

 **KENWOOD**

**HF TRANSCEIVER**

**Model TS-530S**



**INSTRUCTION MANUAL**

## AFTER UNPACKING

It is advisable to save all original packing cartons (inner and outer) to protect your valuable transceiver from damage should you wish to transport it for remote operation or ship it for after-sales service.

The following explicit definitions apply in this manual. Be sure to read these definitions:

**NOTE:** If disregarded, inconvenience only — no damage or personal injury.

**CAUTION:** Equipment damage may occur, but not personal injury.

**WARNING:** Personal injury may occur — do not disregard.

**CAUTION:** -----  
Read Operating Manual Section 4. before placing transmitter in service.  
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**WARNING:** -----  
HIGH VOLTAGES PRESENT.  
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# SECTION 4. OPERATION

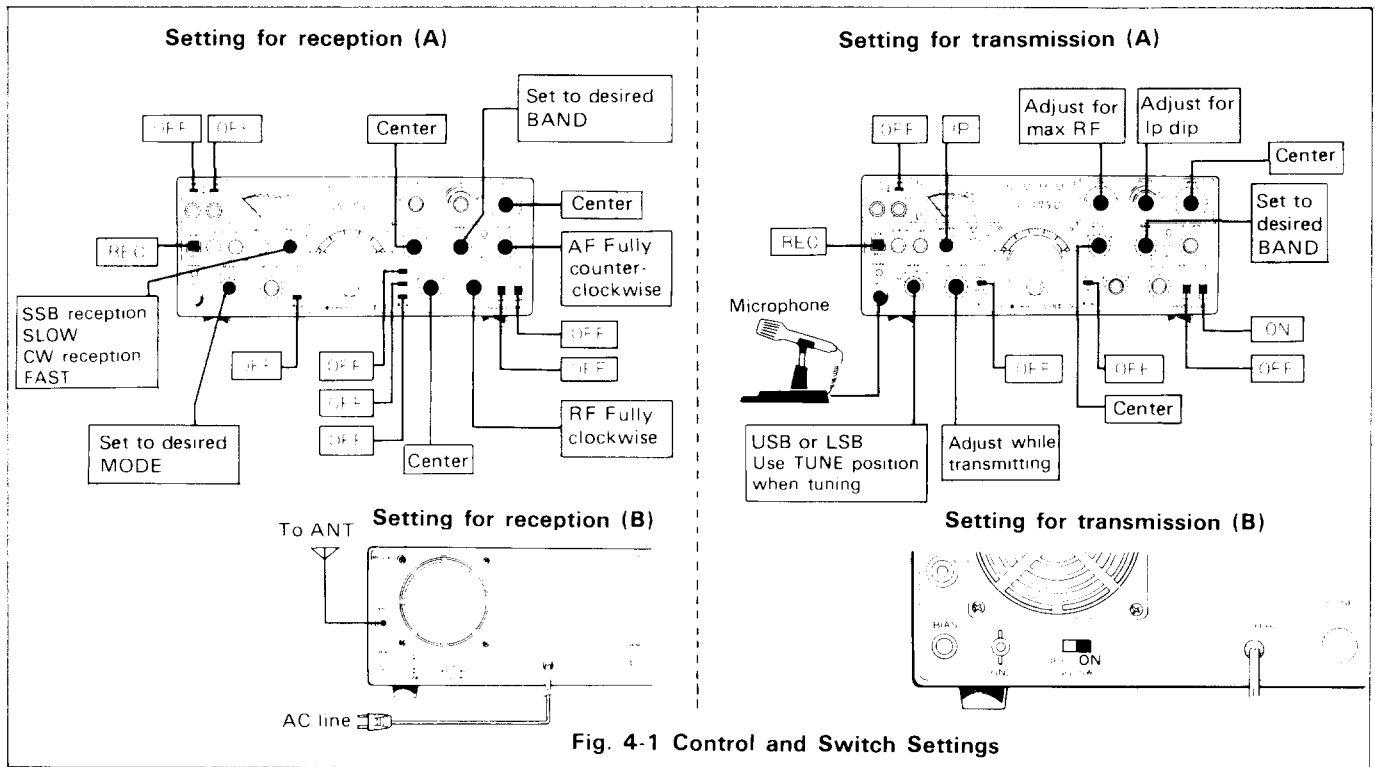


Fig. 4-1 Control and Switch Settings

## 4.1 RECEPTION (I)

### NOTE:

Set the MIC and CAR controls to minimum to prevent accidental transmission before tune-up is completed. The TS-530S must be operated into 50 ohm ~ 75 ohm antenna or dummy load with an SWR less than 2 : 1. Random length wire antennas or light-bulb dummy loads cannot be used.

Conventional half-wave dipoles and beam antennas should only be used at or near their resonant frequency. Exceeding an SWR of 2 : 1 can damage the output stage of the transceiver.

### (1) Basic Procedures for Receive Operation

With a suitable antenna and microphone or key connected to the transceiver, set the controls as described in Fig. 4-1.

