

OPERATING INSTRUCTIONS

RADIO SET AN/URC-32

Sections I through V and section VII of these instructions provide standard operating procedures. Section VI provides special instructions for dual independent sideband operation.

LINE FUSE BOX AND DISCONNECT SWITCH ARE LOCATED IN REAR PANEL

I PRELIMINARY SETTINGS

GENERAL PRELIMINARY SETTINGS:

<u>Unit</u>	<u>Control</u>
LOW-VOLTAGE POWER SUPPLY:	ON-OFF switch to OFF.
POWER AMPLIFIER:	FIL OFF - TUNE - OPERATE switch to FIL OFF. PLATE ON-OFF-KEY switch to OFF.
SIDEBAND GENERATOR:	RECEIVER RF GAIN control counterclockwise. EXCITER RF GAIN control counterclockwise. TUNE - LOCAL - EXTERNAL CONTROL switch to LOCAL.
FREQUENCY COMPARATOR:	FREQUENCY SELECTOR switch to OFF.
CW/FSK:	XMIT-REC-CW TEST toggle switch to REC.
AUDIO AND CONTROL:	MIC GAIN control counterclockwise.

PRELIMINARY SETTINGS FOR SINGLE-SIDEBAND AND AM VOICE OPERATION:

SIDEBAND GENERATOR: SSB-AM toggle switch to desired mode of operation.

CW/FSK: OSC CONTROL switch to OFF.

HANDSET ADAPTER: HANDSET REMOTE - LOCAL switch to LOCAL.

AUDIO AND CONTROL: SIDEBAND SELECTOR switch to desired sideband. On AM operation, set this switch to USB.

PRELIMINARY SETTINGS FOR CW OPERATION:

<u>Unit</u>	<u>Control</u>
SIDEBAND GENERATOR:	SSB-AM toggle switch to SSB. SIDETONE toggle switch to ON (this control is under the unit dust cover).
CW/FSK:	OSC CONTROL switch to CW 1KC or CW 1.5 KC (1KC for even-numbered assignments, 1.5KC for 500-cycle increment assignment, (see TUNING PROCEDURE, section III). OUTPUT control fully counterclockwise.
AUDIO AND CONTROL:	SIDEBAND SELECTOR switch to USB.

PRELIMINARY SETTINGS FOR TELETYPEWRITER FSK OPERATION:

SIDEBAND GENERATOR: SSB-AM toggle switch to SSB. SIDETONE toggle switch to OFF (this control is under the unit dust cover).

CW/FSK: OSC CONTROL switch to FSK. OUTPUT control fully counterclockwise. BFO control to center mark.

AUDIO AND CONTROL: SIDEBAND SELECTOR switch to USB.

HANDSET ADAPTER: HANDSET REMOTE - LOCAL switch to LOCAL.

II TURNING ON EQUIPMENT

The following procedure is used to apply power to the equipment. If the equipment is to be used only as a receiver, perform only steps 1 and 2.

NOTE

When using auxiliary equipment, such as an AN/BRA-3 on submarine installations, these equipments must be turned on.

CAUTION

Make the preliminary settings before performing the following steps. Failure to do so may result in damage to the Power Amplifier. EXCITER RF GAIN control *must* be fully counterclockwise.

STEP 1 LOW-VOLTAGE POWER SUPPLY: ON-OFF switch to the ON position. The red indicator lamp will light when air pressure is present in the cooling system.

STEP 2 SIDEBAND GENERATOR: Set meter selector switch to the -90, +130 and +250 positions; check that the meter reads between 35 and 50 db in each position.

STEP 3 POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to OPERATE. Depress the PLATE ON-OFF-KEY switch to KEY. The PLATE CURRENT meter should indicate 150 ma of static current. Alternately depress PL NO. 1 TEST switch and PL NO. 2 TEST switch. The PLATE CURRENT meter should indicate between 60 and 90 ma of static plate current for each tube.

III TUNING PROCEDURE

The following tuning procedure is used whenever the AN/URC-32 is set to a new operating frequency.

- STEP 1** POWER AMPLIFIER: PLATE ON-OFF-KEY switch to OFF. Set band change control to desired operating band.
- STEP 2** FREQUENCY GENERATOR: Release DIAL LOCK. Set FREQUENCY CHANGE and BAND CHANGE controls for desired operating frequency. See decal instructions on dust cover for operation in the CW and FSK modes.

