INTRODUCTION

You are now the owner of our most recent product, the TS-430S amateur band transceiver and general coverage receiver. Please read this instruction manual carefully before placing your new transceiver in service. This equipment has been carefully engineered and manufactured to rigid quality standards, and should give you satisfactory and dependable operation for many years.

AFTER UNPACKING:

- Shipping container:
  Save the boxes and packing in the event your unit needs to be transported for remote operation, maintenance, or service.

- The following explicit definitions apply in this manual:
  Note: If disregarded, inconvenience only.
    No risk of equipment damage or personal injury.
  Caution: Equipment damage may occur, but not personal injury.

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NOTE:

Before connecting or disconnecting the AC power plug, always be sure to set the POWER switches of the TS-430S and the PS-430 to OFF.
SECTION 1. SPECIFICATIONS

[GENERAL]
Transmitter Frequency Range: 160, 80, 40, 30, 20, 17, 15, 12, 10 meter Amateur bands
Receiver Frequency Range: 150 kHz to 30 MHz
Mode: A3J (LSB, USB), A1 (CW), A3 (AM), F3 (FM)
Antenna Impedance: A3J (LSB, USB), A1 (CW), A3 (AM), F3 (FM) - OPTION
Power Requirement: 12.0 to 16.0 V DC (13.8 V nominal)
Power Consumption: 20A approx. in transmit mode
1.2A approx. in receive mode
Dimensions: 270 (10.6) W x 96 (3.8) H x 257 (10.1) D mm (inch)
Weight: 6.5 kg (14.3 lbs)

[TRANSMITTER]
Final Power Input:

<table>
<thead>
<tr>
<th>Band</th>
<th>Mode</th>
<th>SSB</th>
<th>CW</th>
<th>FM</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>160m - 15m band</td>
<td></td>
<td>250WPEP</td>
<td>200WDC</td>
<td></td>
<td>60W</td>
</tr>
<tr>
<td>10m band</td>
<td></td>
<td>250WPEP</td>
<td>200WDC</td>
<td>120W</td>
<td>60W</td>
</tr>
</tbody>
</table>

Modulation: SSB = Balanced Modulation
FM = Variable Reactance Direct Shift
(with FM-430 optional accessory)
AM = Low Level Modulation (IF stage)
Carrier Supression: Better than 40 dB
Unwanted Sideband Suppression: Better than 50 dB
Harmonic Content: Less than -40 dB
Maximum Frequency Deviation (FM): ± 5 kHz (with FM-430 optional accessory)
Microphone Impedance: 500Ω to 50 kΩ

[RECEIVER]
Circuitry: SSB, CW, AM = Double conversion Superheterodyne
FM = Triple Conversion Superheterodyne
Intermediate Frequency:
1st IF = 48.055 MHz
2nd IF = 8.83 MHz
3rd IF = 455 kHz (FM only)

Sensitivity:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>150kHz - 500kHz</th>
<th>500kHz - 1.8MHz</th>
<th>1.8MHz - 30MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>SSB/CW(10 dB S/N)</td>
<td>AM(10 dB S/N)</td>
<td>FM (30 dB S/N)</td>
</tr>
<tr>
<td></td>
<td>Less than 1 μV</td>
<td>Less than 13 μV</td>
<td>Less than 1 μV</td>
</tr>
</tbody>
</table>

Image Ratio: More than 70 dB (1.8 to 30 MHz)
IF Rejection: More than 50 dB (FM-3rd image ratio)
Selectivity:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Selectivity</th>
<th>-6 dB</th>
<th>-60 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSB/CW</td>
<td>2.4 kHz</td>
<td>4.4 kHz</td>
<td></td>
</tr>
<tr>
<td>AM *1</td>
<td>6 kHz</td>
<td>12 kHz</td>
<td></td>
</tr>
<tr>
<td>FM *2</td>
<td>15 kHz</td>
<td>32 kHz</td>
<td></td>
</tr>
</tbody>
</table>

* 1 with YK-88A optional filter
* 2 with FM-430 optional accessory

Frequency Stability: Better than ± 30 x 10^-6 (0°C to +50°C), Within ± 200 Hz from 1 to 60 minutes after turn-on; within ± 30 Hz any 30 minute period thereafter
Frequency Accuracy: Better than 10 x 10^-6
RIT Variable Range: More than ± 1 kHz
Audio Output Impedance: 4Ω to 8Ω
Audio Output Power: More than 1.5W across 8Ω (at 10% distortion)

Note: Circuit and ratings subject to change without notice due to developments in technology.
SECTION 2. FEATURES

150 kHz – 30 MHz GENERAL COVERAGE RECEIVER

ALL MODE OPERATION
Operating mode include USB, LSB, CW, and AM, both transmit and receive, with FM optionally available using the FM-430 frequency modulation unit (installs easily inside the transceiver). Mode selection is made by front panel mode keys with adjacent LED indicators.

SUPERIOR RECEIVER DYNAMIC RANGE
The receiver front-end has been carefully designed to provide an exceptionally wide dynamic range, through the use of 2SK125 junction-type FET’s in the RF amplifier and balanced mixer circuits.

DUAL DIGITAL VFO’s
- 10 Hz step dual digital VFO’s include band and mode information, allowing split frequency or cross-band operation.
- A STEP switch is provided to permit tuning in 10 Hz (10 kHz/revolution of the tuning knob), or 100 Hz (100 kHz/revolution) steps.
- An A = B switch is provided to bring the idle VFO to the active VFO mode and frequency.
- A VFO LOCK switch is provided.
- The RIT control allows shifting the receive frequency in either VFO or memory mode operation.

EIGHT MEMORY CHANNELS
- Each memory stores frequency, mode and band information.
- The memory CH 8 stores both a receive and a transmit frequency for split-frequency memory operation.
- A front panel MR switch is provided to allow the operator to operate each of the eight memories as an independent VFO, or as a fixed frequency.

LITHIUM BATTERY MEMORY BACK-UP
All memory and VFO information are backed-up by an internal lithium battery (estimated 5 year life).

MEMORY SCAN
Scans only those memory channels in which data is stored. The scanning time is approximately 1.8 sec. for each channel, with a HOLD switch provided to interrupt the scan.

PROGRAMMABLE BAND SCAN
Scans within the programmed band width. Memory channel 6 establishes the lower band scan limit, memory channel 7 the upper limit. The HOLD switch interrupts the scan. Scan speed is externally adjustable.

AUTOMATIC ANTENNA TUNER CONTROL
The band selection of the automatic antenna tuner AT-250 and TS-430 is possible.

IF SHIFT CIRCUIT
The apparent IF passband may be shifted to place interfering signals outside the passband, while keeping the desired signal optimally placed for best signal-to-noise ratio.

TUNABLE NOTCH FILTER

SPEECH PROCESSOR
The speech processor uses an audio compression amplifier and change in the ALC time constant, resulting in substantially increased “talk-power”.

ALL SOLID-STATE
The TS-430S runs 250W PEP input on CW, on 160-10 meters. In the AM mode, it runs 60W input, all bands. In the FM mode (optional FM-430 unit installed), it runs 120W input. A built-in cooling fan, plus other protection circuitry assures maximum final amplifier reliability. Both the receiver and the solid-state wide band final amplifier requires no tuning.

NOISE BLANKER
An effective noise-blanker eliminates pulse-type interference such as ignition noise.

RF ATTENUATOR
The carefully designed receiver front-end includes a switchable 20 dB RF attenuator for intermodulation distortion rejection.

VOX CIRCUIT
Both VOX and push-to-talk operation available. VOX gain, delay and anti-VOX controls are located on top of the cabinet, for easy adjustment. Semi-break-in operation available in CW, using the built-in sidetone oscillator.

RUGGED CONSTRUCTION AND STYLING
The TS-430S is styled to enhance the appearance of any fixed or mobile station, while providing maximum ease of operation through a functional layout of the controls.

