

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

EQUIPMENT SERVICE ABILITY CRITERIA

FOR

ELECTRONIC EQUIPMENT CONFIGURATIONS IN ARMY MODELS

CH-54A AND CH-54B HELICOPTERS

Headquarters, Department of the Army, Washington, D.C., 13 July 1972

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Section I. INSTRUCTIONS

1. Purpose. This manual furnishes the user with a procedure for evaluating the readiness condition of the equipment to perform satisfactorily its primary mission for 90 days with normal maintenance support.

NOTE

Application of this procedure, however, does not eliminate or reduce the requirement for prescribed maintenance service on the equipment, and does not authorize replacement of components.

2. Definitions. a. Equipment Category **GREEN.** Equipment free of conditions that would reduce its capability for reliable performance of its primary mission for a period of 90 days.

h. Equipment **Category AMBER.** Operationally ready equipment with limitations which may curtail a reliable performance of its primary mission for a period of 90 days.

c. Equipment Category **RED**. Equipment unable to perform its primary mission immediately or possessing an unacceptable reliability level for 90 days sustained performance of its primary mission.

d. Color Rating Rating of equipment accessories, components, etc., in accordance with a, b, and c above.

c. *Multiple-aspect equipment*. Equipment of one logistic manager which contains subsystems, end items, or components of another logistics manager.

3. General Instructions. a. This technical manual will be filed in the equipment log binder.

b. This evaluation actually will be performed on the item being rated by the operator/crew.

c.. Authorized subsystems and components of multiple-aspect equipment requiring evaluation but which are **not available** at the organization shall **be** given the lowest color rating authorized for that item.

d. Equipment covered in this manual which requires serviceability checks but which is not authorized to the, evaluating organization shall not be rated.

e. This equipment is rated on the basis of capability for immediate operation and amount of wear life remaining on limited life components. The rating is not meaningful unless each check is made with the utmost care and accuracy.

f.. Record the evaluation results on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) using a separate sheet for each multiple--aspect item of equipment, subsystem or component, including those evaluated by separately published ESC

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technical manuals. The blocks will be completed in accordance with TM38-750.

g. If an URGENT modification work order has not been applied to any authorized equipment, the equipment and the system will be rated "**RED.**"

h. Subsystems and components will be separately color rated.

i. A color rating will be assigned for the overall system.

4. Special Instructions. The electronic configuration in aircraft **may** vary, depending on the year of manufacture, production run, geographical area of operation, etc. The equipments that may be installed in the various configurations are listed below. Refer to the master log of the aircraft to be tested to determine which equipments should be installed in the particular aircraft. For the purpose of ESC evaluations, **equipments** listed in the master log shall be considered as authorized for the particular aircraft. Equipments listed below, but not in the master log of the aircraft, shall be considered as unauthorized.

a. Control, Intercommunication Set Set **C-1611 (*)** /AIC (item 2).

b. Radio Set AN/ARC-(*), vhf communication (item 3).

c. Radio Set AK/ARC-54, fm communication (item 4).

d. Radio Set AN/ARC-51 and Antenna AS-1922, fm homing (item 5).

e. Radio Set AN/ARC-131, fm communication and homing (item 6).

f. Radio Set AN/ARC-51BX, uhf communication (item 7).

g. Radio Set AN/ARC-134, vhf communication (item 8).

- h. Direction Finder Set AN/ARN-83 (item 9).
- i. Transponder Set AN/APX-72 or Transponder Set AN/APX-44 transponder (item 10).
- j. Receiving Set, Radio AN/ARN-82, omnifunction (item 11).
- k. Radio Set AN/ARC-102, hf communication (item 12).
- l. Gyromagnetic Compass AN/ASN-43 (item 13).
- tn. Transmitter, Radio T-366A/ARC, vhf emergency communication (item 14).
- n. Radio Set AN/ARC-54 or Radio Set AN/ARC-131 and Communications Security Set TSEC/KY-28 (item 15).

NOTE

Automatic Flight Control System (AFCS) for CH-54B, blight Control Set AN/ASW-29, and Voice Warning System should be checked during aircraft systems checkout and are covered in TM 55-1520-217-ESC.