Turn the POWER switch ON. The meter, dial scale, and VFO indicator will light, indicating the transceiver is operating. Advance the AF GAIN control clockwise until some receiver noise is heard in the speaker. Turn the main tuning dial within the frequency range of the Amateur band chosen until a signal is heard. Tune the signal for clearest reception, and then adjust the DRIVE control for maximum S-meter deflection.

### (2) WWV Reception

Set the band switch to "10" and turn the main tuning control to 10.0 MHz.

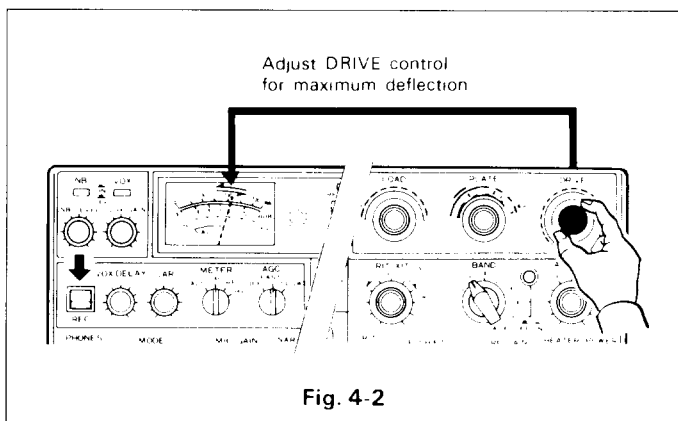


Fig. 4-2

## 4.2 RECEPTION (II)

This section covers operation of controls and switches to provide the maximum performance from the TS-530S.

### (1) RF ATT SWITCH

The input to the receive RF amplifier is attenuated approximately 20 dB, providing distortion-free reception. This feature may be used in cases of receiver overload, caused either by a strong local signal, or during weak signal reception when a strong adjacent signal may blank the receiver.

### (2) RF GAIN CONTROL

RF GAIN is controlled by changing the AGC threshold voltage. Adjust the RF GAIN so the S-meter does not deflect excessively. This also reduces noise during reception. For normal operation, this control should be turned fully clockwise for maximum sensitivity.

### (3) AGC (AUTOMATIC GAIN CONTROL)

Set the AGC switch to the appropriate position: Generally for SSB, SLOW, for CW FAST, and for very weak signals, the AGC may be turned OFF.

#### Simultaneous Use of the RF GAIN CONTROL and AGC Switch

If a strong signal (such as a local station) appears in the vicinity of the intended receive signal, the S meter may show unusual deflection due to the AGC voltage developed from the strong disturbing signal. If this occurs, turn the RF GAIN down so the meter pointer remains at about the original deflection peak and turn the AGC switch OFF. This will eliminate the unwanted AGC voltage and permit clear reception.

### (4) RIT/XIT

First set the RIT/XIT control to center, and turn the RIT switch ON.

The RIT/XIT control allows shifting the receive frequency by approximately  $\pm 2$  kHz without changing the transmit frequency.

With the RIT switch ON, the receive frequency can be adjusted by using the RIT control.

With both the RIT and XIT switches ON, both the transmit and receive frequencies can be shifted.

For XIT switch operation, refer to Section 4.4 "Transmission (II)".

#### NOTE:

When the RIT is ON, transmit frequency is different from the receive frequency. For normal operation, leave the RIT switch OFF. It should be turned ON only when needed.

### (5) IF SHIFT

The IF SHIFT control is used to shift the passband of the IF filter without changing receive frequency. By turning this control in either direction, the IF passband is shifted as shown in Fig. 4-3.

The IF SHIFT is effective in eliminating interference when the receive signal is superimposed on nearby signals during operation in both SSB or CW mode.

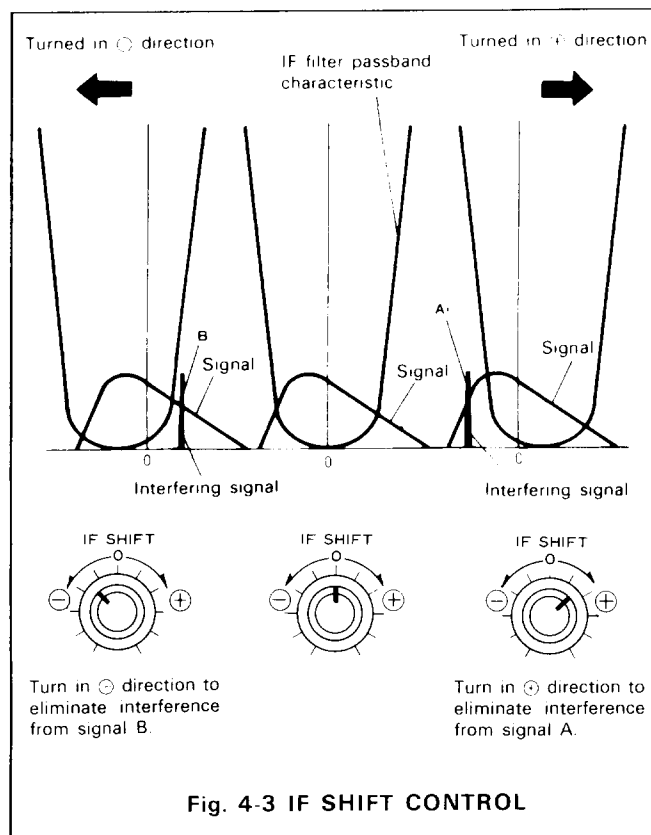


Fig. 4-3 IF SHIFT CONTROL

#### (a) USB MODE (10 MHz and above)

Adjust the IF SHIFT control in the (+) direction and lower frequencies are cut. Adjust the control in the (−) direction and high frequencies are cut.