BUILT-IN SQUELCH CIRCUIT EFFECTIVE FOR ALL MODES

OTHER FEATURES
- Meter reads S in receive, IC or ALC in transmit.
- An audible “beep” from the speaker confirms key entry operations.
- Indicators provided for VFO A/B, ON AIR, F.LOCK, F.STEP, RIT, NOTCH, M.CH, and MODE.
- VFO dial drag externally adjustable.
- Remote terminal provided for linear amplifier control.
- Accessory terminal provides band information.
- Transverter terminal is provided on the rear panel.
SECTION 3. PREPARATION FOR USE

INTERCONNECTION
Connect the transceiver as illustrated in Fig. 3-1, 3-2.

Microphone
Either a low or high impedance microphone (500Ω to 50 kΩ) can be used. The P.T.T. switch should be isolated from the mic circuit (shown in A). Use a microphone with a separate switch and MIC line so both P.T.T. and VOX are available.

Headphones
Use headphones of 4 to 16Ω impedance. The optional HS-5 or HS-6 headphones are best suited for use with the TS-430S. Stereo-type headphones can also be used.

REMOTE connector
External accessories can be connected to the TS-430S through the REMOTE connector. The PTT terminal can be used for remote control of transmit/receive operation.

ACCESSORY connector
Accepts automatic antenna tuner AT-250.

GND terminal
It is recommended that a ground lead be connected to the GND terminal at the rear of the set to prevent the possibility of electric shock, TVI and BCI. Use as short and heavy a lead as possible.

Fig. 3-1 Fixed Station Connection

Fixed station operation
For fixed station antenna installation, see Page 19.

Mobile station operation
For mobile antenna installation, see page 18.

Connect battery to DC power terminal. For detailed instructions, see Page 17.

Note: Use either battery or regulated supply, but not both.

Fig. 3-2 Antenna and Power Supply Connection for TS-430S
4.1 FRONT AND TOP PANELS
(TS-430S shown)

1. POWER switch
This switches the TS-430S ON and OFF.
Before operating the POWER switch, confirm that the VOX
indicator is off, and the STANDBY switch is set to the reception mode (REC).

2. METER
The meter has three functions, two being selected by the METER switch. In receive, the meter is automatically an S-meter showing receive signal strength on a scale of 1–9, +20, +40 and +60 dB. In transmit, the meter shows IC or ALC level, depending on METER switch position.

3. VFO indicators
VFO A indicator lights when VFO A is operating. VFO B indicator lights when VFO B is operating.

4. Digital display
The digital display indicates true operating frequency in all modes to an accuracy of 100 Hz.

5. M.CH (Memory Channel) display
Indicates memory channel 1–8 or P, program scan.

6. FUNCTION switch
This selects the VFO which will control receive and transmit frequencies. Select position A or B for normal operation. A-R and B-R are used for split frequency or cross-band operation.
A-R: VFO A operates during reception and VFO B during transmission.
B: VFO A operated, VFO B stands by.
B-R: VFO B operates during reception and VFO A during transmission.

7. MEMORY CH selector
This selects one of the eight memory channels. To write in a frequency depress the M.IN switch and the displayed frequency will store in the selected channel. To recall from a memory channel, select the channel and depress the MR switch.

8. NOTCH control
Turn the NOTCH switch ON to activate the notch filter. Adjust the notch frequency to null beat (carrier interference) signals.

9. SQUELCH control
The squelch control is used to eliminate noise during no signal time. This control may be adjusted clockwise until the noise disappears (threshold level). The control functions for all modes; SSB, AM and CW. In the FM mode, squelch functions only when the optional FM-430 is installed.

10. Indicators
ON AIR indicator: This lights during transmission mode.
F.LOCK (Frequency lock): Lights when the F.LOCK switch is ON, indicating the VFO operating frequency is locked.
F.STEP (Frequency step): Lights when the STEP switch is ON, indicating a fast VFO tuning rate.
RIT (Receiver Incremental Tuning): Indicates the RIT switch is ON.
NOTCH: Indicates the notch filter is operating and lights when the NOTCH switch is ON.

11. STANDBY switch
This switch selects:
REC: The transceiver is receiving unless the microphone PTT switch or the VOX circuit is activated.
SEND: Locks the unit in transmit. Transmission is locked out (reception only) if the selected transmission frequency is outside the amateur radio bands, or the final stage thermal-protects (is deactivated due to excessive heat-sink temperature).

VOX switch
Turn this switch on to activate the VOX (Voice Operated Xmit) during SSB, AM or FM operation or to allow semi-break-in CW operation.

PROC (Speech processor) switch
This switch is used during SSB or AM operation. At switch ON the speech processor will be activated, increasing average "talk power".

METER switch
During transmission, the meter switch determines meter function. The switch selects between:
ALC – The meter monitors the output of the final stage power amplifier during transmission. During SSB operation, adjust the MIC control so that the meter pointer is within the ALC zone. Similarly, adjust the CAR control for CW operation. ALC does not indicate in the AM or FM mode.
IC – The meter monitors final stage collector current. 12 – 19A is normal, 17A typical.

NAR/WIDE switch
This switch selects receive IF bandwidths when optional filters are installed. The WIDE position provides the same IF bandwidth for both CW and SSB. For the NARROW position, optional filters are available for both CW and SSB. In the AM mode, the SSB filter is on in the narrow position.

MIC (Microphone) connector (8-pin)
Microphone audio input. Frequency UP/DOWN control and PTT lines are included. The MC-42S or MC-60A microphones (optional) are recommended. MIC connector pin assignments are shown below.

PHONES jack
The headphone jack allows use of 4 – 16 ohm (or greater) impedance headphones. HS-5 or HS-6 optional headphones provide optimum results. Stereo-type headphones can also be used. Headphones will disable the internal or external speaker.

MIC (Microphone gain) control
This control adjusts microphone amplifier gain for SSB and AM operation. In the SSB mode, adjust for an on-scale ALC reading at voice peaks. For low power operation, adjust this control below the ALC range. For AM mode adjustment, see "AM transmission" page 11.

CAR (CARRIER LEVEL) CONTROL
This controls carrier level during CW operation. Adjust the carrier level for an on-scale ALC meter reading. For low-power operation, adjust this control below the ALC range.

MODE switches and indicators
These switches are used to select the mode: USB, LSB, CW, AM or FM (optional). Each indicator lights corresponding to the mode.

Tuning Knob
This knob controls the dual digital VFO's which operate in 10 Hz step at 10 kHz turn for normal slow tuning, or with the STEP switch depressed, at 100 Hz step for fast tuning.

Keyboard
• A = B switch: Depress this switch to equalize the frequency and mode of the idle VFO to that of the operating VFO.
• LOCK switch: This electrically locks the VFO frequency. When this switch is on, the tuned frequency does not vary when either the tuning knob or BAND switch is operated. This is convenient when operating on the same frequency for extended periods. The RIT does operate with the LOCK switch on. The F.LOCK indicator lights to show operation.
• STEP switch: Used to select the VFO tuning rate.
• M.CH (Memory channel) switch: Used to select a memory channel as a fixed frequency. With this switch ON, the channel number is displayed on the M.CH display.
• MR (Memory recall) switch: Depress to recall a selected channel from memory to the VFO for tunable operation.
• M.IN (Memory in) switch: Depress to store the displayed VFO frequency in to a selected memory channel.
• MS (Memory scan) switch
Depress this switch for memory scan operation. Only channels with stored data are scanned. Scan rate is fixed at approximately 1.8 sec./channel.
• PG.S (Program scan) switch
Depress this switch to scan from the frequency stored in CH 6 to the frequency stored in CH 7. Programmed Scan Speed is adjustable. However, the presence of a signal does not stop the scan.
• HOLD (Scan hold) switch
Depress this switch to stop the scan operation. Resetting this switch to OFF resumes the scan operation.

BAND selector switches
Used to select the amateur or frequency band. When the UP or DOWN switch is pressed, the band changes by one step.

