TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL

NAVIGATION SET,

INERTIAL AN/ASN-86
FSN 5826-179-8441

This copy is a reprint which includes current pages from Changes 1 and 2. Title changed by Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY

SEPTEMBER 1971

WARNING

HIGH VOLTAGE

**Be careful when working near the 115-volt ac power connections.
Serious, injury or death may result from contact with these terminals.**

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 3 *May 1972*

Organizational Maintenance Manual
NAVIGATION SET, INERTIAL
AN/ASN-86
(FSN 5826-179-8441)

TM 11-5826-245-20, 8 September 1971, is changed as follows:
1. The title is changed as shown above.
2. Remove old pages and insert new pages as indicated below.

Remove	*Insert*
1-0	1-0
1-3 and 1-4	1-3 and 1-4

3. File this change sheet in front of the manual for reference purposes.

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff

Official:

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

Distribution:
To be distributed in accordance with DA Form 12-36, (qty rqr block no. 226) Organizational maintenance requirements for AN/ASN-86.

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 14 *December 1973*

Organizational Maintenance Manual
NAVIGATION SET, INERTIAL
AN/ASN-86
(FSN 5826-179-8441)

TM 11-5826-245-20, 8 September 1971, is changed as follows:
1. A vertical bar appears opposite changed material.
2. Remove old pages and insert new pages as indicated below:

Remove page	Insert page
i and ii	i and ii
1-1 and 1-2	1-1 and 1-2
2-1 and 2-2	2-1 and 2-2
B-1 and B-2	None

3. File this change sheet in the front of the manual for reference purposes.

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CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

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Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-36, Section I (qty rqr block no. 226) Organizational Maintenance requirements for AN/ASN-66.

TECHNICAL MANUAL

No. 11-5826-245-20

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *8 September 1971*

Organizational Maintenance Manual

NAVIGATION SET, INERTIAL AN/ASN-86

*This manual supersedes TM 11-5826-245-200, 21 March 1969.

LIST OF ILLUSTRATIONS

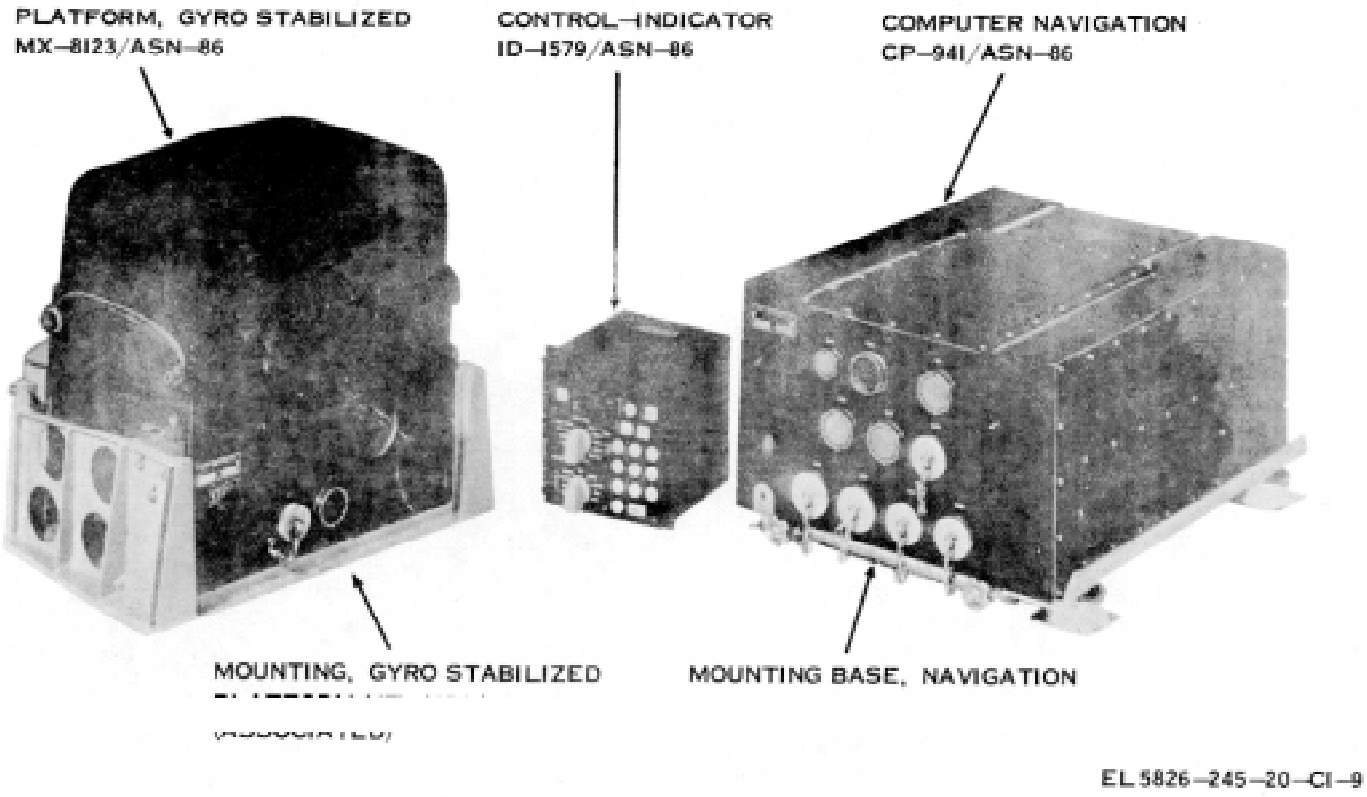

Figure 1-1. Navigational Set, Inertial AN/ASN-86.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope of Manual

a. This manual describes Navigation Set, Inertial AN/ASN-86 and covers its operating procedures and organizational maintenance. It covers instructions for operation, cleaning, inspection, and minor repair of the equipment.

b. Through this manual, Navigation Set, Inertail AN/ASN-86 is referred as the *navigation set.*

NOTE

Appendix C is current as of 31 October 1970.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 71-4 (Air Force)/and MCO P4030.29 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF .361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38 (Army)/NAVSUP PUB 459 (Navy)/AFM 75-34 (Air Force)land MCO P4610.19 (Marine Corps).

1-3.1 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 for- warded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-AN Fort Monmouth, NJ 07703.

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

(fig. FO-1)

a. Purpose. The navigation set is a self- contained navigation and attitude-reference system that is totally independent of aircraft maneuvers, weather conditions, and terrain. The navigation set, in conjunction with aircraft equipment interface, permits flight to predetermined surveillance area under instrument flight rules (IFR) conditions. Simultaneously, the navigation set provides a visual display of the aircraft's present position in universal transverse mercator (UTM) coordinates or conventional latitude-longitude coordinates during all phases of the flight.

b. Use. The navigation set is used in reconnaissance aircraft to provide the following visual displays:

(1) Bearing and range (true), in kilometers, to 10 destinations and 10 TACAN stations, when used.

(2) Present-position, destination, or TACAN station UTM coordinates.

(3) Present-position, destination, or TACAN station latitude and longitude coordinates.

(4) Present-position magnetic variation or selected TACAN station local magnetic variation.

(5) Course select angle (true) manually inserted for intercept approach to a destination or TACAN station.

(6) Altitude of selected TACAN station tower.

(7) Channel number of selected TACAN station.

(8) Readout of any preselected computer core storage location in octal format.

(9) Readout of the difference in kilometers, east or west and north or south, between air- craft present position and the destination or TACAN station selected.

(10) Wind direction (true)

(11) Windspeed.
(12) Ground track angle (true)
(13) Groundspeed.
(14) Heading (true)
(15) Flight time to selected destination or TACAN station.

1-5 Technical Characteristics

a. Ambient Temperature.

Continuous operation +55° C. (131°F.) (max)
-54° C. (-65°.) (min).
Intermittent operation +68° C. (154°F.) (max).
-54°C. (65°F.) (min).
Storage ..... +68° C. (154°F.) (max).
-54°C. (165°F.) (min).

b. Power Requirements.

Standby mode ..... 28 vdc, 531 w.[1]
5 vac, 400 Hz, single phase, or 5 vdc, 12 w.
26 vac, 400 Hz, single phase, 39 w.[2]
115 vac, 400 Hz, 3 phase, Y-connected, 74 w.
..... (min); 1, 424 w (max).

Align mode .....28 vdc, 671 w.
5 vac, 400 Hz, single phase, 39 w[2]
115 vac, 400 Hz, 3 phase Y-connected, 74w (min): 1, 424 w. (max).

Navigate mode .....28 vdc, 671 w.
5 vac, 400 Hz, single phase, or 5 vdc, 12 w.
26 vac, 400 Hz, single phase, 29 w.[3]
115 vac, 400 Hz, 3 phase, Y-connected, 214 w (Max).

Air data .....28 vdc, 531w.
5 vac, 400 Hz, single phase, or 5 vdc, 12 w.
26 vac, 400 Hz, single phase, 39 w[2]
115 vac, 400 Hz, 3 phase, Y-connected, 74 w.

[1] During turn-on, 700 watts for 1 second.
[2] During destination select, 135 watts for 1 second.
[3] During destination select, 125 watts for 1 second

1-6 Items Comprising an Operable Equipment and Component Dimensions

The components of the navigation set with their Federal stock numbers, quantities, dimensions, weights and figure references are listed below:

FSN	*Qty*	*item*	*Dimensions (in.)*			*Unit Weight*	*Fig.*
			Height	*Depth*	*Width*	*(lb)*	*No.*
5826-179-8441		Navigation Set Inertial AN/AS?-86 consisting of:	1400	12.12	13.59	39.0	1-2
5826-179-8440	1	Platform, Gyro Stabilized MX-8123/ASN-86.	812	19.52	14.15	56.5	1-3
5826-179-8440	1	Computer, Navigation CP-941/ASN-86.	2.00	21.63 (max.)	15.04	4.5	1-4
5826-220-2065	1	Mounting Base, Navigation Computer MT-4075/ASN-86.	6.00	6.72	5.75	6.5	1-5
5826-179-8438	1	Control-Indicator ID-1579/ASN-86					

1-7 Common Names

The nomenclature and common names assigned to the components of the navigation set and the associated mountings are listed below.

Nomenclature	*Common name*
Platform, Gyro Stabilized Mx-8123/ASN-86.	Platform
Mounting, Gyro Stabilized Platform MT-4074/ASN-86 (associated).	Platform mount
Computer, Navigation CP-941/ASN-86.	Computer
Mounting Base, Navigation computer MR-4075/ASN-86	Computer mount
Control-Indicator ID-1579/ASN	Control-indicator

1-8 Navigation Set Description

the navigation set consists of the platform.

computer w/mount, and control-indicator. The platform, computer, and control-indicator are three interconnected major electronic replaceable units. The navigation set has built-in test capability to isolate failures to a specific unit of the set. The units are interconnected with multiconductor cables which transfer signals and power within the navigation set. The platform is mounted on the associated platform mount, which maintains a precise platform alignment with respect to the aircraft's line-of-flight and attitude axes. Both the platform mount and computer are bolted to the aircraft frame and provide ducting for connection to the aircraft vent air blowers. Further description of each unit is contained in paragraphs 1-9, 1-10, 1-11, and 1-12.

1-9. Platform Description

(fig. 1-2)

The platform, a separately housed replaceable unit, is secured to the associated platform mount by three spherical mounts within precision V- blocks. Electrical connection to the platform is made through the input-output connector on the front of the unit. Cooling air for the platform is controlled by the internal airflow controller assembly, which allows ambient airflow into the cooling air inlet. The cooling air is drawn out through exhaust air ports on the back of the plat- form. The inlet air ports mate with an inlet air plenum on the platform mount. A purge plug and fill valve on the front of the platform is used for leak-testing and purging and pressurizing (filling) the platform with nitrogen gas.

1-10. Computer Description

(fig. 1-3)

The computer, a separately housed replaceable unit, is installed on the computer mount in the aircraft. The computer is secured at the front by holddown brackets that engage two screw clamps on the computer mount. The computer is secured at the back by two guide pins on the computer mount that slide into locating holes of the computer. Electrical connection to the computer is made by five input-output connectors on the front panel. Two special input-output connectors (with covers) provide means for interconnecting an additional 4096-word core memory module if required. The cooling air inlet at the top of the computer allows ambient airflow through the computer heat exchanger. The air is drawn out through an exhaust outlet on the bottom of the computer.

1-11. Computer Mount Description

(fig. 1-4)

The computer mount is a standard vibration-isolating type that provides four isolators between the mounting surface and the computer. The bottom of the mount, which is enclosed, provides a cooling air duct for the computer. The duct contains two exhaust air access plates which are removed to connect the hose to the aircraft exhaust air system.

1-12. Control-Indicator Description

(fig. 1-5)

The control-indicator, a separately housed replaceable unit, is installed in the aircraft navigation control panel with six Dzus fasteners. On the control-indicator front panel are all switches, controls, and indicators required to control the operation of the navigation set. Electrical connection to the control-indicator is made through a multipin input-output connector on the back of the unit. The cutouts on each side of the cover assembly lighten the equipment and improve radiant heat dissipation.

1-13. Additional Equipment Required

Additional equipment required for operation of the navigation set is listed below.

a. Navigation Junction Box. The navigation junction box and the aircraft cabling interconnect the platform, computer, and control-indicator.

b. Equipment Cooling. When installed in the aircraft, the platform and computer have adequate inlet and exhaust cooling facilities to maintain a temperature environment within the operational parameters specified in paragraph 1-5*a.* The control-indicator does not require a cooling air supply.

c. Mounting, Gyro Stabilized Platform MT-4074/ASN-86. The platform mount is separately installed in the aircraft and precisely aligned with respect to aircraft pitch, roll, and yaw axes. The platform mount is fastened securely to the aircraft frame and does not provide vibration-isolation. The platform is supported on the platform mount by three precision V-block mounts and secured by three screw clamps located on the V-block mounts. An exhaust air plenum on the platform mount mates with the exhaust air port on the platform.

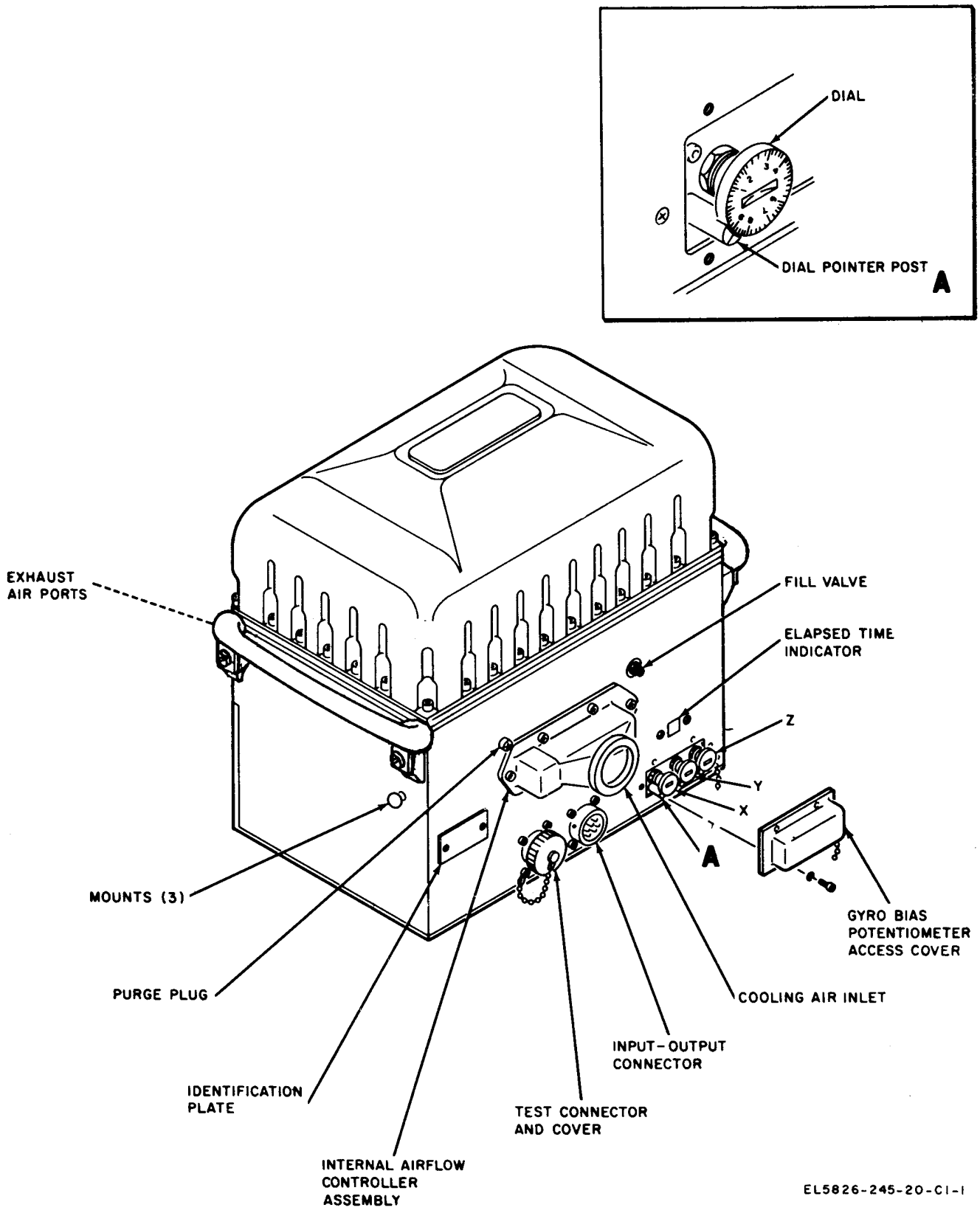

Figure 1-2. Platform, Gyro Stabilized MX-8123/ASN-86.