5. Reporting of Errors. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded directly to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-MA-AN, Fort Monmouth, N. J. 07703.

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Section II. EVALUATION REQUIREMENTS AND PROCEDURES

6. Evaluation Requirements. a. Aircraft Placement. Have the aircraft placed in a location that is clear of obstructions such as large buildings, hangers, power-hues, and other aircraft.

b. Power Application.

CAUTION

To prevent damage to the equipment, the aircraft's master power (battery) switch must be in the OFF position at all times when an auxiliary power unit is connected to the aircraft.

(1) *Auxiliary power.* For those tests not requiring flight of the aircraft, items 2 through 4 and 7 through 9 use aircraft auxiliary power unit.

(2) *Aircraft power.* Tests given in items 5, 6, 10 and 13 require the use of aircraft power and aircraft flight controls. For those criteria items that require the use of aircraft flight controls or aircraft power, qualified personnel must be used to operate the aircraft and to perform the ESC checks. (Refer to Organizational Maintenance Manuals, Electronic Equipment Configuration, Army Model CH-54A Helicopter (TM11-1520-217-20), Electronic Equipment Configuration, Army Model CH-54B Helicopter (TM 11-1520-217-20-2) ; DS, GS, and Depot Maintenance Manuals, Electronics Equipment Configuration, Army

Model CH-54A Helicopter (TM11-152G-217-35)) Electronic Equipment Configuration, Army Model CH-54B Helicopter (TM11-1520-217-35-2); Operator's Manual: Army Mo CH-54A Helicopter (TX 55-1520-217-10), Operator's Manual. Army Model CH-54B Helicopter (TM 55-1520-217-10/2) ; and Operator's and Crewmember's Manuals: Army Model CH-54A Helicopter, Pilot's Checklist (TM 55-1520-217-CL), Army Model CH-54B Helicopter, Pilot's Checklist (TM 55-1520-217-CL/2).

c. Controls. Before beginning the tests, set the electronic equipment controls to their normal OFF positions. Set **the** aircraft alternating current (**ac**) and direct current (dc) circuit breakers so that power is available to operate the electronic equipment. Perform the tests from each position in turn to insure a complete check of the electronic facilities.

CAUTION

Avionics equipments require a 3 minute warmup prior to operation, except the uhf radio set which requires a 5 minute warmup period.

7. Evaluation Procedures. a. Information to Be Determined By Inspection and Operation. Evaluate each item listed and record the proper color rating on DA Form 2404 as described in Section I.

ITEM 1. MWO's.

Determine whether URGENT MWO's have been applied.

Condition

URGENT MWO's not applied.

Rating

RED

ITEM 2. Control Intercommunications Set C-1611 (*)/AIC.

Note. The following serviceability test applies only to the interphone function of the C-1611 (*)/AIC. Other functions of the C-1611(*)/AIC, with communication and navigation equipment interconnected, are tested in other items.

Turn on pilot's, copilot's, aft pilot's and two crewmember's C-1611 (*)/AIC sets for interphone operation. Operate *pilot's microphone* switch for interphone and speak into microphone. Repeat from copilot's, aft pilot's and crewmember's positions.

Condition	Adequate sidetone heard in headsets : undistorted audio heard at a comfortable level in the pilot's, copilot's, aft pilot's and two crewmember's headsets.	Audio heard in pilot's, copilot's, and aft pilot's headset ; other positions inoperative.	Audio not heard in pilot's, copilot's or aft pilot's headsets.
Rating	GREEN	AMBER	RED

ITEM 3. Radio Set AN/ARC-73(*), Vhf Communications.

Note. Do not transmit on emergency vhf of 121.5 megahertz.

Set the pilot's, copilot's, and aft pilot's C-1611 (*) /AIC for vhf communication. Set the vhf control unit to the frequency of the local vhf station and establish two-way communications each in turn from the pilot's, copilot's, and aft pilot's positions. During operation, tune to an unused channel and operate the squelch.

