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NAVSHIPS 94841(A)

VOLUME II
OPERATOR'S HANDBOOK
for
RADIO RECEIVER
R-1051/URR

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS

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SECTION 3
OPERATION

3-1. FUNCTIONAL DESCRIPTION.

3-2. GENERAL.

3-3. Radio Receiver R-1051/URR (R-1051/URR) is designed to receive upper sideband (USB), lower sideband (LSB), independent sideband (ISB), continuous wave (CW), tone modulated CW (MCW), compatible and standard amplitude modulated (AM), and frequency shift keyed (FSK) transmissions in the 2 to 30-megacycle frequency range. The R-1051/URR contains a power supply and may be operated as an individual unit or as part of a system, such as Radio Set AN/WRC-1 (AN/WRC-1).

3-4. OPERATION.

3-5. The signal from the antenna is applied directly to the receiver. The signal passes through an overload protection circuit in the R-1051/URR to the RF Amplifier Electronic Assembly. The output from the two stages of rf amplification and digitally tuned circuits is an amplified rf signal in the 2 to 30-megacycle range. The rf signal is triple-converted to a 500-kilocycle if. signal.

3-6. The desired if. signal passes through the Receiver Mode Selector Electronic Assembly, and depending on the mode of operation, is applied to one of two Receiver IF./Audio Amplifier Electronic Assemblies. Any undesired signals are suppressed in the Receiver Mode Selector Electronic Assembly. In the CW, AM, FSK, and USB modes, the if. signal passes through one IF./Audio Amplifier Electronic Assembly, and in the LSB mode, the if. signal passes through the other IF./Audio Amplifier Electronic Assembly. In the ISB mode, both IF./Audio Amplifier Electronic Assemblies are in operation. The if. signals are amplified and detected, and the resultant audio signals are again amplified and applied to the audio output transformers. Multiple outputs of the transformers provide a 600-ohm balanced or unbalanced output for remote listen-

ing and a local output for the headset. Overall gain is controlled by an automatic gain control (AGC) voltage developed in the Receiver IF./Audio Amplifier Electronic Assemblies.

3-7. The R-1051/URR is tuned by setting the MCS and KCS controls and the CPS switch on front panel to the desired frequency. An internal power supply converts the nominal 115 vac to the necessary dc operating voltage.

3-8. OPERATING PROCEDURES.

3-9. When the R-1051/URR is used as part of the AN/WRC-1 system, refer to the Technical Manual for Radio Set AN/WRC-1 and Antenna Coupler CU-937/UR, NAVSHIPS 94840(A).

3-10. DESCRIPTION OF CONTROLS AND INDICATORS.

3-11. All controls, indicators, and connectors required for normal use are located on the front panel (see figure 3-1) and are listed in table 3-1.

3-12. SEQUENCE OF OPERATION.

3-13. To operate the R-1051/URR, proceed as follows using figure 3-1 as a guide:

- a. Before beginning the operating procedures, proceed as follows:
 - (1) Loosen the front panel screws and slide chassis out fully on slides.
 - (2) Ensure that switch S7(AUX/NORM) is in the AUX position and that switch S9(SIMPLEX/DUPLEX) is in the SIMPLEX position.
 - (3) Release slide locks, slide chassis back into case and secure it.
- b. Set Mode Selector switch at STD BY. This switch should be set prior to operation to allow frequency standard to come up to temperature. Allow a 20-minute warm-up for general

