

STUDENT HANDOUT

OPERATION OF TACTICAL AIRBORNE RADIOS

F 5-561-2

69-561-2



FEBRUARY 1969

UNITED STATES ARMY AVIATION SCHOOL
FORT RUCKER, ALABAMA/FORT STEWART, GEORGIA

DEPARTMENT OF TACTICS
UNITED STATES ARMY AVIATION SCHOOL
Fort Rucker, Alabama/Fort Stewart, Georgia

February 1969
File No. 5-561-2
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PERFORMANCE OBJECTIVES

OPERATION OF TACTICAL AIRBORNE RADIOS

1. KNOWLEDGES: Without the aid of notes or reference material, and with no errors, the student will be able to list in writing—

(Period one of two periods)

- a. The purpose, operation, and type modulation of the following:
 - (1) AN/ARC-44 radio.
 - (2) AN/ARC-54 radio.
 - (3) AN/ARC-131 radio.
- b. The purpose of having two signal distribution panels installed in certain Army aircraft.
- c. Match the squelch setting with its proper description from a given list.
- d. The positions of the mode and squelch control for retransmit operation with the AN/ARC-54 and AN/ARC-131.

(Period two of two periods)

- e. The purpose of the homing equipment used with—
 - (1) The AN/ARC-44.
 - (2) The AN/ARC-54.
 - (3) The AN/ARC-131.
- f. The procedures followed in homing with the—
 - (1) AN/ARC-44.
 - (2) AN/ARC-54.
 - (3) AN/ARC-131.

2. SKILLS: With the use of the AN/ARC-44, AN/ARC-54, and AN/ARC-131 (when available) mockups and a set of written instructions, correctly operate the radios and complete the problems outlined on the worksheet.

NOTES

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ADVANCE SHEET

OPERATION OF TACTICAL AIRBORNE RADIOS

1. PURPOSE: This 2 hours of instruction is designed to provide the student with a general knowledge of the description, utilization, and operation of the AN/ARC-44, AN/ARC-54, AN/ARC-131, and AN/ARA-31 homing antenna group.
2. GENERAL: During the first hour, the AN/ARC-44, AN/ARC-54, and AN/ARC-131 radio sets will be discussed. Be prepared to actively participate in this conference by answering questions in class covering the material in your study assignment. The second hour you will be required to operate the AN/ARC-44 with sample communication problems during a Practical Exercise and will receive a homing demonstration using the AN/ARC-44 radio and the associated antenna.
3. STUDY ASSIGNMENTS:
 - a. Study: Section V, chart 3, "Communications Reference Handbook for Army Aviators."
 - b. Read: Paragraphs 42 and 43, "Communications Reference Handbook for Army Aviators."
 - c. Scan: Chapter 1 and chapter 2, paragraphs 16 through 34.
4. SPECIAL INSTRUCTIONS: Bring to class the Advance Sheet, Student Outline, "Communications Reference Handbook for Army Aviators," Performance Objectives, and Performance Check.

NOTES

Purpose
Operation
Modulation

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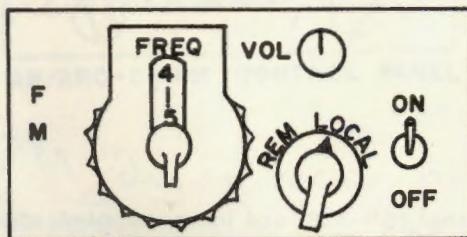
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STUDENT OUTLINE

OPERATION OF TACTICAL AIRBORNE RADIOS

1. AN/ARC-44 airborne tactical command communications radio set ("Communications Reference Handbook for Army Aviators," page 55).

old



AN/ARC-44 FM CONTROL PANEL

a. Description.

FM two way voice airborne radio set aerial bombing capabilities

b. Purpose. Provides tactical command air to air and air to ground comm

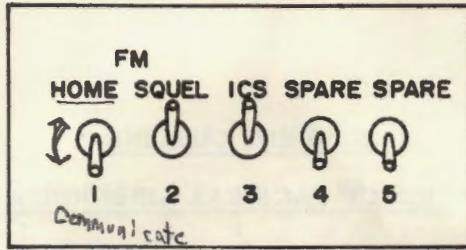
c. Characteristics FM - Frequency Modulated, noise free operation

280 channels 24.0 - 51.9

d. Operating instructions. Range 50 miles line of sight
Remote loc - takes control of set