Condition	Received and transmitted signals heard in pilot's, copilot's, and aft pilot's headsets and strength and readability of signals are adequate to maintain two way communications at each position (pilot's copilot's, and aft pilot's). Squelch operative. Side tone heard in headsets.	No sidetone heard. Reliable two way communications possible from one position only (pilot's or copilot's). Squelch inoperative,	No reliable two way communication possible from any position.
Rating	GREEN	AMBER	RED

ITEM 4. Radio Set AN/ARC-54, Fm Communications.

Note. Establish two-way communication with a tactical fm station located not less than 1 mile from the aircraft.

Set the pilot's, copilot's and aft pilot's C-1611 (*) /AIC for fm communication. On the **C-3835/ARC-54**, select the frequency of a local tactical fm station and set the mode control to PTT. Establish two-way communication each in turn from the pilot's, copilot's, and aft pilot's positions. After communication check, set the C-3835/ARC-54 to an unused channel and check squelch disabling.

Condition	Strength and readability of signals are adequate to maintain reliable communications from each position (pilot's, copilot's, and aft pilot's). Squelch disabling operative ; sidetone heard.	Reliable communications possible from one position only (pilot's or copilot's). No sidetone heard. Squelch disabling inoperative.	No reliable two-way communication possible from any position.
Rating	GREEN	AMBER	RED

ITEM 5. Radio Set AN/ARC-54 and Antenna AS-1922, Fm Homing.

Note. To perform this test the aircraft must be in flight. Move the aircraft through a **180°** arc while performing the tests.

Set the pilot's and copilot's C-1611 (*) /ATC for fm communication. Set the mode control of the C-3835/ARC-54 to PTT. Establish two-way communication with a local tactical fm station. Request the local tactical fm station to transmit a carrier signal for at least 30 seconds. After the request has been made, switch the mode control switch on the C-3835 ARC-54 from PTT to HOME. Set the SQUELCH control to CARRIER. Observe the homing indicator. The red flag will drop completely out of sight. The vertical needle on the indicator will swing to the left, right, or remain centered. A left needle swing will indicate that the fm station is to the left; a right needle swing will indicate the fm station is to the right; and a needle center condition will indicate the fm station is directly in front of, or directly in back of the aircraft. Rotate the aircraft while observing the meter indication for the three conditions. After the test is completed, return the mode control switch to PTT.

Condition	Vertical pointer flag completely disappears. Vertical pointer swings left, right, or centers.	Vertical pointer flag does not completely disappear. Vertical pointer does not swing left, right., and will not remain centered.
Rating	GREEN	RED

ITEM 6. Radio Set AN/ARC-131. Fm Communication and Homing.

Note. The tests of this equipment are performed in flight. Move the aircraft through a 180° arc while performing the tests. Homing capability is not available to the aft pilot.

Set the pilot's, copilot's and aft pilot's C-1611 (*)/AIC for fm communication. Turn the AN ARC-131 on and set to a frequency of a local tactical fm station. Establish two-way communications each in turn from the pilot's, copilot's and aft pilot's positions. After communication check, tune to an unused frequency and check squelch disabling. Request the local tactical fm station to transmit a carrier signal for at least 30 seconds. After the request has been made, set the mode control switch to HOME on the C-7088 ARC-131. Observe the homing indicator. The vertical flag should disappear and the vertical pointer should deflect right, left, or remain centered.

	Strength and readability of signals are adequate to maintain reliable communications from the three positions (pilot's, copilot's, and aft pilot's). Squelch disabling operative; sidetone heard. Vertical pointer flag completely disappears. Vertical pointer deflects right, left, or centers.	Reliable communications possible from pilot's position only. No sidetone heard. Squelch disabling inoperative.	So reliable two-way communication possible from any position. Vertical pointer flag does not completely disappear. Vertical pointer does not swing left, right, and will not remain centered.
Condition			
Rating	GREEN	AMBER	RED

ITEM 7. Radio Set AN/ARC-51BX Uhf Communication.

Note. This radio set operates within line-of-sight characteristics. Man-made or natural obstructions between the aircraft and communication stations may prevent reliable testing. Establish communications with a station located no less than 1 mile from the aircraft. Do not transmit on emergency uhf of 243.0 megahertz.

