1 is for 1.8MHz to 9MHz, B2 is for 10MHz to 18MHz, B3 is for 19MHz to 24MHz and B4 is for 25MHz to 30MHz.
12. Replace the PD Unit X50-1340-00 in the PLL Assembly X60-1010-00.
13. Use a 3mm nutdriver to remove the 4 hex nuts mounting the VCO Unit X50-1330-00 in the PLL Assembly X60-1010-00, then remove the two phillips screws.
14. Carefully remove the VCO Unit X50-1330-00 from the PLL Assembly X60-1010-00.
15. Use the board layout of the VCO Unit X50-1330-00 to locate Q11.
16. Install C01, C02, C03, C04, C05, and T11 as needed for the band desired. (Install T11 last)
17. Replace the VCO Unit X50-1330-00 in the PLL Assembly X60-1010-00.
18. Install the connectors on the PLL Assembly X60-1010-00.

ALIGNMENT

1. Turn on TS-820
2. Tune VFO to 250.
3. Set band switch to AUX.
4. Set the TUN/NOR switch on the VCO Unit X50-1330-00 to TUN.
5. Connect a frequency counter to terminals TP5 and TP6 on the VCO Unit X50-1330-00. (TP6 is ground.)



4. CARRIER POINT (X50-1310-00)

- Peak TX power in CW mode. Then switch to LSB and modulate with Audio Gen. (A.G.) @ 5mv 1500Hz while reducing mic. gain to 50 watts output.
- In the CW mode connect a frequency counter to TP5 on the IF Unit (X48-1150-00) and adjust TC1 on the CAR-2 Unit (X50-1320-00) for 8.830.7MHz.
- Adjust VR1 on the CAR-1 Unit (X50-1310-00) for equal output freq. on USB and LSB.
- In LSB mode, check the RX and TX frequency at TP-5 on the IF Unit. It should not change.
- With mode switch in LSB position Audio Gen. input @ 5mv, vary input frequency from 400Hz to 2600Hz and check for BALANCED output while monitoring on scope LSB to USB and vice versa.

5. SPEECH PROCESSOR (X48-1150-00)

- Tune TX for maximum output power at 14.175MHz.
- Set mic. gain in center and S.G. off, comp. meter on.
- Place scope on TP2 and counter on TP3
- Set A.G. for 10mv @ 1500Hz and modulate unit.
- Turn processor max. "on" position, and adjust TC4 to 451.9 ± 200 Hz. Adjust T11, T12, T13 for peak indication on COMP. meter.
- Peak T14 by scope on TP2.
- Turn processor full C.C.W. and reduce A.G. gain to 1mv @ 400Hz.
- Adjust TC4 for max. level on scope but at proper frequency. (451.9 ± 200 Hz) (May adjust slightly off frequency if higher peak can be obtained.)
- Sweep A.G. frequency from 400Hz to 2000Hz and check for balanced output on LSB and USB.
- COMP. full clockwise and @ 1500Hz adjust TC3 and VR6 for min. reading on COMP. meter.
- At 1500Hz @ 10mv adjust VR7 to balance processor in "on" and "off" positions (same level).

6. BALANCE MOD. ADJUSTMENT (X48-1150-00)

- In CW position adjust Tx for max. output. Key unit with mode switch in SSB position (no Mod.).
- Adjust VR5 and TC2 for min. output level on scope.
- Check BALANCED output LSB and USB.



SERVICE BULLETIN

from: TRIO-KENWOOD COMMUNICATIONS, INC.