1 MHz step switch
When depressed ON, this allows the band switch to raise or lower the frequency in 1 MHz steps within the transceivers full frequency range. At OFF (out) the Band switch steps the amateur band.
RIT switch
This push switch turns the RIT (Receiver Incremental Tuning) circuit ON and OFF. With the switch depressed, the circuit is activated and the RIT indicator is illuminated, allowing the receive frequency to be shifted by about 1 kHz independent of the transmit frequency by using the RIT control. The RIT circuit is turned OFF when the switch is out.

NB (Noise Blanker) switch
This switch is used to reduce pulsating type ignition noises usually emitted from motor vehicles. Power-line, QRM and atmospheric "white" noise will not operate the noise blanker.

RF ATT (Attenuator) switch
With this switch ON, a 20 dB attenuator is inserted in the antenna circuit, protecting the RF amplifier and mixer from overload on strong input signals.

NOTCH switch
This switch controls the NOTCH circuit and indicator.

RF GAIN control
This adjusts receiver RF amplifier gain. Turn fully clockwise for maximum gain and a correct S-meter reading.

AF GAIN (Audio Frequency) control
This control adjusts the receiver audio output level. Volume increases as the control is turned clockwise.

RIT control
When the RIT switch is ON, this will vary the receive frequency by about 1 kHz. When the control is set to the "O" center position, there is no frequency shift.

IF SHIFT control
By using this control, the IF crystal filter center frequency can be shifted about 1 kHz, allowing adjustment of tone quality, or eliminating interference from adjacent frequencies. For normal operation, this control should be set to the center "0" position (at the detent).

VOX controls
VOX GAIN: This controls sensitivity of the VOX (Voice operated Transmit) circuit. Adjust the gain for consistent key-over by voice, but not back ground noise.
DELAY control: This controls hold time for VOX, or CW semi-break-in operation. Adjust to hold the transmitter on between words, at a normal speech, or keying rate.
ANTI-VOX control
This control is used to adjust the VOX system so that it is not false tripped by sound from the speaker.

PG.SCAN (Program scan) control
This adjusts program scan speed.

4.2 REAR PANEL

1 ANT (Antenna) connector
This UHF connector should be attached to a suitable antenna for transmitting and receiving. The antenna cable should be 50-ohm coax, terminated with a PL-259 connector.

2 X. VERTER (transverter) terminal
This 8 Pin DIN connector is used to interface a VHF or UHF transverter.
See page 23 for pin-outs.

3 GND (Ground) terminal
To prevent electric shock, as well as RFI and BCI, connect the transceiver to a good earth ground.

4 EXT. SP (External speaker) jack
The receiver audio output can be connected through this jack to an external 4 to 16 ohm speaker. The internal speaker is disconnected when an external speaker is connected.

5 CW key jack
Using shielded line, connect a key to this 1/4" phone jack for CW operation. Key open-terminal voltage is approximately 9V DC.

6 REMOTE connector
This connector is used to interconnect a linear amplifier or other accessory item.

7 ACC (Accessory) connector
This connector is used to access the automatic antenna tuner AT-250. Refer to page 22.

8 DC POWER connector
This is used to connect the DC power supply.
SECTION 5. OPERATION

Note: ① denotes transmit mode; ② denotes receive mode.

Fig. 5-1 Initial Control Settings

5.1 RECEPTION

5.1.1. RECEPTION
First connect the antenna, microphone and key. Then, set the controls and switches referring to Fig. 5-1.
Acertain that the TS-430S is ready for operation, then turn the POWER switch ON. The meter and digital display will illuminate, indicating the transceiver is in operation. The transceiver is fully solid-state, allowing reception as soon as the POWER switch is switched ON.
Advance the AF GAIN control clockwise until some receiver noise is heard from the speaker. Turn the main tuning control so the desired signal can be heard clearly.

5.1.2. 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.

5.1.3. NB SWITCH
The TS-430S has a sophisticated noise blanker designed to reduce ignition-type pulse noise. The noise blanker is particularly important for mobile operation. When necessary, activate the noise-blanker by depressing the NB switch ON.

5.1.4. RF GAIN CONTROL (Fig. 5-2)
For normal operation, this control should be turned fully clockwise for maximum sensitivity. Receive sensitivity is reduced by turning the control counterclockwise.
Adjust the RF GAIN so the S-meter does not show excessive deflection. This minimizes noise during reception and allows the S-meter to indicates signal peak (or a little below that point). Noise is markedly reduced when signal is absent.

Fig. 5-2 RF GAIN Control Operation
5.1.5.1. SQUELCH
To eliminate receiver noise at the no-signal condition, slowly advance the squelch clockwise until the noise just disappears (threshold point).
The squelch will open and the speaker will operate when a signal is received. If the signal is weak or fades, readjust the squelch for consistent reception.

5.1.5.2. NOTCH CONTROL
If a single tone such as a CW signal is superimposed on the receive signal, turn the NOTCH ON and adjust the NOTCH control to eliminate or minimize the beat signal. A beat of approximately 300 Hz can be eliminated at the center position of the control. The NOTCH is effective between 350 and 2600 Hz.

5.1.6. RIT CONTROL
By using the RIT (Receiver Incremental Tuning) control, the receive frequency can be shifted by about ± 1 kHz without changing the transmit frequency.
If the frequency of the station you are working changes, your receive frequency can be reset by turning the RIT switch ON and adjusting the RIT control. Adjusting the control clockwise increases the frequency. When first calling another station, the RIT should be OFF, otherwise your transmit and receive frequency will not coincide.

5.1.7. IF SHIFT CONTROL
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. 5-3.
The IF SHIFT is effective in eliminating interference when nearby signals are superimposed on the receive signal during either SSB or CW operation. IF SHIFT does not operate in the AM or FM modes.

(1) 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.

(2) 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.

(3) CW Mode
By using the IF SHIFT in conjunction with the RIT, tone quality can be adjusted.

5.1.8. NAR-WIDE switch control
For short to medium distance communication, the WIDE position may be used for both SSB and CW operation. For DX (long distance) communication, the NAR position will be an advantage in reducing interference.
This feature, in combination with the IF SHIFT control, will provide outstanding interference rejection. The receive IF bandwidth is 2.4 kHz in the SSB and CW wide position, 270 or 500 Hz for CW (with optional filters YK-88CN or YK-88C) and 1.8 kHz for SSB (with optional filter YK-88SN), in the NAR position.
*In the AM MODE without an optional filter, both WIDE NARROW positions are 2.4 kHz. With a YK-88A, Wide is 6 kHz, and Narrow is 2.4 kHz.
*In transmit bandwidth is automatically WIDE.

PASSBAND WIDTH (–6 dB) kHz

<table>
<thead>
<tr>
<th>FILTER</th>
<th>MODE</th>
<th>CW</th>
<th>SSB</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WIDE</td>
<td>NARROW</td>
<td>WIDE</td>
<td>NARROW</td>
</tr>
<tr>
<td>No optional filter</td>
<td>2.4</td>
<td>*</td>
<td>2.4</td>
<td>*</td>
</tr>
<tr>
<td>YK-88C or CN</td>
<td>2.4</td>
<td>500 or 270</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>YK-88SN</td>
<td>–</td>
<td>–</td>
<td>2.4</td>
<td>1.8</td>
</tr>
<tr>
<td>YK-88A</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

NOTE:
1. Without optional filters, there is no SSB or CW reception in the NAR switch position (*).
2. The NAR/WIDE switch does not function in the AM, FM mode.
3. Without an optional filter, the AM mode bandwidth is 2.4 kHz.
5.2 TRANSMISSION (Fig. 5-4)

CAUTION:
Before transmitting, be sure to connect an antenna or dummy load with a VSWR of less than 1.5:1. Never attempt to transmit with the antenna terminal left open.

When testing the transmitter, use a 50-ohm dummy load, rated at greater than 100W (TS-430S). Refer to Fig. 5-1 for initial control settings. When the TS-430S is ready for transmission, use the following procedures:

![TS-430S Diagram]

Fig. 5-4 Testing with Dummy Load or Power Meter

5.2.1 SSB Operation
1. Set the MODE switch to SSB.
2. Meter switch to ALC.
3. Standby switch to SEND.
4. Speak into the microphone and adjust the MIC GAIN for meter deflection within the ALC zone at signal peaks.
5. For QRP (Low Power) operation, use less MIC GAIN and consult your external wattmeter for output level.