NOTE

When setting up a frequency on *any* band, make certain the white index line on the last digit of the 15.7- to 30.0-mc frequency counter is centered in the window.

- STEP 3** FREQUENCY GENERATOR: Reset DIAL LOCK and momentarily depress the TUNE-OPERATE switch to TUNE.
- STEP 4** SIDEBAND GENERATOR: Adjust RECEIVER RF GAIN control for desired receiver output level (see AUDIO LEVEL ADJUSTMENTS). On FSK operation, adjust BFO control on CW/FSK unit for proper operation of an external FSK converter. This completes tuning of the receiver portion.

CAUTION

Before performing the following steps, assure that a dummy load is connected to the dummy load connector of the associated antenna tuning device (AN/SRA-22 or CU-737/URC). When using an AN/BRA-3 or similar antenna tuner, set coupler control switch to the ON position and set TUNER BY-PASS switch to OFF.

- STEP 5** ANTENNA TUNING DEVICE: ANT-LOAD switch to LOAD.
- STEP 6** POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to TUNE.
- STEP 7** SIDEBAND GENERATOR: Set the meter selector switch to RF OUT. TUNE-LOCAL-EXTERNAL CONTROL switch to TUNE.

NOTE

In the following steps, key to transmit by depressing the PLATE ON-OFF-KEY switch on the Power Amplifier to KEY.

- STEP 8** SIDEBAND GENERATOR: With the EXCITER RF GAIN control in the maximum counterclockwise position, key to transmit and turn EXCITER RF GAIN control clockwise until the meter reads approximately 20 db.
- STEP 9** POWER AMPLIFIER: Key to transmit, and adjust DRIVER TUNE control within the desired band limits to peak the PLATE CURRENT meter reading, adjusting the EXCITER RF

GAIN control on the Sideband Generator as necessary to maintain a PLATE CURRENT meter reading of under 200 ma. The red index on the DRIVER TUNE control must fall within the proper band limits marked on the panel. If a power output reading is observed on the power output wattmeter of the associated antenna tuning control, detune the PA TUNE control until no power output is indicated.

NOTE

After completing STEP 9, make no adjustments on the DRIVER TUNE control for the remainder of the tuning procedure.

- STEP 10** POWER AMPLIFIER: Set PA TUNE control within the desired frequency band limits. Key to transmit, and adjust PA TUNE control for a dip in the PLATE CURRENT meter reading.
- STEP 11** SIDEBAND GENERATOR: Set EXCITER RF GAIN control in the maximum counterclockwise position.
- STEP 12** POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to OPERATE. Key to transmit, turn the Sideband Generator EXCITER RF GAIN control clockwise until 500 watts of *forward* power is indicated on the antenna coupler wattmeter, and redip the Power Amplifier PLATE CURRENT meter reading, using the PA TUNE control. The PLATE CURRENT meter reading *should not* exceed 500 ma.

CAUTION

To prevent damage to antenna tuning device, refer to operating instructions for the associated antenna tuning device (AN/SRA-22 or CU-737/URC) and follow the operating procedures *step by step*.

Do not operate ANT-LOAD switch while AN/URC-32 is keyed to transmit.

- STEP 13** POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to TUNE.
- STEP 14** ANTENNA TUNING DEVICE: ANT-LOAD switch to ANT, and adjust antenna tuning controls for *minimum reflected* power. For this procedure, see the operating instructions for the associated antenna tuning device (AN/SRA-22 or CU-737/URC) and follow *step by step*.
- STEP 15** POWER AMPLIFIER: FIL OFF-TUNE-OPERATE switch to OPERATE. Key to transmit, and adjust Sideband Generator EXCITER RF GAIN control for a *forward* power output of

500 watts. The *reflected* power should be less than 10 watts. The PLATE CURRENT meter reading should be between 450 and 550 ma. Adjust antenna tuning device (AN/SRA-22 or CU-737/URC) as necessary. Key to transmit, and adjust Sideband Generator EXCITER RF GAIN control for a *forward* power output of 125 watts.

