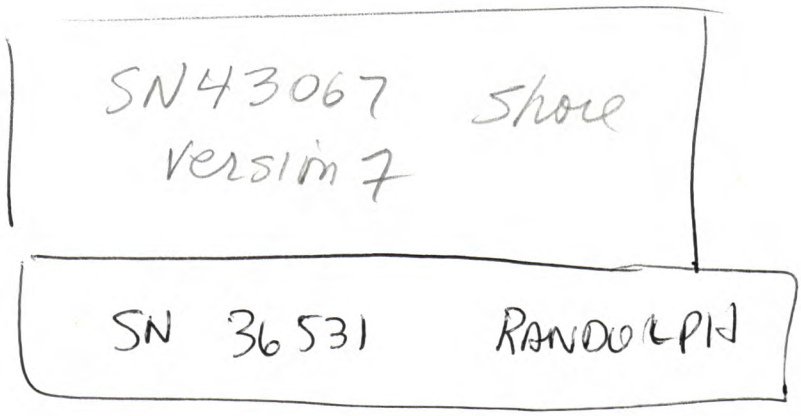
440S/PK232 INTERFACE BOX

With the front panel switch in the up position the 440s speaker (AFSK Audio) is connected to the PK232. Volume can be increased or decreased with the volume control on the 440s.

With the front panel switch in the lower position the AFSK Audio comes from the 3 AFSK OUT Terminal and is a constant level.

The interface box also connects AFSK Audio from the PK232 to the440s AFSK Audio in connector.



440S/PK232 INTERFACE BOX

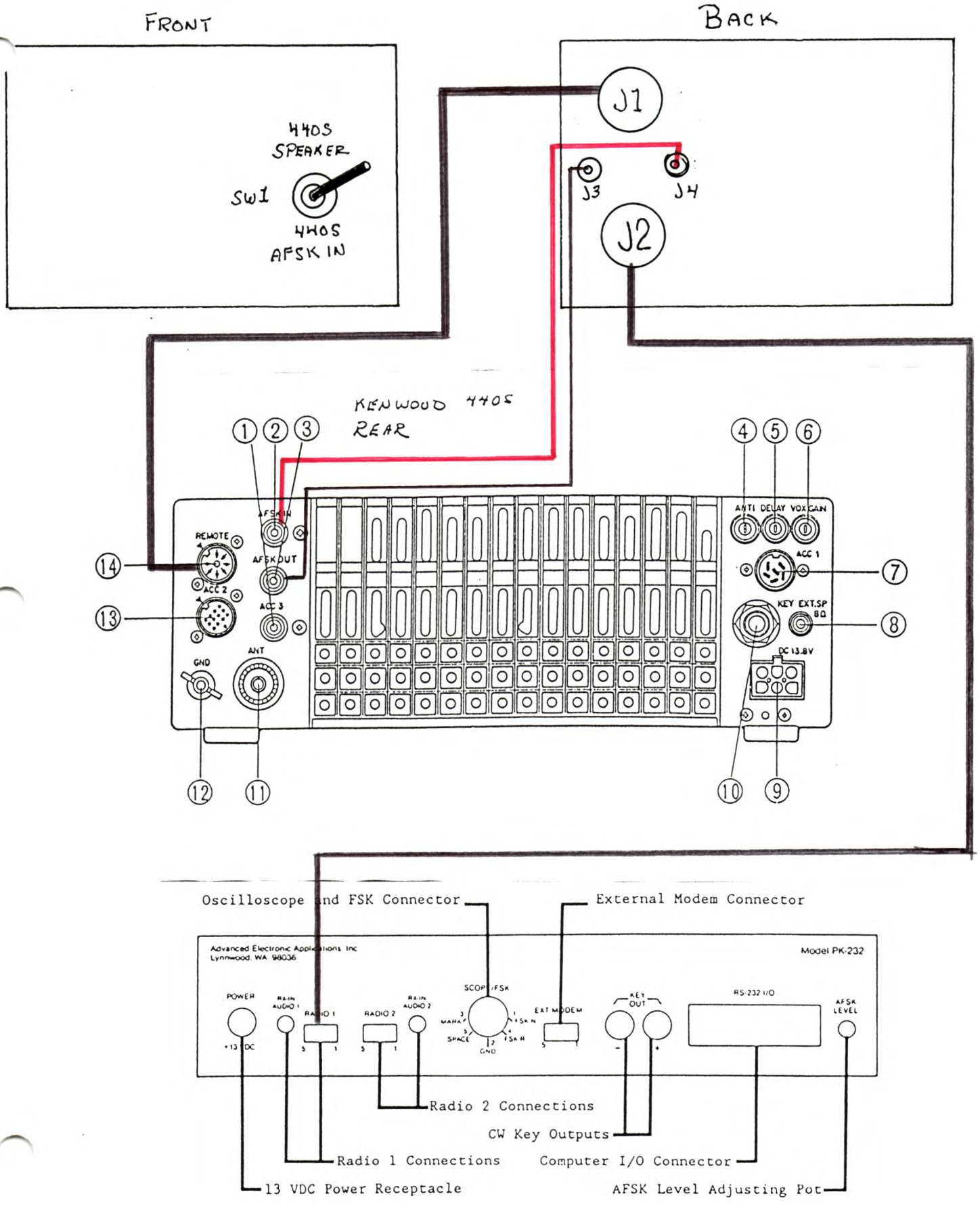
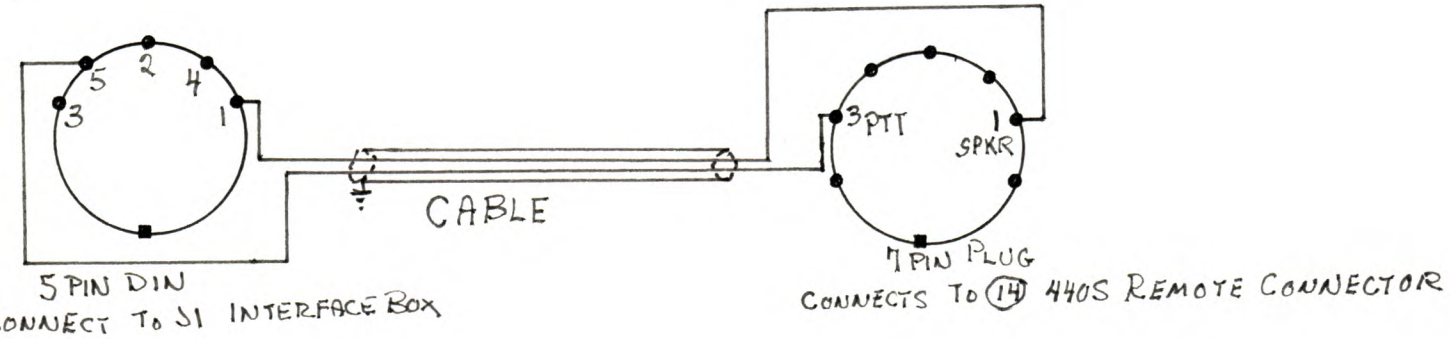
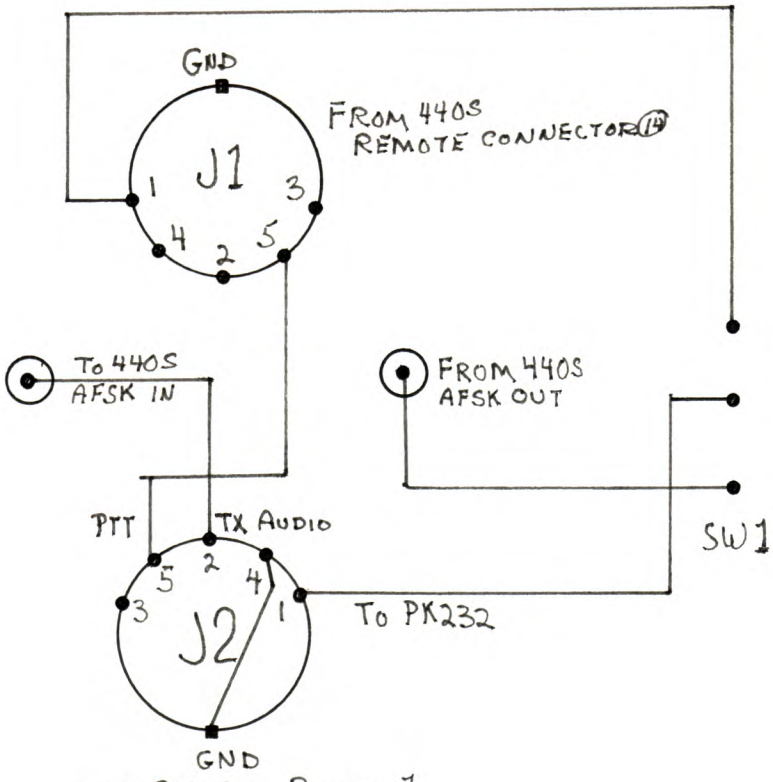