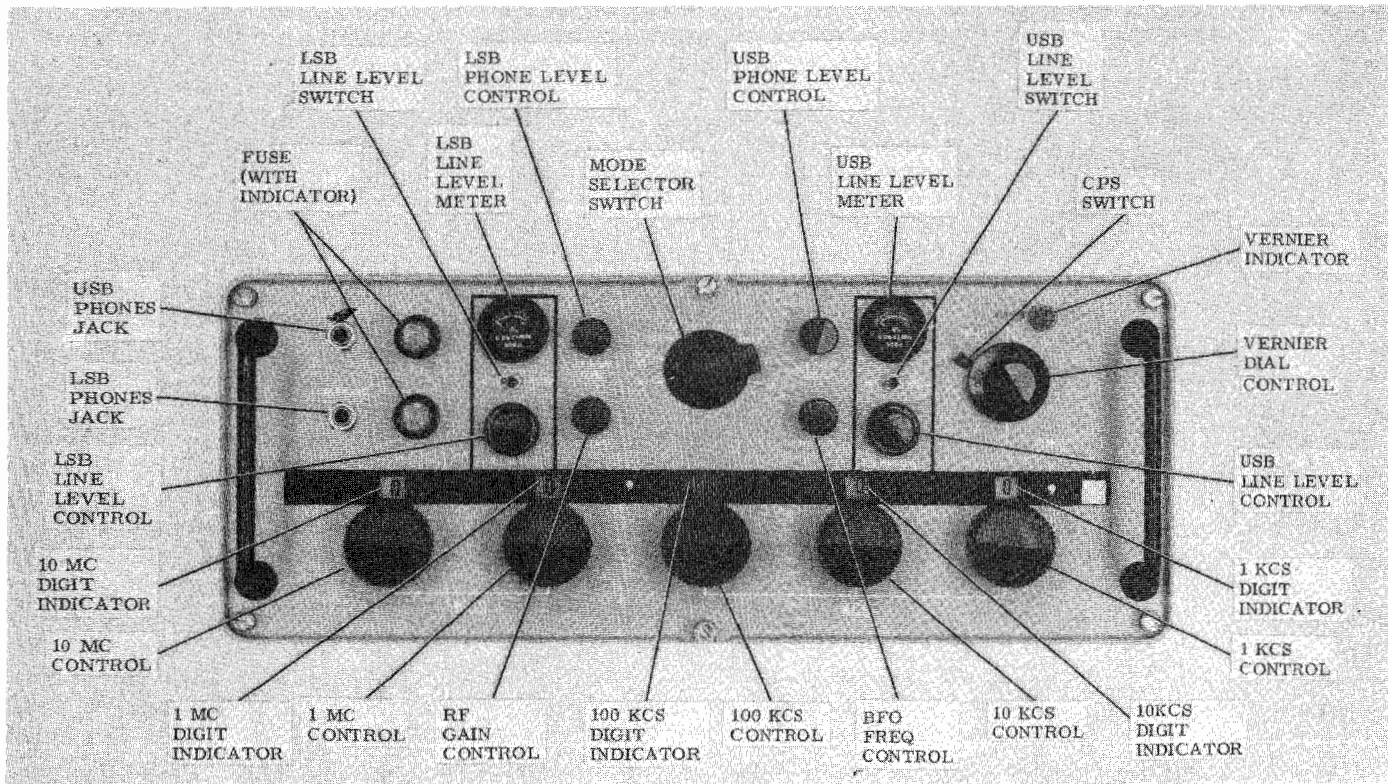


Figure 3-1. Radio Receiver R-1051/URR, Operating Controls, Indicators, and Connectors

operation and at least a 60-minute warm-up for optimum frequency stability.

c. Set Mode Selector switch at desired mode of operation.

d. Using MCS controls, KCS controls, CPS switch, and VERNIER control, select desired operating frequency. Frequency selected will be displayed in small windows above MCS and KCS controls.

e. Depending on mode of operation selected, connect headset to USB PHONES jack or LSB PHONES jack on front panel.

f. Rotate RF GAIN control fully clockwise.

g. Adjust LSB LINE LEVEL control or LSB PHONE LEVEL control for desired lower sideband headphone volume level.

h. Adjust USB LINE LEVEL control or USB PHONE LEVEL control for desired upper sideband headphone volume level.

NOTE

If installation includes remote operation, initially set remote audio line level to required value by use of USB LINE LEVEL control or LSB LINE LEVEL control. Thereafter, all local headphone volume should be adjusted with use of USB PHONE LEVEL control or LSB PHONE LEVEL control only.

i. When CW is being received, adjust BFO FREQ control to vary pitch of received signal.

j. When strength of received signal is extremely high, better reception may be achieved by varying RF GAIN control to reduce gain.