- STEP 16** SIDEBAND GENERATOR: TUNE-LOCAL-EXTERNAL CONTROL switch to LOCAL.
- STEP 17** POWER AMPLIFIER: PLATE ON-OFF-KEY switch to ON. On AM mode of operation, readjust Sideband Generator EXCITER RF GAIN control for 125 watts *forward* power. This completes tuning procedure. Proceed to section IV for audio adjustments.

IV AUDIO LEVEL ADJUSTMENTS

RECEIVE:

SIDEBAND GENERATOR: Adjust RECEIVER RF GAIN control so that the agc *does not* increase the gain excessively between characters on CW and FSK mode and between words on SSB voice mode. This control normally is set so that the meter "kicks up" about 15 db with the meter selector switch in the AGC-TGC position. If the handset, speaker or remote audio output is inadequate, adjust the SPEAKER gain control, located under the dust cover of the Audio and Control unit, for the desired output level.

VOICE TRANSMIT:

SIDEBAND GENERATOR: Set meter selector switch to AGC-TGC position.

HANDSET ADAPTER: HANDSET REMOTE-LOCAL switch to LOCAL. Press the push-to-talk button on handset, and speaking at a normal level, adjust Audio and Control unit MIC GAIN control so that normal voice peaks read in the *red* area of the Sideband Generator meter. *Do not* readjust Sideband Generator EXCITER RF GAIN control. HANDSET REMOTE-LOCAL switch to REMOTE for remote operation.

CW TRANSMIT:

CW/FSK: CW TEST-REC-XMIT switch to CW TEST. Adjust OUTPUT control on CW/FSK unit for 0 VU. Adjust EXCITER RF GAIN control on Sideband Generator for 500 watts *forward* power as indicated on the antenna tuning device (AN/SRA-22 or CU-737/URC) wattmeter. The PLATE CURRENT meter on the Power Amplifier *must not* exceed 550 ma.

HANDSET ADAPTER: HANDSET REMOTE-LOCAL switch to REMOTE.

CW/FSK: METER MULTR switch to +8 DBM position. MONITOR switch to USB XMIT.

FSK TRANSMIT:

CW/FSK: Adjust OUTPUT control on CW/FSK unit for 0 VU. Adjust EXCITER RF GAIN control on Sideband Generator for 500 watts *forward* power as indicated on antenna tuning device (AN/SRA-22 or CU-737/URC) wattmeter. The PLATE CURRENT meter on the Power Amplifier *must not* exceed 550 ma. METER MULTR switch to +8 DBM position. MONITOR switch to USB XMIT.

HANDSET ADAPTER: HANDSET REMOTE-LOCAL switch to REMOTE.

V TRANSMIT-RECEIVE OPERATION

HANDSET: Key to transmit by pressing the push-to-talk button.

CW KEYING: On CW operation, the AN/URC-32 operates break-in. The equipment keying circuit has a delay which holds the AN/URC-32 in transmit between normal key-open intervals. Adjust CW KEYING RELEASE TIME control (under the dust cover of the CW/FSK unit) for the desired break-in time between groups of words.

FSK: On FSK teletypewriter operation, the AN/URC-32 is keyed to transmit by applying a ground to the remote

key line by a switch on the teletypewriter control panel (C-1004/SG or similar).

THERMAL RELAY RECEIVER INPUT PROTECTOR:

When RCVR ANT OVERLOAD indicator on the Junction Box is lighted, press RCVR ANT RESET button. If this indicator lights again, there is excessive rf being picked up on the antenna transmission line caused by another transmitter on the same or close frequency. This device protects the receiver input coils from burnout.

VI DUAL INDEPENDENT SIDEBAND OPERATION

TWO REMOTE INPUTS:

When two separate remote audio signals are fed through the Junction Box audio input terminals, perform the following steps:

AUDIO AND CONTROL: SIDEBAND SELECTOR switch to LOCAL OFF. Adjust USB and LSB LINE INPUT

GAIN controls (under dust cover) so that the meter on the CW/FSK unit indicates 0 VU for each sideband. SIDEBAND GENERATOR: TUNE-LOCAL-EXTERNAL CONTROL switch to TUNE. Adjust EXCITER RF GAIN control for 60 watts *forward* power as indicated on antenna tuning device (AN/SRA-22 or CU-737/URC) wattmeter. Set TUNE-LOCAL-EXTERNAL CONTROL switch to LOCAL.

