

DATE: 3/21/69



ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION

SUBJECT: SPECIFICATION FOR L-854 RADIO CONTROLS

-
1. **PURPOSE.** This circular describes the subject specification requirements and is published by the Federal Aviation Administration (FAA) for guidance to the public.
 2. **REFERENCES.** The following advisory circulars, which are in effect on the date of application for qualification (Paragraph 8), may be obtained from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.
 - a. AC 90-33, VFR Communications for General Aviation.
 - b. AC 150/5340-14A, Economy Approach Lighting Aids.
 - c. AC 150/5345-1B, Approved Airport Lighting Equipment.
 - d. AC 150/5345-24, Specification for L-849 Condenser Discharge Type Flashing Light.
 - e. AC 150/5345-25, Specification for L-848 Medium Intensity Approach Light Bar Assembly.
 - f. AC 150/5345-28, Specification for L-851 Abbreviated Visual Approach Slope Indicator.
 3. **SCOPE OF PUBLICATION.** The specification requirements presented are for a fixed tuned, crystal controlled, very high frequency (VHF) receiver to be used with the necessary accessories (Paragraph 6), which in turn operate control components of the economy approach lighting aids systems.
 4. **MATERIAL AND WORKMANSHIP.** Use components and materials of industrial quality or better. The workmanship must be in accordance with high-grade commercial practice.
-

3/21/69

5. PERFORMANCE REQUIREMENTS.

- a. Environmental. Design and construct the receiver to operate indoors. Provide a weatherproof cabinet and components to permit outdoor operation of the equipment at any ambient temperature, from a minimum of -40 degrees Fahrenheit to a maximum of 140 degrees Fahrenheit at sea level.
- b. Operational.
 - (1) Design the VHF receiver to operate in conjunction with Decoder Equipment, a relay and a contactor, which in turn are used to control the airport lighting systems in AC 150/5340-14A. The contactor is not a part of this specification. The signal used to activate the receiver is transmitted from a 1/4-watt(minimum) transmitter in an aircraft at a maximum altitude of 2,000 feet and a maximum distance of 10 miles.
 - (2) Make the operation of the receiver dependent on receiving five pulses within five seconds. The pulses of radio frequency (RF) energy are produced by pressing and releasing the microphone button of the aircraft's VHF transmitter. The decoder equipment used in conjunction with the receiver accepts only this code. The decoder permits a relay to operate the external contactor that controls the airport lighting circuits. See AC 150/5340-14A for typical system wiring diagrams.

6. DETAILED REQUIREMENTS.

- a. Receiver. Design and construct the receiver to meet the applicable Federal Communications Commission (FCC) requirements.
- b. Frequencies.
 - (1) Design and construct the receiver to operate a relay [Paragraph 6d(2)(a) and (b)], which in turn operates a contactor that controls the airport lights. Make the operating VHF frequencies for control of the lights as specified by the FCC rules and regulations. This includes 122.8 MHz as a standard frequency. See AC 90-33 for details concerning VFR communications. Make the receiver insensitive to normal air traffic control communications on the assigned or adjacent frequencies.
 - (2) Sensitivity. Design and construct the receiver to have a signal plus noise over noise $\frac{(s + n)}{n}$ ratio of five microvolts.

- (3) Selectivity. Make the bandwidth at the six decibel (db) attenuation not less than ± 15 KHz from center frequency. Make the bandwidth at 80db attenuation not more than 100 KHz.
- (4) Spacing. Make the channel spacing 50 KHz.
- (5) Impedance. Make the input circuit impedance 50 ohms.
- (6) Power Supply. Design the power supply to operate from 120 volts $\pm 5\%$, 60 Hz. Provide adequate capacity and proper rating to permit proper operation under conditions described in Paragraph 5. Provide a manual switch for on-off operation of the power supply.
- (7) Audio. Make provision for the connection of an audio output for listening to the character of the received signal. The external audio circuit (not included in this specification) shall have suitable components and characteristics.
- (8) Relay. Provide an integral plug in relay as specified in Paragraph 6d(2)(a) and (b).

c. Antenna. Provide a high grade, vertically polarized, commercial antenna to permit proper operation of the receiver under the conditions specified in Paragraph 5b. Furnish 100 feet of coaxial transmission line. Make both of these items suitable for outside installation under the conditions specified in Paragraph 5a. Make the antenna, coupled with its feed line, present minimum loss of receiver signal at the receiver's input terminals. If required, provide a method in the antenna circuit to discharge excess static electricity due to the buildup during storms.

d. Activation, Signal, and Decoder.

