MILITARY SPECIFICATION

NAVIGATION SET, INERTIAL
AN/ASN-84

This Amendment forms a part of Military Specification MIL-N-81497A(AS) date 15 March 1970 and has been approved by the Naval Air Systems Commmand, Department of the Navy.

*Page 2, Paragraph 2.1: Delete and substitute

"2.1 General - The following documents form a part of this specification to the extent specified herein. Listed are the issues of the documents in effect for the previous procurement. However, in lieu of the issue listed, the contractor shall use the latest issue in effect of these documents where feasible. If the use of the latest issue will affect design performance, testing, data or interchangeability of any replacement part, then the issue of the document listed below shall be used.

SPECIFICATIONS

Military

MIL-W-5088C	Wiring, Aircraft, Installation of
MIL-E-5400H	Electronic Equipment, Aircraft, General Specification For
MIL-T-5422E	Testing, Environmental, Aircraft Electronic Equipment
MIL-I-6181D	Interference Control Requirements, Aircraft Equipment
MIL-C-6781B	Control Panel: Aircraft Equipment, Rack or Console Mounted
MIL-P-7788A	Plate, Plastic, Lighting
MIL-M-7793c	Meter, Time Totalizing

MIL-E-17555F	Electronic and Electrical Equipment and Associated Repair Parts, preparation for Delivery of
MIL-T-18303A	Test Procedures: Preproduction and Inspection, for Aircraft Electronic Equipment, Format For
MIL-N-18307C	Nomenclature and Nameplates for Aeronautical Electronic and Associated Equipment
MIL-T-19576	Transmitter, Remote Compass Thin Wing Type ML-1 (Unstabilized)
MIL-S-20708A	Synchros, 60 and 400 cycles, General Specification For

SPECIFICATIONS

Naval Air Systems Command

WR-98	Microelectronic Devices Used in Avionics Equipment, Procedures for Selection and Approval of
AR-34	Failure Classification for Reliability Testing, General Requirements For

STANDARDS

Military

MS17322	Meter, Time Totalizing, Miniature Digital, 115 volt 400 cycle
MS91403	Cases, Large Size (For Use with Electronic Equipment in Aircraft)
MIL-STD-454A	Standard General Requirements for Electronic Equipment
MIL-STD-704	Electric Power, Aircraft Characteristics and Utilization of
MIL-STD-781B	Reliability Tests, Exponential Distribution

MIL-STD-794	Parts and Equipment, Procedures for Packaging and Packing of
Federal	
FED-STD-595	Colors
Other	
ARINC 407	Synchro Standard Manual,
ARINC 407-1	Aeronautical Radio, Inc.

PUBLICATIONS

Naval Air Systems Command

EI-554	Avionics Installation Instructions for Navigation Set, Inertial AN/ASN-84

*Page 4, Pargraphs 3.2.l and 3.2.2: Delete "AR-5" and substitute "WR-98".

*Page 5, Paragraph 3.3.1: Delete "85.0" and substitute "90.0".

Page 5, Paragraph 3.3.2.3: Delete "750 hours" and substitute "200 hours".

*Page 7, Paragraph 3.3.7.2.3: Add new paragraphs

"3.3.7.2.3 Flight Line Maintenance - Navigation Computer Operation Program Load - Verify Capability - The equipment shall have the capability which will provide a means to load and verify the, ASN-84 operational computer program, normally stored in the CP-924/ASN-84 Navigation Computer Memory, utilizing the existing Central Data Processor Interface (3.4.3.4.4). An appropriate external computer with special test program containing, in part, the ASN-84 operational computer program shall be provided to complete this capability.

(1) Load - Verify Maintenance Switch - The navigation computer shall contain a load-verify maintenance switch which shall be used to allow the equipment to perform load verify operation.

(2) Load - Verify Operation Restrictions -

(a) Load - Verify Operation shall only commence upon the simultaneous operation of the load-verify maintenance switch and equipment turn-on.

(b) Normal equipment operation (3.4.1.2) subsequent to load-verify operation shall require a removal of system power.

(c) The equipment shall permit sequential load operation, sequential load/verify operation without system shut-down."

*Page 10, Paragraph 3.4.1.1, Line 3: Add "and shall provide" between "longitude," and "velocity".

page 15, Paragraph 3.4.2.1: Delete and substitute

"3.4,2.1 Present Position - The present position accuracy shall be as stated in Table IIA."

Page 15, Add Table IIA

Page 16, Paragraph 3.4.2.2: Delete and substitute

"3.4.2.2 Digital True Heading - Digital true heading output error shall not exceed the requirements of Table IIA."

page 17, Add

"3.4.2.9 Velocity Output (Digital) - The digital velocity output signals shall be equivalent in performance to these signals used to compute present position to the accuracies listed in Table IIA."