#### (b) LSB MODE (7 MHz and below)

Adjust the control in the (+) direction and higher frequencies are cut. Adjust the control in the (−) direction and low frequencies are cut.

#### (c) CW MODE

By using the IF SHIFT in conjunction with the RIT, tone quality can be adjusted.



## (6) NARROW SWITCH

In the NARROW position without optional filters no signals are received. Optional filters (CW: YK-88C, YK-88CN, SSB: YK-88SN) for NARROW operation are available for improve radio interference rejection. Any two filters can be used according to your application. When two CW filters, YK-88C and YK-88CN are used, the WIDE position in CW mode is 0.5 kHz.

### Receive Pass Bandwidth (−6 dB) kHz

Optional Filter	Jumper connector		SSB		CW	
	A	B	NAR SW		NAR SW	
YK-88○○			OFF	ON	OFF	ON
Without filter optional	CW	SSB	2.4 kHz	*	2.4 kHz	*
SN	SSN	SSB	2.4 kHz	1.8 kHz	2.4 kHz	1.8 kHz
C	CW	SSB	2.4 kHz	*	2.4 kHz	500 Hz
CN	CW	SSB	2.4 kHz	*	2.4 kHz	270 Hz
SN + C	CW	SSB	2.4 kHz	1.8 kHz	2.4 kHz	500 Hz
	CW	SSN	2.4 kHz	1.8 kHz	1.8 kHz	500 Hz
SN + CN	CW	SSB	2.4 kHz	1.8 kHz	2.4 kHz	270 Hz
	CW	SSN	2.4 kHz	1.8 kHz	1.8 kHz	270 Hz
C + CN	CW	SSN	2.4 kHz	500 Hz	500 Hz	270 Hz

Table 4-1

\* No reception in this position

In transmission, the SSB (WIDE) filter is used regardless of MODE or NAR-WIDE switches positions.

## (7) NOISE BLANKER (NB)

For pulse type noise, such as generated by automotive ignition systems, turn the NB switch ON. Adjusting the NB LEVEL control varies the blanker's threshold, eliminating even low level noises.

If high level signal or noise is present on an adjacent frequency, do not use excessive NB threshold LEVEL as it may distort the received signal.

## 4.3 TRANSMISSION (I)

This section covers adjustment of the transceiver for transmission.

Refer to Fig. 4-1 for initial transmitter switch settings. Set the main tuning to the desired operating frequency. (Refer to Table 4-2 for a summary of the following.)

### CAUTION:

DO NOT turn the BANDSWITCH while the transceiver is in transmit mode.

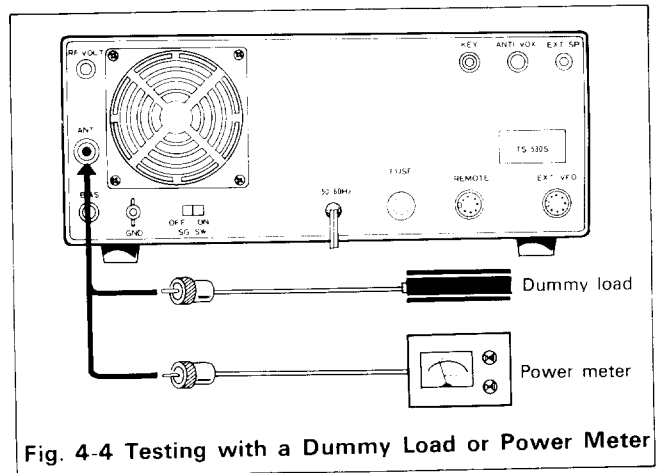


Fig. 4-4 Testing with a Dummy Load or Power Meter

1. Connect a 50Ω antenna for the band you will operate or a dummy load, and connect a Key. SWR must be 2:1 or better. The life of the final tubes is directly related to the SWR of the antenna, and to the length of tuning periods.
2. Turn POWER and HEATER Switches ON.
3. Place the MODE switch to SSB, METER switch to Ip.
4. Place the STAND-BY switch to SEND and adjust bias to 60 mA with the BIAS control on the rear panel.

### CAUTION:

If the plate current is higher than 60 mA do not leave the stand-by switch on for more than a few seconds. Excessive plate current shortens the life of the final tubes.