Figure 2-2 PK-232 Rear Panel Connections and controls

440S/PK232 INTERFACE





440S | PK232 INTERFACE BOX CONNECTIONS AND CABLES

Please refer to section 2.9 for more information on connections to specific computers, and APPENDIX K for connections to specific radios.

The following two figures (Figures 2-1 and 2-2) show the front and rear panel controls, connectors and indicators. Please take a moment to familiarize yourself with them, as we will be referring to them throughout this manual.

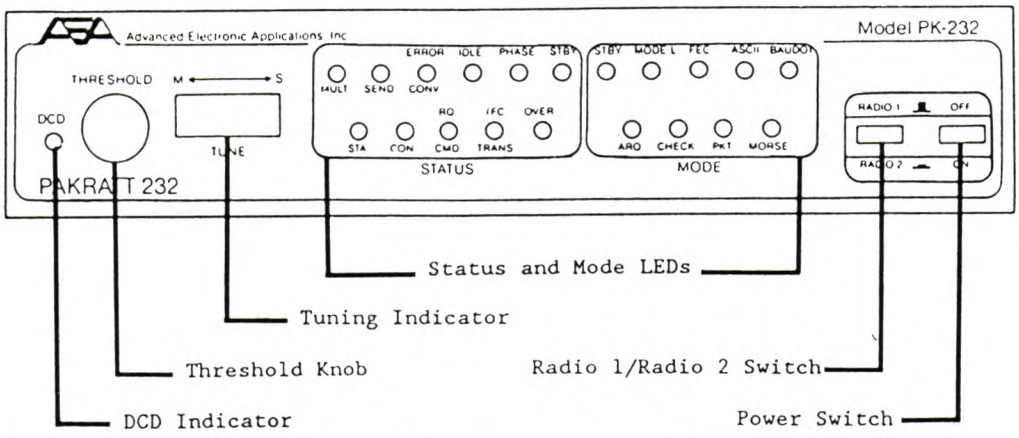


Figure 2-1 PK-232 Front Panel Controls and Indicators

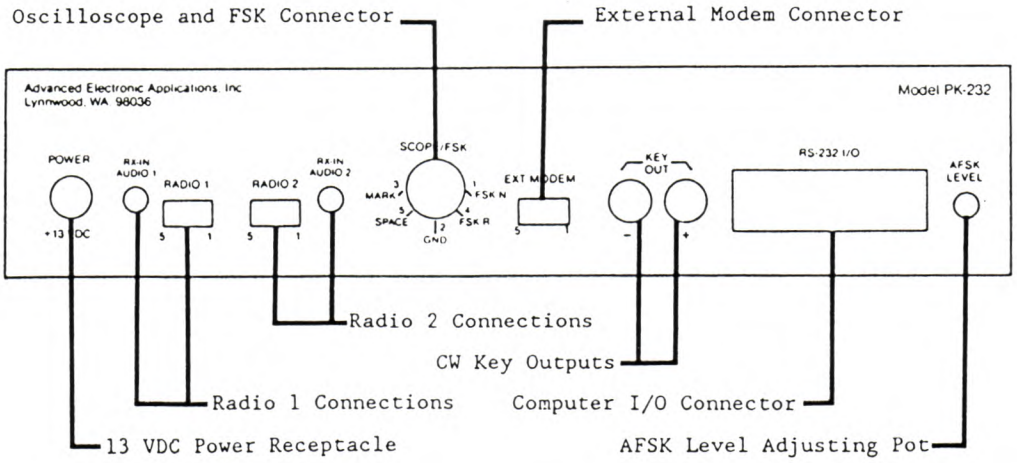


Figure 2-2 PK-232 Rear Panel Connections and controls

2.3 System Quick-Check

Verify that you've done these initial steps before going any further:

- the ROM backup batteries are installed in the PK-232;
- your PK-232 is connected to your computer via the RS-232-C cable;
- ONLY PINS 1 THROUGH 8, and PIN 20 are connected;
- your PK-232 is connected to a regulated 13.6-volt DC supply;

2.4.1.1 Positive PTT

Place the slip-on jumper across the center pin and the pin nearest the front of the unit. Replace the cover and six screws.