No. 13

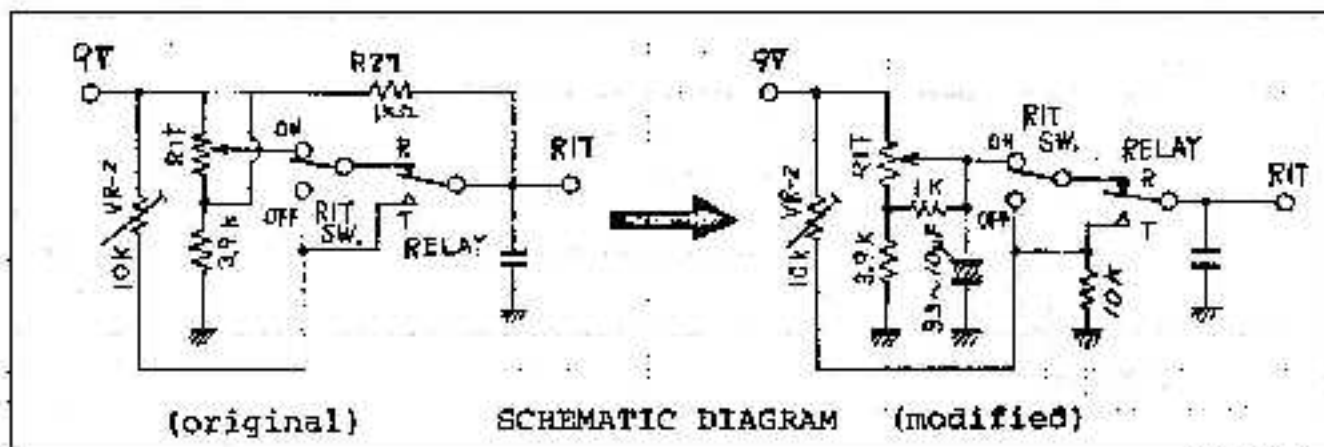
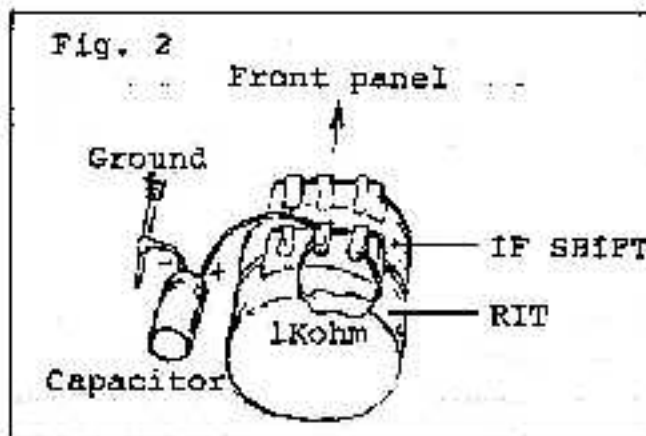
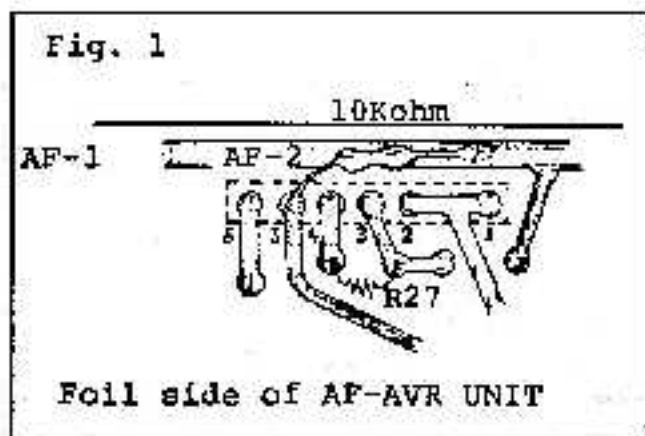
SUBJECT: TS-820 RIT Modification

DATE 1/27/77

We have had a few reports of the TS-820 RIT tuning being "rubbery". The following information will solve this.

HOW TO MODIFY

1. Remove resistor R27 (1Kohm) on AF-AVR UNIT (X49-1080-00).
2. Install a 10Kohm resistor on foil side of AF-AVR UNIT --- see Figure 1.
3. Install a 1Kohm resistor on RIT control --- see Figure 2.
4. Install a capacitor (3.3 μ F-10 μ F) between RIT control and ground --- see Figure 2.
5. Adjust VR-2 on AF-AVR UNIT (X49-1080-00) for the same frequency as the center position of the RIT control.





SERVICE BULLETIN

from: TRIO-KENWOOD COMMUNICATIONS, INC.