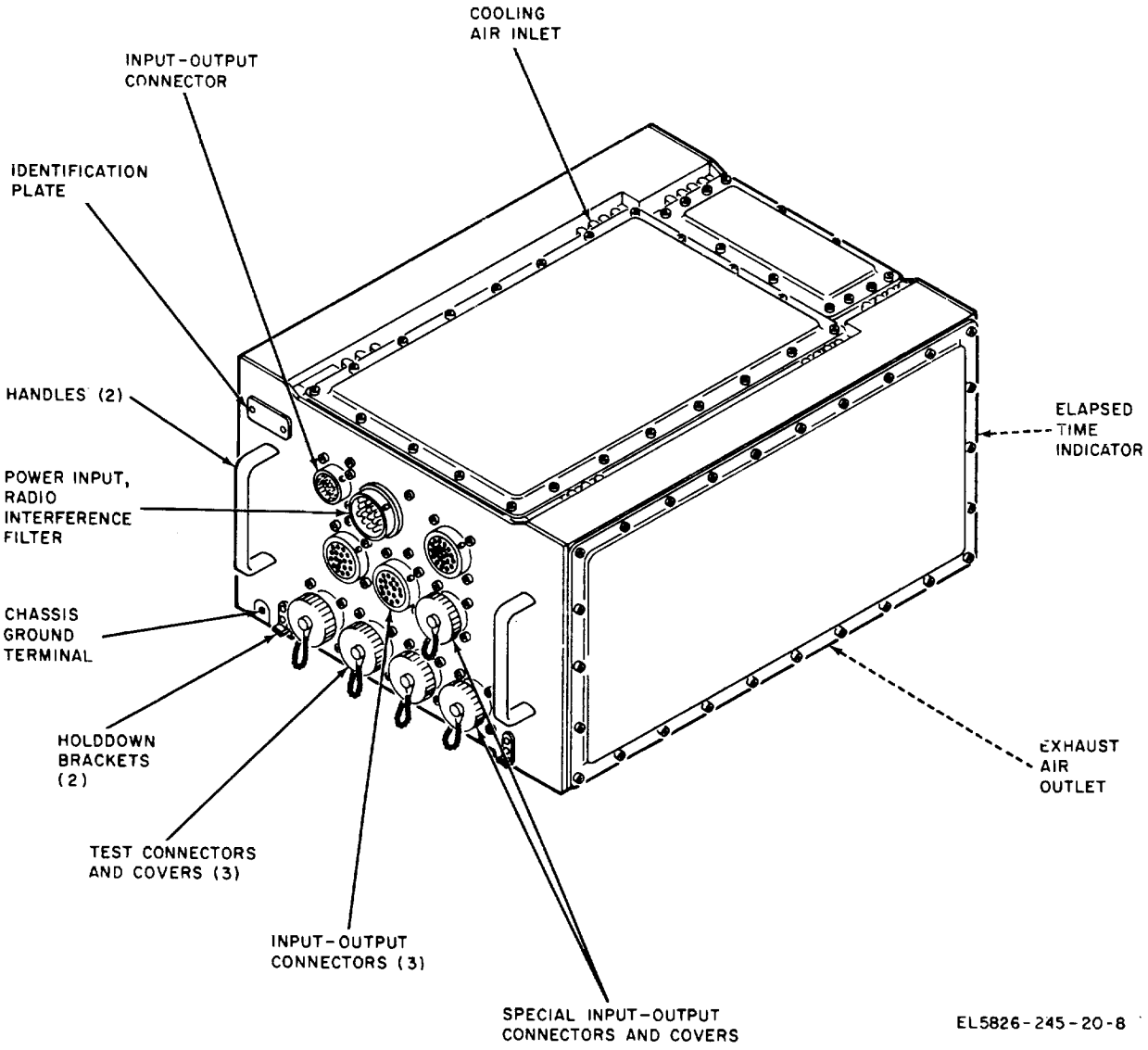

Figure 1-3. Computer, Navigation CP-941/ASN-86.

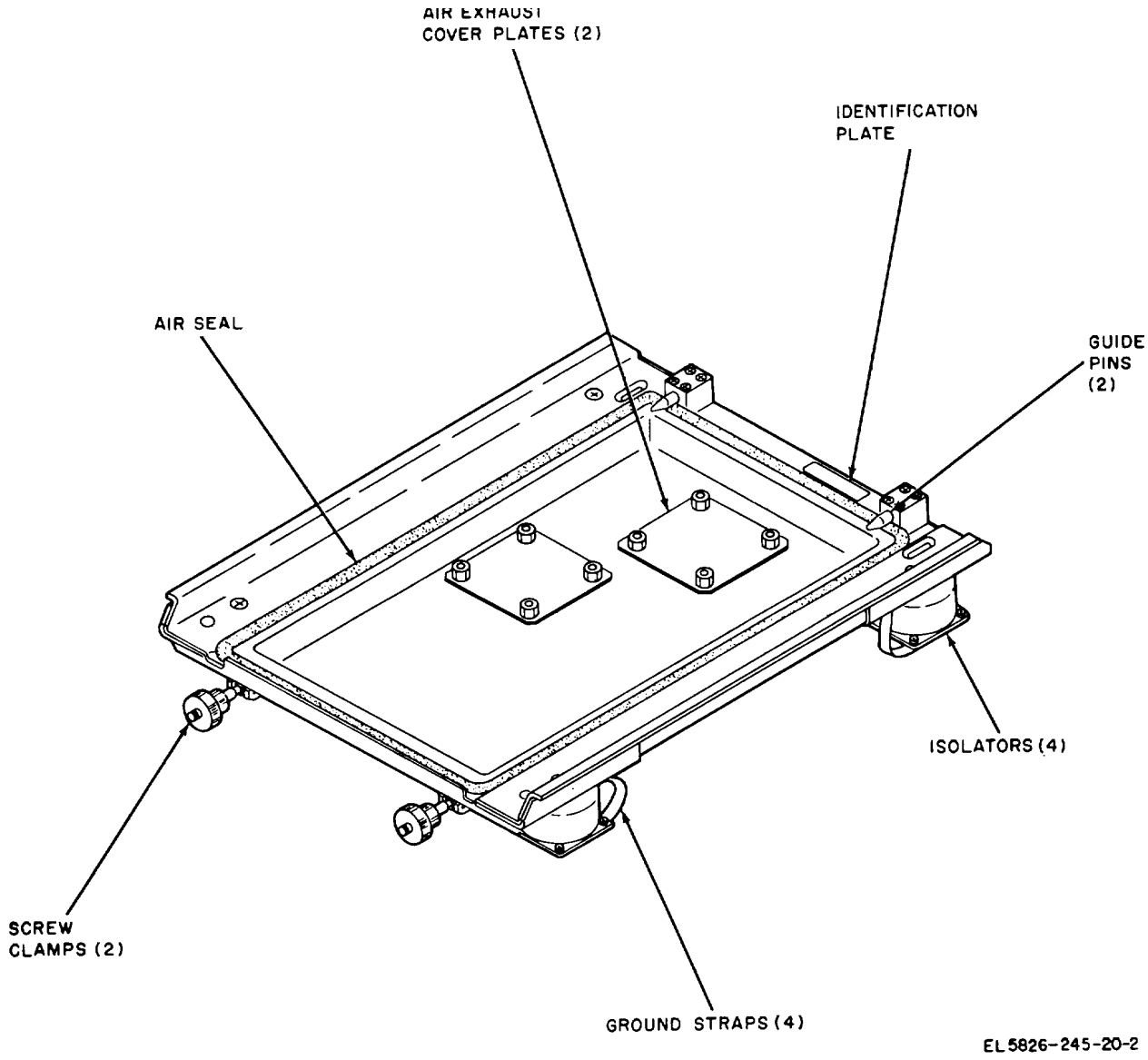

Figure 1-4. Mounting Base, Navigation Computer MT-4075/ASN-86.

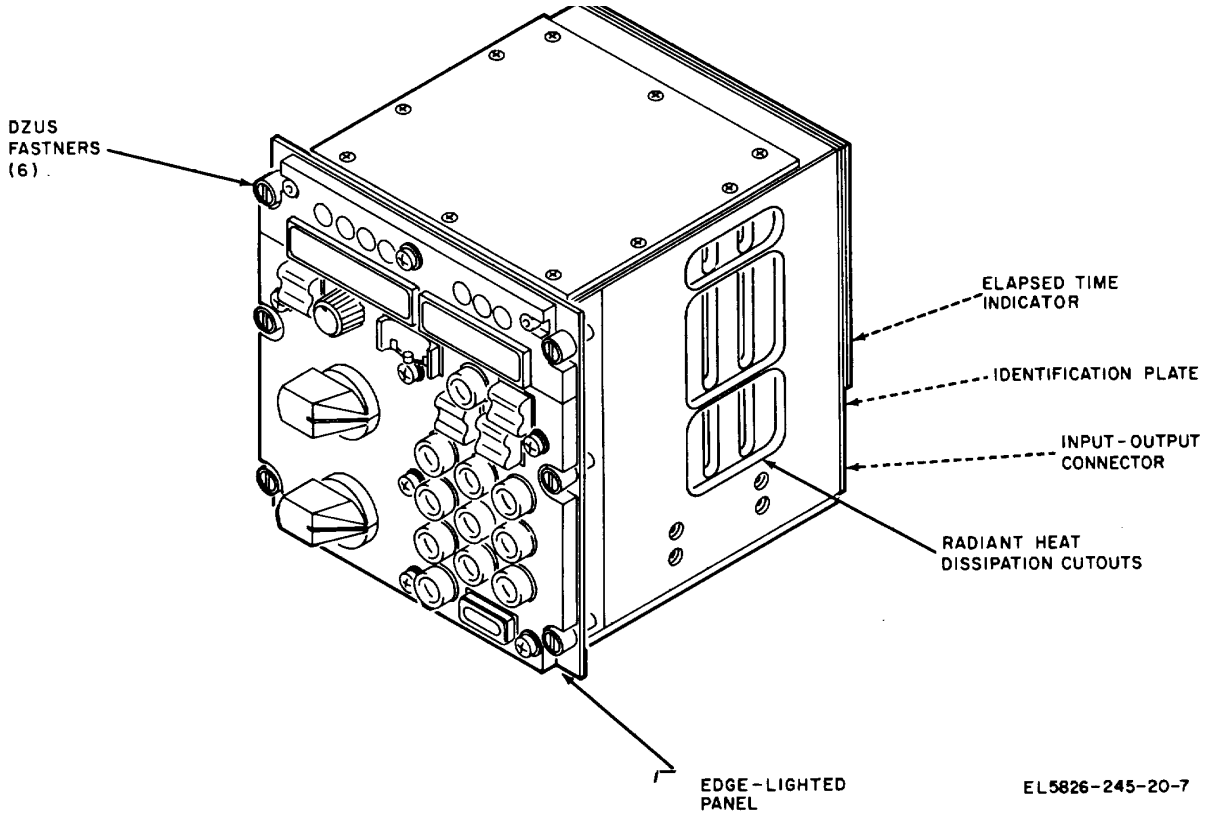

Figure 1-5. Control-Indicator ID-1579/ASN-86.

1-14. System Application In addition to the navigation set functions described in paragraph 1-4, the navigation set provides outputs for control and communication with other aircraft navigation and ancillary equipment. The computer can be programmed to interface with a variety of aircraft navigation equipment. Figure FO-1 illustrates a navigation set interface with a typical aircraft configuration. The navigation set requires magnetic heading, synchro reference excitation, true airspeed, and edgelight control input signals for operation. Output signals developed by the navigation set are sent to the navigation instruments for display of guidance data to the destination selected. Signals are sent to an autopilot for automatic control of aircraft flight to a selected destination. A direct/ intercept discrete signal from the pilot's direct-intercept switch dictates to the navigation set whether the aircraft is to be guided along the shortest track or on a preselected intercept course to the destination selected. Flight data and synchro reference signals are sent to aircraft radar systems for comparison and development of navigation correctional computer inputs. Flight data are sent upon request to data annotation equipment for processing and recording. Directional location, heading, and time driving signals are sent to a map display to develop and provide a visual record of flight. When required, TACAN interface is used for updating the navigation set present-position data. A discrete signal is sent to the aircraft warning panel INS indicator to indicate the operational status of the navigation set. A more detailed description of the navigation set interface is presented in chapter 4.

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Packaging Data

The three major components of the navigation set are packed in triple-walled fiberboard boxes and padded with polyurethane ester and polyethylene foam. Each component mounting base is packed in a single-walled fiberboard box with protective wrapping.

Container contents	*Container inside dimensions (in.)*	*Container volume (cu. in.)*	*Container weight (lb)*	*Shipping weight (lb)*
Computer	$29^{1}/_{8}X22^{3}/_{4}X16^{3}/_{8}$	10, 850	16.0	67.0
Control-indicator	$21^{1}/_{4}X16X16^{3}/_{8}$	5, 556	4.5	17.0
Platform	$24^{7}/_{8}X23^{3}/_{8}X26$	15, 087	32.2	74.0
Computer mount	21X16x3	1, 008	1.0	5.5

2-2. Unpacking Instructions

CAUTION

The platform, computer, and control-indicator contain delicate electronic gear. Be extremely careful when removing each item from the container. Do not touch connector pins; static electricity discharge from body may cause damage to equipment.

a. Unpack the platform in accordance with figure 2-1.

b. Unpack the computer in accordance with figure 2-2.

c. Unpack the control-indicator in accordance with figure 2-3.

d. The computer mount is packed in fibreboard box and cushioned with cellulosic cushioning material. No special unpacking instructions are required.

NOTE

Store all packaging materials for possible reshipment.

2-3. Checking unpacked Equipment

a. Inspect the equipment for damage that may have occurred during shipment. If equipment has been damaged, fill out and forward DD Form 6.

b. Check to see that the equipment is complete as listed on the packing slip. Report all discrepancies in accordance with TM 38-750.

c. Check to see whether the equipment has been modified. If the equipment has been modified, the MWO number will appear on the front panel, near the nomenclature plate. Check also to see whether all MWO's, current at the time the equipment is placed in use, have been applied.

NOTE

Current MWO's applicable to the equipment are listed in DA Pam 310-7.

d. Check the latest issue of DA Pam 310-4 (never more than 1 year old) and its latest change (never more than 6 months old) to see whether you have the latest editions of all applicable maintenance literature. (Equipment issued by depots may have been in stock for some time and may contain superseded manuals.)