- (1) Activation and Signal. Make the activation signal a series of five pulses of RF energy within five seconds. Pressing and releasing the microphone button of the aircraft's VHF transmitter produces these pulses. Make the RF pulse duration and space between pulses $1/4$ to $1/2$ second. Provide a manual push to test switch.

- (2) Decoder. The decoder in the receiver circuit accepts only the code referred to in the preceding Paragraph (1). The decoder permits a timing circuit and relay combination to close the two normally opened contacts of the relay for a period of 15 minutes. The relay contacts close within one second after the last pulse is received. Provide a reset to permit the receiver to be reactivated prior to the expiration of the 15 minutes. Reactivating the receiver during any part of the timing cycle restores a total time of 15 minutes. Provide a pilot lamp on the receiver to glow during the time that the receiver is activated.
- (a) Relay Coil Rating. Select a relay with a coil rating compatible with the output of the receiver.
- (b) Relay Contact Rating. Select a relay with two normally opened contacts rated to perform 100,000 operations minimum, making and breaking an in-rush current of 10 amperes at 120 volts AC. Select contacts rated to continuously carry a 4-ampere, 60 Hz inductive load.
- (c) Warning Signal. Provide a warning signal to indicate when the receiver equipment will turn airport lights off. Obtain the warning signal by providing a circuit to the lights "off" for approximately one second. Make this one second turnoff occur two minutes before the completion of the 15-minute "on" time cycle.
- (d) Mean Time Between Failure (MTBF). Design and construct the receiver and its auxiliary circuits to provide 10,000 hours MTBF for the system.
- (e) Parts List and Instructions. Furnish a component parts list and installation and maintenance instructions with each receiver. Provide sufficient drawings or illustrations to clearly indicate the methods of installation and maintenance.
- (f) Nameplate. Securely attach a nameplate, which is permanently and legibly filled in with at least the following information, to the outside of the receiver:
- (1) Identification: FAA-L-854
 - (2) Power Supply Voltage
 - (3) Control Circuit Current Capacity

(4) Frequency Range

(5) Manufacturer's Part Number

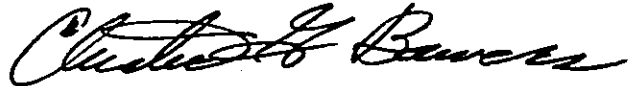
7. TEST.

- a. High Temperature. Install a receiver in the weatherproof cabinet and subject the receiver and accessories to an ambient temperature of 55 degrees Centigrade at 90 percent relative humidity for at least eight hours. Operate the receiver in consecutive cycles of 15 minutes "on" and 15 minutes "off."
- b. Low Temperature. Install the receiver in the weatherproof cabinet and subject the receiver and accessories to an ambient temperature of -55 degrees Centigrade for at least four hours. Operate the receiver in four consecutive 15-minute on cycles at the completion of this test.
- c. Operational. Check the qualification unit (Paragraph 8) and production receiver and its accessories to determine if the equipment meets the detailed requirements in Paragraph 6.

8. QUALIFICATION. Send requests for approval to the FAA, Airports Service, Washington, D.C. 20590.

- a. Furnish a sample with accessories to an independent testing laboratory acceptable to the FAA, Airports Service, to be tested as described herein, to obtain certification regarding the ability to manufacture equipment meeting the requirements of this specification. Furnish two copies of the testing laboratory's reports to Airports Service for review and approval consideration. Upon approval of the test reports which show satisfactory certification of compliance, the Airports Service will list the name of the qualified manufacturer and a description of their equipment in AC 150/5345-1B. The cost of testing is borne by the manufacturer offering the material for qualification.
- b. If the manufacturer has satisfactory laboratory facilities, the tests may be performed at the factory and must be witnessed by a representative of the FAA, Airports Service. The manufacturer furnishes written reports of these tests.
- c. Submit for review and approval a parts list, installation instructions, drawings, and theory of operation of all components installed as part of the regulator.

- d. Submit certification that all components and materials will operate satisfactorily within the ambient temperature limits specified.
 - e. After approval has been granted under the above conditions, make available a certified copy of factory test reports on the latest production run upon written request by the FAA, Airports Service, Washington, D.C. 20590.
9. HOW TO OBTAIN THIS CIRCULAR. Obtain additional copies of this circular, AC 150/5345-40, Specification for L-854 Radio Controls, from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.



Chester G. Bowers
Director, Airports Service

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Washington, D.C. 20590

Official Business

POSTAGE AND FEES PAID
FEDERAL AVIATION ADMINISTRATION