SUBJECT: SERVICE NOTES ON TS-820

DATE 10-25-77

RECEIVER

1. Low audio output receiver sensitivity and no transmit: -6V supply is bad. Q13 on fix VOX (X50-1350-00).
2. 25KHz callibrator will not zero: ADD 3pf in parallel with TC-1 at (X52-0005-01) marker unit.
3. Receiver sensitivity down: Q2 35K35(GR) on RF unit (X44-1150-00). +9V on PD unit is shorted. L-6 shorted to ground.
4. Intermittant receive when moving set. (Shock): Check for touching terminals at final relay socket.
5. No receiver or digital: 14V wire pinched between DG-1 chassis and ground.
6. Receiver sensitivity 40dB down: Check for shorted L-8 1.9 antenna coil on coil pack (X44-1140-00).
7. Adjacent signal interference: See TKC bulletin.
8. No receive audio: Check for shorted TA 7201-P IC module at (X49-1080-00).
9. Poor receive audio: The 100V AC 120 volt taps were mis-wired.
10. Receiver doesn't work 20-40: Check for wafer touch to ground on band switch.
11. No DG-1, no Rx, no Tx, no VCO: Bad D-1 5 volt Zener on Relayunit (X43-1190-00).
12. RIT action seems warbly: See TKC bulletin.
13. Receiver has bad static and is noisy: Bad C14, C15 tantalum on PD unit (X50-1340-00).
14. VFO frequency shift: Check for loose tension of VFO tension spring.
15. USB - LSB will not work: Check for loose connection at C-18 CAR-1 on (X50-1310-00).
16. Intermittant audio: Check for Loose mounting screws on audio board (X49-1080-00).

6. Adjust T11 for a frequency of 9.00MHz plus the lower limit of the band desired.
7. Connect a frequency counter to TP4 and ground on the PD Unit X50-1340-00 and verify the frequency of the reference oscillator. It may vary ± 500 KHz.
8. Return the TUN/NOR switch on the VCO Unit X50-1330-00 to the NOR position.
9. Turn off the TS-820.
10. Replace the covers on the PLL Assembly and reinstall it in the TS-820.
11. Replace the top and bottom covers on the TS-820.

CAUTION

Do not use magnetized tools when working on the PLL Assembly X60-1010-00. Beryllium tools would be better than ferrous ones. If the PLL Assembly X60-1010-00 should become magnetized, use a bulk tape eraser on open core AC transformer to demagnetize it.



SERVICE BULLETIN

from: TRIO-KENWOOD COMMUNICATIONS, INC.

TS-520/S, TS-820/S

4812

SUBJECT: TS-520/s, TS-820/S CW FILTER SELECT CONTROL

DATE 2/14/80

In the TS-520SE, the Heater Switch has been replaced with a CW WIDE/NARROW select switch. For those operators who desire this type feature for their transceiver, the following information may be considered as a guideline

TS-520S Series Transceivers

1. A miniature SPDT switch may be installed at the operators preference, on the rear side, or bottom panel. Use this to switch the CW or SSB filters by wiring the BROWN lead, which normally is transferred to the CW terminal on the IF unit, between the SSB filter, for WIDE, and CW filter for NARROW.
2. A "Traditional" solution has been to use the FIX CH switch, position 3 and 4 for filter switching. This may be done by completely rewiring the switch, or by leaving the switch wiring and the filter wiring as for normal operation, and bridging the following terminals:
 - A. FIX CH "C" terminal to IF "SSB" terminal.
 - B. FIX CH "4" terminal to IF "CW" terminal.Placing the FIX CH switch to 4 will operate the SSB filter in CW Mode.

TS-820/S Series Transceivers:

1. Similar to the TS-520 series, a miniature SPDT toggle switch may be installed at the operators preference at the rear or on the bottom cover.
2. The FIX CH switch, or Digital Hold switch may be rewired to control the CW WIDE/NARROW function.

On the MODE switch, S6-1, the SSB filter control is GREEN, and the CW filter control line is GREY. Break the GREY line and connect from the MODE switch to the SPDT common terminal. Connect the GREY line to the IF unit to one terminal, and bridge the GREEN SSB line to the other Switch terminal.

JBB/yn

SERVICE BULLETIN AMATEUR RADIO

SUBJECT TA7201P SUBSTITUTION PARTS KIT	DATE 07/20/89
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The Toshiba TA7201P audio amplifier (Q3) used in the TS-820(S) and R-820 is no longer available. The part has been replaced with a kit (PART # W05-0257-00). This service bulletin will provide the correct installation procedures for replacing a defective TA7201P with the new kit.