Set the pilot's, copilot's, and aft pilot's C-1611 (*)/AIC for uhf communication. Turn II Control C-6287 ARC-51BX to TR and Guard position. Set to frequency of local uhf station. Establish two-way communications each in turn from pilot's, copilot's, and aft pilot's positions. After communication check, turn to an unused frequency and check squelch disabling.

Strength and readability of signals are adequate

Condition	to maintain reliable communications from all positions (pilot's, copilot's, and aft pilot's). Squelch disabling operative ; sidetone heard.	Reliable communications possible from pilot's position only. No sidetone heard. Squelch disabling inoperative.	No reliable t-x-way communication possible from any position.
Rating	GREEN	AMBER	RED

ITEM 8. Radio Set AN/ARC-134, Vhf Communication.

Set the pilot's, copilot's, and aft pilot's C-1611 (*) /AIC for vhf communication. Set the C-7197/ARC-134 vhf control unit to the frequency of the local vhf station and establish two-way communications each in turn from the pilot's, copilot's, and aft pilot's positions. During operation, tune to an unused channel and operate the squelch.

Condition	Received and transmitted signals heard in pilot's, copilot's, and aft pilot's headsets and strength and readability of signals are adequate to maintain two-way communications at each position (pilot's, copilot's, and aft pilot's). Squelch operative ; sidetone heard in headsets.	Reliable communications possible from pilot's position only. No sidetone heard. Squelch disabling inoperative.	No sidetone heard. No reliable two-way communication possible from any position (pilot's, copilot's, or aft pilot's).
Rating	GREEN	AMBER	RED

ITEM 9. Direction Finder Set AN/ARN-83.

Note. Tests performed at night or using radio stations too distant may give erroneous results. Apply power to the AN/ARN-83. Set pilot's or copilot's C- 1611(*)/AIC for NAV signal reception. Set C-6899/ARN radio set control panel for antenna (ANT) mode of operation. With the station tuned in properly, set the C-6899/ARN for ADF mode of operation. After the needle on the direction finding indicator stabilizes, operate the LOOP switch momentarily to the right and then left while observing the direction finding indicator. Set the C-6899/ARN for LOOP mode of operation. Turn the BFO switch on. Using LOOP switch, move bearing indicator pointer to either side of the station bearing. Tune in a station, identify, and perform tests on each of the three bands.

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h ANT mode of operation, maximum indication on tuning meter occurs when radio set is properly tuned to the same frequency as the station. Undistorted station signal of adequate volume is heard in headset. In ADF mode, bearing indicator gives correct relative bearing to the station. Operation of LOOP switch moves the needle to the left and right of the relative bearing. Needle returns to relative bearing when LOOP switch is released. In LOOP mode of operation, and when BFO turned on, a beat note is heard.

Bearing indicator operates correctly in ADF mode in one band only. Bearing indicator operates correctly on all three bands in LOOP mode only.

Bearing indicator inoperative in ADF mode. Reliable adf station signals heard at one position only (pilot's or copilot's).

No reliable adf station signals heard at either position (pilot's or copilot's).

Condition

Rating

GREEN

AMBER

RED

ITEM 10. Transponder Set AN/APX-72 or Transponder Set AN/APX-44, Iff Transponder.

Note. To perform this test, the aircraft must be in flight.

Established communication with a local ground station equipped with an iff radar interrogator system. Request that the ground station operator interrogate in each mode and observe the replies. Include mode 4 tests if Computer KIT-1A/TSEC is installed. Include mode C tests if the altitude transducer is installed.

Proper replies received by ground station operator for all operational modes.

Proper reply not received by ground station operator in one or more operational modes.

Condition

Rating

GREEN

RED

ITEM 11. Receiving Set, Radio AN/ARN-82, Omnifunction.

Apply power to the AN/ARN-82. Set pilot's or copilot's C-1611 (*)/AIC for NAV signal reception. Set the control unit power switch to PWR. Consult Airman's (Guide or Aeronautical Chart for local vor station. Tune receiving set to frequency of local vor station of known bearing. Turn the omnibearing selector (OBS) knob until vertical pointer is centered and the to/from indicator reads TO. Listen for coded station identification of vor station. Rotate the OBS knob to reciprocal heading (180° from previous heading). Determine bearing of aircraft, using magnetic compass.