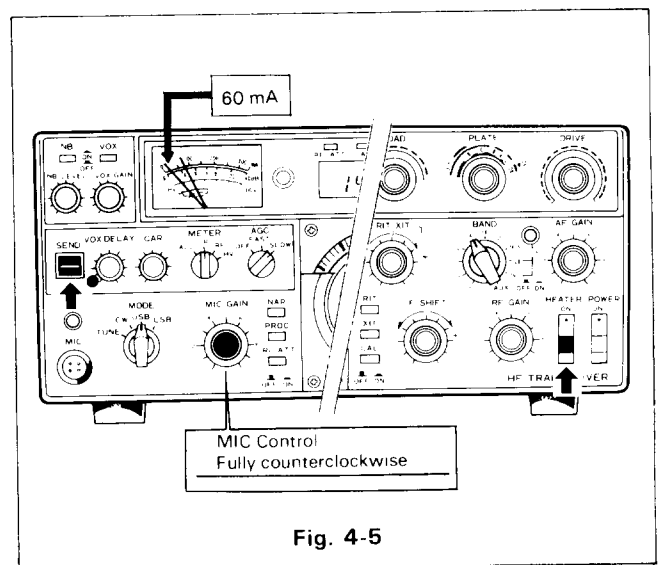


Fig. 4-5

- Place MODE switch to TUNE. METER switch to ALC. Peak the DRIVE control. If the meter pegs or goes out of the ALC range, reduce the CARRIER control setting for an on-scale reading. (the CAR control is a level adjustment, while the drive control is a resonative adjustment.)

**NOTE:**

The TUNE position permits tuning of the final tank circuit at reduced power without danger to the tubes. In the TUNE position, the screen voltage to the finals is reduced approximately 50% and the keying circuit is closed.

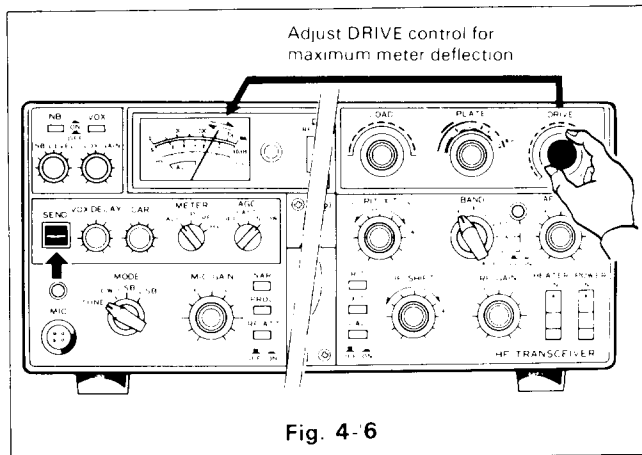


Fig. 4-6

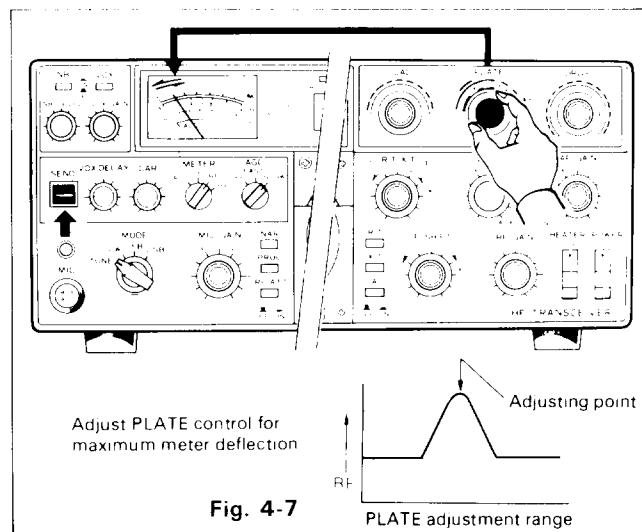


Fig. 4-7

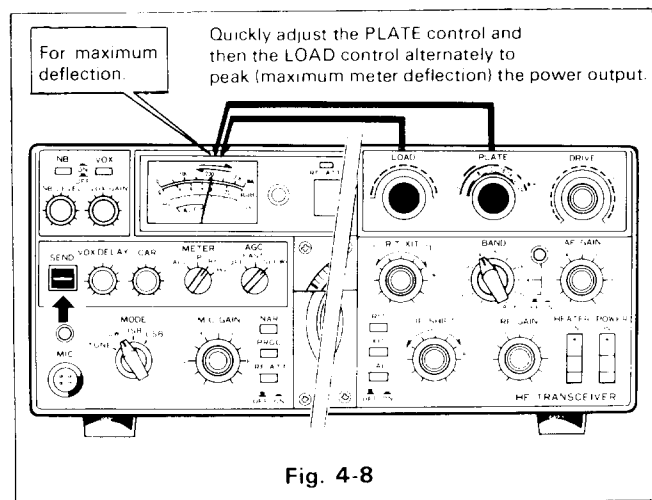


Fig. 4-8

- Place the meter switch to Ip and dip the PLATE. Dip will be typically only about 5ma.
- Place the meter switch to RF and peak the LOAD control.
- Place the Mode switch to CW, Meter switch to Ip. Close the key and IMMEDIATELY redip the PLATE control. Rduce the carrier control setting if Ip reads over 265ma. Open the key.
- Place the meter switch to RF. Close the key and repeat the LOAD for maximum RF output. You may at your option also redip the PLATE for maximum RF output. Open the key. You are tuned up for CW operation. If necessary, adjust the RF VOLT control on the rear panel to bring the output reading to about 2/3 scale. This is a meter adjustment, not an output adjustment.