2. Switch assembly, SA-474/AR ("Communications Reference Handbook for Army Aviators," page 43).

*Quiet radio
Squelch eliminates noise when set to not selected*

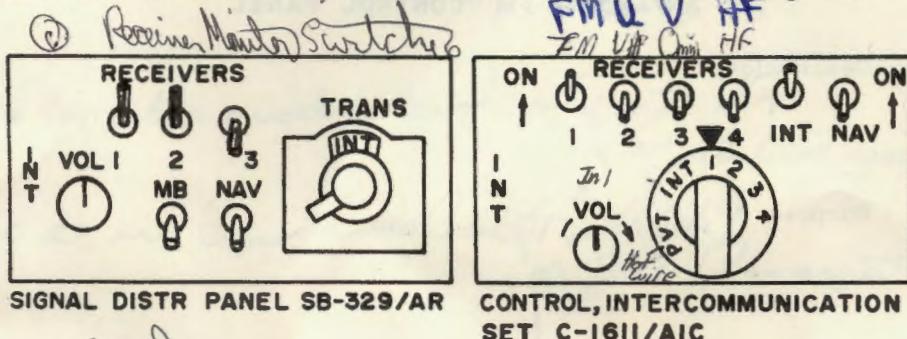


AN/ARC-44 SWITCH PANEL ASSY.

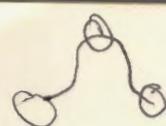
a. Purpose. *Timing & squelch circuitry for AN/ARC 44*

b. Operation.

3. Signal distribution panel (SB-329) and intercommunications control set (C-1611) ("Communications Reference Handbook for Army Aviators," page 43).



*(1) Receiver Master Switches
(2) Control, Intercommunication Set C-1611/AIC*



Retransmission - radio relay

b. Operation.

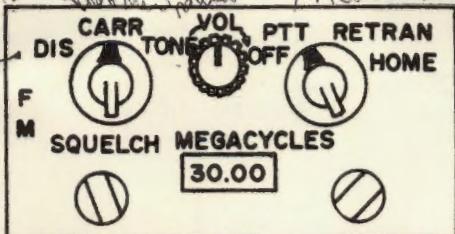
- ① Minimum 5 MC separation
- ② Both mode selectors set to retransmit carrier level
- ③ Both squelch turned on
- ④ Pilot must monitor

5 requirements ① 2 AN/ARC-54 radios

4. AN/ARC-54 airborne tactical command communications set ("Communications Reference Handbook for Army Aviators," page 60).

more noise and
better reception

more noise and
better reception



AN/ARC-54 FM CONTROL PANEL

only signals that
accompany the carrier
wave

a. Description. FM 2-way voice airborne radio set with visual homing and retransmission capabilities

b. Purpose. Used to provide tactical command
air to air & air
to ground voice transmission
and automatic!

6 Characteristics. FM noise free

30.00 - 69.95 MHz
800 channels

Planning long line of
sight.

d. Operating instructions.

e. Retransmit operations.

- (1)
- (2)
- (3)
- (4)
- (5)

f. FM homing.

- (1) Antennas. ARC 54
[travel marks] 10453 indic
[travel marks] to directional
- (2) Instruments. Home to any FM in your freq. range.

station passing indicated by opposite turn signal

8

+

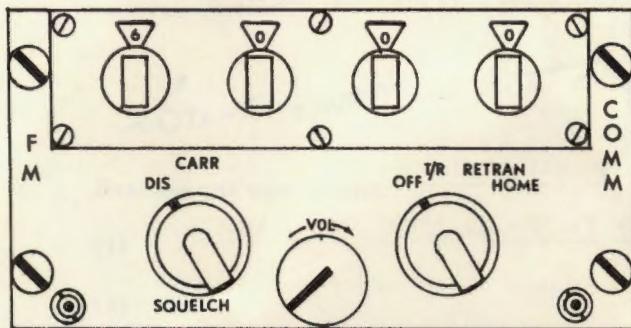
(3) Visual homing procedures (AN/ARC-54).

Visual homing
capability to talk in home mode

5. Aural homing procedures (AN/ARC-44).

— . . turn left
. . — turn right

6. AN/ARC-131 airborne tactical command communications set ("Communications Reference Handbook for Army Aviators," page 62).



AN/ARC-131 CONTROL PANEL

a. Description. Same as 54

b. Purpose. FM.

30 - 75.95

920 channel,
line of sight range

c. Characteristics.