	Bearing of vor station corresponds to position of aircraft within +2°. Flag alarm for vertical pointer is completely out of sight. To from indicator reads TO. Undistorted station signal of adequate volume heard in pilot's or copilot's headset. To/from indicator reads FR and vertical pointer centers when OBS knob is rotated to reciprocal heading.	Bearing of vor station does not correspond to position of aircraft. Flag alarm remains visible. To/from indicator reads incorrectly. No signal heard in headset.
Condition		
Rating	GREEN	AMBER

ITEM 12. Radio Set AN/ARC-102, Hf Communications.

Set pilot's, co-pilot's, and aft pilot's C-1611 (*) /AIC for hf operation. **On** hf control panel, apply power to set and select an **OP**-erating channel. Establish two-way communication with a local hf station from pilot's, copilot's, and aft pilot's positions, using upper sideband (usb), lower sideband (lsb), and amplitude modulation (am).

	Strength and readability of signals are adequate to maintain reliable communications from the pilot's, copilot's, and	Two-way communication possible from one position for usb, lsb, or	No reliable two-way
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Condition	aft pilot's positions for sidebands and am.	am. only. No sidetone heard.	communication possible from any position.
Rating	G R E E N	AMBER	RED

ITEM 13. Gyromatic Compass AN/ASN-43.

Place aircraft on a compass rose to obtain known heading. Set MAG-DG switch to MAG.

Condition	Magnetic heading indication agrees with known heading.	Magnetic heading indication does not agree with known heading.
Rating	GREEN	AMBER

ITEM 14. Transmitter, Radio T-366/ARC, Vhf Emergency Communications.

Vote. The AN/ARN-82 is used for emergency vhf reception. Do not transmit on emergency vhf of 121.5 megahertz. This radio transmitter operates within line-of-sight characteristics. The power output of the transmitter is low. Man-made or natural obstructions between the aircraft and communicating stations may prevent reliable testing. Establish communications with a station located not less than 1 mile from the aircraft.

Set the pilot's, copilot's, and aft pilot's C-1611 (*)/AIC for emergency vhf communications. **Turn** on the AN/ARN-82 and tune to frequency of local vhf station. Select the same frequency for the T-366/ARC transmitter. Establish two-way communication each in turn from the pilot's, copilot's, and aft pilot's positions.

Condition	Strength and readability of signals are adequate to maintain reliable communications from pilot's, copilot's, and aft pilot's positions. Sidetone heard.	No reliable communications from any position. No sidetone heard.
Rating	GREEN	AMBER

ITEM 15. Radio Set AN/ARC-54 or Radio Set AN/ARC-131 and Communications Security Set TSEC/KY-28.

Note. A tactical fm station equipped with a compatible security encoder and located not less than 1 mile from the aircraft is required.

Set the C-8157/KY-28 to operate in the plain language mode. Set the pilot's, copilot's and aft pilot's C-1611 (*) AIC for fm com-

munication. Establish two-way communication in the plain language mode from the pilot's, copilot's, and aft pilot's positions, in turn. Set the C-8157/KY-28 to operate in turn. Set the C-8157/KY-28 to operate in the secure mode. Establish two-way communication in the secure mode.

	Strength and readability of signals are adequate to maintain reliable communications in plain language and secure modes from each position (pilot's, copilot's and aft pilot's).	Secure communications not possible.	No reliable two-way communication possible from any position in either mode.
Condition			
Rating	GREEN	AMBER	RED

Rating for Army Model CH-54A and CH-54B Helicopters. The color rating will be the lowest rating recorded above.

By Order of the Secretary of the Army:

Official :
 VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General

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General, United States Army,
Acting Chief of Staff

Distribution :

To be distributed in accordance with A Form 12-31, Organizational Maintenance requirements for CH-54A and CH-54B aircrafts.

END

10-20-82

DATE

