4.20 CONNECTION TO THE TS-820S

Connect the R-820 to the TS-820S for Full Transceive operation. By connecting the R-820 to an HF band transceiver, the following operating modes are available:

i) TS-820S:
Transceive operation (both Full Transceive or VFO Transceive operation)

ii) TS-520S:
Separate operation ..... Seperate System(1)

iii) Any HF band transceiver (with a different frequency arrangement:
Separate operation ..... Separate System(1)
The difference between Transceive operation and Separate operation is explained below.

TRANSCEIVE OPERATION

Transmit and receive signals are controlled by the VFO's of R-820 and TS-820S. By using both VFO's cross-operation is available. Transceive operation is classified into Full Transceive operation and VFO Transceive operation.

i) Full Transceive operation
By applying a Heterodyne signal from the TS-820S to the R-820, transceive operation at the same operating frequency is effected through the VFO's.
For Transceive operation, Full Transceive is recommended.

ii) VFO Transceive operation
Cross-operation is effected by using seperate R-820 and TS-820S VFO's. In this case, the HET frequency deviation between both units must be compensated for by using the RIT circuits.

SEPARATE OPERATION

Separate operation is classified into the following two types:

i) SEPARATE SYSTEM (1):
Using a transmitter and a receiver or a transceiver and a receiver, two VFO's are operated at the same time for transmission and reception at their own frequencies. In this way, cross band QSO or simultaneous reception of two signals (when a transceiver and receiver are used) can be effected. However, this method is recommended as secondary- the other Transceive modes should be used for more effective operation.

ii) SEPARATE SYSTEM (2)'
Using a transmitter and a receiver, a transceiver and a receiver, or a transceiver and an EXT VFO, two VFO's are operated alternately at the normal or reverse position during Full Transceive operation for transmission and reception on the same or different frequencies.
The combination of transmitter and receiver, or transceiver and receiver, assures effective Transceive operation even when transmit and receive frequencies are far removed from each other, since receiving sensitivity and transmit drive circuit adjustments are separate.

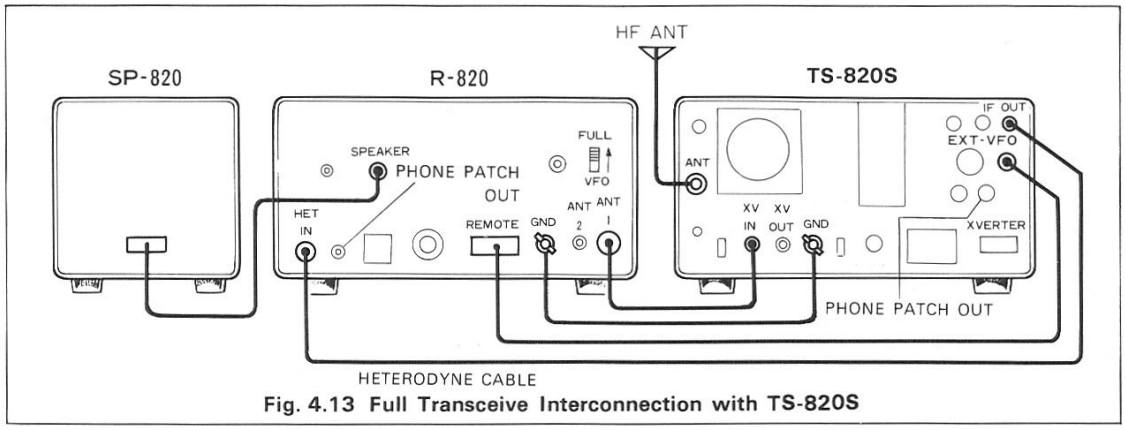

Fig. 4.13 Full Transceive Interconnection with TS-820S

4.20.1 Cabling for Full Transceive Operation (Fig. 4-13)

Connect as shown in Fig. 4-13. The TS-820S IF OUT jack and EXT VFO connector must be rewired: refer to Section 4.24, modification of the TS-820S.

i) Operation

Set the R-820 rear panel FULL-VFO Transceive switch to the full (normal operation) position. The BAND switches of both the R-820 and TS-820S must be set to the same band. Set the R-820 TRCV-SEP switch to TRCV and the TS-820S RF ATT switch ON.