5.2.2 AM Operation
1. Set the MODE switch to AM and the meter switch to IC.
2. Place the STANDBY switch to SEND and adjust the CAR control so the meter registers approximately 2/3 its usual deflection.
3. Speak into the microphone and advance the MIC GAIN control so the meter deflects only slightly at peaks. Note that excessive meter deflection indicates overmodulation.
4. The PROC may be used to provide a more constant modulation level.

5.2.3 PROC (processor) operation
In DX (long distance) SSB or AM operation, it may be desirable to increased talk-power by using the speech processor.

The speech processor in the TS-430S combines an audio compression amplifier with changes in ALC time constant to provide extra audio punch and increases 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 may result.
To prevent this, use an attenuator in the microphone circuit as shown below, or connect a 10 – 33kΩ resistor (depending on the microphone used) across the microphone input. (Mic control setting should be approximately 12 o’clock)

![Microphone Attenuation Circuit]

The MC-60A microphone is recommended (Microphone sensitivity: -55 ± 3dB for approx. 5 cm distance to the mic). The MC-60A MIC AMP Switch should be set at the OUT position.

5.2.4 CW Operation
1. Set the MODE switch to CW and the meter switch to ALC.
2. Set the standby switch to SEND and adjust the CAR control so the meter deflects within the ALC zone. If a key is connected, it should be depressed during the adjustment.
3. For QRP operation, adjust the Carrier Control below the ALC point.

NOTE:
Full power operation (more than 5 minutes at ambient temperature of 25°C, in case of 10 MHz band, more than 30 seconds because of final efficiency), with the key kept depressed may result in unit trouble. At this time, pay attention to installation condition as well as ambient temperature, and decrease the power or operate the unit after an interval.

5.2.5 FM Operation (With FM-430 FM unit installed)
1. Place the MODE switch to FM.
2. Place the STANDBY switch to SEND.
3. Speak into the microphone. (In the FM mode, the MIC GAIN, CAR and meter switches are not used.)
5.2.6. FINAL STAGE PROTECTION
The TS-430S features a VSWR protection circuit to protect the final-amplifier transistors. Three different protection circuits are used.
1. The final-stage transistors are protected by detecting VSWR of the antenna system and automatically lowering transmitter output power if the VSWR is too high.
2. When the heat-sink temperature rises, a detection circuit activates a cooling fan. Under normal conditions, this cooling fan sufficiently cools the heat sink.
3. The heat-sink temperature could rise abnormally during long transmissions, if the area adjacent to the heat-sink is blocked. In this case, the transmission is inhibited until the heat-sink cools to the proper temperature.

NOTES:
1. If transmitter output decreases due to activation of the protection circuit caused by high VSWR, carefully recheck and retune the antenna system.
2. When the cooling fan starts to operate, determine that adequate air flow is possible in the heat-sink area.

- Operation of the Cooling Fan
The cooling fan operates when the heat-sink temperature rises to approximately 50°C (122°F) and ceases to operate when the temperature decreases to normal, approximately 40°C (104°F). The heat-sink is made of die-cast aluminum and is actually the rear panel. It must be kept clear of surrounding objects to allow heat to dissipate easily. The cooling fan is designed to operate when the heat-sink temperature is at a specific level, regardless of whether the unit is in transmit or receive mode.

5.2.7. MIC GAIN CONTROL (Fig. 5-5)
This control adjusts the microphone input level. When using the TS-430S in a voice mode, connect a microphone and set the STANDBY switch to SEND (an antenna or dummy load must be connected).
For SSB operation, set the meter switch to ALC and speak into the microphone. Adjust the MIC GAIN control so the meter does not deflect out of the ALC zone at signal peaks.
The TS-430S accepts either a low or high impedance microphone (500 Ω to 50 kΩ). When using a low impedance microphone (500 Ω) the MIC GAIN control should be advanced slightly higher than when a high impedance microphone is used, while observing the ALC meter.

- ALC (Automatic Level Control)
The ALC monitors the transmitter final stage output to minimize distortion in your transmitted signal. It automatically adjusts output to an optimum level.

![Fig. 5-5 ALC Adjustment](image)

5.3 VOX OPERATION
5.3.1. VOX SWITCH
VOX (voice operated transmit) is used to switch the TS-430S into transmit mode by your voice. Place the VOX switch ON and speak into the microphone. The transceiver automatically switches to transmit mode (the MIC control should be adjusted in advance as explained in Item 5.2.7). Both the SEND switch and the MIC P.T.T. switch are left in the REC position.

5.3.2. VOX GAIN CONTROL
This adjusts the VOX circuit sensitivity. Speak into the microphone at a normal voice level and adjust the control. Increased sensitivity allows transmission with a lower voice level. Transceiver operating condition (receive or transmit) can be checked by the ON AIR LED. Note that if the control is advanced too far, the VOX circuit may be “tripped” by ambient noise.

5.3.3. ANTI-VOX CONTROL
This prevents the VOX circuit from being false-triggered by sound from the speaker. Adjust the control so the VOX will not operate at the desired speaker volume level.
5.3.4. VOX DELAY CONTROL
This control adjusts the VOX circuit transmit hold time. If the
hold time is too short, the transceiver will return to re-
ceive mode as soon as you stop talking into the micro-
phone. This can be eliminated by advancing the control.
Adjust the control for comfortable operation at a normal
rate of speech.

5.4 SEMI-BREAK-IN OPERATION
The TS-430S has a built-in side-tone oscillator which,
used in conjunction with the VOX circuit, allows semi-
break-in operation, besides the conventional (SEND switch
controlled) CW operation. During semi-break-in operation,
the transceiver is placed in transmit mode when the key is
depressed, and returns to receive mode when the key is
released. The VOX circuit is activated by the side-tone.
For semi-break-in operation, set the VOX switch ON and
the MODE switch to CW. Adjust the VOX GAIN to insure
that the transceiver is set in transmit mode whenever the
key is depressed. Also, adjust the VOX DELAY for the de-
sired hold time.
ANTI VOX adjustment is not required.

NOTES:
In VOX operation (semi-break-in) with VFO A/B or
transmission/reception memory (CH8), the following
combination is not possible by the circuit configura-
tion.

<table>
<thead>
<tr>
<th>RX</th>
<th>TX</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANY VOICE MODE</td>
<td>CW (Semi-break-in)</td>
</tr>
<tr>
<td></td>
<td>LSB, USB (VOX)</td>
</tr>
<tr>
<td>CW</td>
<td>Any voice mode</td>
</tr>
<tr>
<td></td>
<td>VOX</td>
</tr>
</tbody>
</table>

5.5 OPERATION WITH A LINEAR
AMPLIFIER
The remote connector on the rear panel provides for inter-
connection with an amplifier. See the amplifier instruction
manual to determine whether the linear requires a normal-
ly opened or normally closed (during receive) relay con-
tact. Connect the amplifier control line to either pin 5
(N.C.) or pin 4 (N.O. during receive). Connect the Ground
(Shield) of the Control Line to Pin 2. Connect amplifier
ALC to pin 6 of the remote connector. The TS-430S out-
put is quite adequate to drive most amplifiers to full rated
output.
For full details, see section 6.8, page 22.

5.6 CW OPERATION
For CW operation, your transmit frequency should be
"zero-beat" to the transmit frequency of the station you
are contacting. This also allows your contact to receive
your signal without having to retune his receiver. Tuning
methods are detailed in the following paragraphs.