2.4.1.2 Negative PTT

Place the slip-on jumper across the center pin and the pin nearest the rear of the unit. Replace the cover and six screws.

2.4.2 FM Installation and Adjustment

1. Turn on your computer and PK-232 and start your terminal program.

2. Connect the radio to a dummy load; be prepared to monitor your transmissions with another nearby radio.

3. Verify that your PK-232 and FM radio are connected as shown in Figure 2-3 below.

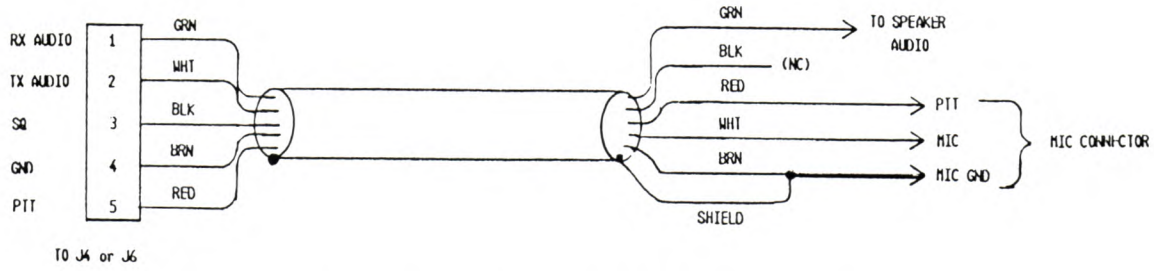


Figure 2-3 Radio-to-PK-232 Connections

4. Enter the Calibrate mode by typing: 'CAL <RETURN>.'

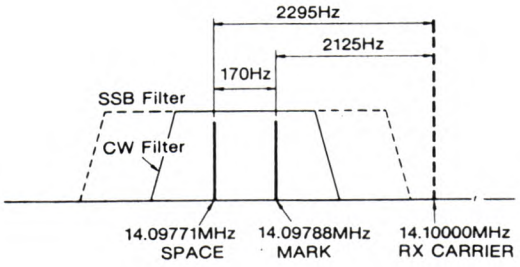
NOTE: In the Calibrate mode only, the 'K' key toggles the transmitter PTT line on and off. The 'SPACE BAR' toggles the PK-232's AFSK tone generator from 'Mark' (the lower pitched tone) to 'Space' (the higher pitched tone). The PK-232 has a transmit watchdog timer circuit that unkeys your transmitter automatically after sixty (60) seconds. As you perform the following adjustments, unkey periodically, then rekey the transmitter by typing 'K.'

5. Press the 'K' key on the keyboard to key the transmitter. You should hear a continuous tone in the monitor receiver.

6. Tap the space bar several times until the higher pitched of the two tones ('space') is heard.

7. Press 'K' again to unkey the transmitter.

The figure below shows the frequencies relationship.



3-8-2. Transmit

Note:
Key down periods of 1 hour will require a cool down period of approximately 30 minutes.

1. Ensure that your terminal is set up for AFSK type keying.
2. Connect the terminal units AFSK output jack to TS-440S/44X AFSK IN jack, and the terminal unit's AFSK input jack to the TS-440S/44X AFSK OUT jack on the rear panel of the transceiver. The terminal units standby (PTT) terminal should be connected to the standby terminal on the REMOTE connector of the TS-440S/44X. (See page 11 for the REMOTE terminal pin configuration.)
3. Place the MODE key on the TS-440S/44X to AFSK, and the Meter switch to ALC.
4. To transmit, either place the SEND/REC switch on the TS-440S/44X to SEND, or use the PTT signal from your terminal unit.
5. When using AFSK, you can also apply your transmit signal tones to pin number 1 of the microphone connector, if you do not wish to use the two jacks on the rear of the TS-440S/44X. To adjust the power output in AFSK, increase or decrease the MIC gain control setting. A mid-scale ALC reading will yield full power output.

Notes:

1. AFSK operation requires terminal unit designed to supply this type of operation. You cannot use FSK tones with a AFSK jack!
2. The AFSK oscillator circuit should provide audio tones of 2125 and 2295 Hz. Lower tones may cause spurious output due to the higher harmonic content present with these lower frequencies.
3. The TS-440S/44X and RTTY terminal unit should use separate power supplies, in order to prevent RFI (Radio Frequency Interference).
4. During AFSK mode operation the microphone switch should be OFF, or the microphone disconnected, if you are using the AFSK jacks on the rear panel.
5. AFSK operations utilize the LSB Mode. AMTOR utilizes USB, or reversed tone pairs.
6. The AFSK input level should be less than 100 mV.

3-9. OPERATION WITH A LINEAR AMPLIFIER

The TS-440S/44X may be operated with any conventional linear amplifier which will accept up to approximately 125 watts of RF drive, has a low current DC operated keying circuit, and returns approximately −8 to −1 VDC ALC back to the exciter. Please note that in order to operate full QSK (FULL break-in) the linear amplifier must also be QSK capable.
Refer to the REMOTE connector diagram on page 11 and section 5-8-10..

Initial linear amplifier tune-up should be performed with the TS-440S/44X set for approximately 50 watts output to reduce wear and tear on both the linear, and the TS-440S/44X. Use of a dummy load is strongly recommended, since the bands are already sufficiently crowded.

⑨ **MODE switch**

This switch is used to select the mode of operation, FM1, FM2, USB, CW, or LSB. The frequency step and the number of digits displayed are controlled by the DS switch.

⑩ **POWER/VOL control**

Push button type, power ON-OFF switch and volume control are combined. Clockwise rotation will increase the volume.