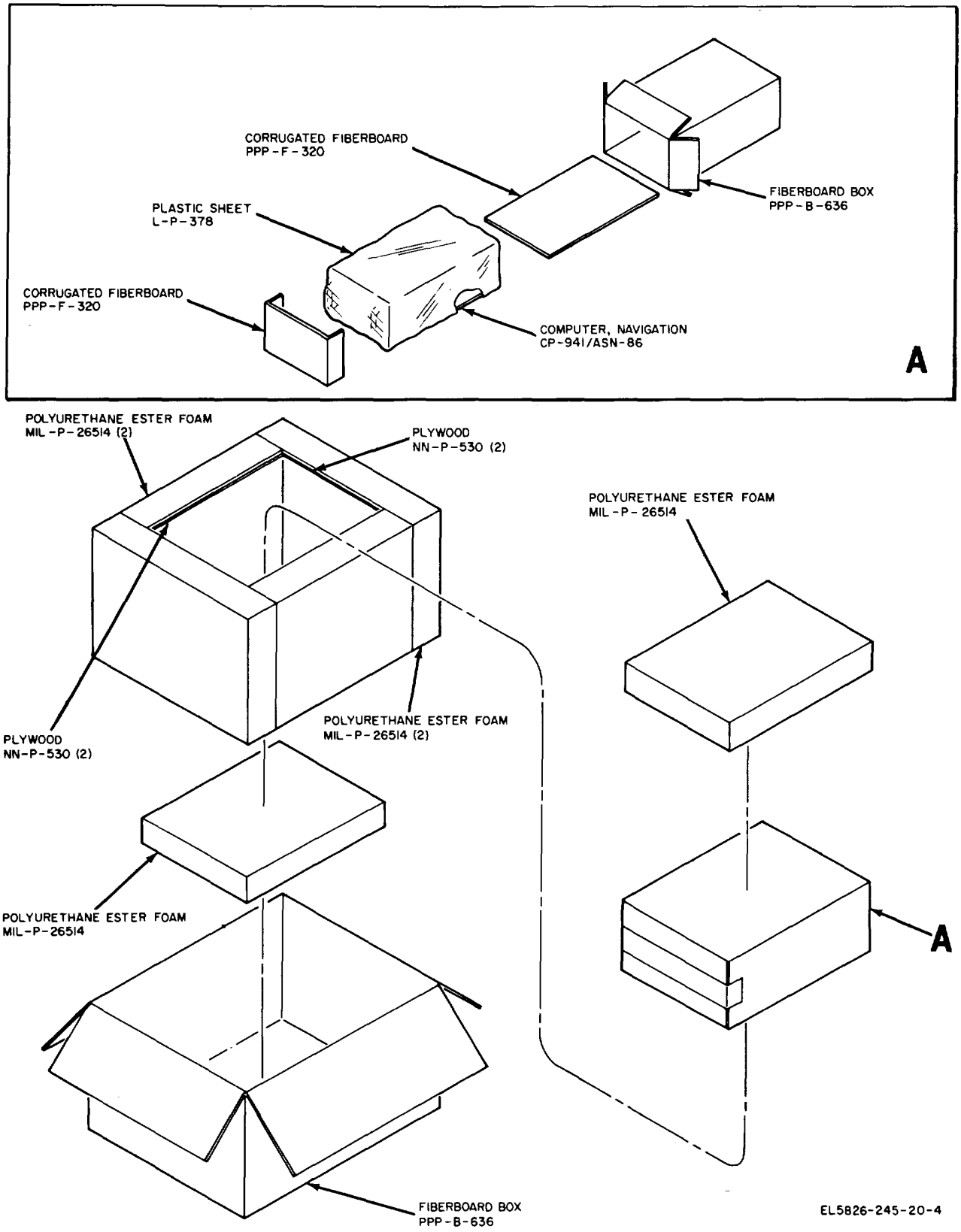

Figure 2-2. Container assembly, computer.

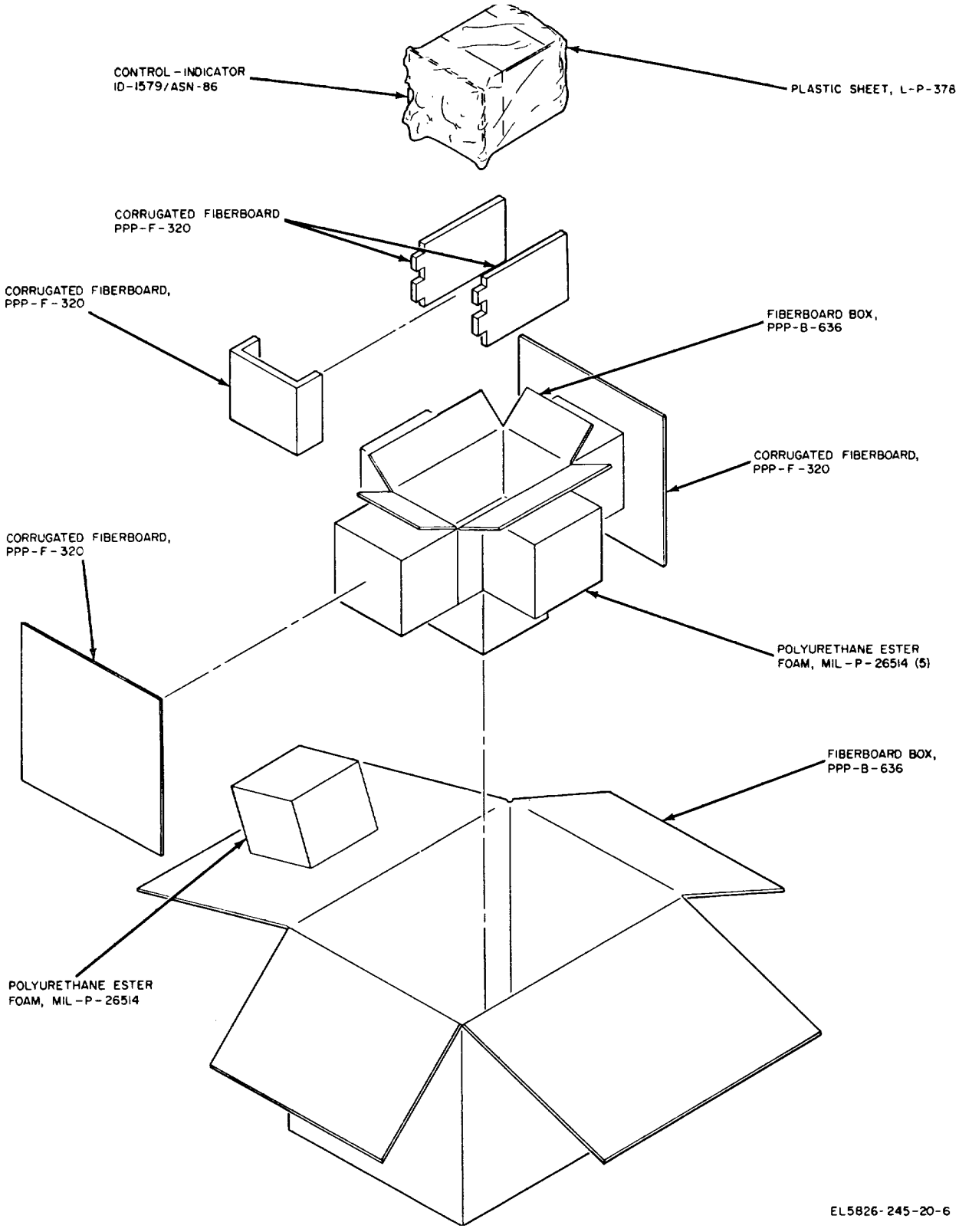

Figure 2-3. Container assembly, control-indicator.

Section II. CONTROLS AND INDICATORS

2-4. Damage from Improper Settings

No combination of control settings will cause damage to the equipment or hazard to personnel.

2-5. Controls and Indicators

(fig. 2-4)

All controls and indicators (less elapsed-time indicators) are located on the control-indicator front panel. Elapsed-time indicators are located at the rear of the computer and control-indicator, and on the front of the platform. The left and right display variables, maximum value and units and the function of each control and indicator is listed below.

a. Display Readouts.

Control-indicator SELECT switch position (fig. 2-4)	Maximum value of variable left display	Units of variable left display	Maximum value of variable right display	Units of variable right display
BRG/RNG	0359.9	Degrees	9999.9	Kilometers
UTM POS	E 60:999.9	Kilometers	N/S 9999.9	Kilometers
UTM DEST	E 60:999.9	Kilometers	N/S 9999.9	Kilometers
L/L POS	E/W 179°59.9	Degrees and minutes	N/S 89°59.9	Degrees and minutes
L/L DEST	E/W 179°59.9	Degrees and minutes	N/S 89°59.9	Degrees and minutes
MV/CS	E/W 00179.9	Degrees	359.9	Degrees
ALT/STA	99999.9	Feet	00126	No units
MON	E/W 99999.9	Variable	N/S 9999.9	Variable
EVAL	E/W 09999.9	Kilometers	N/S 9999.9	Kilometers
WIND	00359.9	Degrees	0600.0	Knots
TCK/GS	00359.9	Degrees	0600.0	Knots
HDG/TIME	00359.9	Degrees	9999.9	Minutes

b. Functions.

Control or indicator	Position	Function
Control-indicator (fig. 2-4).		
MODE (9-position rotary switch)		Selects navigation set mode of operation.
	OFF	Turns navigation set off.
	STBY	Initiates standby (STBY) mode of operation. In this mode, primary power is applied to the computer and control-indicator, and heater power is applied to the platform.
	ALIGN	Initiates align mode of operation. In this mode, the platform stable element is leveled with respect to the local vertical and aligned to true north.
	NAV	Initiates navigate (NAV) mode of operation. This is the normal mode selected for flight.
	AD	Initiates air data (AD) mode of operation. This mode is automatically selected if the platform malfunctions during the navigate mode of operation. The air data mode may be selected manually as an alternate to the navigate mode.
	COMPT	Initiates test of the computer (COMPT).
	PLAT	Initiates test of the platform (PLAT).
	GB1	Initiates gyro bias 1 (GB1) test, which provides a control-indicator readout of the Y- and Z-gyro bias correction required on the
	GB2	Initiates gyro bias 2 (GB2) test, which provides a control-indicator readout of the X- and Z-gyro bias correction required on the platform.
SELECT (12-position rotary switch)		Selects data to be inserted into the computer memory or readout on the control-indicator displays.
	Position	*Function*
	BRG/RNG	Permits readout (left display) of bearing (BRG) to the destination or TACAN station selected by the DEST thumbwheel switch

Control or indicator	*Position*	*Function*
		and STA pushbutton switch-indicator and readout (right display) of range (RNG) to the destination or TACAN station selected. Also used in conjunction with the DEST thumbwheel switch, STA and INSERT pushbutton switch-indicators to select the destination or TACAN station for navigation set control of aircraft navigation instruments.
	UTM POS	Permits insertion or readout (left display) of present-position (POS) zone number and easting distance and insertion or readout (right display) of northing and southing distance.
	UTM DEST	Permits insertion or readout (left display) of zone number and easting distance and insertion or readout (right display) of northing and southing distance of the destination (DEST) or TACAN station selected by the DEST thumbwheel switch and STA pushbutton switch-indicator.
	L, L POS	Permits insertion or readout (left display) of present position (POS) longitude (L) and insertion or readout (right display) of latitude (L).
	L, L DEST	Permits insertion or readout (left display) of longitude (L) and insertion or readout (right display) of latitude (L) of the destination (DEST) or TACAN station selected by the DEST thumbwheel switch and STA pushbutton switch-indicator.
	MV/CS	With the STA pushbutton switch-indicator in destination position (indicator light dim) permits insertion or readout (left display) of present-position magnetic variation (MV) and insertion or readout (right display) of the course select (CS) angle through the destination selected by DEST thumbwheel switch. With the STA pushbutton switch-indicator in TACAN position (indicator light bright), permits insertion or readout (left display) of the local magnetic variation of the TACAN station selected by DEST thumbwheel switch and insertion or readout (right display) of the course select angle through the TACAN station selected.
	ALT, STA	With the STA pushbutton switch-indicator in destination position (indicator light dim), permits insertion or readout (left display) of aircraft altitude above sea level on the left display; the right display contains zeros. With the STA pushbutton switch-indicator in TACAN position (indicator light bright), permits insertion or readout (left display) of altitude above sea level of the TACAN tower selected by DEST thumbwheel switch and insertion or readout (right display) of the selected TACAN station channel number.
	MON	Permits readout (left and right displays) of contents of any preselected computer core storage location. With the MODE switch set to NAV and DEST thumbwheel switch set to 0, permits readout (left display) of bit identifying failure, and readout (right display) of the destination or TACAN station selected for navigation set control of aircraft navigation instruments.
	EVAL	Permits position fix updating and readout (left and right displays) of the difference in kilometers, east or west and north or south, between present position and the destination or TACAN station selected by the DEST thumbwheel switch and STA pushbutton switch-indicator.
	WIND	With the MODE switch set to NAV, permits readout (left display) of wind direction with respect to true north and readout (right display) of windspeed. With the MODE switch set to AD (air data), permits insertion and readout (left display) of and direction and insertion and readout (right display) of windspeed.

Control or indicator	*Position*	*Function*
	TCK/GS	Permits readout (left display) of the ground track (TCK) angle with respect to true north and readout (right display) of groundspeed (GS).
	HDG/TIME	Permits readout (left display) of aircraft heading (HDG) with respect to true north and readout (right display) of time (TIME) to the destination or TACAN station selected by DEST thumbwheel switch and STA pushbutton switch- indicator.

DEST (10-position thumbwheel switch) Permits insertion or readout of data determined by the SELECT switch position. With the SELECT switch set to MON, the left and right displays read out the following:

DEST thumbwheel *Position*	*Left display*	*Right display*
0	Test failure when MAL indicator is on.	Destination or TACAN station selected for display on aircraft instruments.
1	Y-gyro bias	Z-gyro bias
2	X-gyro bias	Z-gyro bias
3	East/West velocity error, in feet per second.	North/South velocity error, in feet per second.
4	Test status	Align status.
5	Unused	Elapsed time, in minutes, in each position of the MODE switch except OFF.
6	Unused	Unused
7	Unused	Unused
8	Unused	Permits selection of any one of 4096 core storage locations.
9	Contents of selected core storage location in octal form.	Contents of selected core storage location in octal form.

Control or indicator	*Function*
MAL indicator	Lights when the navigation set malfunctions (MAL).
RDY indicator	Flashes when navigation set is ready (RDY) for navigate mode.
MEM indicator	Lights when heading memory (MEM) alignment is initiated or in progress.
DEST indicator	Lights when aircraft is within 2 minutes flying time of destination (DEST). Flashes when destination is passed or range increases.
TAC indicator	Lights when navigation set is using TACAN (TAC) data for automatic updating of present position.
INS indicator	Lights when navigation set (INS) is operating in the navigate mode.
AD indicator	Lights when the navigation set is in air data (AD) mode of operation.
HDG MEM pushbutton switch	When pressed any time after completion of alignment and held in (until MEM indicator light comes on), permits heading memory (HDG MEM) alignment on the subsequent navigation set turn on.
DIM pushbutton switch-control	Pressed and held in to turn on the E, W, N, S, degree, colon, decimal points, all 8's in the left and right displays, and the following indicators and switch-indicators: MAL, RDY, MEM, DEST, TAC, INS, AD, STA, POS FIX and INSERT. The light intensity of the left and right displays and the indicators and switch-indicators listed above is changed by turning the control.
STA pushbutton switch-indicator	Used in conjunction with DEST thumbwheel switch to select destinations or TACAN stations (STA). Brightens when a TACAN station is selected.
POS FIX pushbutton switch-indicator	When pressed, establishes the instant at which the position fix (POS FIX) error is to be computed and stored. With the SELECT switch set to EVAL, UTM POS, or L/L POS, the left and right displays are frozen when the POS FIX switch-indicator light is on bright.
SL pushbutton switch	When pressed, clears left display and INSERT indicator lights brighter.
SR pushbutton switch	When pressed, clears right display and INSERT indicator lights brighter.
Data entry pushbutton switches 1, N/2, 3,	Pressed in conjunction with the SELEC switch, DEST thumbwheel switch, SL,

Control or indicator	*Function*
W/4, 5, E/6, 7, S/8, 9, and 0. ----------	SR, STA, and INSERT switch-indicators, to load left and right displays and to store data in the computer. The direction is specified first by pressing the N/2, E/6, S/8, or W/4 pushbutton before pressing the pushbuttons to insert the appropriate numerical data.
INSERT pushbutton switch-indicator.	Pressed in conjunction with SELECT switch, STORE DEST thumbwheel, data entry pushbuttons, SL, SR, STA and POS FIX switch-indicators, stores and updates data in the computer.
E readout indicator----------	Indicates the direction, east or west, of the data displayed on the control indicator.
W	
N readout indicator ----------	Indicates the direction, north or south, of the data displayed on the control indicator.
S	
Platform (fig. 1-2):	
X-, Y-, and Z-gyro bias potentiometers	Adjusts X-, Y-, and Z-bias of platform gyros.