ONE LOCAL - ONE REMOTE INPUT:

SIDEBAND SELECTOR switch on the Audio and Control unit selects the sideband for the *local* handset signals and places remote signals on the remaining sideband. Set levels as outlined under TWO REMOTE INPUTS.

TRANSMIT OPERATION WITH FSK ON USB AND REMOTE AUDIO ON LSB:

- STEP 1** Refer to the general preliminary settings under section I, PRELIMINARY SETTINGS. Set METER MULTR switch on the CW/FSK unit to the +8 DBM position.
- STEP 2** Refer to section II, TURNING ON EQUIPMENT.
- STEP 3** Refer to section III, TUNING PROCEDURE, and perform steps 1 through 10. Key to transmit (refer to NOTE in STEP 7), and adjust EXCITER RF GAIN control for 60 watts *forward* power as indicated on antenna tuning device (AN/SRA-22 or CU-737/URC) wattmeter.
- STEP 4** SIDEBAND GENERATOR: TUNE-LOCAL-EXTERNAL CONTROL switch to LOCAL.
AUDIO AND CONTROL: SIDEBANDSELECTOR switch to LSB.
CW/FSK: MONITOR switch to USB XMIT. OSC CONTROL switch to FSK. CW TEST-REXMIT switch to XMIT. Adjust OUTPUT control for an indication of 0 VU on the panel meter. Antenna tuning device (AN/SRA-22 or CU-737/URC) wattmeter will indicate approximately 250 watts forward power. OSC CONTROL switch to OFF. MONITOR switch to LSB XMIT.
- STEP 5** Perform the audio input adjustment that applies:
- (a) If LSB audio signal is fed in through the Junction Box terminals, adjust LSB LINE INPUT GAIN control (under Audio and Control unit dust cover) for a peak indication of 0 VU on the CW/FSK panel meter. Antenna tuning device (AN/SRA-22 or CU-737/URC) wattmeter will indicate approximately a peak of 250 watts forward power.
- (b) If LSB audio is fed into the Audio and Control unit from the ship's radio remote control system, adjust MIC GAIN control on the Audio and Control unit for a peak indication of 0 VU on the panel meter of the CW/FSK

unit. Antenna tuning device wattmeter will indicate approximately 250 watts of forward power.

- STEP 6** SIDEBAND GENERATOR: Meter selector switch to AGC-TGC.
CW/FSK: OSC CONTROL switch to FSK.
- STEP 7** With signal fed in on both sidebands, the panel meter on the Sideband Generator should indicate within the *red* area of the scale. If indication is greater than the red area of scale, adjust the EXCITER RF GAIN control for a correct indication.

NOTE

Antenna tuning device (AN/SRA-22 or CU-737/URC) will not indicate 500 watts. However, 500 watts PEP is being transmitted as indicated by the indication in the red area of the meter.

RECEIVE:

NOTE

The SIDEBAND SELECTOR switch on the Audio and Control unit determines which channel is fed locally on handset or fed out through remote outputs.

- STEP 1** The USB position allows local reception of USB. LSB output is fed through terminals in the Junction Box and is controlled by the LSB LINE OUTPUT GAIN control on the Audio and Control unit.
- STEP 2** The LSB position allows local reception of LSB. USB output is fed through terminals in the Junction Box and is controlled by the USB LINE OUTPUT GAIN control on the Audio and Control unit.
- STEP 3** There is output on both sidebands through the Junction Box terminals when the SIDEBAND SELECTOR switch on the Audio and Control unit is set to LOCAL OFF. The output levels are adjusted as in STEPS 1 and 2 of this procedure.

VII TURNING OFF EQUIPMENT

POWER AMPLIFIER: PLATE ON-OFF-KEY switch to OFF. FIL OFF-TUNE-OPERATE switch to FIL OFF.

LOW-VOLTAGE POWER SUPPLY: ON-OFF switch to OFF.

BEFORE PERFORMING MAINTENANCE ON THIS EQUIPMENT, TURN OFF THE PRIMARY POWER SOURCE AT THE BULKHEAD POWER DISTRIBUTION PANEL.