NOTE:
1. In CW mode, transmit frequency is displayed when
both transmitting or receiving.
2. During CW operation, operating the BAND switch
differs from other modes; for example, pressing the UP
(BAND) switch at display frequency 14,000.0 shows as
follows.
14,000.0 → 14,500.0 → 18,500.0 ... → UP
10,500.0 ← 14,500.0 ← DOW

5.6.1. OPERATION WITHOUT AN OPTIONAL
CW FILTER
Set the IF SHIFT control to its center position and the RIT
switch OFF. Adjust the main tuning control for an 800-Hz
beat note and your transmit frequency will then coincide
with that of your contact station ("zero-beat"). During re-
ception, the side-tone monitor is activated by pressing
down 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 so doing, transmit frequencies will coincide.
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 YK-88C or YK-88CN CW crystal filter
is recommended.
5.6.2. OPERATION WITH A CW FILTER
Set the IF SHIFT to its center position and the RIT to OFF. Adjust the main tuning control for maximum deflection of the S-meter. Receive signal pitch will be about 800 Hz, indicating correct tuning.

5.6.3. KEY CONNECTION
Your key should be connected as illustrated in Fig. 5-7. When using an electronic keyer, make sure that polarity is set for positive. Always use shielded line from the key to transceiver.

5.7 Keyboard function

Brings the idle VFO frequency and mode to that of the active VFO.

Locks the operating frequency.

Switches to RAPID frequency step for VFO step tuning or program scanning. Step is 10 Hz in the normal position, and 100 Hz in the ON position.

Inputs both frequency and mode into a selected memory channel (CH's 1-8).

- **Erasing an unwanted frequency from memory**
  Unwanted memory content can be erased.
  1. Depress the M.CH switch, and select the channel to be erased with the M.CH switch.
  2. Simultaneously depress the BAND switch (either UP or DOWN), and the M.IN switch.
  3. The display will clear, and only the decimal points will display. All mode indicators will remain off.

Depress to recall a memory channel. Select the channel with the M.CH switch.

Depress to scan the memory channels.

Scans the range between CH 6 frequency and CH 7 frequency.

Holds scan. During program scan hold, frequency can be tuned with the VFO control and the mode can be switched.

When this switch is depressed, the channel selected by the M.CH switch is recalled to the VFO for tunable operation. The mode can also be controlled when recalled by the MR switch.
M.CH (Memory channel) operation
The TS-430S has eight memory channels. The memory permits input of both frequency and mode, and this data will be permanently retained (by the built-in lithium battery).
1. The M.CH switch selects the desired channel from CH 1-8.
2. When the M.IN switch is depressed, a "beep" sounds, indicating memory input.
3. There are two recall modes for memory channel contents.
   * Depress the M.CH switch. Any one of eight channels can be selected by the M.CH switch as a fixed (non-tunable) frequency and mode.
   * Depress the MR switch. The channel designated by the M.CH switch is recalled to the VFO for tunable operation. The memory contents are not changed.

Memory scan operation
1. Input frequencies and modes to be scanned into the memory channels.
2. Depress the MS switch. The channel number and frequency of each occupied channel is displayed. Scan interval is approximately 1.8 seconds per channel.
3. When the desired traffic is received during scan, depress the HOLD switch.
4. Scan will resume by releasing the HOLD switch.

NOTES:
1. The channel eight transmit frequency is not scanned.
2. When memories are empty, [ ] is displayed and there is no scan.
3. Scan is held by transmitting, and resumes when the transceiver returns to the receive mode.
Program scan operation

1. Program the scanning frequency range.
2. Input the lower (or upper) frequency limit and mode into CH 6 (using the M.IN switch). Then, input the upper (or lower) frequency limit into CH7.
3. Depress the PG.S switch to initiate scan. The letter P will display during program scan.
4. The scan speed is adjustable using the speed control on the top panel, along with the STEP switch. Select the scan speed appropriate for the selected frequency and mode.
5. When the desired station is received and that frequency is to be held, depress the HOLD switch. Then, adjust the VFO for best tuning. During hold, the mode may be temporarily changed. When Hold is released, the mode will revert to the original programmed mode setting after one scan cycle.
6. After the CH 7 upper (or lower) frequency limit has been reached, a “beep” sounds and the scan repeats from the CH 6 frequency.

NOTE:
1. Program scan is from CH 6 to CH 7, only.
2. During scan, only the CH 6 mode is used.
3. During scan or scan hold, a frequency can be stored into a memory channel selected by the M.CH switch by depressing the M.IN switch.
4. When the scan is on and the STEP switch is depressed, the step is 100 Hz.
5. When CH 6 and CH 7 are empty, there can be no scan.
6. Scanning is stopped during transmit and resumed after return to the receive mode.

Memory CH 8 reception and transmission operation
1. Place the M.CH switch to “8”.
2. Input the reception frequency and mode using the M.IN switch.
3. The usual data entry “beep” is emitted as a pulse train. Input the transmission frequency (and mode).
4. The “beep” ceases.
5. Depress the M.CH switch. “Split” frequency operation (transmission and reception on different frequencies are programmed into CH 8).

NOTE:
1. Different modes and/or bands can also be programmed for transmission and reception.
2. If the M.IN switch is depressed twice in succession, this memory can be used as an ordinary memory, now having the same frequency for both transmission and reception.

Pressing this switch TWICE allows transmission and reception on different frequencies.
5.8 MOBILE OPERATION

Being compact in design, this transceiver is ideal for mobile operation. Satisfactory mobile operation is achieved through proper power and antenna connection, and thoughtful transceiver installation and adjustment.

5.8.1. TS-430S INSTALLATION

Secure the TS-430S under the dashboard using an optional MB-430 mounting bracket as shown in fig. 5-8. As an alternative, use strapping, making sure that the TS-430S will not slip out of place while operating the vehicle.

NOTES:

1. Do not install the TS-430S near the heater outlet.
2. Allow sufficient space behind the TS-430S to ensure proper ventilation.

5.8.2. CONNECTING THE POWER CABLE

When connecting or disconnecting the power cable to or from the power connector, be sure that the power switch is always in the "OFF" position. Observe polarity of the cable. The TS-430S operates on 13.8V DC, negative ground. Battery polarity must be correct. The power cord is color coded.

Since an HF antenna is large and heavy, it must be installed to withstand high wind stress.

Use fuse block, battery accessory position, 20A minimum rating.

As short as possible

Turn POWER switch OFF before connecting/disconnecting the power cord.

Fig. 5-8 Mobile Operation
POWER CABLE

CAUTION: Observe battery polarity.

<table>
<thead>
<tr>
<th>TS-430S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red and White +</td>
</tr>
<tr>
<td>Black and gray -</td>
</tr>
</tbody>
</table>

Connect the TS-430S power cable to the battery terminals, with consideration to current requirements and noise prevention. The maximum current drawn by the TS-430S reaches to between 18 and 20A when transmitting. Therefore, the cable should be made as short as possible, using the specified fuse. Also, determine that the power system of the car (including the battery and generator or alternator) will handle the increased load of the TS-430S.

Route battery and ANTENNA leads away from all high voltage secondary circuits to prevent ignition noise interference.

5.8.3. MOBILE ANTENNA

(1) Antenna Installation

Use a sturdy mount for the mobile antenna since HF antennas are larger (and have more wind load) and are heavier than VHF antennas. A bumper mount is recommended for general use. The ground side of the mount must be well grounded to the car body, since the body itself functions as the ground plane for the mobile antenna. (Refer to Fig. 5-8)

NOTES:

1. Some cars have plastic bumpers. For such cars, ground the antenna mount to the body.
2. When tuning a newly installed antenna, use the following procedure:
   • Turn the CAR control fully counter-clockwise for minimum transmit power.
   • With the transceiver in transmit mode, raise transmit power output slowly by rotating the CAR control clockwise. The antenna should be adjusted with minimum power.
   • Transmitting with full power is recommended only after the antenna has been adjusted for a VSWR below 1.5:1.
3. Antenna installation is critical for successful mobile operation. For further information refer to THE RADIO AMATEUR'S HANDBOOK, RADIO HANDBOOK, or other texts.

(2) Coaxial Cable Connection

When the antenna is mounted on the vehicles bumper, the coaxial cable from the antenna can be routed through a drain hole in the trunk. When the antenna is roof mounted pass the cable between the body and door. Leave a drip loop at the lowest point in the cable before entry into the vehicle to prevent water from entering the car.