NOTE

This will desensitize the R-1051/URR. Whenever operating channels or frequencies are changed, rotate the RF GAIN control fully clockwise.

k. When receiving from a transmitter that is not tuned to exact same frequency as the R-1051/URR, use VERNIER control to tune-in received signals.

l. When FSK ancillary equipment has only a 2550-cps center frequency, a special tuning procedure is required if it is necessary to receive FSK transmissions using a 2000-cps center frequency. In this case, proceed as follows:

(1) If FSK transmissions are on LSB channel, tune the R-1051/URR 550 cps above frequency selected with MCS and KCS controls using VERNIER control.

(2) If FSK transmissions are in USB channel, set 1 kc (KCS) control down one digit from assigned frequency and use VERNIER control to tune the R-1051/URR 450 cps above new frequency.

3-14. SHUTDOWN.

3-15. During short periods of shutdown, place the Mode Selector switch at STD BY. This eliminates the need for frequency standard warm-up prior to resuming normal operation. To shut down the R-1051/URR, set the Mode Selector switch at OFF.

3-16. OPERATOR'S MAINTENANCE.

3-17. OPERATING CHECKS AND ADJUSTMENTS.

3-18. When the R-1051/URR is suspected of malfunction, perform the following checks to locate the trouble:

a. Check that MCS and KCS controls are set at proper frequency.

b. Check that primary power is applied to unit.

c. Check all fuses; if any are open, associated indicator will light. Replace any open fuses.

3-19. PREVENTIVE MAINTENANCE.

3-20. The preventive maintenance procedures that should be performed by the operator are listed in table 3-2.

3-21. EMERGENCY MAINTENANCE.

3-22. If the R-1051/URR malfunctions while a technician is not available, the operator should perform the following emergency repair procedures:

a. Try another mode of operation.

b. Perform steps a through e of paragraph 3-17.

c. Check for any damaged cables.

d. Loosen front panel screws and pull chassis out from case. Perform following checks:

(1) Check all electronic assemblies for proper seating.

(2) Check vacuum tubes to see that filaments are lighted. If tubes in RF Amplifier Electronic Assembly should be replaced, remove tube shield and pull tube out with tube puller, using steady pressure straight up. Dust cover over the electronic assembly may be removed if necessary.

TABLE 3-1. RADIO RECEIVER R-1051/URR, OPERATING CONTROLS, INDICATORS, AND CONNECTORS

CONTROL/INDICATOR/CONNECTOR	REFERENCE DESIGNATION	FUNCTION
LSB PHONES jack	J1	Used to connect headset to LSB receiver output
USB PHONES jack	J2	Used to connect headset to USB receiver output
FUSE (with indicator)	F1, DS1	Protects R-1051/URR against overload; indicator glows when fuse is open

TABLE 3-1. RADIO RECEIVER R-1051/URR, OPERATING CONTROLS, INDICATORS, AND CONNECTORS (Continued)

CONTROL/INDICATOR/ CONNECTOR	REFERENCE DESIGNATION	FUNCTION		
FUSE (with indicator)	F2, DS2	Protects R-1051/URR against overload; indicator glows when fuse is open		
LSB LINE LEVEL control	R1, R11	Used to adjust volume of remote audio for LSB and ISB (LSB) operation		
LSB LINE LEVEL switch	S1	Selects range for LSB LINE LEVEL Meter (M1)		
		<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Switch Position</td> <td style="width: 50%;">Equipment Response</td> </tr> </table>	Switch Position	Equipment Response
		Switch Position	Equipment Response	
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0DB	Reading of LSB LINE LEVEL meter (M1) is taken directly			
+20DB	20 db is added to indication of LSB LINE LEVEL meter (M1)			
LSB LINE LEVEL meter	M1	Indicates level of audio supplied to LSB remote lines		
RF GAIN control	R3	Used to control gain of rf and if. amplifiers		
LSB PHONE LEVEL control	R4	Used to adjust volume of audio applied to head-phone in LSB and ISB (LSB) operation		
Mode Selector switch	S2	Selects R-1051/URR modes of operation		
		<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Switch Position</td> <td style="width: 50%;">Equipment Response</td> </tr> </table>	Switch Position	Equipment Response
		Switch Position	Equipment Response	
		OFF	No power is applied	
		STD BY	Energizes frequency standard and tube filaments	
		LSB	R-1051/URR operates in lower sideband mode	
		FSK	R-1051/URR operates in FSK mode	
		AM	R-1051/URR operates in AM mode	
CW	R-1051/URR operates in CW mode			
USB	R-1051/URR operates in upper sideband mode			
ISB	R-1051/URR operates in independent sideband mode			