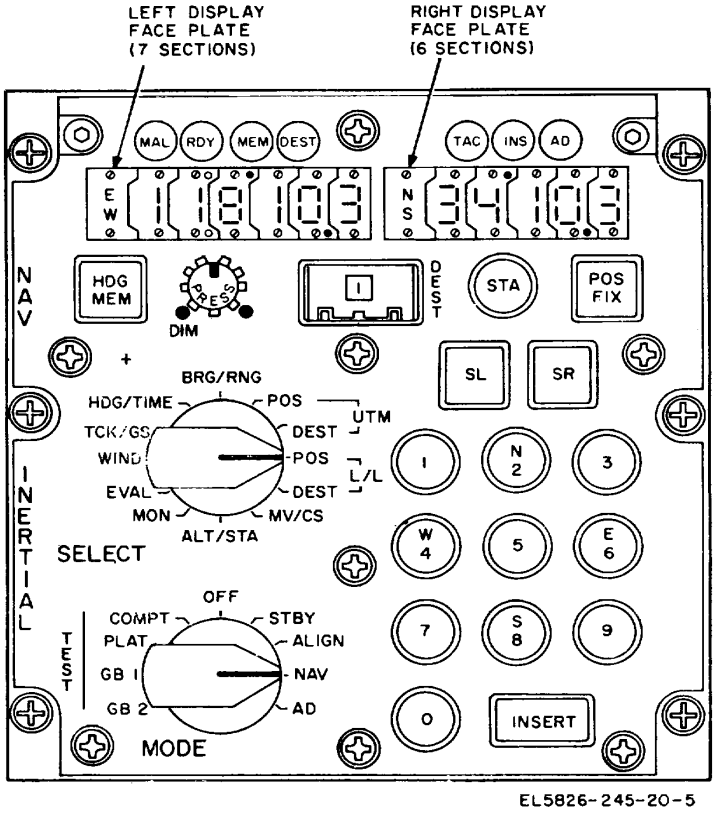

Figure 2-4. Control-indicator front panel.

Section III. OPERATION UNDER USUAL CONDITIONS

2-6. Preoperating Procedures

All the operating procedures given here are not necessarily performed by the aircrew. Under normal operating circumstances, some procedures are performed by the ground crew in preparing the aircraft for flight. Before performing any operating procedures, read and become thoroughly familiar with the information given in paragraphs 2-7 through 2-13.

2-7. Material and Date Required for Flight

a. Present-Position Data. Local magnetic variation data and latitude and longitude coordinates or UTM coordinates for the location of the air- craft during alignment must be available for storage in the computer.

b. Destination Data. The latitude and longitude coordinates or UTM coordinates and, if applicable, course select angle of all destinations must be available for storage in the computer.

c. TACAN Station Data. The following data is required for storage in the computer for each TACAN station that is to be used for updating the navigation set.

(1) Local magnetic variation of TACAN tower.

(2) Latitude and longitude coordinates or UTM coordinates.

(3) Altitude above sea level of TACAN tower.

(4) TACAN channel number.

(5) Course select angle (if applicable).

2-8. Preliminary Control Settings

a. On the control-indicator, be sure that the MODE switch is set to OFF.

b. On the pilot's compartment circuit breaker panel, be sure that the navigation set circuit breakers are set to off.

c. On the aircraft navigation junction box, install all fuses and energize all circuit breakers which supply power to the navigation set.

d. On the aircraft warning panel, be sure that the INS indicator lamp is on.

2-9. Preflight Procedures

NOTE

If the control-indicator MAL lamp comes on any time during the preflight procedures, refer to the trouble shooting procedures (chapter 3).

a. Circuit Breaker Setting. On the pilot's compartment circuit breaker panel, set the navigation set and vent air blower circuit breakers to on.

NOTE

Do not move the control-indicator MODE switch from the OFF position before aircraft navigation junction box control-indicator circuit breakers are energized or fuses installed. Loss of data, stored in computer, may result.

NOTE

Unless otherwise specified, all reference controls and indicators are located on the control-indicator (fig. 2-4).

b. Selecting Standby Mode. Set the MODE switch to STBY. Make sure that the INS indicator on aircraft warning panel is lighted. If the MEM indicator lamp comes on, perform the heading memory alignment (n below).

NOTE

Prior to using the navigation set for the first time, or any time the computer has been replaced, it is necessary to make certain the computer contains the correct mission program for the aircraft in which it is installed. To determine this, proceed as follows: set SELECT switch to MON, DEST thumbwheel switch to 8, press SR pushbutton switch once, press N/2 pushbutton switch once, press 7 pushbutton switch four times, press INSERT pushbutton switch once, and reset DEST thumbwheel switch to 9. The number displayed should agree with the number for the aircraft the navigation set is installed in (a list of the numbers for various types of aircraft is available from the higher level support unit).

c. Checking Display Lights. Press and hold the DIM pushbutton switch-control. Make sure that the MAL, RDY, MEM, DEST, TAC, INS, and AD indicator lamps are on. Be sure that all 8's appear in the left display and that E, W, colon, degree, and decimal point lamps come on. Make sure that all 8's appear in the right display and that N, S, degree, and decimal point lamps come on.

d. Adjusting Light Intensity. Turn the DIM pushbutton switch-control for the desired light intensity. Be sure that STA, POS FIX, and INSERT indicator lamps brighten. Release the DIM pushbutton switch-control and verify that all indicator lamps go off, except the STA, POS FIX, and INSERT indicator lamps which should only go dim.

e. Inserting Present-Position Coordinates. Insert the present-position coordinates into the computer memory. If the UTM coordinates are

being used, proceed with (1) below. If conventional latitude and longitude coordinates are being used, proceed with (2) below.

NOTE

When the present-position coordinates are inserted into the computer memory, they are also automatically inserted into the computer as the coordinates for destination.

(1) Inserting UTM coordinates. Insert the present-position UTM coordinates as follows:

(*a*) Set SELECT switch to UTM POS.

(*b*) Set DEST thumbwheel switch to 0 position.

(*c*) Make sure that the STA indicator lamp is off. If the STA indicator lamp is on, press the STA pushbutton switch. Verify that the STA indicator lamp is off.

(*d*) Press the SL pushbutton switch. Be sure that the left display clears and the INSERT indicator lamp brightens.

(*e*) Press data entry pushbutton switch E/6 to insert the E on the left display; then press the applicable data entry pushbutton switches to insert easting zone number and distance in kilo- meters and tenths of a kilometer. As the pushbutton switches are pressed, the data will be shifted from right to left on the left display.

NOTE

If an error is made while inserting information, press the SL pushbutton switch twice and repeat (e) above.

(*f*) Press the INSERT pushbutton switch to store information in the computer. Be sure that the INSERT indicator dims and information on the left display is correct.

(*g*) Press the SR pushbutton switch. Make sure that the right display clears and the INSERT indicator lamp brightens.

(*h*) Press data entry pushbutton switch N/2 or S/8 to insert N for northing or S for southing on the right display. Then press the applicable data entry pushbutton switches to insert the northing or southing distance in kilo- meters and tenths of a kilometer. As the pushbutton switches are pressed, the data will be shifted from right to left on the right display.

NOTE

If an error is made while inserting information, press the SR pushbutton switch twice and repeat (h) above.

(*i*) Press the INSERT pushbutton switch to store information in the computer. Make sure that the INSERT indicator lamp goes dim and information on the right display is correct.

(*j*) Proceed with *f* below.

(2) Inserting latitude-longitude coordinates. Insert the present-position longitude and latitude coordinates as follows:

(a) Set the SELECT switch to L/L POS.

(b) Set the DEST thumbwheel switch to 0 position.

(c) Make sure that the STA indicator lamp is off. If the STA indicator lamp is bright, press the STA pushbutton switch. Be sure that the STA indicator lamp is dim.

(d) Press the SL pushbutton switch. Be sure that the left display clears and the INSERT indicator lamp brightens.

(e) Press the data entry pushbutton switch E/6 or W/4 to insert E for east or W for west, respectively. Then press applicable data entry pushbutton switches to insert the longitude in degrees, minutes, and tenths of minutes. As the pushbutton switches are pressed, the data will be shifted from right to left on the left display.

NOTE

If an error is made while inserting information, press the SL pushbutton switch twice and repeat (e) above.

(f) Press the INSERT pushbutton switch to store information in the computer. Make sure that the INSERT indicator lamp goes dim and information on the left display is correct.

(g) Press the SR pushbutton switch. Make sure that the right display clears and the INSERT indicator lamp brightens.

(h) Press data entry pushbutton switch N/2 or S/8 to insert N or S on the right display. Then press the application data entry pushbutton switches to insert latitude in degrees, minutes, and tenths of minutes. As the pushbutton switches are pressed, the data will be shifted from right to left on the right display.

NOTE

If an error is made while inserting information, press the SR pushbutton switch twice and repeat (h) above.

(*i*) Press the INSERT pushbutton switch to store information in the computer. Make sure that the INSERT indicator goes dim and information on the right display is correct.

f. Inserting Local Magnetic Variation. Insert the local magnetic variation as follows:

NOTE

Ascertain that the STA indicator lamp is off.

(1) Set the SELECT switch to MV/CS.

(2) Press the SL pushbutton switch. Make sure that the left display clears and the INSERT indicator lamp brightens.

(3) Press data entry pushbutton switch E/6 or W/4 to insert E or W in the left display. Then press the applicable data entry pushbutton switches to insert the local magnetic variation in degrees and tenths of a degree.

NOTE

If an error is made while inserting information, press the SL pushbutton switch twice and repeat (3) above.

(4) Press the INSERT pushbutton switch to store information in the computer. Make sure that the INSERT indicator goes dim and information on the left display is correct.

NOTE

The aircraft should not be moved while the system is in the align mode of operation.

g. Selecting Align Mode. Before selecting align mode, present-position coordinates and local magnetic variation should be inserted.

NOTE

The alignment time given in (1) below is correct when operating at an ambient temperature of 70° F. When operating at lower temperatures, the alignment time will increase by 1 minute for each 35° F below 70° F.

(1) Set the MODE switch to ALIGN. The navigation set automatically sequences through alignment. The RDY indicator lamp will flash in approximately 12 minutes when the navigation set is ready for the navigate mode.

NOTE

The longer the navigation set remains in the align mode with the RDY indicator lamp flashing, the more accurate the alignment will be.

(2) When alignment is completed and before the aircraft is moved for any reason, select the navigation mode (1 below). If the aircraft is not to be moved, initiate a heading memory alignment by performing the procedure given in m below.

(3) During the align or navigate modes, perform *h* and *i* below using the SELECT switch, STA pushbutton switch, and positions 1 through 9 of the DEST thumbwheel switch as required to insert in the computer the coordinates and course select angles for up to nine destinations.

(4) Perform *h* through *k* below to insert the coordinates, the course select angle, the local magnetic variation, the tower altitude, and the station channel number for 10 TACAN stations (selected by the STA pushbutton switch and positions 0 to 9 of the DEST thumbwheel switch).

NOTE

If a data insertion error is made after a destination or TACAN station has been selected and the SL or SR pushbutton switch has been pressed, press the SL or SR pushbutton switch twice and insert the correct data. To correct an error after the INSERT pushbutton switch is pressed, press the SL or SR pushbutton switch once and insert the correct data; then press INSERT pushbutton switch to store information in computer.

h. Inserting Destination or TACAN Coordinates. Insert the coordinates of the destinations or TACAN stations as follows:

(1) If the UTM coordinates are used., set the SELECT switch to UTM DEST. If latitude and longitude coordinates are used, set the SELECT switch to L/L DEST.

(2) Set the DEST thumbwheel switch to the number chosen to represent the destination or TACAN station being inserted.

(3) If the coordinates are those of a destination and the STA indicator is bright, press STA pushbutton switch. Make sure that the STA indicator goes dim. If the coordinates are those of a TACAN station and the STA indicator is dim, press the STA pushbutton switch and be sure that the STA indicator brightens.

(4) Press the SL pushbutton switch. Make sure that the left display clears and the INSERT indicator brightens.

(5) Insert the coordinate information. If the UTM coordinates are used, press data entry push- button switch E/6 to insert E, press the applicable data entry pushbutton switches to insert easting zone number and distance in kilometers and

tenths of kilometers. If latitude and longitude coordinates are used, press data entry pushbutton switch E/6 or W/4 to insert E or W, and press the applicable data entry pushbutton switches to insert longitude in degrees, minutes, and tenths of minutes. Verify these values on the left display.

NOTE

If an error is made while inserting information, press the SL or SR push-button switch twice and repeat (5) above.

(6) Press the INSERT pushbutton switch to store information in the computer. Make sure that the INSERT indicator lamp goes dim and information on the left display is correct.

(7) Press the SR pushbutton switch. Make sure that the right display clears and the INSERT indicator lamp brightens.

(8) Insert the coordinate information. If the UTM coordinates are used, press data entry push- button switch N/2 or S/'8 to insert N or S, and the distance in kilometers and tenths of a kilometer. If latitude and longitude coordinates are used, press data entry pushbutton switch N/2 or S/8 to insert N or S and the north or south latitude in degrees, minutes, and tenths of minutes. Verify these values on the right display.

NOTE

If an error is made while inserting information, press the SL or SR push-button switch twice and repeat (8) above.

(9) Press the INSERT pushbutton switch to store information in the computer. Make sure that the INSERT indicator lamp goes dim and information on the right display is correct.

i. Inserting Course Select Angle. If an intercept approach to destination or TACAN station is to be made, insert the true course select angle as follows:

(1) Set the SELECT switch to MV/CS.

(2) Set the DEST thumbwheel switch to desired number.

(3) If the course select angle is that of a destination and the STA indicator is bright press the STA pushbutton switch. See that the STA indicator goes dim. If the course select angle is that of a TACAN station and STA indicator is dim, press the STA pushbutton switch. Verify that the STA indicator brightens.

(4) Press the SR pushbutton switch. See that the right display clears and the INSERT indicator lamp brightens.

(5) Press the applicable data entry pushbutton switches to insert the course select angle in degrees and tenths of a degree. Verify this value on the right display.

NOTE

If an error is made while inserting information, press the SL or SR push-button switch twice and repeat (5) above.

(6) Press the INSERT switch to store information in the computer. Make sure that the INSERT indicator lamp goes dim and information on the right display is correct.

j. Inserting TACAN Station Local Magnetic Variation. Insert the local magnetic variation of the TACAN stations as follows:

(1) With the SELECT switch in the MV/CS position, set the DEST thumbwheel switch to the number chosen to represent the TACAN station for which data are to be inserted. If the STA indicator lamp is dim, press the STA pushbutton switch. Make sure that the STA indicator lamp brightens.

(2) Press the SL pushbutton switch. Make sure that the left display clears and the INSERT indicator lamp brightens.

(3) Press data entry pushbutton switch E/6 or W/4 to insert E or W on the left display. Then press the applicable data entry pushbutton switches to insert the TACAN station magnetic variation in degrees and tenths of a degree. Verify these values on the left display.

NOTE

If an error is made while inserting information, press the SL or SR push-button switch twice and repeat (3) above.

(4) Press the INSERT pushbutton switch to store information in the computer. Make sure that the INSERT indicator lamp goes dim and information on the left display is correct.

k. Inserting TACAN Station Tower Altitude and Channel Number. Insert the TACAN station tower altitude and TACAN station channel number as follows:

(1) Set the SELECT switch to ALT/STA.

(2) Set the DEST thumbwheel switch to the number chosen to represent the TACAN station for which data is to be inserted. If the STA indi-

cator is dim, press the STA pushbutton switch. Make sure that the STA indicator brightens.

(3) Press the SL pushbutton switch. Be sure that the left display clears and the INSERT indicator lamp brightens.

(4) Press the applicable data entry pushbutton switches to insert the TACAN tower altitude in feet and tenths of a foot. Verify this value on the left display.

NOTE

If an error is made while inserting information, press the SL or SR push-button switch twice and repeat (4) above.

(5) Press the INSERT pushbutton switch to store information in the computer. See that the INSERT indicator lamp goes dim and information on the left display is correct.

(6) Press the SR pushbutton switch. Make sure that the right display clears and the INSERT indicator light brightens.