*Page 25, Paragraph 3.4.3.4.4: Add:

(20) During Slave, Free, Compass and Standby (Self-Test Submode) Modes and during ground alignment and inflight alignment operations of the Inertial Mode, velocity and true heading data shall be zero.

(21) The following shall specify the central data processor interface during CP-924/ASN-84 Navigation Computer memory load operation.

(a) The VN select gate shall be designated as both a control signal and a start of new word condition signal.

(b) Definition of memory load operation shall be one logic 1 (VN) pulse.

(c) Definition of start of new word shall be one logic 1 pulse which shall follow a total of ten (10) VE and/or TH selects.

(d) Memory load operation shall be terminated by a receipt of two (2) successive VN logic 1 selects without intervening VE and/or TH selects.

(e) Velocity East (VE) and True Heading (TH) select signal shall be interpreted as "1" bit and "0" bit data to be loaded when they are respectively pulsed to logic 1 status.

(f) Minimum select duration: 88 microseconds

(g) Minimum time between select pulses: 12 microseconds.

(h) Logic 1 definition: 3.4.3.4.4 (6).

(i) Minimum time between successive load operations or successive load-verify operations shall be 600 microseconds.

(j) Clock signal - not applicable.

(k) Data signal - The equipment shall supply 22 bit serial data with all data bits, including channel identification bits set to zero.

(l) Enter signal - 3.4.3.4.4(10).

(m) Navigation Computer memory load shall occur sequentially starting with the first memory word and shall terminate with the last memory word.

(22) The following shall specify the central data processor interface during CP-924/ASN-84 Navigation memory verification operation.

(a) The velocity north (VN) select signal shall be designated as both a control signal and as a control for supplying one CP-924/ASN-84 memory data word.

(b) Definition of the start of verify operation shall be the receipt of two successive VN logic 1 selects.

(c) Definition of the request to transmit CP-924 memory word #1 shall be a logic VN select.

(d) End of verify operation shall be the receipt of two successive VN selects.

(e) Velocity East (VE) and True Heading (TH) selects shall be utilized to select for transmission words 2 and 3 from the CP-924 (respectively).

(f) The external computer/central data processor shall shall VN, VE, TH consecutively during memory verification.

(g) Navigation Computer memory verify shall occur sequentially starting with memory word #1 and shall terminate with the last memory word.

(h) Minimum select duration: 88 microseconds.

(i) Minimum time between selects: 12 microseconds.

(j) Minimum time between successive memory verification operations or successive memory verify-load operations shall be 600 microseconds.

(k) The equipment shall provide an enter signal (logic 1) within 1 millisecond after receipt of a select signal. The select signal shall not be terminated unless the equipment has supplied an enter signal or 1 MS of elapsed time has occurred.

(l) Logic levels shall be in accordance with 3.4.3.4.5(6).

(m) Clock signal shall be in accordance with 3.4.3.4.5(7).

(n) The output serial data format shall be:

B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	1	0	0	0	0	0	0
9	8	7	6	5	4	3	2	1	0	0	0	0	0	0							

Velocity North (1st 10 Bit Memory Word)

B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0	1	0	0	0	0	0
19	18	17	16	15	14	13	12	11	10	9	8	7	6	5							

Velocity East (2nd 10 Bit Memory Word)

0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	0	0	1	0	0	0	0
	12	11	10	9	8	7	6	5	4	3	2	1	1	1							

True Heading (Memory Address)

*Page 25, Paragraph 3.4.3.4.5(1): Before "All other times, circuit is closed", Add "Navigation Computer Load verify operation in process."

*Page 27, Paragraph 3.5.1.3: Delete "1.55 pounds" and substitute "1.70 pounds".

*Page 30, Paragraph 3.5.2.4: Delete
" 1 Torquer Control
1 Magnetic Heading Pre-Amplifier
9 Relay Drivers
7 Lamp Drivers"

*Page 31, Paragraph 3.5.2.5.2: Delete and Substitute

"3.5.2.5.2 - Self Test Push Button Switch -
(1) The self test push button switch provided shall be used to initiate the equipment's self test submode when the mode select or switch on the Control, Navigation is in the standby mode.

(2) The self test push button switch shall be used in all modes of operations to validate fail lamp indications."

*Page 31, Paragraph 3.5.2.5.3: Delete "standby not required" and substitute

"Mode	Function
Standby/Self Test	Used for initial course True Heading Control of Gyroscope Assembly."

*Page 39, Paragraph 3.5.4.3: Delete "19.9 pounds" and substitute "20.2 pounds".