TABLE 3-1. RADIO RECEIVER R-1051/URR, OPERATING CONTROLS, INDICATORS, AND CONNECTORS (Continued)

CONTROL/INDICATOR/ CONNECTORS	REFERENCE DESIGNATION	FUNCTION		
BFO FREQ control	R6	Used to adjust pitch of audio output tone when receiving CW		
USB PHONE LEVEL control	R5	Used to adjust volume of audio applied to headset in USB, ISB (USB), FSK, CW, and AM operation		
USB LINE LEVEL control	R2, R12	Used to adjust volume of remote audio for USB, ISB (USB), FSK, CW, and AM operation		
USB LINE LEVEL switch	S5	Selects range of USB LINE LEVEL meter (M2)		
		<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Switch Position</td> <td style="width: 50%;">Equipment Response</td> </tr> </table>	Switch Position	Equipment Response
		Switch Position	Equipment Response	
		0DB	Reading of USB LINE LEVEL meter (M2) is taken directly	
+20DB	20db is added to indication of USB LINE LEVEL meter (M2)			
USB LINE LEVEL meter	M2	Indicates level of audio applied to USB remote lines		
CPS switch	S6	Increases R-1051/URR tuning capabilities		
		<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Switch Position</td> <td style="width: 50%;">Equipment Response</td> </tr> </table>	Switch Position	Equipment Response
		Switch Position	Equipment Response	
		000	R-1051/URR is tuned to frequency indicated by MCS and KCS digit indicators	
500	R-1051/URR is tuned 500 cps above frequency indicated by MCS and KCS digit indicators			
CPS switch (cont)		<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Switch Position</td> <td style="width: 50%;">Equipment Response</td> </tr> </table>	Switch Position	Equipment Response
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VERNIER	R-1051/URR may be tuned continuously (with VERNIER control) between any two 1-kc steps			
VERNIER control	R7	Used to provide continuous tuning between any two 1-kc increments		
VERNIER indicator	DS5	Indicator flashes to indicate that CPS switch is in VERNIER position		

TABLE 3-1. RADIO RECEIVER R-1051/URR, OPERATING CONTROLS,
INDICATORS, AND CONNECTORS (Continued)

CONTROL/INDICATOR/ CONNECTORS	REFERENCE DESIGNATION	FUNCTION
10 mc (MCS) control	S3	Selects 10 mc digit of desired operating frequency; digit selected will be displayed in window above control
1 mc (MCS) control	S4	Selects 1 mc digit of desired operating frequency; digit selected will be displayed in window above control
100 kc (KCS) control	S5/A2A6A2S1	Selects 100 kc digit of desired operating frequency; digit selected will be displayed in window above control
10 kc (KCS) control	A2A6A3S1	Selects 10 kc digit of desired operating frequency; digit selected will be displayed in window above control
1 kc (KCS) control	A2A6A3S2	Selects 1 kc digit of desired operating frequency; digit selected will be displayed in window above control

TABLE 3-2. RADIO RECEIVER R-1051/URR, OPERATOR'S PREVENTIVE
MAINTENANCE CHECKS

INSPECT FOR	REMEDY
Dust	Clean exterior with soft lint-free cloth, clean interior with brush, cloth, and compressed air
Nicks, burrs, dents, scratches, or rust spots	Smooth burrs with file, sandpaper corrosion, rust, or scratches, and re-finish
Loose handles, mounting screws, or other hardware	Tighten loose hardware
Chain-drive tension or binding	Oil lightly