

CHANGE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

6860.2
CHG 2

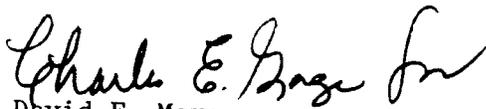
7/15/91

SUBJ: MAINTENANCE OF LORAN-C MONITOR EQUIPMENT

1. PURPOSE. This change corrects standards and tolerances for the monitor and power supply and resequences the maintenance procedures for the power supply. This change implements Configuration Control Decision (CCD) No. N13858, Clarify Standards and Tolerances for Order 6860.2.
2. DISPOSITION OF TRANSMITTALS. Retain this transmittal.

PAGE CONTROL CHART

Remove Pages	Dated	Insert Pages	Dated
19	3/21/90	19	7/15/91
20 (thru 22)	6/18/90	20 (thru 22)	7/15/91
27 and 28 (thru 30)	3/21/90	27 and 28 (thru 30)	7/15/91
Appendix 1			
1	3/21/90	1	7/15/91


David F. Morse
Director, Systems Maintenance Service

Distribution: Selected Airway Facilities Field
and Regional Offices, ZAF-601

Initiated By: ASM-640

CHAPTER 3. STANDARDS AND TOLERANCES

50. GENERAL.

This chapter prescribes the standards and tolerances for the LORAN-C monitor facilities and equipment as defined and described in Order 6000.15A, General Maintenance

Handbook for Airway Facilities. Key performance parameters and/or key inspection elements are identified by an arrow (→) placed to the left of the applicable item.

51.-52. RESERVED.

Parameter	Reference Paragraph	Standard	Tolerance/Limit		Screen
			Initial	Operating	
53. MONITOR.					
* → a. Monitor Diagnosis	93	No faults	Same as standard	Same as standard	I;14 *
→ b. Signal-To-Noise Ratio (SNR)	91				I;15
* (1) Master (snr)		-6dB	Lower limit -10dB	Same as initial	
(2) Secondary stations 1 and 2 (snr)		-6dB	Lower limit -10dB	Same as initial	*
→ c. Envelope Carrier Difference (ECD) (Master and Secondary Station 1 and 2)	91	0.0μs	-4.0μs to +4.0μs	Same as initial	I;15
→ d. Position Offset	91	0.1 nautical miles (nm)	Upper limit 0.3 nm	Same as initial	I;15
→ e. Time Difference (TD) (Secondary Stations 1 and 2 (TD) Signal)	91	TD setting for any given station	Mean error and standard deviation within 0.02μs	Same as initial	I;15
54. POWER SUPPLY					
a. Unregulated Voltage DC (Test Point 1)	94d(4)(a)	+28.0V dc	+25V dc to +32V dc	+22V dc to +33V dc	NA
b. +5V DC (VCC) (Test Point 6)	94d(4)(b)	+5.1V dc	+5.05V dc to +5.15V dc	+5.05V dc to +5.2V dc	
c. +15V DC (Test Point 7)	94d(4)(c)	+15.0V dc	+15V dc to +17V dc	Same as initial	
d. -15V DC (Test Point 8)	94d(4)(d)	-15V dc	-15V dc to -17V dc	Same as initial	
e. +5V DC (VCC) Ripple Voltage	94d(5)(a)	10mV rms	Same as standard	Same as standard	
* f. +15V DC Ripple Voltage	95d(5)(b)	20mV rms	Same as standard	Same as standard	*

Parameter	Reference Paragraph	Standard	Tolerance/Limit		Screen
			Initial	Operating	
g. Comparator Reference Voltage ... (Test Point 11)	94d(4)(e)	+4.3V dc	+4.25V dc to +4.35V dc	Same as initial	
* h. Battery Float Voltage	94d(6)	+27.6V dc	+27.36V dc to +27.84V dc	Same as initial	
i. Charge Current	94d(8)	50mA max	<60mA	≤60mA	
j. Deep Discharge Dropout Voltage ... (Test Point 3)	94d(7)	+21.6V dc	+18.0V dc to +22.0V dc	Same as initial	*
55. CENTRAL PROCESSING UNIT (CPU)					NA
→ a. System Clock (Test Point 5)	95	5.0MHz	Within 100 pulses per million (ppm) of standard	Same as initial	
→ b. Baud-Rate Clock (Test Point 6) ...	96	2.456MHz	Within 100 ppm of standard	Same as initial	
→ c. LORAN Clock (Test Point	97	8.0MHz	Within 10 ppm of standard	Same as initial	
56.-69. RESERVED.					

c. **Test Equipment Required.** None.

d. **Detailed Procedure.**

- (1) Perform the log-on procedure as required.
- (2) Type I and press RETURN. The Maintenance Data directory screen will be displayed.
- (3) Type 14 and press RETURN. Examine the data displayed. Any failures are spelled out. Refer to chapter 3, paragraph 53a.
- (4) Self-test results are also displayed on the B screen.
- (5) Type S and press RETURN.
- (6) Type 5 to log off.

94. **POWER SUPPLY.**

a. **Object.** This procedure provides a method to verify the power supply voltages.

b. **Discussion.** This procedure verifies the different power supply voltages that are used in the LORAN-C monitor system.

c. **Test Equipment Required.** Digital multimeter and oscilloscope.

d. **Detailed Procedure.**

- (1) Turn off the power.
- (2) Slide the LORAN-C monitor drawer out on its rails until full access is gained to the top panel.
- (3) Loosen the nine slotted head captive fasteners on the top panel, and remove. Turn on the power.
- (4) Verify that the following voltages are within standards and tolerances. Refer to chapter 3, paragraph 54a, b, c, d, g.
 - (a) Unregulated voltage TP-1.
 - (b) +5V dc, TP-6.
 - (c) +15V dc, TP-7.
 - (d) -15V dc, TP-8.