Use the TS-820S FUNCTION switch for FIX-CH or VFO operation. Refer to Table 4-4, for TRANSCEIVE and FUNCTION switch settings.

NOTE 1

ANTIVOX: In Transceive operation, the TS-820S ANTI VOX circuit should be modified.

NOTE 2

VFO CALIBRATION: When calibrating the TS-820S at the CAL-RMT or CAL-FIX FUNCTION switch position, the beat tone is heard from the TS-820S speaker. In CW operation, side tone is also heard from the TS-820S speaker.

If the R-820 CAL 25 kHz switch is ON and the AF GAIN is advanced, the sound heard from the R-820 speaker in the vicinity of zero beat is normal, and is not an indication of trouble.

The Digital Display also indicates an incorrect frequency. The error indication disappears at zero beat.

NOTE 3

DIGITAL DISPLAY: During Full Transceive operation, the TS-820S Digital Display indicates transmit frequency, and the R-820 Digital Display goes off in transmit mode. The R-820 Digital Display indicates receive frequency and the TS-820S Digital Display goes off in receive mode. This occurs regardless of the TRANSCEIVE switch position. When the R-820 MONI switch is ON, the R-820 Digital Display is illuminated.

Table 4.4 R-820, TS-820S Transceive Switching Functions

R-820 TRANSCEIVE			TS-820S FUNCTION: TRANSCEIVE VFO	TRANSCEIVE VFO-R	TRANSCEIVE FIX-R	TRANSCEIVE FIX	CAL CAL-FIX	CAL CAL-RMT
*NORM	R		R-820	R-820	TS-820S FIX	TS-820S FIX	TS-820S FIX and R-820	TS820S and R-820
	T		TS-820S	TS-820S FIX	TS-820S	TS-820S FIX		
RX	R		R-820	R-820	TS-820S FIX	TS-820S FIX	TS-820S FIX and R-820	TS-820S and R-820
	T		R-820	TS-820S FIX	R-820	TS-820S FIX		
TX	R		TS-820S	TS-820S	TS-820S FIX	TS-820S FIX	TS-820S FIX and TS-820S-VFO	TS820S and R-820
	T		TS-820S	TS-820S FIX	TS-820S	TS-820S FIX		
*REV	R		R-820	R-820	TS-820S FIX	TS-820S FIX	TS-820S FIX and TS-820S-VFO	TS-820S and R-820
	T		R-820	TS-820S FIX	R-820	TS-820S FIX		

* Separate system (2)

R: Reception TS-820S: TS-820S VFO

T: Transmission R-820: R-820 VFO or FIX

4.20.2 Cabling for VFO Transceive Operation

Connect as shown in Fig. 4-14. Modification to the TS-820S is not required. Do not connect the heterodyne cable.

i) VFO Transceive Frequency Calibration

Set the R-820 and TS-820S BAND and MODE switches to the same position. Set the other switches as follows (TABLE 4-5):