(3) Antenna Adjustment

Some mobile antennas are not designed at 50-ohm impedance. In this case, impedance matching between the antenna and the coaxial cable (50Ω) is required. This can be achieved by using an antenna matching device or coupler.

![Adjusting Antenna Resonance](image)

The antenna to be used should first be checked with a dip meter to insure that it is designed for your operating band, then the impedance matching should be checked with an SWR meter. (See Fig. 5-9)

The VSWR should preferably be less than 1.5:1 for satisfactory operation. For antenna adjustment refer to the antenna instruction manual.

5.8.4. NOISE REDUCTION

In motor vehicles, noise is generated by the ignition system. Other sources of noise include the wiper and heater motors.

Although the TS-430S is equipped with a noise blanker to minimize ignition noise, it is imperative that some preventive measures be taken to reduce the noise to the lowest possible level.

(1) Antenna location Selection

Since ignition noise is generated by the vehicles engine, the antenna must be installed as far from the engine as possible.

(2) Antenna Matching

In general, mobile antennas have a lower impedance than the 50-ohm coaxial cable used to feed them, resulting in a mismatch between the antenna and the coax. Such trouble can be eliminated by using an antenna tuner between the TS-430S and the coaxial cable.
5.9 FIXED STATION OPERATION

5.9.1 Power
The TS-430S requires more than 18A at 13.8 VDC when transmitting at full power. Use the model PS-430 power supply for fixed stations.

5.9.2 ANTENNAS

For HF fixed-station operation, an antenna specifically designed for amateur operation is recommended. Antenna types include wire antennas, verticals, rotary beams, and other antenna types. HF antennas are quite large and must be installed to withstand strong wind, heavy rain, etc.

Any antenna used with the TS-430S should be of 50-ohm impedance and should be connected using an appropriate coaxial cable such as RG-8/U.

Impedance matching is important. Impedance mismatching will result in a high VSWR and power loss, or can cause unwanted harmonic radiation and interference (TVI, BCI).

The impedance match can be checked with an SWR meter. Generally, satisfactory operation is assured when the VSWR (Voltage Standing Wave Ratio) is less than 1.5:1.

A rotary beam antenna is very effective for DX operation in the 14, 21 and 28 MHz bands. (Fig. 5-11)

NOTE:
Protect your equipment – use a lightning arrester.
SECTION 6. ADDITIONAL INFORMATION

6.1 GENERAL INFORMATION
Your TS-430S has been factory aligned and tested to specification before shipment. Under normal circumstances, the transceiver will operate in accordance with these operating instructions.

If your transceiver fails to work, contact the authorized dealer from whom you purchased it for quick, reliable repair. All adjustable trimmers and coils in your transceiver were preset at the factory and should only be readjusted by a qualified technician with proper test equipment. Attempting service or alignment without factory authorization can void the transceiver’s warranty.

6.2 INSTALLING THE OPTIONAL FILTERS
1. Remove the power connector from the radio.
2. Using a #2 phillips screwdriver, remove the top cover (8 screws). Be careful of the VOX controls, and the speaker lead, which may be unplugged.
3. Loosen the two side screws and remove the 2 screws securing the IF unit bracket. Swing the bracket up slightly to access and remove the two heat sink screws. Swing the assembly down.
4. Remove 7 screws from the IF unit. Switch the board forward. Protect the top of the front panel from scratching.
5. Using a 45W (or less) soldering pencil, clear the 6 holes for the filter, if they are filled with solder. When installing an AM filter, first remove R16 on the IF unit, and cut the R-129 lead on the Control unit.

6. There is no polarity to the filter. Install the filter into its position on the IF unit. Solder the 2 mounting tabs, and the 4 input and output pins to the circuit board. Solder sparingly, and heat the connections only long enough to insure a good solder joint. Don’t overheat the filter or circuit board.

7. Carefully inspect your soldering. Be certain that all pins are actually soldered, and that you have not soldered across any spots on the board or between any of the pins on the filter. Clip the pins flush to the board.
8. Replace the IF unit in its place. Make certain no wires will be pinched underneath the board. Replace the 7 screws for the board, plus the two heat sink screws. Tighten the 2 side screws and replace the 2 rear bracket screws. (See that the wire harness does not interfere with the PG scan speed control).
9. Move the connection as illustrated when an AM filter is installed.
10. Reconnect the speaker lead, and reinstall the top cover.
11. Apply power and verify your work. Filter installation is now complete.

---

Fig. 6-2 Top cover removal

Fig. 6-1 AM filter detail No. 1

Fig. 6-3 AM filter Detail No. 2
6.3 OPTIONAL FM-430 INSTALLATION

1. Remove the transceiver top covers and unplug the speaker lead.
2. Mount the FM-430 on the top right side of the transceiver with 6 screws.
3. Connect the FM-430 harness to the transceiver as follows:
   * Connect the leads from connector (1) to connector (19) of the Switch unit (X41-1470-00).
   * Connect the leads from connector (3) to connector (24) of the IF unit (X48-1370-00).
   * Arrange the leads from connectors (2) and (4) on the bottom of the transceiver to pass along the side of the Switch unit. Connect the leads from connector (2) to connector (20) of the RF unit (X44-1510-00). Connect the leads from connector (4) to connector (6) of the RF unit.
4. Tie the leads as illustrated using the supplied vinyl ties.
5. Reinstall the bottom cover, reconnect the speaker lead, and reinstall the top cover.

---

**TABLE: CONNECTION OF FM-430 CONNECTORS**

<table>
<thead>
<tr>
<th>FM-430 connector No.</th>
<th>Unit and TS-430 connector No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Switch unit (X41-1470-00) ....</td>
</tr>
<tr>
<td>(2)</td>
<td>RF unit (X44-1510-00) ..........</td>
</tr>
<tr>
<td>(3)</td>
<td>IF unit (X48-1370-00) ..........</td>
</tr>
<tr>
<td>(4)</td>
<td>RF unit (X44-1510-00) ..........</td>
</tr>
</tbody>
</table>
6.4 HOW THE TX FINAL TRANSISTORS ARE PROTECTED

Final transistor protection is provided by sampling the reflected power. As the reflected power is increased (higher SWR) transmitter drive is reduced, thus decreasing input to the final transistors. This in turn reduces collector loss, protecting the final transistors.

6.5 OPTIONAL 10Hz DISPLAY RESOLUTION

If you would like 10Hz instead of the supplied 100 Hz display resolution, cut the jumper as shown on the Control unit.

Fig. 6-6

6.6 PHONE PATCH OPERATION

In an area where phone patch is legal, the PC-1A Phone Patch may be used with the TS-430S. Recommended setting are:

<table>
<thead>
<tr>
<th>PC-1A</th>
<th>RX Gain</th>
<th>TS-430S VOX Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX Gain</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Null as necessary</td>
<td>4</td>
<td>Mic Gain 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ANTI VOX Max</td>
</tr>
</tbody>
</table>

Most other phone patches will work satisfactorily without any modification to the radio, requiring only an external speaker connection, and that the Mic line be run through the patch.

For those operators who desire a Patch input similar to the TS-930S, TS-520SE or TS-820S, an input connection and terminal must be added at the Mic input preamp circuit. Use a 100-KΩ resistor in series, with a 10-kΩ to ground on the input side of the 100-kΩ resistor. Use shielded line, and connect as follows:

On the IF unit X48-1370-00 install the fixed divider at the junction of R161 10k, C94 100pf, and C93 1μF (input of Q34). Add an RCA jack at the empty rear panel opening or use remote pins 7 and Gnd for input.

6.7 OPERATION WITH A LINEAR AMPLIFIER

Operation with a linear amplifier.
TS-430S internal wiring.

Pin 6 ALC input
Connector Metal Shell is Ground
Pin 2, Relay Common
Pin 4, Relay N.O.

Use shielded line for both ALC and RL (control line). Initial linear amplifier tune-up should be performed with the exciter at 50% power, to reduce wear-and-tear on both the linear, and the exciter. Use of a dummy load is strongly suggested, since the bands are already sufficiently crowded. The TS-430S may be operated with any conventional linear amplifier which will accept up to approximately 100 watts RF drive, has a low current DC operated keying circuit, and returns approximately –8 ~ –10 V DC ALC (adjustable) back to the exciter.