In the power OFF position, about 2.5mA current is drawn to back-up the micro-computer, and 6mA of leakage current to final module provided the power cable is connected to a constant power source.

To completely disable the transceiver, disconnect the power cable.

⑪ **SQUELCH control**

The squelch control is used to eliminate noise during no-signal time. Normally, this control is adjusted clockwise until the noise disappears and the BUSY lamp goes off (threshold level).

⑫ **HI/LOW switch**

This switch is used to set transmit output power to either 25W (high) or 5W (low) in FM or CW mode. In SSB mode, the power is high regardless of switch position.

⑬ **REV switch**

In receive, this switch is used to reverse the repeater shift (±600 kHz) and other transmit/receive frequencies. It is a momentary non-lock type switch and returns to the normal out position when released.

⑭ **DS switch**

By using this switch, frequencies are shifted rapidly. Press the switch to ON. In the FM1 mode, frequencies are shifted in 5 kHz step. In the FM2 mode, the frequency step is 1 kHz when the switch is ON. In the SSB or CW mode, the "kHz" and "100 Hz" frequency data being displayed are set to "0.0", then the frequency is shifted rapidly at 5 kHz intervals.

⑮ **ON AIR indicator**

A light emitting diode (L.E.D.) will light in the transmit mode.

⑯ **BUSY indicator**

This indicator will light when the squelch is open in all receive mode.

⑰ **Frequency display**

LEDs display the operating frequency in 5 digits (MHz—100Hz), 4 digits (MHz—1kHz) and 3 digits (MHz—10kHz) according to the frequency step.

⑱ **S-meter**

This meter indicates receive input signal strength (S) or transmit output (RF). The upper scale is used for reading "S" in SSB or CW mode. The lower 10-division uniform scale is used in FM mode. (B31-0625-05)

⑲ **TONE switch**

The tone switch is for control of a user-supplied tone generator (not available from TRIO-KENWOOD).

⑳ **TX OFFSET switch**

Shifts the transmit frequency for repeater operation.

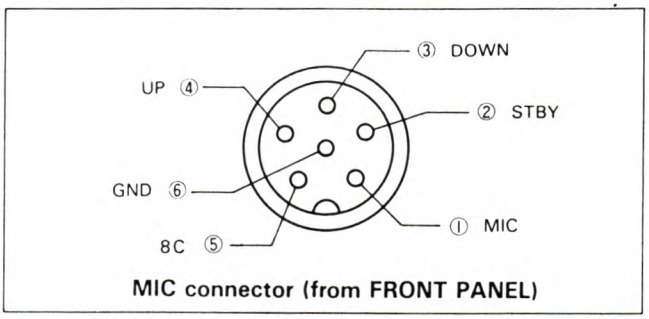
⊕: Switches the transmit frequency up 600kHz from the receive operation.

S: Simplex (receive and transmit frequencies are the same.)

⊖: Switches the transmit frequency down 600kHz from the receive frequency.

㉑ **MIC connector (6-pin)**

For connection of the supplied microphone.



MIC connector (from FRONT PANEL)

㉒ **HOLD switch**

This switch is used to release scan operation.

㉓ **SCAN switch**

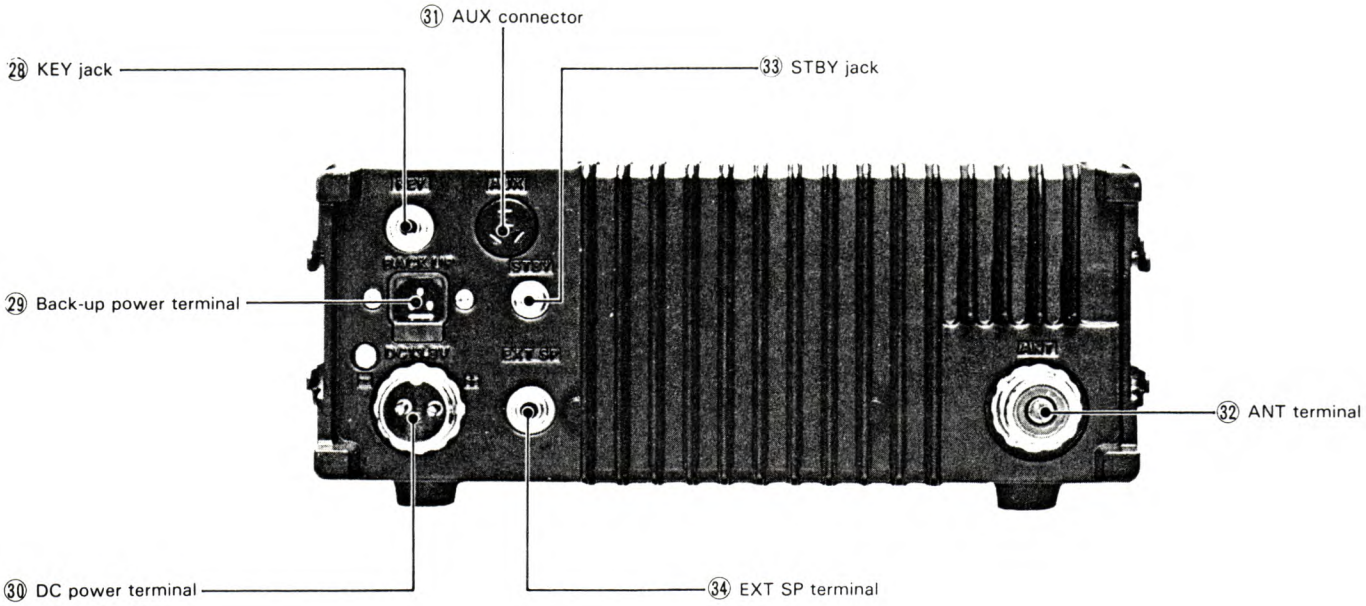
By using this switch, the scan operation is started according to the mode strep (VFO should be used). In MS (memory scan) operation, this acts as a restart switch after pressing the HOLD switch. The SQUELCH control should be set the threshold level for SCAN operation.

㉔ **MS (memory scan) switch**

With this switch depressed the TR-9130 scans only memory channels in which frequencies have been preset and the dot indicating MHz digit in the frequency display cycles on and off. For returning to the usual operation, push this switch again.