TABLE 4.5 VFO Transceive Calibration Settings

TS-820	FUNCTION	VFO
R-820	TRCV-SEP	TRCV
	CAL 25 kHz	ON
	TRANSCEIVE	RX
	TRCV-VFO(rear panel)	VFO

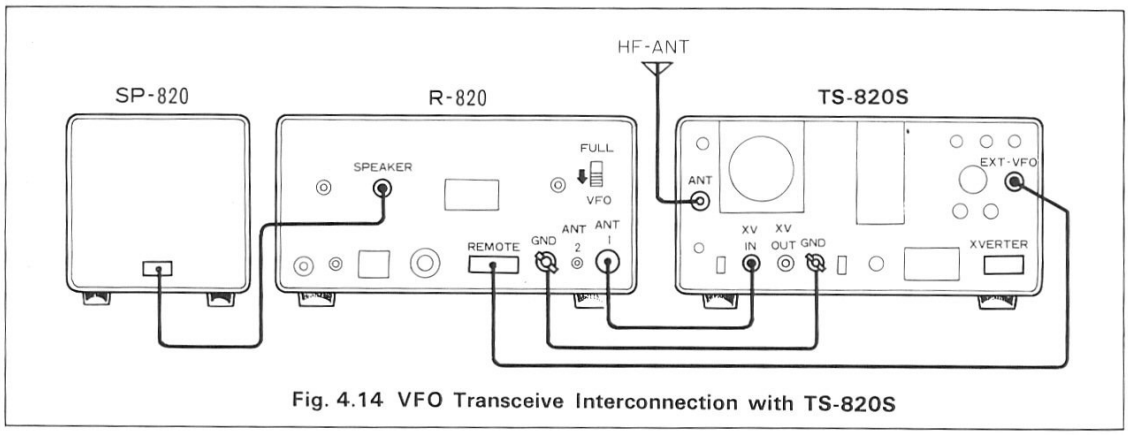

Fig. 4.14 VFO Transceive Interconnection with TS-820S

Heterodyne frequency deviation between the TS-820S and R-820 can be corrected by the following adjustments. After adjustment, DO NOT touch the RIT controls.

NOTE 1

These adjustments should be made when changing bands, or when the VFO is tuned more than 200 kHz within the same band.

NOTE 2

If the R-820 CAL 25 kHz switch is ON and the AF GAIN is advanced, the sound heard from the R-820 speaker in the vicinity of zero beat is normal, and is not an indication of trouble.
The Digital Display also indicates an incorrect frequency. The error indication disappears at zero beat.

a. Advance the TS-820S AF GAIN, and turn the R-820 RIT switch OFF. Adjust the R-820 Main Tuning for marker zero beat.
b. Advance the R-820 AF GAIN and reduce the TS-820S AF GAIN. Turn the R-820 RIT switch ON and adjust the for marker zero beat with the RIT control.
c. Set the R-820 TRANSCEIVE switch to TX.
d. Advance the TS-820S AF GAIN and reduce the R-820 AF GAIN. Turn the TS-820S RIT switch OFF, and adjust the TS-820S Main Tuning for marker zero beat.
e. Advance the R-820 AF GAIN and reduce the TS-820S AF GAIN. Turn the TS-820S RIT switch ON and adjust the for marker zero beat using the RIT control.

ii) Operation
Turn the R-820 CAL 25 kHz switch OFF and the TS-820S RF ATT switch ON. Reduce the TS-820S AF GAIN to Minimum. Refer to table 4-4 for switch settings.

4.20.3 Separate connection

Seperate system (1) applies
When the R-820 is used with the TS-820S, both Transceive and Separate operations are available.

i) Operation
Connect for Full or VFO Transceive operation, then set the R-820 TRCV-SEP switch to SEP. The R-820 functions as a receiver and the TS-820S as a transmitter. During operation, turn the TS-820S RF ATT switch ON and reduce the AF GAIN.

ii) Seperate Operation
*DIVERSITY RECEPTION: In the SEPARATE mode, the R-820 and TS-820S receiver can be operated simultaneously (TS-820S RF ATT should be OFF with the AF GAIN advanced), allowing simultaneous reception of two signals on the same band, or an other band.

*R-820 as Remote VFO: The R-820 will operate as a remote VFO for the TS-820S. Set the R-820 TRCV switch to TRCV. and the STBY switch to STBY.

*TS-820S Independent Transceive: The R-820 stops operating and the TS-820S operates as a transceiver: Set the R-820 TRCV switch to SEP and the STBY switch to STBY.