(7) Use the data entry pushbutton switches to insert the TACAN channel number (right display).

(8) Press the INSERT pushbutton switch to store information in the computer. See that the INSERT indicator lamp goes dim and information on the right display is correct.

NOTE

1 If an error is made while inserting information, press the SL or SR pushbutton switch twice and repeat (8) above.

2. In some instances, the ground crew will have performed a through k above of the preflight procedure. In this case, the MODE switch will be set to ALIGN and the RDY indicator light will be flashing when aircrew begins work. The longer the time that the navigation set remains in the align mode with the RDY indicator lamp flashing, the more accurate the navigation set alignment will be.

l. Selecting Navigate Mode. If the aircraft is to be moved after performing a through g above, see that the RDY indicator lamp is on and set the MODE switch to NAV. Verify that both the RDY indicator lamp and the INS indicator lamp on the aircraft warning panel go off and the control-indicator INS indicator lamp comes on. The navigation set is now ready for flight.

NOTE

The MODE switch NAV position is detented to prevent accidental switching from the NAV position. To switch from the NAV position, pull out and turn the MODE selector.

m. Initiating Heading Memory Alignment for Subsequent Navigation Set Turnon. If the air- craft is not to be moved before the next navigation set turnon when a heading memory alignment is to be accomplished, proceed as follows:

(1) Make sure that the aircraft is in a fixed position.

NOTE

When initiating a heading memory alignment with the MODE switch set to NAV, the subsequent heading memory alignment accuracy will be dependent on the accuracy of the navigation set when heading memory alignment was initiated.

(2) With the MODE switch set to NAV, press and hold the IDG MEM pushbutton switch until the MEM indicator lamp comes on.

(3) Set the MODE switch to OFF.

n. Heading Memory Alignment. If the procedures given in a through g and m above have been accomplished during a previous navigation set turnon, or if heading memory alignment was initiated during shutdown procedures, perform a heading memory alignment as follows:

(1) Set the MODE switch to STBY. Make sure that the MEM indicator lamp and the INS indicator lamp on aircraft warning panel come on.

NOTE

The alignment time given in (2) below is correct when operating at an ambient temperature of 70° F. When operating at lower temperatures, the alignment time will increase by 1 minute for each 35° F below 70° F.

(2) Set the MODE switch to ALIGN. The navigation set is automatically sequenced through a rapid alignment that takes approximately 4 minutes. The RDY indicator lamp will flash when the navigation set is ready for the navigate mode of operation.

(3) When the RDY indicator lamp flashes set the MODE switch to NAV. Make sure that both the MEM indicator lamp and the INS indicator lamp on the aircraft warning panel go off an the control-indicator INS indicator lamp come on. The navigation set is now ready for flight. o. Normal System Alignment Instead of Heading Memory Alignment. If a through g and 7 above have been accomplished during a previous navigation set turnon, or if a heading memory alignment was initiated during shutdown procedures and the aircraft was accidentally moved, o if for any reason it is not desired to make a heading memory alignment, perform a system alignment as follows:

(1) Set the MODE switch to STBY an depress HDG MEM pushbutton switch. Verify that MEM indicator lamp goes out.

(2) Perform the procedures given in through g above.

2-10. Preflight Procedures

NOTE

If the MAL indicator light comes on with the MODE switch set to NAV, set the SELECT switch to MON; set DEST thumbwheel switch to 0. The numeral 1 or 3 will appear on the left display to indicate a computer malfunction. Appearance of numeral 2 will indicate a control-indicator malfunction. Appearance of numeral 4 or 5 will indicate a platform malfunction.

a. Designating Fly to Destinations or TACAL Stations. Use the procedure below to select 1 of 1 destinations or 1 of 10 TACAN stations for the aircraft to fly toward.

(1) Select a destination or TACAN station, using the DEST thumbwheel switch and STI pushbutton switch. The destination represented by DEST thumbwheel position 0 is home base; for example, the aircraft location at which the navigation set was aligned.

(2) Set the SELECT switch to BRG/RNG Make sure that the INSERT indicator lam brightens.

NOTE

If the INSERT indicator does not brighten, the selected destination or TACAN station has already been inserted.

(3) Press the INSERT pushbutton switch. Make sure that the INSERT indicator lamp goes dim.

NOTE

The aircraft navigation instruments will now provide information for guiding the aircraft to the selected destination or TACAN station until a new destination or TACAN station is selected by repeating (1), (2), and (3) above. With the MODE switch set to NAV, the SELECT switch set to MON, and the DEST thumbwheel switch set to 0, the right display indicates the destination or TACAN station selected for the aircraft to fly toward. Numerals 0 through 9 indicate the destination selected. Numeral 1 preceding 0 through 9, indicates that 0 through 9 represents the TACAN station selected.

b. Bearing and Range Readout. Bearing and range to all destinations and TACAN stations are read out as follows:

(1) Use the DEST thumbwheel switch and STA pushbutton switch to select the desired destination or TACAN station.

(2) Set the SELECT switch to BRG/RNG. The left display reads out bearing to destination or TACAN station selected; the right display reads out range to destination or TACAN station.

c. Present-Position Readout. Present position is read out by setting the SELECT switch to UTM POS or L/L POS. In the UTM POS position, easting zone number and aircraft easting is read out on the left display; aircraft northing or southing is read out on the right display. With the L/L POS position selected, aircraft longitude is read out on the left display; aircraft latitude is read out on the right display.

d. Destination or TACAN Station Coordinate Readout. The UTM or latitude-longitude coordinates are read out as follows:

(1) Use the DEST thumbwheel switch and STA pushbutton switch to select the desired destination or TACAN station.

(2) Set the SELECT switch to UTM DEST or L/L DEST. The left and right displays read out the UTM or latitude-longitude coordinates for the destination or TACAN station selected.

e. Magnetic Variation and Course Select Read- out. Set the SELECT switch to MV/CS. If a

destination is selected, the left display reads out the present-position magnetic variation; the right display reads out the course select angle through the destination selected. If a TACAN station is selected, the TACAN station local magnetic variation reads out on the left display; the course select angle through the selected TACAN station reads
out on the right display.

f. TACAN Station Altitude and Channel Number Readout. The TACAN station tower altitude and channel number is read out as follows:

(1) Select the desired TACAN station, using the DEST thumbwheel switch and STA pushbutton switch.

(2) Set the SELECT switch to ALT/STA. The TACAN tower altitude is read out on the left display, and the TACAN station channel number is read out on the right display.

g. Wind Direction and Velocity Readout. Set the SELECT switch to WIND. The wind direction angle with respect to true north is read out on the left display; the wind velocity is read out on the right display.

h. Track and Groundspeed Readout. Set the SELECT switch to TCK/GS. The aircraft track angle with respect to true north is read out on the left display; the aircraft groundspeed is read out on *the right display.*

i. Heading and Time Readouts. Readout of heading angle with respect to true north and flight time, based on present groundspeed and distance to the destination or selected TACAN stations, is accomplished as follows:

(1) Select the desired destination or TACAN station, using the DEST thumbwheel switch and STA pushbutton switch.

(2) Set SELECT switch to HDG/TIME. The heading angle to the selected destination or TACAN station is read out on the left display; the time to destination or TACAN station is read out on the right display.

j. Position Fix Updating of Present Position. When flying over a fixed position the coordinates of which are known, the aircraft present position, as determined by the navigation set, are checked and updated as follows:

(1) Press the POS FIX pushbutton switch when the aircraft is directly over the fix position. Make sure that the POS FIX indicator lamp brightens.

NOTE

The POS FIX pushbutton switch may be pressed with the SELECT switch set to any position. However, with the SELECT switch set to UTM POS or L/L POS, the coordinate information on the displays is fixed with the values at the instant the POS FIX pushbutton is pressed. With the SELECT switch in the EVAL position, the difference between the known and calculated coordinates is fixed. Meanwhile, the computer will continue to update its present-position information and all other information will be displayed normally.

(2) Use the DEST thumbwheel switch and STA pushbutton switch to select the destination or TACAN station used as the fix position. Insert the position coordinates if they have not been stored (para 2-9*k*).

(3) Set the SELECT switch to EVAL. Make sure that the INSERT indicator lamp brightens. The left and right displays read out the difference between the inserted fix position coordinates and the computed present-position coordinates.

(4) If desired, accept the position fix update by pressing the INSERT pushbutton switch. The computer and displays will be automatically updated and restored to normal operation. If updating is not desired, reject the position fix update by pressing the POS FIX pushbutton switch. The computer and displays will be re- stored to normal operation using the inertially derived present position. In either case, make sure that the INSERT and POS FIX indicator lamps go dim.

k. Inserting Altitude Above Sea Level. The altitude above sea level is read out on the aircraft barometric altimeter and inserted as follows:

(1) Set the SELECT switch to ALT/STA.

(2) If the STA indicator is bright, press the STA pushbutton switch. Make sure that the STA indicator goes dim.

(3) Press the SL pushbutton switch. Make sure that the left display clears and the INSERT indicator brightens.

(4) Press the applicable data entry pushbutton switches to insert the altitude above sea level in feet and tenths of a foot.

NOTE

If an error is made while inserting information, press SL pushbutton switch twice and repeat (4) above.

(5) Press the INSERT switch to store information in the computer. Make sure that the INSERT indicator lamp goes dim and information on the left display is correct.

f. TACAN Updating of Present Position. To update navigation set present-position data, insert altitude above sea level as described in k above. With the TACAN set operating in RECEIVE, TR, or AUTO mode, the navigation set automatically requests and evaluates TACAN bearing and range data and updates the navigation set present-position data, if required. If TACAN data are used for updating present position, the control-indicator TAC lamp will come on. m. Intercept Approach to Destination. Use the procedure below to fly a selected intercept approach to a destination or TACAN station:

(1) Select the desired destination or TACAN station, using the DEST thumbwheel switch and STA pushbutton switch.

(2) Set the SELECT switch to MV/CS. The right display reads out the stored course select angle. If necessary, correct the angle by reinsertion.

(3) Set the SELECT switch to BRG/RNG. Make sure that the INSERT indicator brightens. The INSERT indicator lamp should remain dim only if the selected destination or TACAN station was inserted previously to control the aircraft navigation instruments.

(4) Press the INSERT pushbutton switch. Make sure that the INSERT indicator lamp goes dim. The aircraft navigation instruments are now controlled by the navigation set.

(5) On the aircraft instrument panel, set the DIRECT-INTERCEPT switch to INTERCEPT. The navigation instruments now provide information for guiding the aircraft on an intercept approach to the selected destination or TACAN station. The aircraft will intercept the destination or TACAN station at the inserted course select angle.

n. Direct Approach to Destination or TACAN Station. Set the aircraft instrument panel DIRECT-INTERCEPT switch to DIRECT and repeat m(l), (3), and (4) above to obtain data for flying the shortest direct route to a destination or TACAN station.

o. Air Data Mode of Operation. The air data mode, a backup for the navigate mode, is selected automatically if the platform malfunctions. Air data mode can also be selected manually be setting the MODE switch to AD. In either case, wind direction and velocity and present-position magnetic variation must be updated by manual insertion through the control-indicator. If the air data mode is automatically selected, the MAL and AD indicator lamps come on. If the MODE switch is set to AD, the MAL indicator lamp goes off and the AD indicator lamp remains on.

p. Recording Present-Position Coordinates, Time, and Heading. When the aircraft record pushbutton switch is pressed, the following navigation set information is recorded by the teleprinter:

(1) UTM present-position coordinates.

(2) Elapsed time from the instant the MODE switch is set to NAV.

(3) Heading with respect to true north.

2-11. Shutdown Procedure

NOTE

When initiating a heading memory alignment with the MODE switch set to NAV, the subsequent heading memory alignment accuracy will be dependent on the accuracy of the navigation set when heading memory alignment was initiated.

a. If a heading memory alignment is to be performed on the subsequent navigation set turnon, use the procedure below: (1) Be sure that the aircraft is in a fixed position.

(2) With the MODE switch set to NAV, press and hold the HDG MEM pushbutton switch until the MEM indicator lamp comes on.

(3) Set the MODE switch to OFF.

b. If a normal alignment is to be performed on the subsequent navigation set turnon, set the MODE switch to OFF.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-12. Operation Under Emergency Conditions

a. Aircraft power interrupts of over one-half second duration can cause the navigation set to shut down. Frozen or blank left and right displays indicate a navigation set shutdown. If a power

interrupt shutdown occurs, an in-flight alignment will provide emergency attitude and heading signals for operation of aircraft navigation instruments. To perform an in-flight alignment, proceed as follows:

NOTE

Navigation accuracy will be degraded after performing an in-flight alignment.

(1) Set MODE switch to OFF. Fly aircraft at a constant speed and heading and as straight and level as possible.

NOTE

Aircraft must be flown at a constant speed and heading and as straight and level as possible until MODE switch is set to NAV.

(2) Set MODE switch to STBY.

(3) Set SELECT switch to MV/CS.

(4) Check local magnetic variation readout on left display. If different than actual local magnetic variation, enter correct value.

(5) Set MODE switch to ALIGN; wait 45 seconds and then set MODE switch to NAV. Observe that attitude and heading information is available.

b. Aircraft power interrupts or transients on power lines, or platform malfunctions may cause only the platform to shut down. The AD indicator lights to indicate a platform shutdown. When the AD indicator lights, the air data mode of operation may be used (para 2-10*o*). If a power interrupt or transient is the suspected cause of a platform shutdown, an in-flight alignment should be attempted (a above) to provide emergency attitude signals for operation of aircraft navigation instruments.

c. Other than the information contained in a and b above and paragraph 2-10*o*, operation of the navigation set is dependent only on inputs from the true airspeed transmitter, the flux valve, instrument power transformer, lighting control panel, TACAN, and the altitude read out on the aircraft barometric altimeter and inserted with the control-indicator. Loss of input from the true airspeed transmitter causes loss of wind direction and wind velocity readouts, making the air data mode of operation inoperative. Loss of input from the flux valve increases alignment time, causes loss of present-position local magnetic variation readout, and removes magnetic heading output to the aircraft navigation instruments and TACAN. Loss of input from the instrument power transformer causes the navigation set to be inoperable and removes magnetic heading output to the air- craft navigation instruments and TACAN. Loss of input from the lighting control panel causes loss of control-indicator lighting which uses edge- light power. Loss of TACAN input prevents updating present position using TACAN information. Failure to insert altitude decreases the accuracy of TACAN updating of present position.

2-13. Operation Under Adverse Conditions The navigation set is totally independent of air- craft maneuvers, weather conditions, and terrain.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE

Section I. GENERAL

3-1. Scope of Organizational Maintenance The organizational maintenance duties for the navigation set are listed below with a paragraph reference for each specific function. The duties include inspection, testing, and servicing instructions for performing preventive maintenance services.

a. Intermediate maintenance checks and services (para 3-5).

b. Cleaning (para 3-7).

c. Repainting and refinishing instructions (para 3-8).

d. Operational checks (para 3-10).

e. Periodic maintenance checks and services (para 3-12).

f. General troubleshooting (para 3-14).

g. Supplementary troubleshooting (para 3-16).

h. Gyro bias adjustment (para 3-17).

i. Removal and replacement (para 3-18).

3-2. Tools, Test Equipment, and Materials Required

a. Tools. Tool Kit, TK-101/G and TK-90/G.

b. Test Equipment. Multimeter AN/USM-223. (Use AN/URM-105 until AN/USM-223 is avail- able.)

c. Materials.

(1) Sandpaper, No. 000.

(2) Cloth, clean, dry, lint-free.

(3) Brush, soft bristle.

(4) Compound, cleaning (FSN 7930-395-9542).

(5) Enamel, lusterless (MIL SPEC TT-E-527).

(6) Paste, antistatic.

3-3. Special Tools Required

No special tools are required for organizational maintenance.