㉕ **MR switch**

This is used to output memory frequencies from each channel. By pressing (▬) the switch, a memory frequency is displayed in 5 digits, regardless of the operating mode.



㉖ **MR indicator**
This indicator will light when the MR switch is depressed.

㉗ **Main dial**
A click type rotary digital VFO control selects transmit and receive frequencies. Frequency is changed at each click according to the mode step. This digital VFO control is an endless type, changing frequency continuously from the upper to lower end of the band.

㉘ **KEY jack**
For connection of a key using the supplied plug. Use shielded Line and observe polarity.

㉙ **Back up power terminal**
Used for fixed station operation. The micro-computer retains the VFO frequency memory function even when the power supply is turned OFF, when back-up power is supplied.

㉚ **DC power terminal**
DC power input terminal. Connect the supplied power cord with plug. Input voltage is 13.8V DC. Observe plus (+) and minus (−) polarity is correct.

㉛ **AUX connector**
For connection of a linear amplifier. Use the suplied plug.

㉜ **ANT terminal**
Antenna terminal. Connect an antenna of 50 ohms impedance.

㉝ **STBY jack**
For connection of an external standby switch (transmit/receive select switch). Use the supplied plug.

㉞ **EXT SP terminal**
External speaker terminal. Connect a speaker of 8 ohm impedance using the supplied plug.

3-7. SCAN

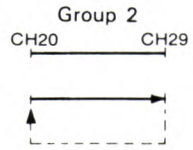
3-7-1. Memory scan

Memory scan operates from memory channel 00 thru memory channel 99 at approximately 3-4 second intervals. Only those memory channels with data entered are scanned.

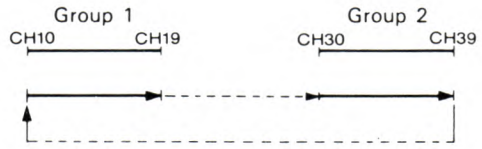
To initiate memory scan

1. Press the VFO/M key to select the memory mode.

Example 1

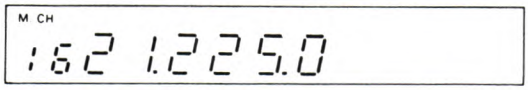


Example 2



2. Press the SCAN key. Scan will begin at memory channel 00, or the lowest numbered channel containing data.

3. You can stop scanning by pressing the CLEAR or microphone PTT switch. Pressing the PTT switch will allow you to continue scanning from the point that you stopped, and pressing the CLEAR key will allow you to start scanning from the beginning.

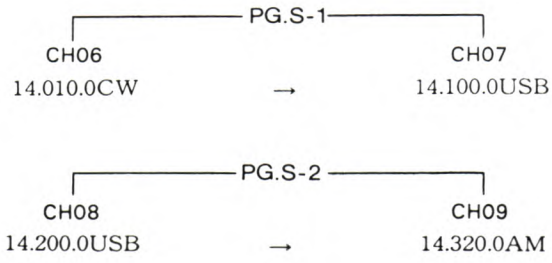


4. To resume scan press the SCAN key again.

3-7-2. Program scan

Two programmable scan ranges are provided on the TS-440S/44X transceiver. PG.S-1 (Program Scan range 1) utilizes memory channels 06 and 07 to specify the upper and lower scan limits. PG.S-2 (Program Scan range 2) utilizes memory channels 08 and 09 to specify the upper and lower scan limits.

Example

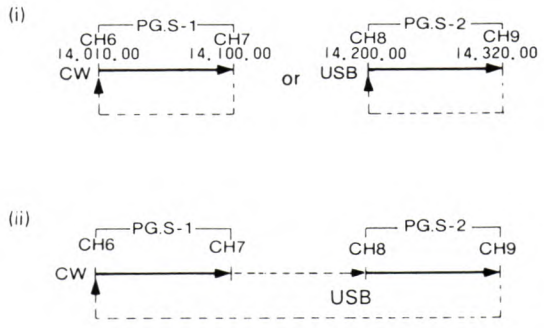


To initiate PG.S-1

1. Press the VFO/M key to select VFO mode operation.

2. To begin scan press the SCAN key. Scan will begin at channel number 06 and proceed in 10Hz (USB/LSB/CW/AFSK), 100Hz (AM/FM) steps towards channel 07.

Example



3. To stop scanning press the PTT switch, or the CLEAR key. Pressing the SCAN key allows scan to resume from the point you stopped.

3-8. AFSK

3-8-1. Reception

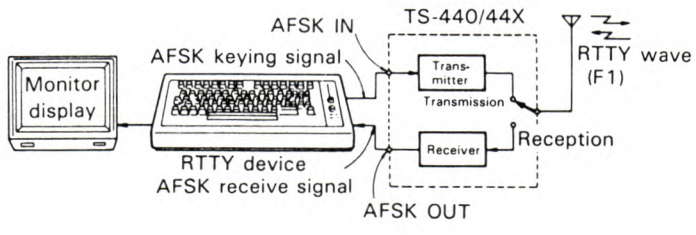
Note:

An RTTY terminal is required to receive and display/print the RTTY signal.

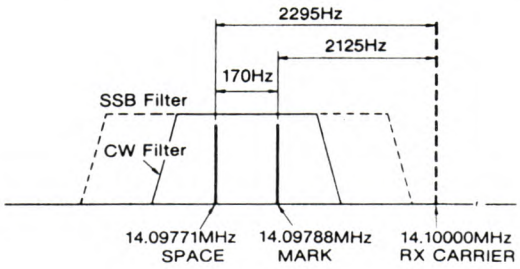
1. The AFSK mode utilizes the LSB carrier frequency, which conforms to international conventions.
2. When the optional YK-88C filter is installed, the normal receiver bandwidth is 500 Hz when the SELECTIVITY switch is set to the AUTO position, and the MODE switch is in AFSK.
   The accompanying diagram illustrates the relationship between the carrier and the passband width.
3. The demodulated AFSK signal is sent from the AFSK OUT terminal on the rear panel.
4. This completes the preparation for using the AFSK mode.

Notes:

1. Before connecting the terminal you should review the contents of the instruction manual provided with that terminal unit.
2. For AMTOR reception, you should use AFSK in the USB mode.



The figure below shows the frequencies relationship.