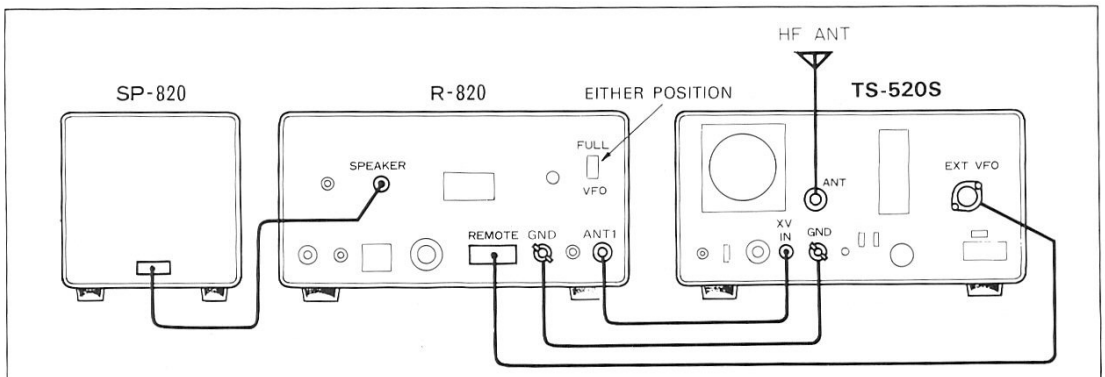

Fig. 4.15 VFO Transceive Interconnecting with TS-520S

4.21 CONNECTION TO THE TS-520S

Connect as shown in Fig. 4-15.

4.21.1 Operation

Set the R-820 and TS-520S BAND switches to the same band. Reference Table 4-4. "TS-820S" should be read as "TS-520S" for switch settings.

VFO Transceive Frequency Calibration:

The R-820 and TS-520S VFO's must be set to the same frequency. Set the R-820 TRCV-SEP switch to the TRCV position and the TS-520S FUNCTION switch to the CAL-RMT position. To set the R-820 VFO to the TS-520S VFO frequency, adjust the TS-520S Main Tuning knob for a zero beat.

Next, set the TS-520S FUNCTION switch to the VFO position, and the R-820 TRANSCEIVE switch to the NORM position.

Set the R-820 TRCV-SEP switch to SEP, and the MONITOR switch to the MONI position.

With the TS-520S in transmit mode, receive the MONI signal on the R-820. Turn the R-820 RIT switch ON and adjust the RIT control for zero beat.

VFO frequency calibration is now completed, and the TS-520S and R-820 are ready for operation.

4.22 CONNECTION TO THE TS-820S, TV-502S AND TV-506

Connect as shown in Fig. 4-16. Since this cabling system is used for full transceive operation. The TS-820S IF OUT and EXT-VFO connectors need to be rewired as outlined in Section 4-24.

4.22.1 Operation

Set the R-820 rear panel FULL-VFO switch to the FULL (normal operating) position. The R-820 and TS-820S BAND switches must be set to the same band. See Table 4-4 for switch settings of the R-820 TRANSCEIVE and TS-820S FUNCTION switches

TV-502S and TV-506 operating procedures are the same for transceive operation with the TS-820S and R-820.

4.23 CONNECTION TO THE SM-220

Fig. 4-17 shows connection of the SM-220 with the BS-8 Pan Display option. The IF output from the R-820 can be observed by connecting IF OUT 2 to the SM-220 V INPUT.

4.24 MODIFICATION OF THE TS-820S (FIG. 4-18 TO 4-28)

For the full transceive operation with the TS-820S, minor wiring changes are required. To modify, proceed as follows:

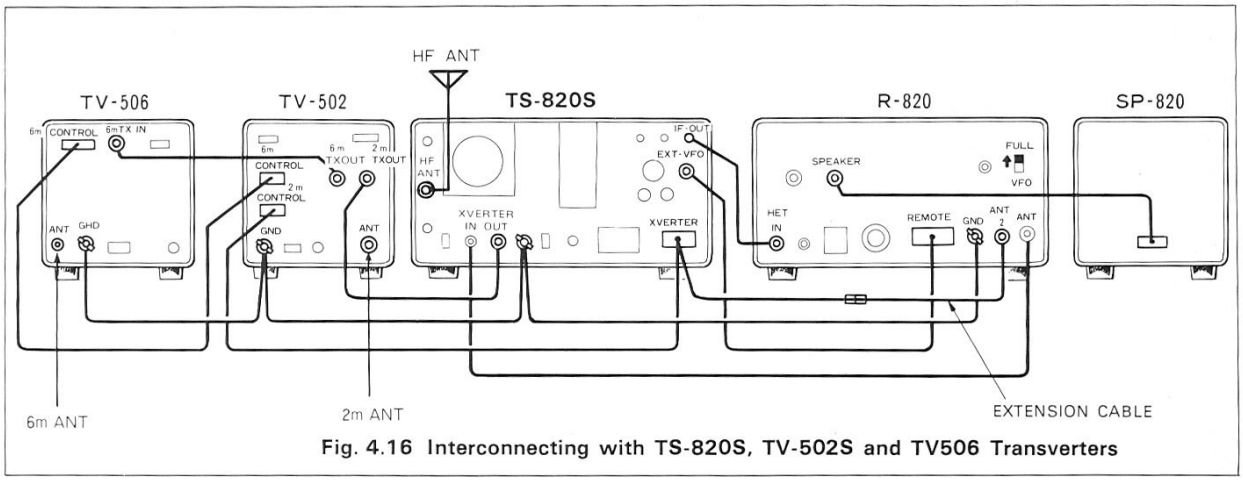

Fig. 4.16 Interconnecting with TS-820S, TV-502S and TV506 Transverters

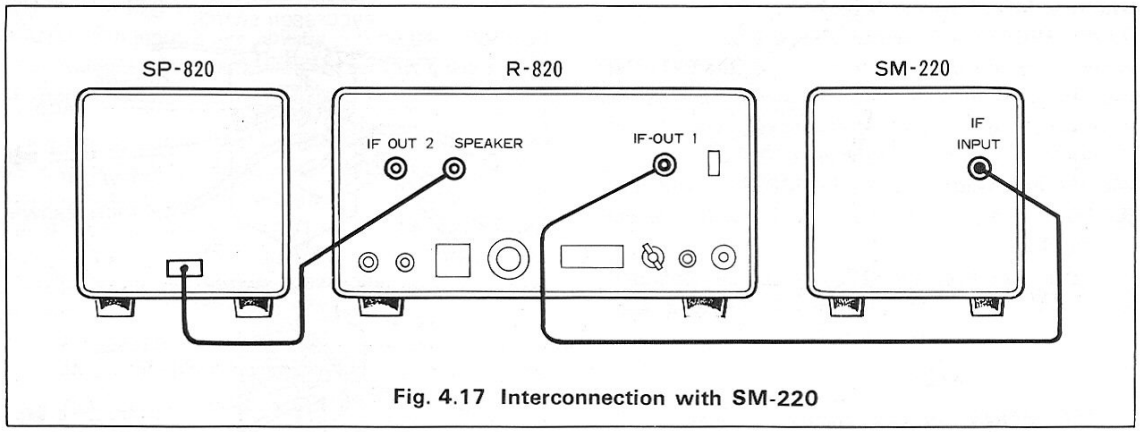

Fig. 4.17 Interconnection with SM-220

1. Remove the PLL-ASSY unit (Fig. 4-18).
2. Remove the PD unit "X50-1340-01" (Fig. 4-19).

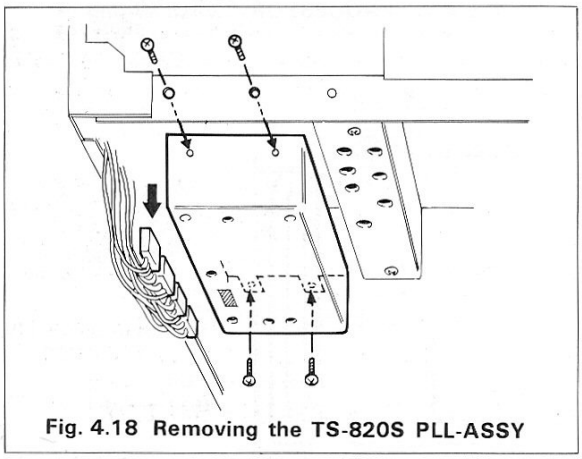

Fig. 4.18 Removing the TS-820S PLL-ASSY

3. Solder one end of the supplied 75Ω (1.5C-2V) coaxial cable to TP4 (Fig. 4-20). Connect the other end to the IF OUT jack. (the pre-wired IF output lead should be disconnected and taped).