*Page 41, Paragraph 3.5.4.9: Delete "+ 55 Deg C" and substitute "- 1 Deg C".

Page 41, Paragraph 3.5.4.11: Delete and Substitute
"3.5.4.11 Gyroscope Assembly Enviromental Limitations - The Gyroscope Assembly shall operate within the accuracies consistent with the requirements of 3.4.2 for ambients between -54 and +55 deg. C."

*Page 42, Paragraph 3.5.5.2: Delete "17.03 inches" and substitute "17.73 inches". Add to last sentence "exclusive of the load verify maintenance switch."

*Page 42, Paragraph 3.5.5.3: Delete "21.65 pounds" and substitute "22.15 pounds".

*Page 43, Paragraph 3.5.5.4: Delete "5 Input/Output Logic Cards" and Add

"Quantity	Nomenclature
4	Input/Output Logic Cards
1	-6 volt regulator
1	Master Oscillator
1	Load-Verify Switch Assembly"

*Page, Paragraph 3.5.5.15: Correct 4J5 to be "MS3122-22E-55SY".

*Page 48: Add

"3.5.5.18 - Load Verify Maintenance Switch - The Computer, Navigation shall contain a load-verify push button switch assembly which shall be chained to the unit and shall mate to test connector 4J6.

*Page 48: Paragraph 3.5.6.3: Delete "23.6 pounds" and substitute "27.6 pounds".

*Page 50, Paragraph 3.5.6.5.3(1): Delete "80" and substitute "100"

*Page 50, Paragraph 3.5.6.5.3(2): Delete

*Page 51, Paragraph 3.5.6.12: Correct 2J4 to be "MS3112-E-18-32PN".

Page 56, Paragraph 4.4.1.3, Line 6: Add

"This test shall be deleted if the reliability test includes a test on each equipment which consumes at least ten hours of operation."

Page 56, Paragraph 4.4.1.3. Under VIBRATION:

Delete "20 to 30 cps" and "±3G's" and substitute "20 to 70 Hz" and "±2G's".

Page 58, Paragraph 4.4.3.1, Line 6: Delete

"Al1 shall be used" and substitute "shall be used except that the lower temperature shall be -25°C."

Page 58, Paragraph 4.4.3.2, Line 4: Add

"except that the lower temperature shall be -25°C."

Page 58, Paragraph 4.4.3.2.1, Lines 4 and 5: Delete the sentence

starting "If the burn-in period....." and substitute "If the burn-in period is to be used, the procuring activity shall be notified of the details thereof."

Page 59, Paragraph 4.5: Delete and substitute

4.5 Longevity Test - This test shall be of 500 hours duration and shall be conducted on one (1) CP-924/ASN-84 navigation computer that has passed the reliability test. The contractor shall furnish the navigation computer sample and shall be responsible for accomplishing the longevity test. The longevity test sample shall be selected by the government inspector and initiation of test shall be authorized by NAVAIR, Code AIR-5337.

Page 60, Paragraph 4.5.1: Delete and substitute

"4.5.1 Test Conditions - The longevity test shall be conducted in accordance with MIL-STD-781, Test Level E except that the lower temperature shall be -25°C."

Page 61, Paragraph 4.6, Line 2: Delete

"life tests" and substitute "longevity tests".

* An asterisk preceding a change denotes a change which did not appear in Amendment 1.

Project Number 5826-N100

Table IIA

Present Position and Digital True Heading Performance

Latitude Range	Quantity***	Ground Align Pure Inertial 1 to 6 Hr.	Ground Align Pure Inertial 6 to 12 Hr.	Doppler-Damped** Inertial 1 to 12 Hr.
0 to 60 DEG	CEP	1.0	1.5	0.5
	True HDG Angle Maximum	(0.2 ± 0.04 T) DEG		0.2 DEG
60 to 75 DEG	CEP	1.0	1.5	0.75
	True HDG Angle Maximum	(0.2 ± 0.04 T) DEG		0.4 DEG
75 to 90 DEG	CEP	1.0	1.5	0.75
	True HDG Angle Maximum	(0.2 ± 0.04 T) DEG		0.5 DEG**
Alignment Complete below 75 DEG				

All CEP in nautical miles per hour
T = Flight Time in HOurs (See 6.9.1)

* Above 82 DEG latitude, true heading = (0.5 DEG ± 0.04 DEG T)

** Performance at 250 knots after the completion of ground alignment or after completion of the inflight alignment sequence with a position fix performed at the end of the inflight alignment. Doppler radar error not greater than 0.1% of actual ground speed.

*** The criteria for acceptance of each system shall be 2.55 times the CEP values listed.

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