Section II. PREVENTIVE MAINTENANCE

3-4. Preventive Maintenance

Preventive maintenance of the navigation set is the systematic care, inspection, and service that prevents breakdowns and insures maximum operational capability. Preventive maintenance includes the inspection, testing, and replacement of components of the navigation set that inspection indicates would probably fail before the next scheduled periodic service. Preventive maintenance checks and services are made at intermediate and periodic intervals unless otherwise directed by the commanding officer. Preventive maintenance services should be performed concurrently with the inspection schedules of the air- craft.

a. Systematic Care. The routine systematic care and cleaning essential to proper upkeep and operation of the navigation set are specified in para- graphs 3-5 through 3-13.

b. Maintenance Checks and Services. The maintenance checks and services charts (para 3-6 and 3-13) outline inspections to be made at specific intervals to determine combat serviceability of the navigation set; that is, to determine that the equipment is in good physical condition and operating condition, and likely to remain combat serviceable. The charts specify what to inspect, how to inspect it, and list appropriate references. Records and reports of these checks and services must be made in accordance with TM 38-750. If the defect cannot be remedied at organizational maintenance, a higher category of maintenance of repair is required. When a component is removed from the aircraft, it is replaced by an equivalent serviceable component from maintenance float stock or on a direct exchange basis from higher category of maintenance.

3-5. Intermediate Maintenance Checks and Services

The intermediate maintenance checks and services chart (para 3-6) provides verification of satisfactory operation of the navigation set at intervals between the periodic inspections. The intermediate maintenance checks and services will be accomplished at intervals of 25-flying hours. The intermediate maintenance checks and services are performed concurrently with the intermediate maintenance performed on the aircraft. Equipment maintained in aircraft in a standby (ready for immediate operation) condition must have intermediate maintenance checks and services perform on it concurrently with the intermediate maintenance performed on the aircraft. Equipment in limited storage (requires service before operation) does not require intermediate checks and services.

3-6. Intermediate Maintenance Checks and Services Chart

Seq No.	Item	Procedure	Reference
Caution.	**Do not touch connector pins; static electricity discharge from body may cause damage to equipment**		
1	Cable connectors	Check connections to all components of navigation set and insure that connections are clean, intact, and not loose fitting.	None.
2	Exterior surfaces	Remove all dirt, grease, and moisture. Inspect Inspect for scratched paint, missing screws, and bent or broken hardware. Repair as necessary.	Paragraphs 3-7 and 3-8.
3	Indicators	Make sure that plastic surfaces are clean and not cracked or damaged.	Paragraph 3-7.
4	knobs, pushbuttons, and switches.	See that mechanical action is positive without backlash, binding, or scraping.	None.
Caution.	**Do not exceed 39 inch-pounds torque when tightening platform V-block mount screws.**		
5	Mountings	Inspect seating and stability of mountings. Check for loose or missing hardware and replace and tighten as necessary. See that shock-mounted components are securely mounted with sufficient clearance. See that al other components are securely mounted. Inspect all bonding for good electrical and mechanical connection.	None.
6	Operational check	See that navigation set operates in accordance with operational checks.	Paragraph 3-10.

3-7. Cleaning

Inspect the exterior surfaces of the navigation set. The surfaces should be free of moisture, dirt, grease and fungus. To clean the exterior surfaces of the navigation set, proceed as follows:

WARNING

Prolonged breathing of cleaning compound is dangerous; provide adequate ventilation. Cleaning compound is flammable; do not use near open flame.

CAUTION

Do not use cleaning compound on the control-indicator front panel. To prevent harmful chemical reaction, use only a clean, dry, lint-free cloth or soft-bristle brush to remove accumulated dust and dirt.

a. Use a clean, dry, lint-free cloth to remove moisture and loose dirt.

b. Use a clean, lint-free cloth dampened (not wet) with cleaning compound to remove grease, fungus, and ground-in dirt from the cases.

CAUTION

Do not touch connector pins; static electricity discharge from body may cause damage to equipment.

c. Use a soft-bristle brush to remove dirt from connectors; use a clean, dry, lint-free cloth to remove moisture.

d. Use a clean, dry, lint-free cloth to clean the indicator faces. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning.

WARNING

When using compressed air to clean the heat exchanger, pressure must not exceed 10 pounds per square inch (psi). Higher pressure may damage parts and present a hazard to personnel.

e. Use compressed air to clean the heat exchanger on top of computer. Where dirt cannot be dislodged with compressed air, use a soft-bristle brush.

3-8. Repainting and Refinishing

NOTE

Refer to the applicable cleaning and refinishing practices specified in TB 746-10.

To repaint and refinish the navigation set, proceed as follows:

a. Remove rust and corrosion from metal surfaces by lightly sanding with No. 000 sandpaper.

b. Brush two thin coats of lusterless enamel (para 3-2c) on bare metal to protect it from further corrosion.

3-9. Lubrication Instructions

No lubrication is required at organizational maintenance category.

3-10. Operational Checks The following operational check is performed with external power connected to the aircraft. To connect external power, refer to the applicable organizational maintenance manual covering the aircraft.

a. Preliminary Control Settings. Refer to paragraph 2-8 for preliminary control settings.

b. Operational Check. Perform the procedure in the operational check list (para 3-11). If the normal indication is not obtained, refer to the troubleshooting chart (para 3-15) for corrective action.

NOTE

Unless otherwise specified, all referenced controls and indicators are located on the control-indicator (fig. 2-4).

3-11. Operational Checklist

Sequence No.	Procedure	Normal indication
1	Energize all circuit breakers that supply power to navigation set and vent air blowers.	*a.* See that INS indicator lamp on aircraft warning panel is on. *b.* Control-indicator HDG MEM, SL, SR, data entry indicators and edgelighted panel lamps light.

NOTE

Edge-lighted panel lamps include MODE and SELECT switch placarding, DIM, and DEST, and NAV INERTIAL placarding.

CAUTION

Do not move MODE switch from the OFF position before aircraft navigation junction box control-indicator circuit breakers are energized or fuses installed. Loss of data, stored in computer, may result.

Sequence No.	Procedure	Normal indication
2	Set the control-indicator MODE switch to STBY.	a. If MEM indicator lamp lights, depress MEM HDG pushbutton switch; MEM indicator lamp goes off. Disregard other indicators while performing this step. b. INS indicator lamp on aircraft warning panel remains on. c. Both MAL and AD indicator lamps remain off.
3	Press and hold DIM pushbutton-switch control.	a. MAL, RDY, MEM, DEST, TAC, INS, and AD indicator lamps light. b. STA, POS FIX, and INSERT indicator lamps brighten. c. All 8's appear in the left display and the E, W, colon, degree and decimal point lamps light. All 8's appear in the right display and the N, S, degree, and decimal point lamps light.
4	While pressed, turn DIM pushbutton-switch control.	All lamps listed in sequence 8 vary in intensity.
5	Release DIM pushbutton-switch control.	a. MAL, RDY, MEM, DEST, TAC, INS, and AD.

Sequence No.	Procedure	Normal indication
		b. The left and right displays read out data selected by the SELECT switch, DEST thumbwheel switch, and STA pushbutton switch.
		c. STA, POS FIX, and INSERT indicator lamps go dim.
6	Insert present position and local magnetic variation as specified in paragraph 2-9*e* and *f*.	Same as paragraph 2-9*e* and *f*.

Note. Do not move aircraft while operating in the align mode.

7	Set MODE switch to ALIGN. Set SELECT switch to MON and DEST thumbwheel switch to 4.	*a.* The following number sequence is read out on the right display as the navigation set proceeds automatically through five stages of alignment.

Alignment stage	Number
Cage	10
Level	20
Gyrocompass 1	30
Gyrocompass 2	40
Gyrocompass 3	50

Note. During the first two stages, the right digit will be 1 if the platform coarse heaters are on. Before stage three begins, the right digit must change to 0, indicating that the platform is up to operating temperature and platform coarse heaters are off.

		b. INS indicator lamp on aircraft warning panel remains on.
		c. MAL and AD indicator lamps remain off.

Note. The alignment time given in d below is correct when operating at an ambient temperature of 70 degrees F. When operating at lower temperatures, the alignment time will increase by one minute for each 35 degrees F below 70 degrees F.

		d. RDY indicator lamp flashes when the number sequence above reaches 50. The time required is approximately 12 minutes.
8	When RDY indicator lamp lights, set MODE switch to NAV.	a. MAL and AD indicator lamps remain off.
		b. INS indicator on control-indicator lamp lights.
		c. INS indicator lamp on aircraft warning panel goes off.

Note. Do not move aircraft after performing sequence No. 9 or while performing sequences No. 10 and 11.

Sequence No.	Procedure	Normal indication
		d. RDY indicator lamp goes off.
9	Press and hold HDG MEM pushbutton switch until MEM indicator lamp lights.	MEM indicator lamp lights.
10	Set MODE switch to OFF.	a. All lamps go off.
		b. INS indicator lamp on aircraft warning panel lights.
11	Set MODE switch to STBY.	a. MEM indicator lamp lights.
		b. Same as sequence No. 2b, c, and d.
12	Set MODE switch to ALIGN.	a. MEM indicator lamp remains on.
		b. Same as sequence No. 7b, c, and d above.
		c. The following sequence number is read out on the right display as the navigation set proceeds automatically through three stages of alignment.

Alignment stage	Number
Cage	10
Level	20
Fine level	60

Note. During the first two stages, the right digit will be 1 if the platform coarse heaters are on. Before the third stage (50) begins, the right digit must change to 0 to indicate that the platform is up to operating temperature and platform coarse heaters are off.

Note. The alignment time given in d below is correct when operating at an ambient temperature of 70 F. When operating at lower temperatures, the alignment time will increase by 1 minute for each 35°F below 70°F.

		d. RDY indicator lamp will flash when the navigation set is ready for the navigate mode of operation. Time required is approximately 4 minutes.
13	When RDY indicator lamp flashes set MODE switch to NAV.	Same as sequence No. 8 above and MEM indicator lamp goes off.
14	Set MODE switch to OFF.	a. All lamps go off.
		b. INS indicator light on aircraft warning panel comes on.

3-12. Periodic Maintenance Checks and Services

In accordance with the requirements of TM 38-750, the periodic maintenance checks and services on the navigation set should be scheduled concurrently with the periodic maintenance service schedule of the aircraft in which the equipment is installed. (Refer to the applicable aircraft technical manual for the hours between service periods.) All deficiencies or shortcomings will be immediately reported to a higher category of maintenance as specified in TM 38-750. A deficiency that cannot be corrected by organizational maintenance should be deadlined in accordance with TM 38-750. Perform all the checks and services listed in the periodic maintenance checks and services chart (para 3-13).

3-13. Periodic Preventive Maintenance Checks and Services Chart

Seq No.	Item	Procedure	Reference
1	Installation	Check to see that the navigation set components and the platform mount are installed in accordance with instructions in aircraft configuration manual.	Configuration manual of applicable aircraft.
2	Publications	a. Check to see that pertinent publications with no missing pages are on hand. Requisition pertinent publications not on hand.	a. Appendix A.
		b. Check to see whether pertinent publications are up to date.	b. DA Pam 310-4.
3	Modification work orders	a. Check to determine whether new applicable MWO's have been published.	a. DA Pam 310-7.
		b. Make sure that all URGENT MWO's have been applied to equipment.	b. DA Pam 310-7.
		c. Make sure that all NORMAL MWO's have been scheduled.	c. DA Pam 3107.

Section III. TROUBLESHOOTING

3-14. General Troubleshooting

Troubleshooting of the navigation set is based on the operational check in paragraph 3-10. When an abnormal condition or result is observed, refer to the troubleshooting chart. The paragraph references given in the *Reference paragraph No.* column of the troubleshooting chart correspond to the paragraph numbers of the operational checklist (para 3-11). Perform the corrective actions specified in the troubleshooting chart. If the corrective actions do not correct the trouble, higher category of maintenance is required. In all cases, the corrective action calls for replacement of a component suspected of being faulty. Paragraph 3-18 contains component removal and replacement procedures.

3-15. Troubleshooting Chart

Item No.	*Reference Paragraph No.*	*Symptom*	*Probable trouble*	*Corrective action*
1	3-11, 1*a*	a. INS indicator on aircraft warning panel is off.	*a.* Probable trouble are as follows: (1) No power applied to INS indicator breakers.	*a.* Corrective actions are as follows: (1) Check appropriate aircraft circuit
			(2) Lamp defective	(2) Replace lamp (para 3-18*e*).
		b. Symptoms are as follows: (1) HDG, MEM, SL, SR, data entry indicators, and edgelighted panel lamp do not come on.	*b.* Probable troubles are as follows: (1) Proceed as follows: (a) No edgelighted panel power applied to control-indicator. (b) Control-indicator defective	*b.* Corrective actions are as follows: (1) Proceed as follows: (a) Check appropriate aircraft circuit breakers and switches. (b) Replace control-indicator (para 3-18*c*).
		Note. Edgelighted panel lamps include MODE SELECT switch, placarding DIM, and DEST and NAV INERTIAL placarding.		
		(2) HDG MEM, SL SR, or one or more data entry indicator lamps do not come on.	(2) Lamps defective	(2) Replace lamps (para 3-18*e*).
		(3) Edgelighted panel lamps do not come on.	(3) Control-indicator defective	(3) Replace control-indicator.(para 3-18*c*).
2		*a.* Disregard indicators	*a.* None	*a.* None.
	3-11, 2*b*	*b.* INS indicator on aircraft warning panel goes off.	*b.* Lamp defective	*b.* Replace lamp (para 3-18*e*).
	3-11, 2*c*	*c.* Both MAL and AD indicator lamps come on.	*c.* Platform, computer, or control-indicator	*c.* Set MODE switch to AD. If MAL indicator lamp goes off and AD indicator lamp remains on, replace platform. If MAL indicator remains on, perform the corrective action in *d* below.
		Note. If present position and local magnetic variation have been inserted previously, they do not have to be inserted again when performing the corrective action in *d*(2) below.		
	3-11, 2*d*	*d.* MAL indicator lights	*d.* Computer platform, or control-indicator malfunction.	*d.* Corrective actions are as follows: (1) Set select switch to MON; set DEST thumbwheel switch to 0If left display read out is 1 or 3, replace computer (pars 5-18a)If left display readout is 2, replace control-indicator (para 3-18:)If left display readout is 4 or 5, replace platform (para 3-18d)If left display readout is not 1, 2, 3, 4, or 5, proceed with the corrective action in (2) below. (2) Set MODE switch to COMPT. Insert present position and local magnetic variation. Set DEST thumbwheel switch to 4. Wait approximately 2 minutes; the left display readout should be 11111.1.

				If all ones do not read out, replace computer (para 3-18a)If all ones are read out, proceed with corrective action in (3) below. (3) Set MODE switch to PLATWait approximately 12 minutes; the left display readout should be 11111.1. If all ones are not read out, replace platform (para 3-18d).
3	3-11, 3*a*	*a.* One or more of the following indicator lamps do not come on: MAL, RDY, MEM, DEST, TAC, INS, AD.	*a.* Control-indicator defective	*a.* Replace control-indictor (para 3-18c).
	3-11, 3*b*	*b.* STA, POS FIX, or INSERT indicator lamps do not come on.	*b.* Lamps defective	*b.* Replace lamps (para 3-18e).
	3-11, 3*c*	*c.* Symptoms are as follows: (1) The left or right display is clear (all lamps out). (2) One or more lamps on the left or right display does not come on.	*c.* Probable troubles are as follows (1) SL or SR pushbutton switch pressed to clear display, or the control indicator is defective. (2) Lamps defective	*c.* Corrective actions are as follows: (1) Press SL or SR pushbutton switch. If displays do not light, replace control-indicator (para 3-18c). (2) Replace lamps (para 3-18e).
4	3-11, 4	Lamps do not vary in intensity	Control-indicator defective	Replace control-indicator (para 3-18c
5	3-11, 5*a*_	*a.* MAL, RDY, MEM, DEST, TAC, INS, AD, STA, POS FIX, and INSERT indicator lamps do not go off.	*a.* Probable troubles are as follows: (1) Control-indicator defective (2) Computer defective	*a.* Corrective actions are as follows: (1) Replace control-indicator(para 3-18c). (2) Perform the corrective action in item No. 2d(2).
	3-11, 5*b*	*b.* The left and right displays do not read out data selected by the select switch, DEST thumbwheel switch, and STA pushbutton switch.	*b.* Probable troubles are as follows: (1) No data has been inserted (2) Control-indicator defective (3) Computer defective	*b.* Corrective actions are as follows: (1) Insert data. (2) Replace control-indicator (para 3-18c). (3) Perform the corrective action in item No. 2d(2).
6	3-11, 6	Present position and local magnetic variation data cannot be inserted	*a.* Computer defective *b.* Replace control-indicator	*a.* Perform the corrective action in item No. 2d(2). *b.* Replace control-indicator (para 3-18c).
7	3-11, 7*a*	*a.* Number sequence does not appear as listed	*a.* Computer or platform defective	*a.* Perform the corrective action in item No. 2d.
	3-11, 7*b*	*b.* INS indicator light goes off	*b.* Lamp defective	*b.* Replace control-indicator (para 3-18c).
	3-11, 7*c*	*c.* Both MAL and AD indicator lamps come	*c.* Platform or computer defective	*c.* Perform the corrective action in item No2c.
	3-11, 7*d*	*d.* indicator lamp comes on	*d.* computer or platform defective	*d.* Perform the corrective action in item No2d.
	3-11 7*e*	*e.* RDY indicator lamp does not flash when number sequence reaches 50,	*e.* Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	*e.* Corrective actions are as follows: (1) Perform the corrective action in item No. 2d. (2) Replace control-indicator(para 3-18c).
8	3-11, 8*a*	*a.* Both MAL and AD indicator lamps come	*a.* Platform or computer defective	*a.* Perform the corrective action in item No. 2c.
	3-11, 8*b*	*b.* MAL indicator lamp comes on	*b.* Computer or platform defective	*b.* Perform the corrective action in item No. 2d.