**NOTE:**

Dip point may not always coincide with maximum output, because neutralization is accomplished on the 10 meter band.

For this reason, you may simply adjust both the PLATE and the LOAD controls for maximum output as described in both tune-up procedure and summary Table 4-2 .

**Table 4-2. Summary of Transmitter Tuning Procedure**

MODE Switch	METER Switch	Stand-by Switch	Procedure
USB or LSB	IP	REC→ SEND	Adjust BIAS control for 60 ma.
TUNE	ALC	REC→ SEND	Peak the ALC reading with the DRIVE control.
TUNE	RF	REC→ SEND	Peak the RF reading with the PLATE control.
CW	RF	REC→ SEND	Peak RF output by alternately adjusting the PLATE and LOAD controls.

## (1) SSB OPERATION

Tune the TS-530S as described in steps 1 through 7. Set the MODE switch per Table 4-3, to USB or LSB and connect a microphone to the MIC input.

### NOTE:

International Amateur practice dictates using USB or LSB as in Table 4-3.

To operate SSB, connect a microphone. (The Key and CARRIER control have no effect in SSB mode.) Place the MODE switch to SSB. METER switch to ALC. Adjust the MIC gain control for an on scale ALC reading on voice peaks. (Disregard RF and Ip meter readings in SSB- they are not accurate or relevant.)

1.8 MHz Band	LSB
3.5 MHz Band	LSB
7 MHz Band	LSB
10 MHz Band	USB
14 MHz Band	USB
18 MHz Band	USB
21 MHz Band	USB
24.5 MHz Band	USB
28 MHz Band	USB

TABLE 4-3

### ■ PTT (Push to talk) OPERATION

By using a microphone equipped with a PTT switch, the transceiver is ready for PTT operation. To key, depress the PTT switch with the stand-by switch left in the REC position.

### NOTE:

1. Transmission is impossible with the BAND switch set to AUX 10, 18 or 24.5.
2. Do not set the unit to the transmission mode when the BAND switch is set to AUX or is in midway between AUX and 1.5. Doing so will damage the drive vacuum tube 12BY7A.

## 4.4 TRANSMISSION (II)

To obtain maximum transmitter performance from your TS-530S you should understand the proper operation of the following controls and switches.

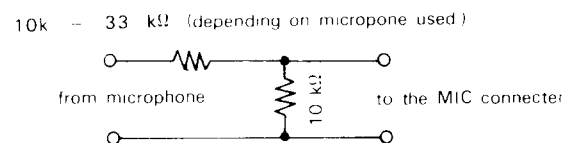
## (1) SPEECH PROCESSOR

In DX (long distance) operation, it may be desirable to increase talk-power by using the speech processor.

The speech processor in the TS-530S Series combines an audio compression amplifier with changes in ALC time constant to provide extra audio punch and to increase average SSB output power, while suppressing sideband splatter. To activate, turn on the PROC switch, and readjust mic gain. Operated as described, distortion will be minimal. However, tone quality will be affected. It is therefore advisable to conduct normal operation with the processor disabled.

### NOTE:

When a high-output microphone is used, input overload and distortion will result. To prevent this, use an attenuator in the microphone circuit as shown below, or connect a 10 – 33 k $\Omega$  resistor (depending on microphone used) across the microphone input. ("Normal" mic control setting should be approximately 12 O'clock).



The MC-50 microphone is recommended (Microphone sensitivity: 55 + 3 dB for approx. 5 cm distance to the mic.)

## (2) VOX (Voice Operated Transmit) OPERATION

Adjust the transceiver as described in the previous paragraph. Flip the VOX switch on and while speaking into the microphone, increase the VOX GAIN control until the VOX relay just operates. For VOX operation it is sometimes desirable to close-talk the microphone to prevent background noises from tripping the transmitter.

Check that the ALC reading for voice peaks is still within range on the meter. If necessary, adjust the MIC control for proper ALC reading.

If the VOX circuit is activated by speaker output, adjust the ANTI-VOX control (on the rear panel) as necessary for proper VOX operation.

Do not use excessive VOX or ANTI VOX gain more than necessary to control VOX operation. If the VOX circuit transfers between words, or holds too long, adjust the release time constant by the DELAY control.

### (3) XIT

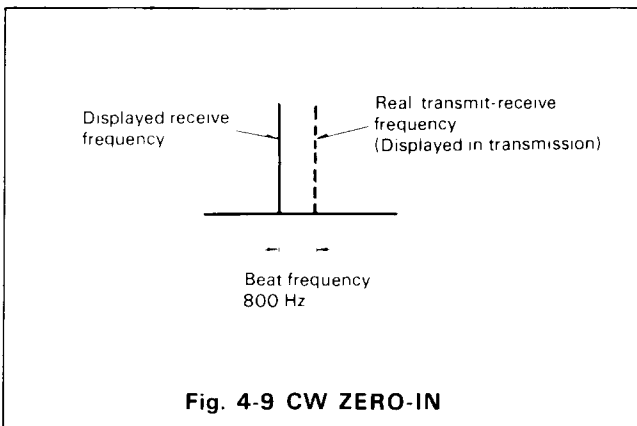
By using XIT, transmit frequency can be shifted independent of receive frequency.