3-8-2. Transmit

Note:
Key down periods of 1 hour will require a cool down period of approximately 30 minutes.

1. Ensure that your terminal is set up for AFSK type keying.
2. Connect the terminal units AFSK output jack to TS-440S/44X AFSK IN jack, and the terminal unit's AFSK input jack to the TS-440S/44X AFSK OUT jack on the rear panel of the transceiver. The terminal units standby (PTT) terminal should be connected to the standby terminal on the REMOTE connector of the TS-440S/44X. (See page 11 for the REMOTE terminal pin configuration.)
3. Place the MODE key on the TS-440S/44X to AFSK, and the Meter switch to ALC.
4. To transmit, either place the SEND/REC switch on the TS-440S/44X to SEND, or use the PTT signal from your terminal unit.
5. When using AFSK, you can also apply your transmit signal tones to pin number 1 of the microphone connector, if you do not wish to use the two jacks on the rear of the TS-440S/44X. To adjust the power output in AFSK, increase or decrease the MIC gain control setting. A mid-scale ALC reading will yield full power output.

Notes:

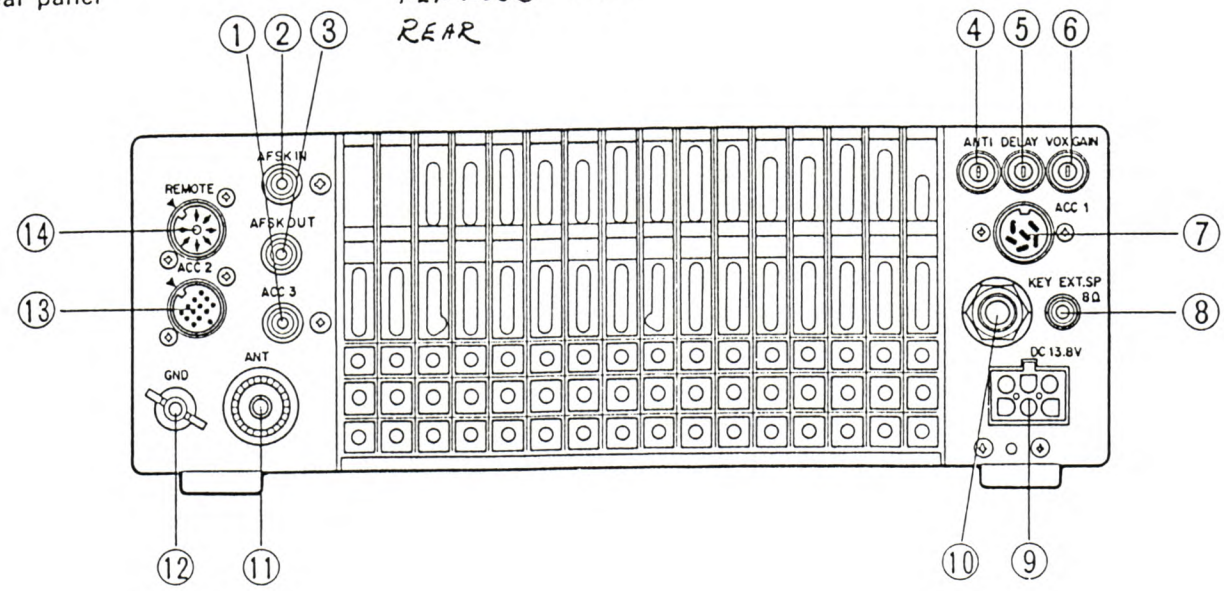
1. AFSK operation requires terminal unit designed to supply this type of operation. You cannot use FSK tones with a AFSK jack!
2. The AFSK oscillator circuit should provide audio tones of 2125 and 2295 Hz. Lower tones may cause spurious output due to the higher harmonic content present with these lower frequencies.
3. The TS-440S/44X and RTTY terminal unit should use separate power supplies, in order to prevent RFI (Radio Frequency Interference).
4. During AFSK mode operation the microphone switch should be OFF, or the microphone disconnected, if you are using the AFSK jacks on the rear panel.
5. AFSK operations utilize the LSB Mode. AMTOR utilizes USB, or reversed tone pairs.
6. The AFSK input level should be less than 100 mV.

3-9. OPERATION WITH A LINEAR AMPLIFIER

The TS-440S/44X may be operated with any conventional linear amplifier which will accept up to approximately 125 watts of RF drive, has a low current DC operated keying circuit, and returns approximately – 8 to – 1 VDC ALC back to the exciter. Please note that in order to operate full QSK (FULL break-in) the linear amplifier must also be QSK capable.
Refer to the REMOTE connector diagram on page 11 and section 5-8-10..

Initial linear amplifier tune-up should be performed with the TS-440S/44X set for approximately 50 watts output to reduce wear and tear on both the linear, and the TS-440S/44X. Use of a dummy load is strongly recommended, since the bands are already sufficiently crowded.

KENWOOD 440S
REAR



① ACC 3 terminal

Spare RCA type terminal. No internal connections have been made.

② AFSK IN terminal

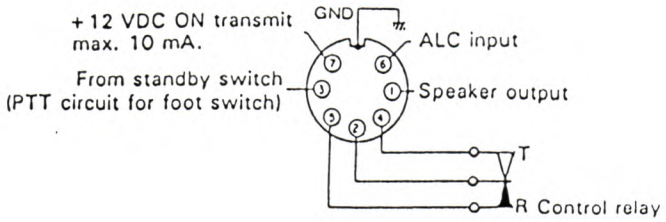
AFSK input terminal.

③ AFSK OUT terminal

Constant level AF output terminal for AFSK operation.

⑭ REMOTE connector

Note:
When the control relay is used refer to section 5-8-10.



⑥ VOX GAIN control

This control adjusts the sensitivity of the VOX amplifier. Adjust this control for your personal preference.

⑦ ACC 1 jack

This jack is designed for connection of the 6-pin DIN connector supplied with the optional interface unit.

⑧ EXT. SP (External speaker) jack

This jack is for connection of an external speaker.

⑨ DC power connector

This is used to connect the DC power supply.

⑩ KEY jack

Using shielded line, connect a 1/4'' phone plug to this jack for CW operation. Open-terminal voltage is approximately 5.5 VDC.