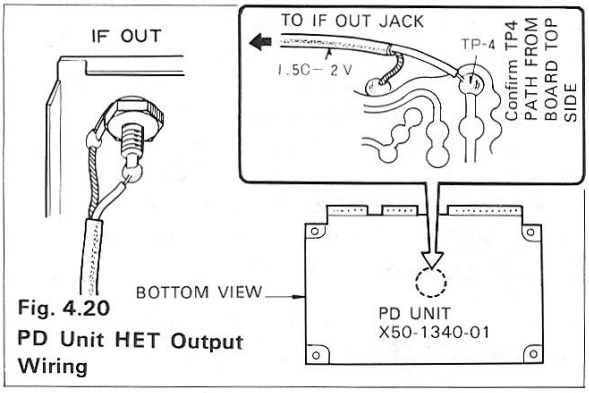

Fig. 4.20 PD Unit HET Output Wiring

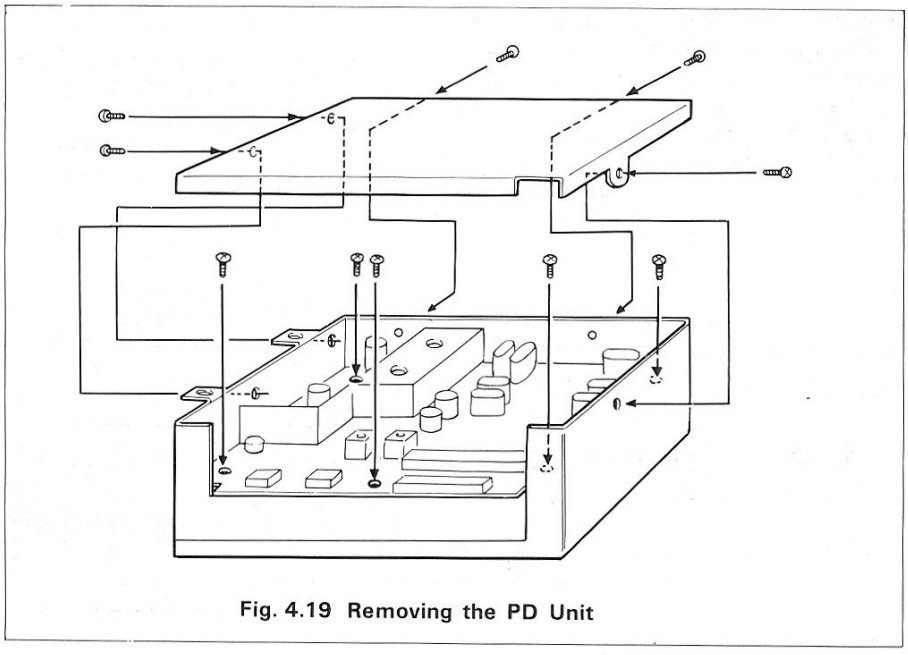

Fig. 4.19 Removing the PD Unit

4. Rewire the MODE switch (Fig. 4-21)
5. Wire the PROCESSOR switch (Fig. 4-22).
6. Remove the white/blue lead from pin "4" the EXT-VFO socket and tape insulate its end. Solder the supplied 0.01μF capacitor to the EXT-VFO socket, pins "3" and "5". Solder a jumper between pins "2" and "3". Solder the new leads from the PROCESSOR switch to EXT-VFO pin "4", and from the MODE switch to pin "7". (Fig. 4-24).
7. When the modified TS-820S is to be operated independently, the 9P-MT plug must be installed, with pins "4" to "7" jumpered. (Fig. 4-25)

NOTE

VFO-820 OPERATION: If after modification remote VFO operation is desired, with the TS-820S, the following changes to the VFO cable connector are required.

i) Remove the connector cover from the cable.
ii) Disconnect the blue lead from the pin 4 and tape the lead end for proper insulation.
iii) Short pins 4 and to 7 using a jumper wire.
iv) Wrap the modified connector with a piece of tape so it can be easily identified in the future.