	3-11, 8*c*	*c.* INS indicator on control-indicator remains off.	*c.* Probable troubles are as follows: (1) Computer defective (2) Control-indicator defective	*c.* Corrective actions are as follows: (1) Perform corrective action in item (2) Replace control-indicator (para 3-18*c).*
	3-11, 8*d*	d. INS indicator on aircraft warning panel	d. Computer or platform defective	d. Perform the corrective action in item No. 2*d.*
	3-11, 8*e*	*d.* RDY indicator lamp does not go out.	*d.* Probable troubles are as follows: (1) Computer defective (2) Control-indicator defective	*d.* Corrective actions are as follows: (1) Perform corrective action in item No. 2*c*(2). (2) Replace control-indicator (para 3-18*c*
9	3-11, 9	MEM indicator lamp does not come on	Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	Corrective actions are as follows: (1) Perform the corrective action in item No. 2*d.* (2) Replace control-indicator (para 3-18).
10	3-11, 10*a*	*a.* All lamps do not go off	*a.* Control indicator defective	*a.* Replace control-indicator (para 3-18*c*).
	3-11, 10*b*	*b.* INS indicator on aircraft warning panel goes off.	*b.* Lamp defective	*b.* Replace lamp (para 3-18*e*).
11	3-11, 11*a*	*a.* MEM indicator lamp does not come on	*a.* Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	*a.* Corrective actions are as follows: (1) Perform corrective action in item No. 2*d.* (2) Replace control-indicator (para 3-18*c*).
	3-11, 11*b*	*b.* Same as item No2 except for *a*	*b.* Same as Item No. 2 except for a	*b.* Same as item No. 2 except for *a.*
12	3-11, 12*a*	*a.* MEM indicator lamp goes off	*a.* Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	*a.* Corrective actions are as follows: (1) Perform corrective action in item No, 2*d.* (2) Replace control-indicator (para 3-18*c*).
	3-11, 12*b*	*b.* Same as item No. 7 b thru d	*b.* Same as item No7 b through d	*b.* Same as item No. 7 b through d.
	3-11, 12*c*	*c.* Number sequence does not appear as listed	*c.* Computer or platform defective	*c.* Perform the corrective action in item No. 2*d.*
	3-11, 12*d*	d. RDY indicator lamp does not flash	d. Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	d. Corrective actions are as follows: (1) Perform corrective action in item No. 2*d.* (2) Replace control-indicator (para 3-18*c*).
13	3-11, 12	Same as item No. 8	Same as item No. 8	Same as item No. 8.
14	3-11, 13*a*	*a.* All lamps do not go off	*a.* Control-indicator defective	*a.* Replace control-indicator (para 3-18*c*).
	3-11, 13*b*	*b.* INS indicator on aircraft warning panel goes off.	*b.* Lamp defective	*b.* Replace lamp (para 3-18*e*).

3-16. Supplementary Troubleshooting

To select the contents of any one of 4096 core storage locations for readout on the left and right display, proceed as follows:

(1) With the control-indicator MODE switch set to any position other than OFF, set the SELECT switch to MON.

(2) Set the DEST thumbwheel switch to 8.

(3) Press the SR pushbutton switch. Make sure that the right display clears and the INSERT indicator lamp brightens.

NOTE

As the data entry pushbutton switches are pressed, the data will be shifted from right to left on the right display.

(4) Use the data entry pushbutton switches to insert core storage location number in octal format.

(5) Press the INSERT pushbutton switch to store information in the computer. Make sure that the INSERT indicator light goes dim and the inserted number is read out on the right display.

(6) Set the DEST thumbwheel switch to 9.

(7) Read out the contents of the core storage location selected on the left and right displays.

NOTE

The sign of the particular word is indicated by the first (high-order) position of the left display. Numeral 1 indicates a minus, 0 indicates a plus. The contents of the selected location are read out in octal form on the remaining five positions of the left display, and the four high-order positions of the right display. The low-order position of the right display will be blank.

3-17. Gyro Bias Adjustment

The platform gyro biases should be checked when the aircrew report excessive terminal error. Gyro biasing of maintenance float stock platforms is performed by a higher category of maintenance and is not required after installation. To check and adjust the gyro bias values, proceed as follows:

a. Energize the navigation set in accordance with instructions given in paragraphs 28 and 29a, b, c, and d.

b. Set the control-indicator MODE switch to COMPT.

c. Insert the present-position coordinates as specified in paragraph 2-9e.

d. Insert local magnetic variation as specified in paragraph 2-9f.

e. Set the MODE switch to GB 2.

f. Set the SELECT switch to MON.

g. Set the DEST thumbwheel switch to 4.

h. Allow the navigation set to operate for 90 minutes after the right hand display reads 7.

NOTE

The X-gyro bias correction readout on the left display will be E or W followed by the number of divisions and tenths of a division that the X-bias potentiometer must be turned for adjustment. The Z-bias correction and readout on the display will be N or S followed by the number of divisions and tenths of a division the Z-bias potentiometer must be turned for adjustment.

i. Set DEST thumbwheel switch to 2.

j. Record the X- and Z-gyro bias correction read-outs.

NOTE

The gyro bias potentiometers are 10-turn potentiometers with 50 divisions per turn. There are five divisions between numerals on the dial (fig. 1-2A). Tenths of a division must be approximated between the division markers.

k. Turn the Z-gyro bias potentiometer on the platform (fig. 1-2) the number of divisions and tenths of a division recorded in j above. If S pre- ceded the indication, turn the potentiometer counterclockwise. If N preceded the indication, turn the potentiometer clockwise.

l. Turn the X-gyro bias potentiometer on the platform (fig. 1-2) the number of divisions and tenths of a division recorded in j above. If W preceded the indication, turn the potentiometer counterclockwise. If E preceded the indication, turn the potentiometer clockwise.

m. If the X- or Z-gyro bias potentiometer requires more than 10 divisions of change, repeat e through I above.

n. Set the MODE switch to GB 1.

o. Set DEST thumbwheel switch to 4.

p. Allow the navigation set to operate for 30 minutes after the right hand display reads 7.

q. Set DEST thumbwheel switch to 1.

NOTE

The Y-gyro bias correction readout on the left display will be E or W followed by the number of divisions and tenths of divisions that the Y-bias potentiometer must be turned for adjustment.

r. Record the Y-gyro bias correction readout.

s. Turn the Y-gyro bias potentiometer on the platform (fig. 1-2) the number of divisions and tenths of a division recorded in r above. If W preceded the indication, turn the potentiometer counterclockwise. If E preceded the indication, turn the potentiometer clockwise.

t. If the Y-gyro bias requires more than 10 divisions of change, repeat e through s above.

3-18. Removal and Replacement

WARNING

Be sure that all navigation set circuit breakers are at OFF and all navigation set fuses are removed before removing or replacing the equipment.

CAUTION

Do not touch connector pins; static electricity discharge from body may cause damage to equipment.

a. Computer.

(1) Remove the computer from the computer mount as follows:

(a) Disconnect the five electrical cables from the front panel connectors.

(b) Remove the screw that attaches the ground strap to the computer front panel.

(c) Disengage the two screw clamps from the holddown brackets on front of the computer by turning the thumb nuts counterclockwise.

(d) Allow the screw clamps to drop free.

CAUTION

Use extreme care while performing the procedures given in (e) below to prevent damaging air seal between the computer and the computer mounting.

(e) Use handles on the front of the computer to pull the computer forward and away from the computer mount.

(2) Replace the computer on the computer mount as follows:

CAUTION

Use extreme care while performing (a) below to prevent damaging the computer mount air seal.

(a) Use handles on the front of the computer to position the computer on the computer mount, and slide the computer to the rear to engage the guide pins at the rear of mount.

(b) Be sure that the computer is firmly seated against the rear of the computer mount. Engage the screw clamps in the holddown brackets at the front of the unit and tighten the thumb nuts securely.

(c) Secure the ground strap to the computer front panel with the attaching screw.

(d) Connect the five electrical cables to the computer front panel connectors.

b. Computer Mount.

(1) Remove the computer mount from the aircraft as follows:

(a) Remove the four screws that secure the aircraft exhaust air duct to the computer mount.

(b) Remove the 16 screws that secure the four isolators to the aircraft.

(c) Lift the computer mount from the support.

(2) Replace the computer mount in the aircraft as follows:

(a) Position the computer mount on the support.

(b) Install the 16 mounting screws.

(c) Secure the aircraft exhaust air duct to the mount with the four mounting screws.

c. Control-Indicator.

(1) Remove the control-indicator as follows:

(a) Loosen the six Dzus fasteners on the front of the control-indicator.

(b) Lift the control-indicator out of the compartment.

(c) Disconnect the cable connector on the rear of the control-indicator.

(2) Replace the control-indicator as follows:

(a) Connect the cable to the connector on the rear of the control-indicator.

(b) Place the control-indicator in its compartment.

(c) Tighten the six Dzus fasteners on the front of the control-indicator.

d. Platform.

(1) Remove the platform from its mount as follows:

(a) Remove the air hose from the front of the platform.

(b) Disconnect the electrical cable from the connector on the front of the platform.

(c) Remove the screws from the three mounting clamps; swing the clamps away from the platform mounts.

(d) Carefully lift the platform off the V-block mounts to prevent damaging mounts.

(2) Replace the platform on its mount as follows:

CAUTION

Use extreme care while performing (a) and (b) below to prevent damaging the platform mount and the mounting springs.

(a) Be sure that the mounting clamps are clear of the platform mount V-block mounts and place the platform on three V-block mounts.

(b) Position three mounting clamps and secure them by tightening down the screws; do not overtighten.

(c) Connect the electrical cable to the connector on the front of the platform.

(d) Replace the air hose on the front of the platform.

e. Lamps.

NOTE

The control-indicator left display face-plate (fig. 2-4) is made up of seven sections. The right display faceplate is made up of six sections. Each section is secured to the control-indicator front panel with two screws. The E and W and the N and S sections of the display contain four lamps each. The numeral sections of the displays contain seven lamps each. The degree and decimal points are illuminated by one lamp each.

(1) Remove a display lamp as follows:

(a) Remove and retain the two screws that secure the display faceplate section to be removed.

(b) Pull the section straight out to expose the lamp socket.

(c) Pull the defective lamp straight out from its socket.

(2) Replace a display lamp as follows:

(a) Push the new lamp straight into the socket.

(b) Place the faceplate section on the display faceplate.

(c) Secure the section with the two screws.

(3) Remove the HDG MEM, STA, POS FIX, SL, SR, INSERT and data entry pushbutton lamps as follows:

(a) Use the slots on both sides of the lens to pull the lens straight out from the panel to expose the lamp socket.

(b) Pull the lamp straight out from the lamp socket.

(4) Replace the HDG MEM, STA, POS FIX, SL, SR, INSERT and data entry pushbutton lamps as follows:

(a) Push the new lamp straight into the lamp socket.

(b) Line up the key on the lens with the keyway on the panel and push the lens into the socket.

NOTE

The MAL, RDY, MEM, DEST, TAC, INS, AD indicator lamps and the edge- light panel lamps are not replaceable by the organizational repairman.

CHAPTER 4

EQUIPMENT INTERFACE

4-1. General This chapter contains a block diagram description of the navigation set interfaces with aircraft navigation and ancillary equipment for a typical air- craft configuration. Figure FO-1 illustrates navigation set interfaces with a typical aircraft configuration.

4-2. Flux Valve

The platform supplies excitation voltage for the aircraft flux valve which in turn develops a magnetic heading output to the stabilized platform. The platform sends this magnetic heading, in addition to the true heading, to the computer where, by using true heading as a reference, the magnetic heading fluctuations are damped to pro- vide smoothed magnetic heading output. The smoothed magnetic heading functions to provide drive voltage for the compass cards on the pilot's and copilot's radio magnetic indicators as well as a reference signal for use by TACAN. In the event the computer or platform malfunctions, pre- venting the damping process, magnetic heading will continue to be supplied to the radio magnetic indicators and TACAN through the navigation set, but will not be smoothed. In this case, the computer sends a compass flag signal to the pilot's and copilot's radio magnetic indicators to indicate that the magnetic heading being utilized is not smoothed.

4-3. Instrument Power Transformer

The aircraft instrument power transformer provides synchro reference excitation voltage for the computer digital-to-synchro converters and for the platform pitch, roll, true heading and magnetic heading synchros.

4-4. True Airspeed Transmitter The true airspeed transmitter sends true airspeed to the computer. The computer returns a true air- speed feedback signal to provide closed-loop operation. The computer calculates groundspeed from data received from the platform. The computer uses the true airspeed input from the true air- speed transmitter, calculated groundspeed, and true heading input from the platform to calculate windspeed and direction for display on the control-indicator. When the air data mode of operation is manually selected, or automatically initiated by a platform failure preventing operation in the navigate mode, the computer will store the last reliable windspeed and direction, and local magnetic variation data calculated. During the air data mode of operation, windspeed and direction, in addition to local magnetic variation data in the computer, must be updated by manual insertion using the control-indicator. This will enable the computer to use the latest true airspeed input to provide up-to-date aircraft groundspeed and true heading.

4-5. Lighting Control Panel The edgelight power control signal from the air- craft lighting control panel, determines the intensity of control-indicator lamps. The control-indicator placarding and HDG MEM, SL, SR, and data entry pushbutton indicators are under edge- light control.

4-6. Pilot's Navigation Instruments

The pilot's navigation instruments may include an attitude indicator, bearing distance heading indicator, course indicator selector, and radio magnetic indicator. Pitch and roll signals are developed by the platform and applied to the attitude indicator for display of aircraft attitude. A gyro flag signal is also generated by the computer and applied to the attitude indicator when the pitch and roll data being displayed is accurate. The computer provides bearing minus heading, range, and an off flag signal to the bearing distance heading indicator during the mission. The bearing minus heading signal is the fly-to distance between aircraft heading and true bearing to the destination selected and is utilized for a visual display of aircraft guidance data to that destination.

The range signal provides for a visual display of distance, in nautical miles, from the air- craft to a selected destination. The off flag signal is sent from the computer to indicate that the navigation set is operating properly. The course indicator selector receives course deviation and a localizer flag signal from the computer. The course deviation signal is developed from bearing minus track angle. This signal is used to drive the course deviation bar thereby indicating the course deviation angle between the aircraft heading and the selected track. The localizer flag signal indicates that the navigation set is operating properly. Smoothed magnetic heading, bearing minus heading, and a compass flag signal are sent from the computer to the radio indicator. The smoothed magnetic heading drives the compass card. The bearing minus heading signal provides visual display for guiding the aircraft to the selected destination. The compass flag signal indicates that the navigation set is operating properly.

4-7. Copilot's Navigation Instruments

The copilot's navigation instruments are normally a slaved course indicator selector and a radio magnetic indicator. Their operation is identical to the pilot's course indicator selector and radio magnetic indicator described in 4-6 above.

4-8. Direct-Intercept Switch

When provided, the direct/intercept discrete switch permits a choice between a direct or intercept approach to a selected destination. If a direct approach is chosen, the computer steering control signals sent to the pilot's and copilot's navigation instruments, and to the autopilot, will guide the aircraft to the selected destination on the shortest direct track. When an intercept approach is chosen, the computer steering control signals sent to the pilot's and copilot's navigation instruments, and to the autopilot, will guide the aircraft on a course which will intercept the selected destination at the true course select angle inserted by the control-indicator for the destination.