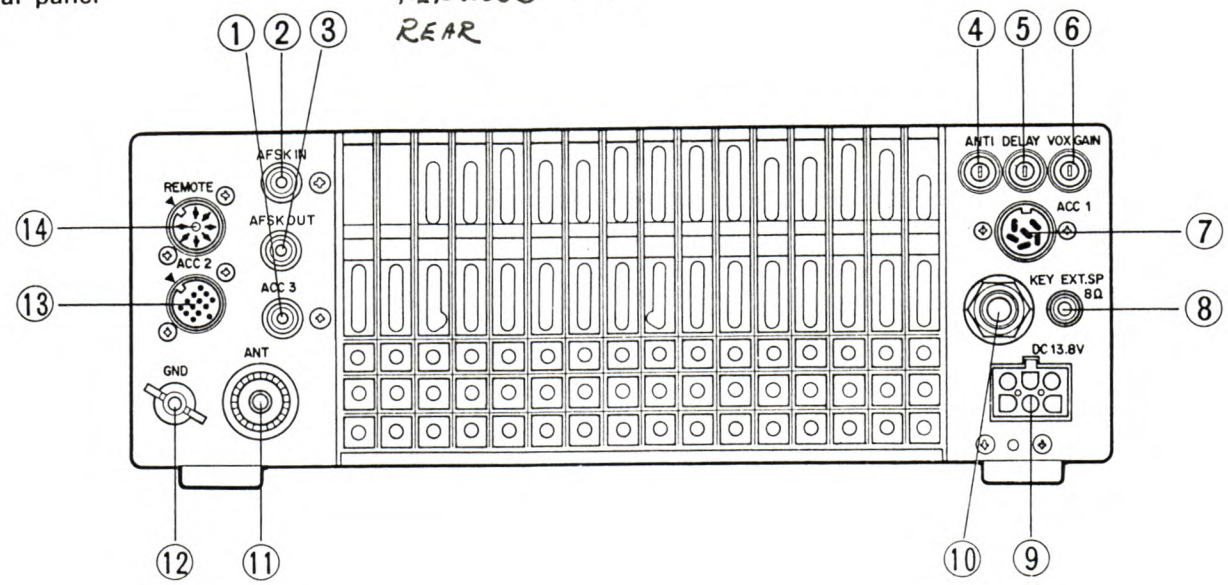
⑪ ANT (Antenna) connector

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.

⑫ GND (Ground) terminal

To prevent electric shock, as well as RFI and BCI, connect the transceiver to a good earth ground.

KENWOOD 440S
REAR



① ACC 3 terminal

Spare RCA type terminal. No internal connections have been made.

② AFSK IN terminal

AFSK input terminal.

③ AFSK OUT terminal

Constant level AF output terminal for AFSK operation.

④ ANTI VOX control

VOX operations are sometimes difficult with high speaker volume control settings. The ANTI VOX control is used to reduce the tendency of the VOX to activate from inputs from the speaker. The ANTI VOX control is not active when headphones are connected, for obvious reasons!

⑤ DELAY control

This control adjusts the "hang-time" that the radio will remain keyed after voice input has stopped.

⑥ VOX GAIN control

This control adjusts the sensitivity of the VOX amplifier. Adjust this control for your personal preference.

⑦ ACC 1 jack

This jack is designed for connection of the 6-pin DIN connector supplied with the optional interface unit.

⑧ EXT. SP (External speaker) jack

This jack is for connection of an external speaker.

⑨ DC power connector

This is used to connect the DC power supply.

⑩ KEY jack

Using shielded line, connect a 1/4" phone plug to this jack for CW operation. Open-terminal voltage is approximately 5.5 VDC.

⑪ 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.

⑫ GND (Ground) terminal

To prevent electric shock, as well as RFI and BCI, connect the transceiver to a good earth ground.

⑬ ACC 2 jack

Terminal numbers and their applications are as follows:

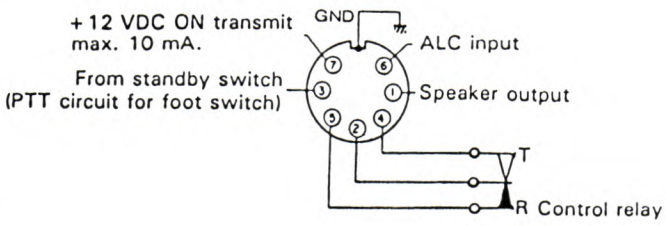
13-pin DIN plug

Pin No.	Pin Name	Application
1	NC	No connection
2	NC	No connection
3	Data output	Output level is fixed regardless of the AF control setting. Output voltage: 300 mV or more at maximum receiving input with 4.7 kΩ load.
4	GND	Grounding (The shielded wire of the audio output terminal is connected here.)
5	NC	No connection
6	NC	No connection
7	NC	No connection
8	GND	Grounding
9	MIC mute	Signal input from the MIC jack is muted. Grounding mutes signal.
10	NC	No connection
11	Data input	Input terminal for data communication. In SSB, MIC gain can be controlled by the MIC control. Input voltage: 500 mV or less (SSB: Voltage starts deflecting ALC. FM: Voltage providing ±3.0 kHz modulation ratio.)
12	GND	Grounding (The shielded wire of the audio input is connected here.)
13	Standby	Standby terminal Grounding transmits.

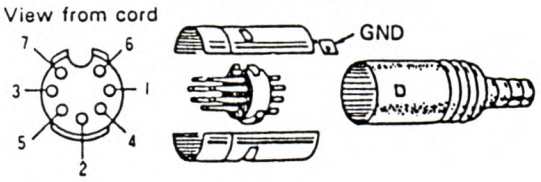
⑭ REMOTE connector

Note:

When the control relay is used refer to section 5-8-10.