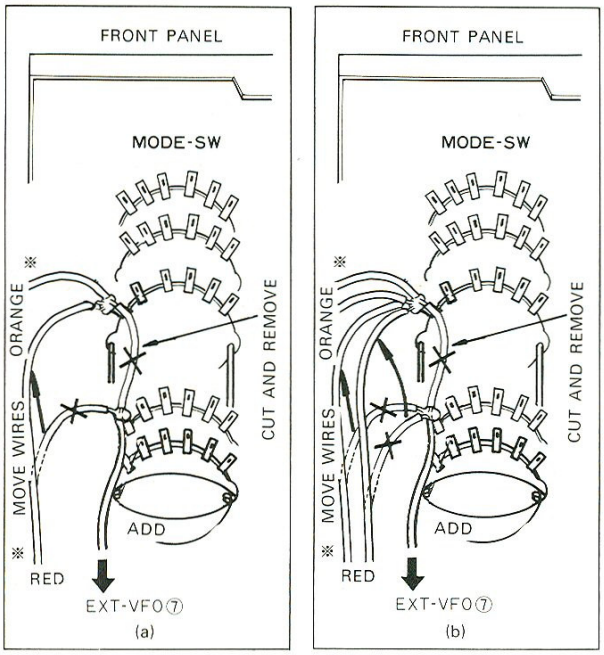

Fig. 4.21 MODE Switch Rewiring

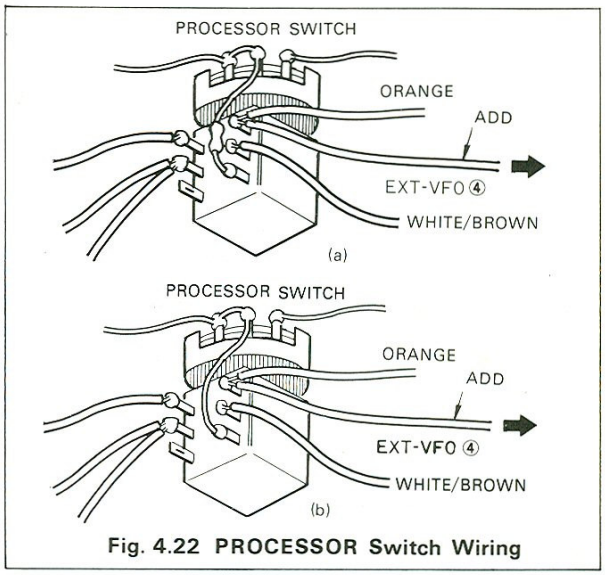

Fig. 4.22 PROCESSOR Switch Wiring

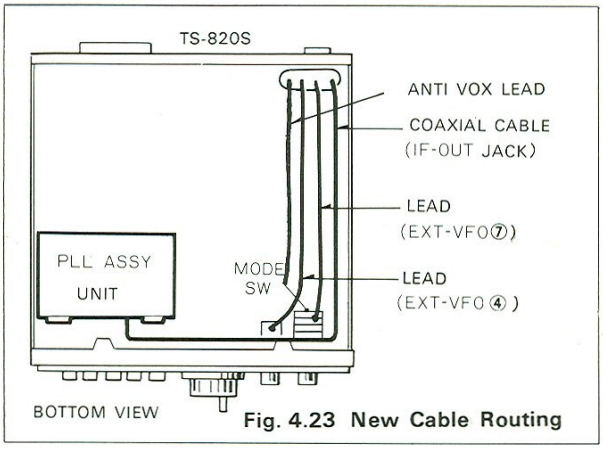

Fig. 4.23 New Cable Routing

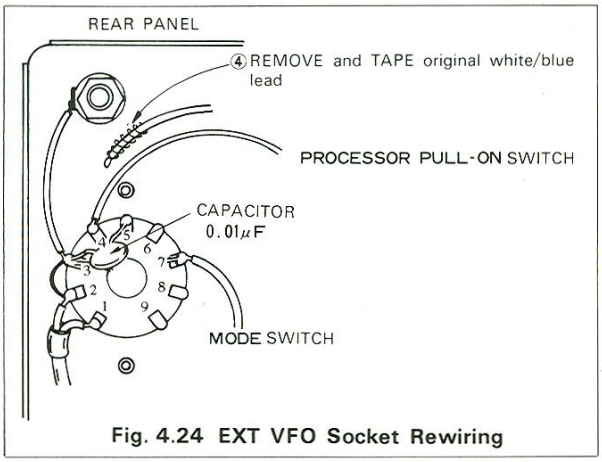

Fig. 4.24 EXT VFO Socket Rewiring

8. ANTI VOX wiring change
An ANTI-VOX input is available by making the following circuit changes. The parts required for this change are not supplied.

i) Locate the two green leads connected to the PHONES jack on the TS-820S front panel. These leads can be seen from the bottom of the unit.

ii) One of the two leads is OUTPUT from the AF-AVR unit, and the other is INPUT to the VOX-VR unit. By pulling on the lead from the AF-AVR unit, locate the lead to the VOX-VR unit.
Cut the lead to the VOX-VR unit and connect it as shown in Fig. 4-26. The terminal strip can be secured to the Counter unit screw (Fig. 4-28).

iv) Rewire the PHONE PATCH OUT terminal as shown in Fig. 4-27. Tape the leads for proper insulation.

v) Connect the PHONE PATCH OUT terminals of the R-820 and TS-820S using an RCA plug patch cord (optional).