With the XIT switch ON, the XIT is controlled by the RIT/XIT knob and transmit frequency can be shifted by about  $\pm 2$  kHz. When both the RIT and XIT switches are ON, both receive and transmit are shifted without adjusting the main tuning.

### (4) CW OPERATION

Tune and load the TS-530S as described in Sections 4.3. Using shielded line, connect a key to the rear panel KEY jack, set the MODE switch to CW, and set the stand-by switch to SEND for transmitting.

CW transmission is automatically monitored through the transceiver's speaker. Sidetone audio gain can be adjusted through the opening in the bottom cover.



#### ■ OPERATION WITHOUT CW FILTER

To receive CW, set the IF SHIFT control to its center position and the RIT switch to OFF. Adjust the main tuning for about an 800 Hz beat and your transmit frequency will be tuned (zeroed) to the transmit frequency of the station you are receiving. During reception, the side tone is activated by the key (VOX off). In this case, listen to the side tone superimposed on the receive signal and adjust the main tuning for similar side tone and incoming CW audio tone. By doing so, transmit frequencies will be zeroed. You may now adjust the RIT for a pitch which suits your preference. If interference is encountered, adjust the IF SHIFT. For more convenient and effective CW operation, use of the optional CW filters is recommended.

#### ■ OPERATION WITH CW FILTER (OPTION)

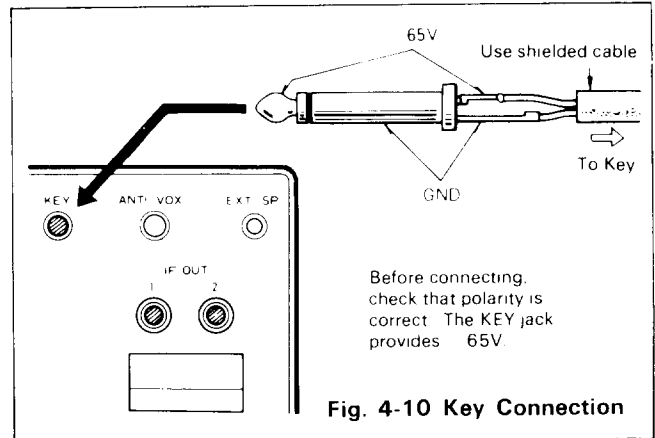
Set the IF SHIFT to its center position and the RIT OFF. Adjust the main tuning for maximum S-meter deflection. Receive signal pitch will be about 800 Hz, indicating correct tuning. On optional CW filters, see page 23.

#### ■ KEY CONNECTION (Fig. 4-10)

Your key should be connected as illustrated in Fig. 4-10. When using an electronic key, make sure that polarity is correct. Use shielded line from the key to transceiver.

#### NOTE:

When using an electronic key, set polarity of the keyer for NEGATIVE keying.

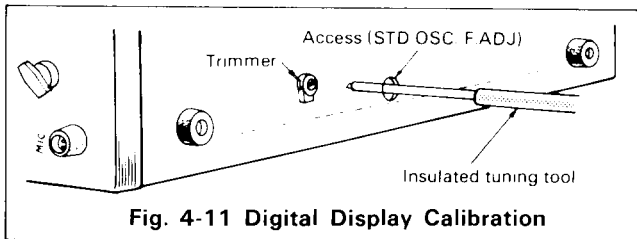


#### ■ SEMI-BREAK-IN OPERATION

The TS-530S has a built-in side-tone oscillator to permit semi-break-in operation, besides the normal CW operation. During semi-break-in operation, the transceiver is set in transmit mode when the key is depressed, and returns to receive mode when the key is released. For semi-break-in operation, place the STANDBY switch to REC and turn the VOX GAIN control ON. Adjust the DELAY control for your preference.

## 4.5 DIGITAL DISPLAY CALIBRATION

Connect the antenna and set the BAND switch to WWV. Turn the main tuning dial to receive 10 MHz WWV. Adjust the dial until a low-frequency beat is heard. Next, turn the MIC control to the CAL position and a marker signal will be superimposed on the WWV signal. A double beat (two beat signals of high and low frequencies) will now be heard. Adjust the IF shift for low AF response. While receiving this double beat, adjust the Standard oscillator trimmer through the reference frequency adjustment access opening (on the bottom of the TS-530S) so the two beats are heard as a single beat. Repeat this procedure 2 or 3 times. This completes calibration of the Digital Display. After calibration turn off the CAL switch.