Internal wiring



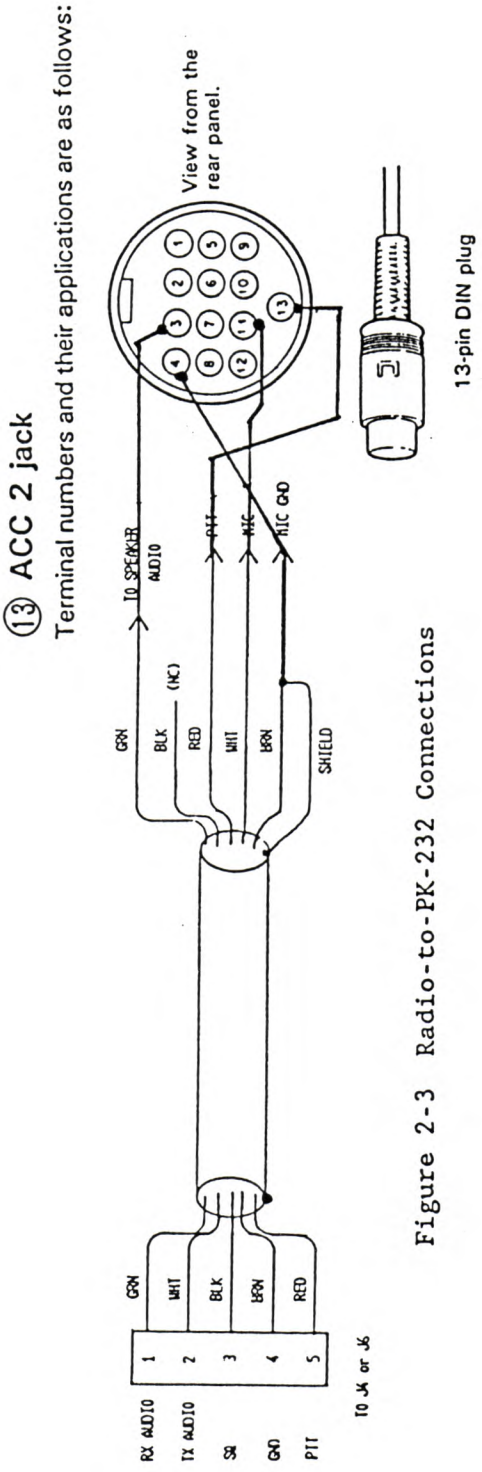


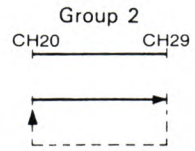
Figure 2-3 Radio-to-PK-232 Connections

memory channel 99 at approximately 3-4 second intervals. Only those memory channels with data entered are scanned.

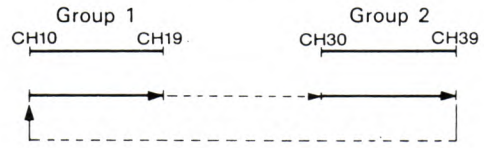
To initiate memory scan

1. Press the VFO/M key to select the memory mode.

Example 1

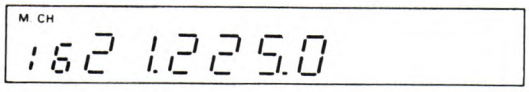


Example 2



2. Press the SCAN key. Scan will begin at memory channel 00, or the lowest numbered channel containing data.

3. You can stop scanning by pressing the CLEAR or microphone PTT switch. Pressing the PTT switch will allow you to continue scanning from the point that you stopped, and pressing the CLEAR key will allow you to start scanning from the beginning.

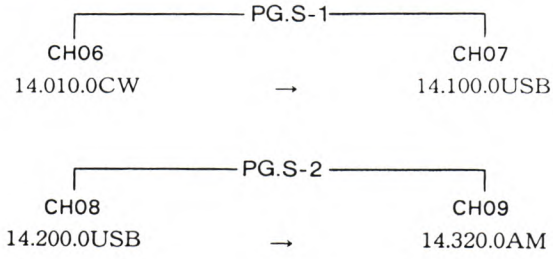


4. To resume scan press the SCAN key again.

3-7-2. Program scan

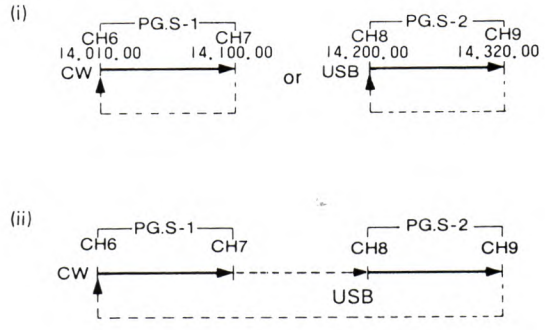
Two programmable scan ranges are provided on the TS-440S/44X transceiver. PG.S-1 (Program Scan range 1) utilizes memory channels 06 and 07 to specify the upper and lower scan limits. PG.S-2 (Program Scan range 2) utilizes memory channels 08 and 09 to specify the upper and lower scan limits.

Example



2. To begin scan press the SCAN key. Scan will begin at channel number 06 and proceed in 10Hz (USB/LSB/CW/AFSK), 100Hz (AM/FM) steps towards channel 07.

Example



3. To stop scanning press the PTT switch, or the CLEAR key. Pressing the SCAN key allows scan to resume from the point you stopped.

3-8. AFSK

3-8-1. Reception

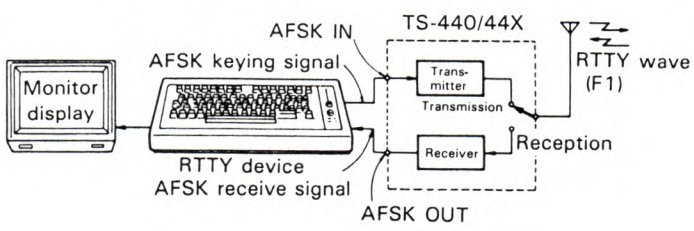
Note:

An RTTY terminal is required to receive and display/print the RTTY signal.

1. The AFSK mode utilizes the LSB carrier frequency, which conforms to international conventions.
2. When the optional YK-88C filter is installed, the normal receiver bandwidth is 500 Hz when the SELECTIVITY switch is set to the AUTO position, and the MODE switch is in AFSK.
   The accompanying diagram illustrates the relationship between the carrier and the passband width.
3. The demodulated AFSK signal is sent from the AFSK OUT terminal on the rear panel.
4. This completes the preparation for using the AFSK mode.

Notes:

1. Before connecting the terminal you should review the contents of the instruction manual provided with that terminal unit.
2. For AMTOR reception, you should use AFSK in the USB mode.



APPENDIX T
PAKMAIL SCHEMATIC