(e) Comparator reference voltage TP-11.

* (5) Using a true RMS reading AC voltmeter such as the Fluke 8050A, verify that the following ripple * voltages are within standards and tolerances. Refer to chapter 3, paragraph 54e,f.

(a) +5V dc ripple voltage, TP-6.

(b) +15V dc ripple voltage, TP-7.

(6) To verify the battery float voltage use the following procedure.

(a) Connect the digital voltmeter to TP-2 of the * power supply card.

(b) Withdrawn-- CHG 2

(c) Withdrawn-- CHG 2 *

(d) Verify that the voltage reading is within standards and tolerances. Refer to chapter 3, paragraph 54h.

* (7) To verify the battery dropout voltage, use the following procedure.

(a) Connect a digital multimeter to TP-3 on the power supply card.

(b) With the system in normal mode of operation, remove the front panel ac voltage fuse.

(c) Record the voltmeter reading at the time the front panel tracking and normal lights go out.

(d) Verify that the voltage reading is within standards and tolerances.

(8) To verify the battery charging current, use the following procedure.

NOTE: If this procedure is performed out of sequence or separately, remove the front panel ac fuse and allow the backup battery system to discharge for approximately 1 minute before proceeding to the next step.

(a) Replace front panel ac voltage fuse.

(b) Using the digital multimeter, measure the voltage drop across R3 or R24 on the power supply card. *

* (c) Record the voltage reading, and divide by five to obtain the charging current.

(d) Verify that the current value is not in excess of the standards and tolerances. Refer to chapter 3, paragraph 54i.

95. SYSTEM CLOCK FREQUENCY.

a. Object. This procedure provides a method to verify the system clock frequency.

b. Test Equipment Required. Counter.

c. Detailed Procedure.

(1) Turn off the power.

(2) Slide the LORAN-C monitor drawer out on its rails until full access is gained to the top panel.

(3) Loosen the nine slotted head captive fasteners on the top panel, and remove. Turn on the power, and wait for the system to return to normal.

(4) Connect a ten-to-one probe to test point 5 on the CPU card.

(5) Observe extra caution not to short pins together.

(6) Adjust the counter sensitive control for reliable reading.

(7) Verify that the system clock frequency is within standards and tolerances. Refer to chapter 3, paragraph 55a.

(8) Return the system to normal configuration.

96. BAUD RATE CLOCK FREQUENCY.

a. Object. This procedure provides a method to verify the baud rate clock frequency.

b. Test Equipment Required. Counter.

c. Detailed Procedure.

(1) Turn off the power.

(2) Slide the LORAN-C monitor drawer out on its rails until full access is gained to the top panel.

(3) Loosen the nine slotted head captive fasteners on the top panel, and remove. Turn on the power, and wait for the system to return to normal.

(4) Connect a ten-to-one probe to test point 6 on the CPU card.

(5) Adjust the counter sensitive control for reliable reading.

(6) Verify that the system clock frequency is within standards and tolerances. Refer to chapter 3, paragraph 55b.

(7) Return the system to normal configuration.

97. LORAN CLOCK FREQUENCY.

a. Object. This procedure provides a method to verify the LORAN-C clock frequency.

b. Test Equipment Required. Counter.

c. Detailed Procedure.

(1) Turn off the power.

(2) Slide the LORAN-C monitor drawer out on its rails until full access is gained to the top panel.

(3) Loosen the nine slotted head captive fasteners on the top panel, and remove. Turn on the power, and wait for the system to return normal.

(4) Connect a ten-to-one probe to test point U16, pin 9 on the CPU card.

(5) Observe extra caution not to short pins together.

(6) Adjust the counter sensitive control for reliable reading.

(7) Verify that the system clock frequency is within standards and tolerances. Refer to chapter 3, paragraph 55c.

(8) Return the system to normal configuration.

98.-104. RESERVED.

APPENDIX 1. CERTIFICATION REQUIREMENTS**Table 1. LORAN-C MONITOR SYSTEM**

<i>Service</i>	<i>Certification Parameter</i>	<i>Reference Paragraph STDS and TOLS</i>	<i>Screen</i>
MONITOR	Master station signal-to-noise ratio (snr)	53b(1)	I;15
	Secondary station number 1 (snr)	53b(2)	I;15
	Secondary station number 2 (snr)	53b(2)	I;15
	Master station envelope cycle difference (ECD)	53c	I;15
	Secondary station number 1 (ECD)	53c	I;15
	Secondary station number 2 (ECD)	53c	I;15
	Position offset	53d	I;15
	Time difference (TD) (secondary stations 1 and 2 (TD) signal	53e	I;15

NORMAL CERTIFICATION INTERVAL: Monthly**MAXIMUM CERTIFICATION INTERVAL:** 60 Days**PERSON RESPONSIBLE FOR CERTIFICATION:** Person assigned the appropriate certification authority and responsibility**CERTIFICATION ENTRY IN FACILITY MAINTENANCE LOG:** LORAN-C MONITOR certified

* **NOTE:** Completion of these parameters certifies the capability of the monitor to detect out-of-tolerance signal in space conditions and does NOT certify the service (i.e., signal in space). *