1. Disconnect the power cord and antenna from the transceiver.
2. Remove the covers from the transceiver and disconnect the speaker wire.
3. Remove the AF AVR board from the bottom of the transceiver (4 screws and 3 connectors).
4. Remove the two nuts that secure the heat sink to the audio amplifier (Q3) and then remove the heat sink. FIGURE 1
5. Desolder and remove Q3, C21, C22, C26, C33, R40, R42, and R47 from the AF AVR board. C33 and R47 are mounted on the foil side of the board, but may not be installed on some models. FIGURE 1 & 2
6. Using the parts from the kit, install a 22uF capacitor in the C21 position, a 0.068uF capacitor (labeled 683K) in the C22 position, a 3.9 ohm resistor in the R40 position, and a 470 ohm resistor in the R42 position. FIGURE 1
7. Solder a 0.1uF capacitor (labeled 104K) in parallel with C30. Mount the part on the foil side of the AF AVR board. FIGURE 1
8. Remove the two nuts from the heat sink mounting screws. FIGURE 3
9. Replace the mounting screws with the ones in the kit. If the original screws have been soldered to the board, remove the excess solder and while the screws are still hot, turn the board upside down to allow the screws to fall onto the working surface. FIGURE 3
10. Secure the new mounting screws with the two nuts that were removed in step 8. FIGURE 3
11. Install the heat sink and secure it with the two hexagon bosses from the kit. FIGURE 3



SERVICE BULLETIN

from: TRIO-KENWOOD COMMUNICATIONS, INC.

30

SUBJECT: General Alignment Procedure for the TS-820(S)

DATE 3-14-78

The purpose of this bulletin is to give a simplified alignment procedure for the TS-820 and TS-820S transceivers. We have tried to combine some of the steps and rearranged the sequence of steps so the alignment may be done quicker. This may be used in lieu of the alignment procedure in the Service Manual.

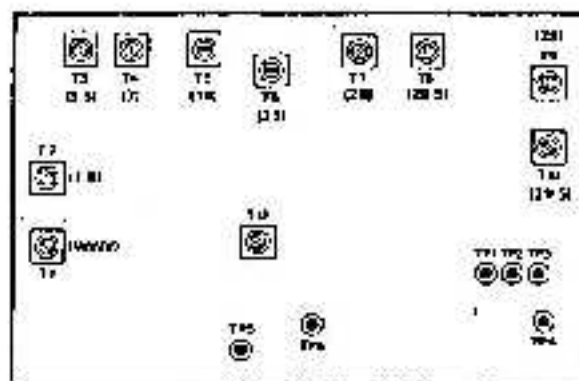
1. ADJUSTMENT, A.V.R. UNIT (X49-1080-00)

- A) Adjust VR1 for 3.3V
- B) Adjust VR4 for 9V.

2. ADJUSTMENT, V.C.O. UNIT (X50-1330-00)

- A) Place S1 to TUNE and connect a frequency counter to TP5.
- B) Adjust T1~T11 for proper frequency. (See table)

Band	Coil	Set frequency
WWV	T 1	24.08 MHz
1.8	T 2	10.08 MHz
3.5	T 3	12.58 MHz
7	T 4	16.08 MHz
14	T 5	23.08 MHz
21	T 8	30.08 MHz
28	T 7	37.08 MHz
28.5	T 8	37.58 MHz
29	T 9	38.08 MHz
29.5	T10	38.58 MHz
AUX	T11	Received signal +0.60 MHz



3. ADJUSTMENT OF COIL PACK (X44-1140-00)

- A) Turn screen grid (S.G.) switch (rear panel) off, heater switch ON.
- B) Center DRIVE control.
- C) Peak coil pack all bands for max. reading on panel meter in TX and RX (except WWV in TX).

Adjusting sequence	BAND	VFO scale
1	1.8	100
2	3.5	250
3	7	150
4	14	175
5	WWV	0 (15.0MHz)
6	21	225
7	28.5	500

7. NEUTRALIZATION

- A) S.G. switch turned off after Tx has been tuned in CW mode at 21.3MHz.
- B) Adjust neutralization cap in final cage for min. output as seen on scope.

SB:ar