Five differences

① everything else is
exactly same

② PTT is T/R

③ 4 selected

④ freq range 75.95

⑤ 920 channel

⑥ 3 megacycles difference
between transmission

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PERFORMANCE CHECK

OPERATION OF TACTICAL AIRBORNE RADIOS

1. List the purpose and type modulation of the following radios:
 - a. AN/ARC-44. The old original FM aviation radio
FM two way voice airborne
Aural homing capabilities
 - b. AN/ARC-54. New FM two way voice with visual homing
and retransmission capability
 - c. AN/ARC-131. Same as ARC 54
2. List the purpose for having two signal distribution panels installed in certain aircraft.
3. Match the squelch setting with its proper description.

a. <u> </u> DIS	(1) Squelch opens only on selected signals.
b. <u> </u> CARR	(2) Squelch circuits operate normally.
c. <u> </u> TONE	(3) Squelch circuits are turned off.

4. List the position of the mode and squelch control for retransmit operation with the AN/ARC-54 and AN/ARC-131.

a.

b.

5. List the purpose of the following homing antenna groups:

a. AN/ARA-31 homing antenna group is used with the AN/ARC-44 and provides the pilot with _____ signals.

b. The "towel rack" and omni indicator or equivalent is used with the AN/ARC-54 and AN/ARC-131 radios which provide the pilot with _____ signals.

6. List the procedures followed in homing with the—

a. AN/ARC-44 (aural).

b. AN/ARC-54 (visual).

c. AN/ARC-131 (visual).

7. List the method of determining station passage with the following:

a. AN/ARA-31 homing antenna group.

b. "Towel rack" antenna and omni indicator.

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SOLUTION TO PERFORMANCE CHECK

OPERATION OF TACTICAL AIRBORNE RADIOS

1. List the type of modulation and purpose of the following radios:
 - a. AN/ARC-44. A frequency modulated radio, used to provide tactical command air-to-ground and air-to-air voice communications and FM homing.
 - b. AN/ARC-54. A frequency modulated radio, used to provide tactical command air-to-ground and air-to-air voice communications, airborne retransmission, and FM homing. Note. Replaces the AN/ARC-44.
 - c. AN/ARC-131. Same as AN/ARC-54. Note. Replaces the AN/ARC-54.

2. List the purpose for having two signal distribution panels installed in certain aircraft.

The primary purpose of the signal distribution panel is to provide the pilot and copilot with a means of operating two different radios simultaneously. Therefore, they allow the pilot and copilot to use the avionics facilities of the aircraft at their discretion.

3. Match the squelch setting with its proper description.

a. <u>(3)</u> DIS	(1) Squelch opens only on selected signals.
b. <u>(2)</u> CARR	(2) Squelch circuits operate normally.
c. <u>(1)</u> TONE	(3) Squelch circuits are turned off.

4. List the position of the mode and squelch control for retransmit operations with the AN/ARC-54 and AN/ARC-131 radios.

- a. Mode control - RETRAN.
- b. Squelch control - either CARR or TONE. Note. Do not place either set in the DIS position.

5. List the purpose of the following homing antenna groups:

- a. AN/ARA-31 homing antenna group. Provides the pilot with audio signals which will allow him to home on any keyed signal transmitted within the frequency range of 24.0 to 49.0 mc.

b. "Towel rack" and omni indicator. Provides the pilot with visual signals which allow him to home on any keyed signal transmitted within the frequency range of 30.00 to 69.95 mc (AN/ARC-54) or 30.00 to 75.95 mc (AN/ARC-131).

6. List the procedures followed in homing with the—

a. AN/ARC-44 (aural).

- (1) Identify the ground station to which you wish to home.
- (2) Place the FM COMM-HOME switch in the HOME position.
- (3) Orientation.
 - (a) Receive U (- - -), turn right.
 - (b) Receive D (- . .), turn left.
 - (c) Solid on-course (heading directly to or directly away from the station)—solve for ambiguity by turning off-course left or right, receive a D or U and turn to the station.

b. AN/ARC-54 (visual).

- (1) Identify the ground station.
- (2) Set the mode control to HOME.
- (3) Squelch control to CARR or TONE.
- (4) Observe the homing indicator.
 - (a) Flags lowered - sufficient signal strength.
 - (b) Vertical indicator - right or left indicated direction of turn.
 - (c) Horizontal indicator - relative strength of the signal which may give an indication of station passage.

c. AN/ARC-131 (visual). Same as AN/ARC-54.

7. List the method of determining station passage with the following:

a. AN/ARA-31 homing antenna group.

- (1) As you approach the station, make small turns off-course in the SAME direction at 1- or 2-minute intervals.
- (2) Station passage will be indicated by the reversal of the D and U signals.

b. "Towel rack" and omni indicator. Use the same procedure as the AN/ARA-31 (ARC-44) homing system described above, except that a reversal of the visual indicator will take place.