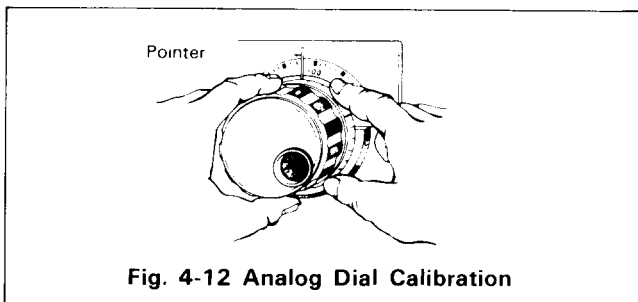


## 4.6 ANALOG DIAL CALIBRATION

The main dial scale is graduated at 1 kHz intervals. One revolution of the main dial covers 25 kHz. To calibrate the scale, turn the MIC control to the CAL position. Zero-beat in SSB or CW mode. Hold the main tuning knob from rotating and slip the calibration ring to the nearest major (5 kHz) graduation. The dial is now calibrated.

### NOTE:

For exact frequency, read the Digital Display.



### ■ ADJUSTMENT OF ANT AND MIX COILS (RF UNIT)

The ANT and MIX coils are included in the coil pack unit. Use the 25 kHz calibrator as a signal. Connect a 50Ω dummy load to terminate the receiver input. Set the DRIVE control to 12 o'clock. Adjust the ANT and MIX coils for maximum S meter deflection, following the frequency table. Start with the 1.8 MHz band and then proceed to other bands. To adjust the 10m band, use only 28.8 MHz in the 28.5 MHz band.

### ■ ADJUSTMENT OF RECEIVE IF COILS (RF AND IF UNITS)

Receive a marker signal using any frequency. Adjust the DRIVE and the main tuning for maximum S meter deflection. Adjust T2 on the RF unit L2, L5, L6, L7, L8 and L10 on the IF unit for maximum S meter indication. DO NOT adjust L3, L4, L5 and L9.

### ■ S METER ADJUSTMENT (IF UNIT)

Disconnect the antenna with the transceiver in receive mode. Zero-point adjustment.

Adjust VR1 for meter pointer zero indication. If a standard SIGNAL GENERATOR (SSG) is available, adjust VR2 so the S-meter indicates "S-9", at 14.175 MHz, 40 dB signal.

## 6.4 TRANSMITTER ADJUSTMENTS

### ■ TRANSMITTER NEUTRALIZATION (See Internal View Bottom)

The TS-530S requires neutralization every time the final tubes are changed.

Tune up the TS-530S into a 50 ohm dummy load at 28.5 MHz for CW operation as described in Section 4. Set the SG switch to OFF and place a sensitive RF milli-voltmeter across the dummy load. Flip the stand-by switch to SEND and adjust TC1 (at the bottom of the final section) for a minimum reading on the voltmeter. After the final section is neutralized, flip the stand-by switch to REC and slide the SG switch ON.

A receiver tuned to 28.5 MHz works very well for neutralizing if an RF voltmeter is not available. Instead of tuning for a minimum voltage, tune for a minimum S-meter reading.

**NOTE:** \_\_\_\_\_

Since the drive tube operates into a fixed load (the finals) it is not always necessary to replace this tube when replacing the finals.

**CAUTION:** \_\_\_\_\_

Neutralization of the final section should be carried out with the chassis shield in place. Dangerous high voltages are present in the final section when the transceiver is turned on. Use an insulated tool to make this adjustment.

### ■ TRANSMIT DRIVE COIL ADJUSTMENT (RF UNIT)

The drive coils are part of the coil pack unit. Set the SG switch on the rear panel to OFF and center the DRIVE control (12 o'clock). Set the METER switch to ALC and the MODE switch to CW.W, CW.N or TUN.

With the standby switch in the SEND position, adjust the drive coils for maximum ALC deflection for each band using the same frequency and in the same order as for adjustment of ANT and MIX coils.

During adjustment, adjust the CAR control so there is just enough injection to swing the ALC meter.

### ■ TRANSMIT IF COIL ADJUSTMENT (RF UNIT)

Using any frequency, place the transceiver in transmit mode in the CW or TUNE position. Adjust T4 in the RF unit for maximum ALC deflection.

### ■ CARRIER BALANCE ADJUSTMENT (IF UNIT)

With a 50Ω dummy load connected to the ANT terminal, adjust for maximum output at 14.175 MHz. Reduce mic gain to zero. Set the transceiver in LSB mode and adjust the RF VOLT control on the rear panel for maximum sensitivity. The RF meter will deflect if the carrier is unbalanced. To balance the carrier, alternately adjust trimmer TC1 and trimpot VR4 until the meter indicates minimum. Switch to USB mode and if the pointer deflects, readjust so the pointer deflects equally for both LSB and USB.

### ■ ADJUSTMENT OF SIDE TONE LEVEL (AF UNIT)

Adjust VR1 to your preference.