Fig. 6-7 REMOTE connector

<table>
<thead>
<tr>
<th>PIN</th>
<th>FUNCTION</th>
<th>PIN</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Speaker output</td>
<td>5</td>
<td>Relay N.C</td>
</tr>
<tr>
<td>2</td>
<td>Relay common</td>
<td>6</td>
<td>ALC input</td>
</tr>
<tr>
<td>3</td>
<td>PTT line</td>
<td>7</td>
<td>ALC threshold level approx. –6V</td>
</tr>
<tr>
<td>4</td>
<td>Relay N.O</td>
<td></td>
<td>Not used</td>
</tr>
</tbody>
</table>
6.8 ACC Connector Data
Data output connector to control the AT-250.

ACC connector output

<table>
<thead>
<tr>
<th>Freq. band</th>
<th>PIN No.</th>
<th>No. 2</th>
<th>No. 4</th>
<th>No. 1</th>
<th>No. 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHz</td>
<td>BD</td>
<td>BC</td>
<td>BB</td>
<td>BA</td>
<td></td>
</tr>
<tr>
<td>0.15 – 0.4999</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>0.5 – 1.5999</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1.6 – 2.4999</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.5 – 3.9999</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4.0 – 6.4999</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6.5 – 7.4999</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
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<tr>
<td>7.5 – 10.4999</td>
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<td>0</td>
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<tr>
<td>10.5 – 15.9999</td>
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<table>
<thead>
<tr>
<th>Frequency band</th>
<th>Pin No. 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHz</td>
<td>WRC</td>
</tr>
<tr>
<td>0.15 – 1.5999</td>
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</tr>
<tr>
<td>1.6 – 1.9999</td>
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</tr>
<tr>
<td>2.0 – 2.9999</td>
<td>1</td>
</tr>
<tr>
<td>3.0 – 3.9999</td>
<td>0</td>
</tr>
<tr>
<td>4.0 – 6.8999</td>
<td>1</td>
</tr>
<tr>
<td>6.9 – 7.4999</td>
<td>0</td>
</tr>
<tr>
<td>7.5 – 13.8999</td>
<td>1</td>
</tr>
<tr>
<td>13.9 – 14.9999</td>
<td>0</td>
</tr>
<tr>
<td>15.0 – 20.8999</td>
<td>1</td>
</tr>
<tr>
<td>20.9 – 21.9999</td>
<td>0</td>
</tr>
<tr>
<td>22.0 – 27.8999</td>
<td>1</td>
</tr>
<tr>
<td>27.9 – 29.9999</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Band output data is TTL level.
0 = Low
1 = high

ACC connector wiring

---

6.11 FRONT BAIL
The transceiver can be elevated for operating convenience by extending the bail.

6.12 OPERATION WITH A SECOND RECEIVER
Use the XVTR port and an 8 Pin DIN Plug, Part E07-0851-05.
Pin 8  HF Ant output from the TS-430S
Pin 5  RX Ant input
Pin 3  GND
Pin 2  RL control, 12V DC in TX
Connect pins 8 and 5 together and through a short length of 50Ω coax to your second receiver Ant input.
Use pin 2 to mute the second receiver in TX.

6.13 OPERATION WITH A SEPARATE RECEIVER ANTENNA
Use the XVTR port and an 8 Pin DIN Plug, Part E07-0851-05
Pin 8  HF Ant output from the TS-430S
Pin 5  RX Ant input
Pin 3  GND
Either wire your extra antenna to pin 5 and ground, and use the DIN plug as the connect/disconnect, or wire pins 8 and 5 and the external antenna through a SPDT switch.

6.14 OPERATION AS A SECOND RECEIVER
Use the REMOTE Connector. Connect Pin 3 (PTT line) (and Pin 2, GROUND) to your XMTR control output, to ground Pin 3 in TX. Feed the antenna through the primary transmitter or transceiver antenna relay.

6.15 ADJUSTMENTS
1. S Meter Zero is VR2 on the IF unit.
2. S meter S-9 calibration is VR3 on the IF, set with 50μV input at 14.175 MHz.
3. "Beeper" audio level is VR6 on the IF unit.
4. CW Sidetone level is VR10 on the IF unit.
5. VFO dial drag (torque) is adjustable from the small slotted screw accessed through the bottom cover, directly under the VFO.

CAUTION:
The supply voltage (13.8V) always flows at the final transistor collector of the TS-430 independently of the ON/OFF position of the Power switch. Please be sure to unplug the power cable before removing the shield cover of the final unit.

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6.10 SSTV or AFSK operation
The TS-430S will adapt to slow scan television or AFSK RTTY operation. For SSTV, the only cabling required are connections between the transceiver microphone input and the camera output, and between the speaker output and the monitor input.
When transmitting, adjust the transmitter output so that final input power is less than approximately 100 W, or for approximately 1/2 of normal output power. For AFSK operation, connect the T.U. output to the microphone input, and speaker output to the T.U. inpunt.

---

X VTR Connector
## SECTION 7. TROUBLE SHOOTING

The problems described in this table are failures caused in general by improper operation or connection of the transceiver, not by defective components.

There is a separate Service Manual for repair of the Transceiver.

### TRANSMITTER AND RECEIVER CIRCUITS

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
</table>
| Pilot lights do not light and there is no receiver noise when the POWER switch is turned on. | 1. Power cord disconnected or AC power OFF.  
2. Loose power connector.  
Turn AC power ON.  
2. Reconnect.  
3. Replace fuse (if fuse blows again, contact service station.)  
4. Turn ON the PS-430 power switch. |

### RECEIVER SECTION

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>No signals received with antenna connected.</td>
<td>Standby or microphone PTT switch is in transmit position.</td>
<td>Place switch in receive position.</td>
</tr>
</tbody>
</table>
| S-meter deflects without signals.             | 1. Power supply voltage is too low.  
2. RF gain is too low. | 1. Adjust voltage to 13.8V DC (12 ~ 16V DC).  
Reset voltage selector to correct local AC line voltage (PS-430).  
2. Turn RF GAIN control fully clockwise. |
| SSB signal unintelligible.                    | Wrong sideband.                           | Set MODE switch to alternate SSB position.  |
| SSB received signal is high or low cut.       | IF SHIFT is out of adjustment.            | Set to the center position (click).         |
| Frequency remains the same when RIT control is adjusted. | RIT switch is OFF. | Depress RIT switch ON. |
| No output.                                    | Standby switch not in transmit position.  
CAR or MIC control in minimum position. | Turn CAR or MIC clockwise. |
| No SSB output.                                | 1. MIC plug loose.                        | 1. Reconnect.  
2. MIC control in minimum position.      | 2. Turn MIC control clockwise. |
| FMing in sideband operation.                 | Unstable or insufficient Power Supply.     | Adjust voltage to 13.8V DC (12 ~ 16V DC).  
Reset voltage selector to correct local AC line voltage (PS-430). |
| VOX circuit inoperative                       | 1. VOX control in minimum position.       | 1. Turn VOX control clockwise. |
2. VOX switch in MAN position.                 |                                            | 2. Set VOX switch to VOX. |
| VOX operates by sound from speaker.          | ANTI VOX setting incorrect.               | Turn ANTI VOX control clockwise.            |
| VOX circuit releases between words or holds too long | VOX time hold control requires adjustment. | Adjust delay control.                      |
| Signal reports of distortion                 | Too much microphone gain.                | Reduce MIC control.                         |
| Mic or radio chassis is "hot" during TX.     | Excess RF in the shack. No earth ground, poor ground, or antenna is too close to the radio. | 1. ANT too close to X CVR.  
2. Poor mic GND.  
3. Poor or excess length GND less. |
| Poor audio in SSB                             | TX-feedbackExcess RF in the shack.        |                                             |
SECTION 8. OPTIONAL ACCESSORIES

The following optional accessories are available for use with the TS-430S.