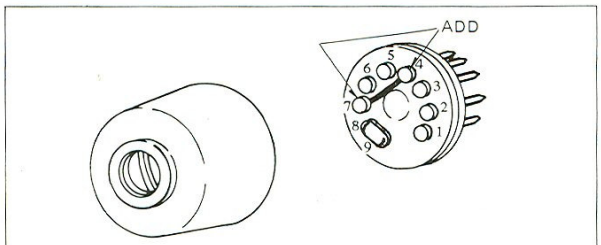

Fig. 4.25 9P-MT Plug Rewiring

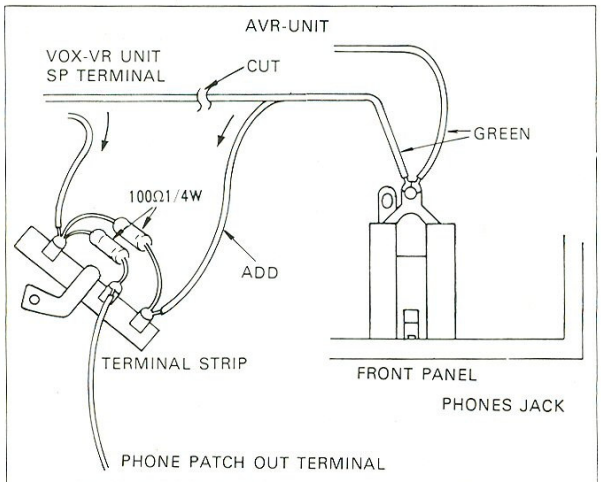

Fig.4.26 ANTI VOX (Speaker Line) Rewiring

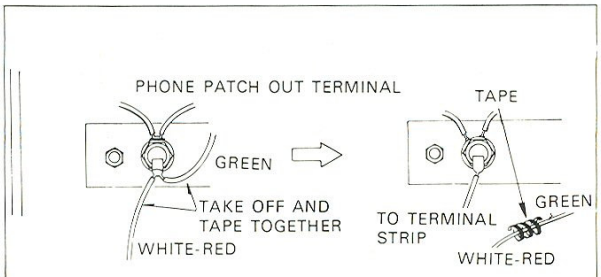

Fig. 4.27 ANTI VOX (Phone Patch Output) Rewiring

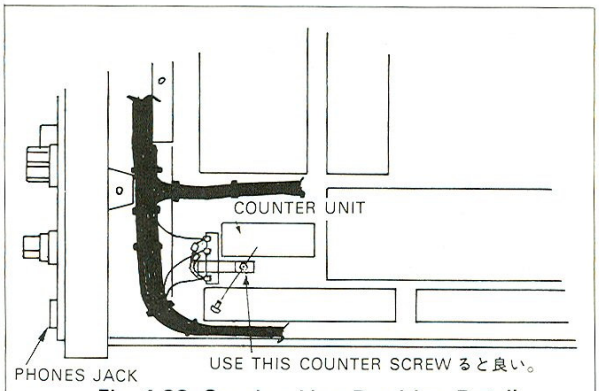

Fig. 4.28 Speaker Line Rewiring Detail

4.25 AC VOLTAGE SELECTION

The R-820 will operate on 100, 120, 220 or 240 VAC 50 or 60 Hz. For proper operation, select the closest power setting to your local line voltage. If you are not sure of local line voltage contact the utility company. To reset the Voltage Selector, FIRST DISCONNECT THE POWER CORD. Unscrew the fuse cap and pull the selector ring out of its socket. Align the selector window with the desired voltage and reinsert the ring. Reinstall the fuse, and connect the AC power cord.