## 6.5 TRANSMITTING ON WARC BANDS

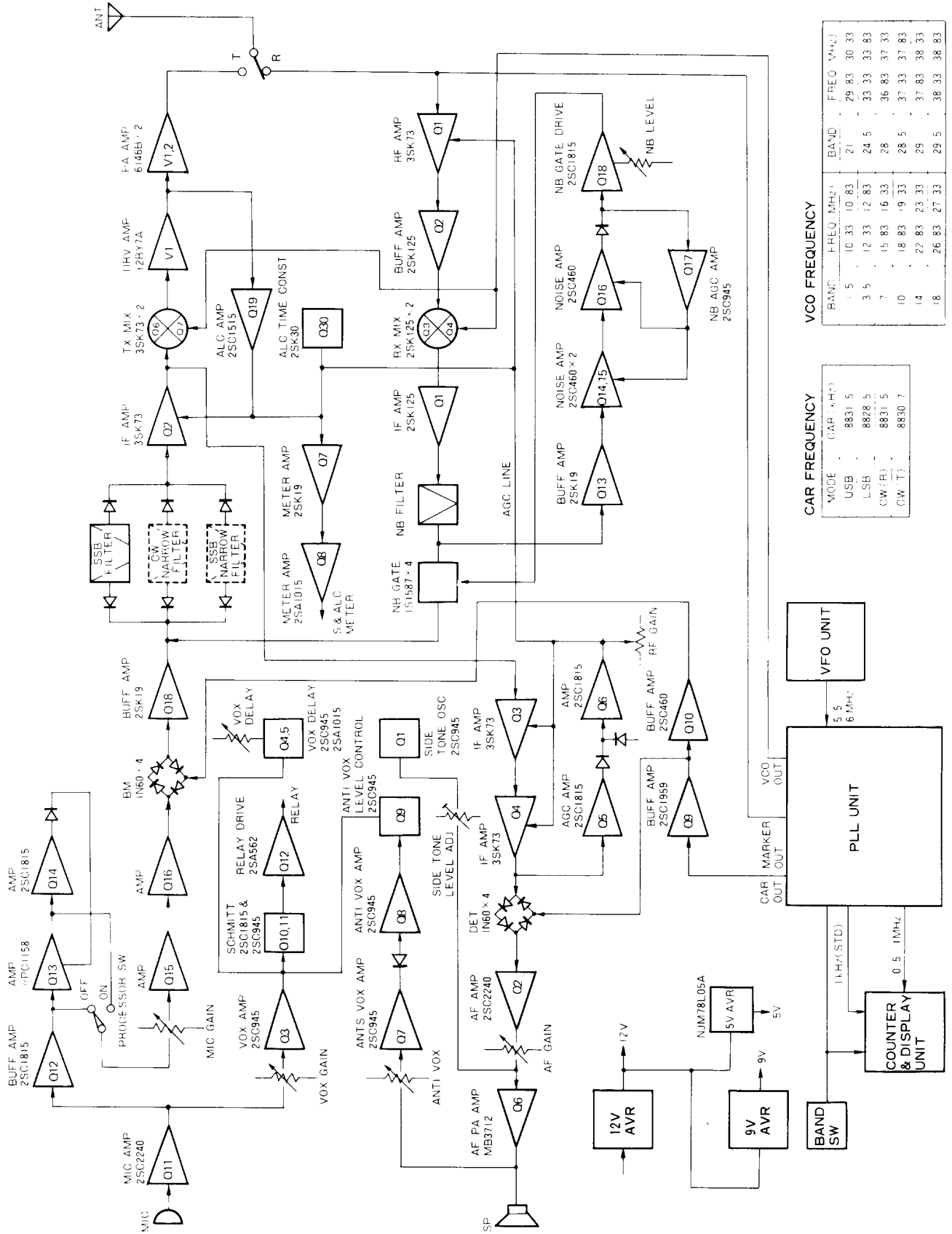
As supplied, the TS-530S will receive but not transmit on the 3 new WARC bands. If transmit capability is desired, a minor wiring change is required.

1. For all 3 bands: Break the line between the RF unit X44-1360-01, connector #6, Pin #1 (TOF terminal) and AF unit X49-1150-00, connector #7, Pin #4 (TOF terminal).
2. Or, for individual Bands: On the RF unit **X44-1360-01**:

Band	Remove (or Cut) Part
10 MHz	D4
18 MHz	D5
24.5 MHz	D6



# TS-530S BLOCK DIAGRAM



**CAR FREQUENCY**

MODE	CAR. FREQ.
USB	8831.5
LSB	8828.5
CW (R)	8831.5
CW (T)	8830.7

**VCO FREQUENCY**

BAND	FREQ. (MHz)	BAND	FREQ. (MHz)
1	10.33	21	29.83
2	10.83	22	30.33
3	12.33	23	33.83
4	12.83	24	34.33
5	15.83	25	36.83
6	16.33	26	37.33
7	18.83	27	37.83
8	19.33	28	38.33
9	22.83	29	38.83
10	23.33	30	38.83
11	26.83	31	38.83
12	27.33	32	38.83

# INTERNAL VIEW

SIDETONE ADJ. VR

AF UNIT  
(X49-1150-00)

VFO ASSY UNIT  
(X60-1150-01)

PLL UNIT  
(X50-1680-01)

FINAL UNIT  
(X56-1380-00)

RECTIFIER UNIT  
(X43-1370-02)

POWER TRANSFORMER

REFERENCE FREQUENCY  
ADJ. TRIMMER

IF UNIT  
(X48-1310-00)

COUNTER UNIT  
(X54-1540-00)

RF UNIT  
(X44-1360-01)

POWER TRANSFORMER

FAN

6146B

# TS-530S SCHEMATIC DIAGRAM

## PLL UNIT (X50-1680-01)