■ SP-430 EXTERNAL SPEAKER
The SP-430 is an external speaker designed exclusively for use with the TS-430S. It matches the transceiver in design and tone quality.

■ SP-40: MOBILE SPEAKER

■ PS-430 REGULATED DC POWER SUPPLY
The PS-430 is a regulated DC power supply with high current capability. The output is 13.8 VDC/20A (intermittent). Since terminals for 13.8 VDC/10A are also provided, in addition to an output power cable for use with the TS-430S, the PS-430 can also be used as the power source for another low power mobile transceiver such as a 2-meter rig.

■ FM-430: FM UNIT

■ AT-250

■ HF LINEAR AMPLIFIER TL-922/TL-922A
The TL-922/TL-922A is an HF linear amplifier operating at maximum legal power, and employing a pair of 3-500Z high performance transmitting tubes. The TL-922A (without 10m band) is available only in U.S.A.

■ HS-4: HEADPHONES

■ HS-5 COMMUNICATIONS HEADPHONES
Headphones designed for communications equipment. These light-weight open air-type headphones remain comfortable during extended operation. Easily attached ear-pads are provided.

■ HS-6 COMMUNICATIONS HEADPHONES
Deluxe, very lightweight headphones designed for communications equipment.

■ HS-7: COMMUNICATIONS HEADPHONES

■ MC-60A BASE STATION MICROPHONE
Communications microphone with push-to-talk and remote frequency UP/DOWN switches.

■ HC-10: DIGITAL WORLD CLOCK
The HC-10 is a highly advanced world clock with dual displays which can memorize 10 preset world major cities and 2 additional programmable regions.

■ MB-430 MOBILE MOUNT
Mobile mount designed for the TS-430S. It allows easy installation and removal the transceiver.
The MB-430 can either be suspended from the dashboard or attached to the transmission tunnel or a center console. The transceiver tilt angle can be adjusted 5 steps.

■ MC-42S: MICROPHONE (8 pin plug)
Filter Options
For AM

- **YK-88A**
  - Center Frequency: 8,831.5 kHz
  - Passband Width: 6 kHz (-6 dB)
  - Attenuation Bandwidth: 11 kHz (-60 dB)
  - Guaranteed Attenuation: More than 80 dB

For CW
- **YK-88C**
  - Center Frequency: 8,830.7 kHz
  - Passband Width: 500 Hz (-6 dB)
  - Attenuation Bandwidth: 1.5 kHz (-60 dB)
  - Guaranteed Attenuation: More than 80 dB

For CW
- **YK-88CN**
  - Center Frequency: 8,830.7 kHz
  - Passband Width: 270 Hz (-6 dB)
  - Attenuation Bandwidth: 1.1 kHz (-60 dB)
  - Guaranteed Attenuation: More than 80 dB

For SSB
- **YK-88SN**
  - Center Frequency: 8,830.0 kHz
  - Passband Width: 1.8 kHz (-6 dB)
  - Attenuation Bandwidth: 3.3 kHz (-60 dB)
  - Guaranteed Attenuation: More than 80 dB

- **Model AT-130 Antenna Tuner**
  The AT-130 is a compact antenna tuner designed for use with the TS-430S in either a mobile or fixed station. The SWR meter is illuminated. It is equipped with a highly accurate SWR detecting circuit for matching within the impedance range between 20 and 300 ohms on all amateur bands between 3.5 and 29.7 MHz.

- **PC-1A: PHONE PATCH**
  (Available only where phone patch operation is legal.)
  Hybrid phone patch with VU meter for null and audio gain measurements.
  The PC-1A Phone Patch provides interface between the transceiver and telephone line.
  Providing excellent performance, it is designed with high isolation between receive input and transmit output.
  Its compact design permits easy installation in a limited space.
  (FCC Part 68 registered)
SECTION 9  INTERNAL VIEWS

Top View
- CW Sidetone VR10
- "Beeper" VR6
- IF Unit (X48-1370-00)
- Switch unit (X41-1470-00)
- Filter Unit (X51-1290-00)
- Final Unit (X45-1280-00)
- Optional FM-430 mounting Space

Bottom View
- Encoder unit (X54-1710-00)
- RF Unit (X44-1510-00/11)
- PLL Unit (X50-1910-00)
- VFO Dial Drag ADJ.
Section 10  RADIO FREQUENCY ALLOCATION

Frequency Distribution in the Broadcast and Amateur Bands.
The TS-430S receiver covers from 150 kHz to 30 MHz, to receive international broadcast and communication services.
As shown in the Frequency Allocation Chart, Fig. 10-1, broadcast and Amateur radio station frequencies are allocated in specific bands expressed in megahertz (MHz) or wavelength in meters (m). Also in Fig. 10-1, the frequencies of “other stations” are assigned for fixed station business use, marine mobile, aviation mobile, land mobile, radio beacon stations, etc.

NOTE:
1. Radio stations throughout the world are listed in the WORLD RADIO TV HANDBOOK or similar publications.
2. Antennas designed for HAM BAND operation will generally provide satisfactory reception for SW stations near the HAM BANDS. For antenna construction details, see the ARRL ANTENNA HANDBOOK, or similar publications.
ORDERING SPARE PARTS

Spare parts may be ordered from any KENWOOD dealer, or the factory service facility parts department. When ordering replacement or spare parts for your equipment, be sure to specify the following information: Model and serial number of the equipment. Schematic number of the part. Printed circuit board number on which the part is located. Part number and name, if known, and quantity desired.

NOTE:
A full Service Manual is available as a separate publication. KENWOOD Service Manuals typically contain: Specifications, expanded circuit descriptions, printed circuit board views, parts list, disassembly, Alignment, level chart, expanded schematics, block diagram, and other reference data. Schematics show main signal paths, plus DC voltages and voltage lines are shown in a second colour. Accessory for the main unit are typically included.

SERVICE

Should it ever become necessary to return the equipment for repair, pack in its original boxes and packing, and include a full description of the problems involved. Also include your telephone number. You need not return accessory items unless directly related to the service problem.

You may return your radio for service to the Authorized Kenwood Dealer from whom you purchased it. A copy of the service report will be returned with the unit. Please do not send sub-assemblies or printed circuit boards. Send the complete unit, in its original boxes and packing. If you want verification of receipt, please supply a self-addressed card (or letter) and you will be informed of the date of receipt and estimated service time.

MASTER OSCILLATOR CALIBRATION
The built-in master oscillator can be calibrated using a WWV signal.
1. Remove the top and bottom cases.
2. Connect the second MKR terminal connector 2 on the Control unit and the RF unit M terminal with the supplied calibration cable.
3. Receive WWV at 10 MHz or 15 MHz (with an antenna connected.)
4. Place the Control CAL switch unit to ON.
5. The WWV signal and the marker signal may make two beat signals (high and low). Adjust the tuning control for zero-beat.
6. Adjust the F.ADJ trimmer TC1 adjacent to the CAL switch for zero-single beat.
7. This completes the calibration.
8. Turn the CAL switch OFF. Remove the calibration cable, and replace the cases.

SERVICE NOTE:
Dear OM, if you desire to correspond on a technical or operational problem, please make your note short, complete, and to the point. And PLEASE make it readable.
Please list: Model and serial number.
The question or problem you are having.
Please give sufficient detail to diagnose; other equipment in the station, meter readings and anything you feel might be useful in attempting diagnoses.

NOTE:
1. Record the data of purchase, serial number and dealer from whom purchased.
2. For your own information, retain a written record of any maintenance performed on the unit.
3. When claiming warranty service, please include a photocopy of the bill of sale, or other proof of purchase showing the date of sale.

LITHIUM BATTERY FOR MICROPROCESSOR BACK-UP
The TS-430S employs a lithium battery to back up stored memories. The life of the battery is approximately five years. If the display indicates 14.000.0 MHz, USB when turning the POWER ON and OFF, this may show the lithium battery needs replacement. This should be performed by an authorized KENWOOD service facility — either your dealer or the factory.