4-9. INS Indicator

Normally the INS indicator lamp on the aircraft warning panel is illuminated when the navigation set is not in the navigate or air data mode of operation, or when the navigation set is in the navigate mode and the control-indicator MAL indicator lamp is on. If the INS indicator on the aircraft warning panel, and the control-indicator MAL and AD indicator lamps are on, the INS indicator lamp on the aircraft warning panel and the' control-indicator MAL indicator lamp will go out when the air data mode of operation is selected. The control-indicator AD indicator lamp will remain on to indicate that the navigation set is operating in the air data mode.

4-10. Autopilot

The platform sends pitch, roll, and true heading to the autopilot for attitude and heading reference. The computer sends lateral steering correction, navigate engage, and autopilot engage signals to the autopilot. The lateral steering correction signal is used by the autopilot to guide the aircraft to the selected destination. The navigate engage signal indicates that the lateral steering correction data is accurate. The autopilot engage signal indicates that the pitch, roll, and true heading data are accurate and that the navigation set is operating properly.

4-11. Weather Radar

Pitch and roll signals are sent from the platform to the weather radar, where a stabilization signal is developed to position the radar antenna to compensate for the pitch and roll motion of the aircraft.

4-12. Data Annotation

The data annotation receives data from the navigation set and conditions it for use by other air- craft equipment. The platform sends pitch and roll data to the data annotation. The data annotation sends a data request signal to the computer to request one of seven parameters. After reading the data request, the computer provides the appropriate data. The seven parameters are northing, easting (including zone number), altitude, heading, drift angle, groundspeed, and ground- speed-to-altitude ratio (Vg/H).

4-13. Side Looking Radar

The computer sends groundspeed and drift angle signals to the side looking radar where a signal is developed to compensate for aircraft groundspeed and drift. The computer provides synchro reference excitation and the side looking radar returns groundspeed feedback and drift angle feedback to provide closed-loop operation. The computer sends a nav-go signal to the side looking radar to indicate that the navigation set is operating properly.

4-14. TACAN

The computer sends smoothed magnetic heading and data request and control signals to the TACAN. Upon request, the TACAN sends bearing and range data to the computer. The computer evaluates the TACAN bearing and range data and, if required, updates the navigation set present-position data.

4-15. Map Display

The computer sends northing and southing pulses to the map display to move the map display forward or backward, and easting and westing pulses to move the map marker right or left. The map display provides a visual record of aircraft flight.

4-16. Teleprinter

When the operator presses the record pushbutton switch, the teleprinter sends a data request signal to the computer. Upon request, the computer sends present position (UTM coordinates), heading, and elapsed time in the navigate mode to the teleprinter.

CHAPTER 5

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

5-1. Disassembly of Equipment

Equipment disassembly is not required. The procedures for removing the navigation set components from the aircraft are specified in paragraph 3-18.

5-2. Repackaging of Equipment

Repackaging of equipment for shipment or limited storage normally will be performed at a pack- aging facility or by a repackaging team. If practicable, the original packaging materials should be stored and used for repackaging. Should emergency packaging be required, select the materials from those listed in SB 38-100. Package the equipment in accordance with the original pack- aging, so far as possible with the available materials.

a. Packaging Materials. The platform, computer, and control-indicator are packed in double-wall fiberboard boxes and padded with polyurethane ester and polyethylene foam. Each component is wrapped in a waterproof container. The computer mount is packed in a single-wall fiberboard box with protective wrapping.

b. Packaging Instructions.

CAUTION

The platform, computer, and control-indicator are sensitive electronic units containing fragile components. Use extreme care in packing each unit. Do not toss or drop the unit in its container.

(1) Platform. Pack the platform in accordance with figure 2-1.

(2) Computer. Pack the computer in accordance with figure 2-2.

(3) Control-indicator. Pack the control-indicator in accordance with figure 2-3.

(4) Computer mount. Cushion the computer mount with cellulosic cushioning material and pack in a fiberboard box.

Section II, DEMOLITION TO PREVENT ENEMY USE

5-3. Authority .for Demolition

Demolition of the equipment will be accomplished only upon order of the commander. Use the destruction procedures outlined in paragraph 5-4 to prevent further use of the equipment.

5-4. Methods of Destruction

Any or all of the methods of destruction given below may be used. The time available will deter- mine the order and methods of destruction. Also, the tactical situation will determine how the destruction will be carried out. In most cases, it is preferable to demolish completely the computer rather than partially destroy all the components of the navigation set.

a. Smash. Smash the navigation set components; use sledges, axes, hammers, crowbars, and any other heavy tools available.

b. Cut. Cut the interconnecting cables and equipment internal cable harnesses; use axes, handaxes, machetes, and similar tools.

c. Burn. Burn as much of the equipment as is flammable; use gasoline, oil, flamethrowers, and similar flammables. Burn the technical manuals first. Pour gasoline on the cut cables and internal wiring and ignite it. Use a flamethrower to burn spare parts or pour gasoline on the spares and ignite them.

WARNING

Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

d. Explode. Use explosives to complete demolition or to cause maximum damage, before burning, when time does not permit complete demolition by other means. Powder charges, fragmentation grenades, or incendiary grenades may be used. Incendiary grenades usually are most effective.

e. Dispose. Bury or scatter destroyed parts or throw them into nearby waterways. This is particularly important if a number of parts have not been completely destroyed.

5-5. Report of Destruction

Report of equipment destruction will be made through command channels.

APPENDIX A

REFERENCES

The following publications contain information applicable to the organizational maintenance of the navigation set.

DA Pam 310-4	Military Publications: Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	U.S. Army Equipment Index of Modification Work Orders.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies and Equipment Used by the Army.
TB 746-10	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 5-241-8	Universal Transverse Mercator Grid.
TM 11-6625-203-12	Operator and Organizational Maintenance Manual: Multimeter AN/URM-105, including Multimeter ME-77/U.
TM 38-750	Army Equipment Record Procedures.
TM 740-90-1	Administrative Storage of Equipment.

APPENDIX C

MAINTENANCE ALLOCATION

Section 1. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for AN/ASN-86. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. INSPECT. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

b. TEST. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This is accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.

c. SERVICE. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. ADJUST. To rectify to the extent necessary to bring into proper operating range.

e. ALIGN. To adjust two or more components or assemblies of an electrical -- mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

f. CALIBRATE. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. INSTALL. To set up for use in an operational environment such as an encampment, site, or vehicle.

h. REPLACE. To replace unserviceable items with serviceable like items.

i. REPAIR. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. OVERHAUL. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. REBUILD. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. SYMBOLS. The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

C-3. Explanation of Format

a. Column 1, group number. Column 1 lists arbitrary group numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly.

b. Column 2, functional group. Column 2 lists the noun names of components, assemblies, subassemblies and modules on which maintenance is authorized.

c. Column 3, maintenance functions. Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to per- form that function at higher categories. The codes used represent the various maintenance categories
as follows:

Code	*Maintenance Category*
C----------	Operator/Crew
0 ----------	Organizational Maintenance
F ----------	Direct Support Maintenance
H----------	General Support Maintenance
D----------	Depot Maintenance

d. Column 4, tools and test equipment. Column 4 specifies, by code, those tools and test equipment required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in table I.

e. Column 5, Remarks. Self-explanatory.

C-4. Explanation of Table I, Tool and Test Equipment Requirements

The columns in Table I, Tool and Test Equipment Requirements are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the Maintenance Allocation Chart. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number of the specific tool or test equipment.

e. Tool Number. Not used.

SECTION II. MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A	INERTIAL NAVIGATION SET AN/ASN-86	O	O	O	O				O	O			1,7 7 1 1 1	Isolate failure to black box.
1A1	NAVIGATIONAL COMPUTER UNIT CP-941/ASN-86	O	F	O					O	F	H		2 THRU 4,9, 11,12,146,147, 7 1 2 THRU 4,9, 11,12,112 2 thru 4,9, 11,12,115, 116,118,121, 122,123,128, 129,133,134, 136,137,142	
	TRAY ASSY'S A1 THRU A11; ELECT	F												4k memory module to be returned
	SUP (+5V +30V); REG BOARDS)-6V, ±15V, -25V, +12V,+25V); 30V DC/DC CONV ;VOLT MONITOR BOARD;OVERVOLT SENSOR; 4K MEMORY MODULE		D						F	D			2 THRU 5,8,9, 10,12,24,34 thru 37,84 3,4,112,149, 150,151 2 thru 5,8, 9,10,24,25, 34 thru 37, 73,74,75,81, 84,92 thru 99,108	to contractor for test and repair.

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A2	CONTROL INDICATOR UNIT ID-1579/ASN-86	O	F	O					O	F	H	D	7 3,4,9,148 1 3,4,9,11 3,4,9,11,81, 120,122,123, 126 thru 129, 133,134,137, 145 3,4,5,7,9,11, 12,34 thru 38,73,74,75, 81,82,93 thru 99,108, 109	
	PWR SUP MODULE; TRAY ASSY MODULES (CONT NO. 1 & 2);DIGITAL DISPLAY DRIVER	F	D						F	D			12,34,84 3,4 12,34 thru 38,73,74,75, 81,84,92 thru 99,108	

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A3	GYRO STABILIZED PLATFORM MX-8123/ASN-86		O H										7 3,4,5,7,8,15, 23,25,27,28, 31,32,33,77 thru 80	
				O					O	H			1 2 thru 5,7, 8,15,17,18, 23,25,27,28, 31 thru 33, 40,77 thru 80,116,118 thru 121,124 thru 127,133, 134,136,137, 139,142,145	
												D	2 thru 8,12 thru 17,19 thru 22,24 thru 72,77 thru 89,91, 97,100,101, 102,104 thru 107,109,110	
	TRANSFORMER BUFFER AMPL; MAG HEADING SERVO MODULE;PWR SUPPLY; DUMMY ACCELEROMETER	H	H										2 thru 5,8, 12,25,31,32, 33	Isolate failures to one of the following; elect ckt card assy; buffer ampl ckt card assy; mag heading servo ampl assy; pwr supply ckt card assy; dummy accelerometer resistor heater.
or			D										2 thru 6,8, 12,31, thru 34,39,58,104	Isolate failure to a discrete component, integrated circuit, dummy acceler heater.

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
									H	H			2 thru 4 2 thru 5,8, 25,31,32,33, 140	Repair by replacement of following: elect ckt card assy buffer ampl ckt card assy; mag heading servo amp assy: pwr supply ckt card assy; dummy accel resistors.
										D			2 thru 6,8, 12,24,25,26, 34 thru 39, 73,81,92 thru 99,108	Repair by replacement of discrete components, integrated circuits, dummy acceler heaters.
	ELECT CKT CARD ASSY; BUFFER AMPL; CKT CARD ASSY MAG HEADING SERVO AMPL ASSY; PWR SUPP;Y CKT CARD ASSY; MODE ASSY; CONVERT CARD; ±15V REGULATOR;TEMP CONTROL BOARD; SERVO AMPL ,MODULE; GYRO SPIN PWR AMP MODULE	H	D						H	D			3 thru 7,12, 23 thru 26, 34 2 THRU 4 3 TKRU 7,12, 23 THRU 26, 34 THRU 38, 81,91 THRU 99,108	
	HEATER EXCHANGER	H		D						D			7,39,96,99 3,4,7,85,134	Replace by whole new chassis; no repair
	STABLE ELECTRICAL ASSY; STABLE ELEMENT SUBASSY; TEMP SENSOR; ELEC COMPONENT ASSY; BIAS RESISTOR ASSY	H	H						H	H			2 THRU 5,9, 12,25,27,28, 31 THRU 33, 140 3,4 3,4,86	

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
	GYROS AND ACCELEROMETERS	**H**												
			H										2 thru 5,9, 12,23,25,27, 28,31,140	
									H				2 thru 5,9, 12,23,25,27, 28,31,140	
										D	D	D		Return to contractor for repair.
	STABLE ELEMENT TEMP CONTROL	H												
			H										2 thru 5,12, 25,27,28,31, 32,33,140	
									H				3,4	
	AZ ASSY UPPER; AZ CART ASSY LOWER; PITCH CART ASSY (TRANSOLVER); PITCH CART ASSY (TORQUER); IR CART ASSY 9 RESOLVER); IR CART ASSY (TORQUER)	H	H										2 thru 5,9, 12,13,25,27, 28,31,90,140	
									H				2 thru 4	
										D			2 thru 4,13, 19,21,22,42 thru 47,49, 51 thru 57, 59 thru 61, 65,68,69,82, 83,88,90,91, 105,113,114, 140	
	OUTER ROLL CART ASSY	H												
			H										2 thru 5,9, 12,23,25,27, 28,31,90,140	
										D			2 thru 4	
											D		2 thru 4,20, 21,43,46,47, 59,63,82,87, 88,90,113,114	

TABLE I. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
1	O	TOOL KIT,ELECTRONIC EQUIPMENT TK-101/G	5180-610-8177	
2	O,F,H,D	TORQUE WRENCH (P/O TK-90/G)	5180-542-5812	
3	F,H,D	TOOL KIT,ELECTRONIC EQUIPMENT TK-100/G	5180-605-0079	
4	F,H,D	TOOL KIT,ELECTRONIC EQUIPMENT TK-105/G	5180-610-8177	
5	H,D	OSCILLOSCOPE AN/USM-281	6625-179-8441	
6	D	OSCILLOSCOPE PLUG IN (HP 1803A		
7	O,F,H,D	MULTIMETER AN/USM-223	6625-999-7465	
8	H,D	PHASE ANGLE VOLTMETER ME-223	6625-810-3917	
9	F,H,D	TAPE READER AN/USA-34	6625-491-3491	
10	D	POWER SUPPLY, 28VDC (HP-6268A W/NO. 26 OPTIION, OR EQUIV)		
11	F,H,D	NAVIGATIONAL COMPUTER CONTROL INDICATOR TEST SET AN/ASM-386	6625-404-3280	
12	F,H,D			
13	H,D	VOLTMETER DIGITAL (NON LINEAR SYSTEM, MODEL X-2)		
14	D	CONNECTOR SUPPORT FIXTURE (LITTON P/N T119363)		
15	H,D	PIN LOCATOR (CANNON P/N L750CL)		
16	H,D	EXTRACTOR TOOL (HUGHES P/N TWO 22RT000)		
17	H,D	EXTRACTOR TOOL (CANNON P/N CET-P-CTA-1)		
18	H,D	CRIMPING TOOL (DANIELS TOOL CO. P/N MH 750-(C HEAD))		
19	H,D	HANDLING FIXTURE (LITTON P/N T119311)		
20	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 2, LITTON P/N T119301)		
21	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 4, LITTON P/N T119317)		
22	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 6, LITTON P/N T119320)		
		CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 8, LITTON P/N T119324)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
23	H,D	COUNTER, ELECTRONIC DIGITAL READOUT AN/USM-207	6625-911-6368	
24	D	VOLTMETER (FLUKE 887A)		
25	H,D	DECADE SYNCHRO BRIDGE (GERTSCH P/N DSK-5C-4R)		
26	D	OSCILLATOR SG-621/U	6625-606-9727	
27	H,D	RECORDER AN/USM-365(V1)	6625-230-3834	
28	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 3, LITTON P/N T119315)		
29	D	CEMENT FIXTURE (LITTON P/N T116790)		
30	D	CEMENT FIXTURE (LITTON P/N 207273)		
31	H,D	GYRO STABILIZED PLATFORM TEST SET AN/ASM-385	6625-404-3281	
32	H,D	PURGE AND FILL UNIT, GYRO STABILIZED PLATFORM MX-8474/ASN-86 GYRO STABLIZE PLATFORM TEST STAND MT-4145/ASN-86	6605-022-3739	
33	H,D	ANALOG MODULE TEST SET AN/ASM-404	6605-522-3740	
34	D	FLAT PACK REMOVAL TOOL (LITTON P/N T116154)		
35	D	LEAD CUTTING FIXTURE, FLAT PACK (LITTON P/N T119808)		
36	D	LEAD CUTTING FIXTURE, FLAT PACK (LITTON P/N T207202) ADAPTER (LITTON P/N TE112236)		
37	D	HEATER TESTER (LITTON P/N TE112236) HOLDING FIXTURE (LITTON P/N T116118)		
38	D	NULL FIXTURE (LITTON P/N T116135)		
39	D	ADAPTER, TORQUE (LITTON P/N T115938)		
40	H,D	SOLDER POT (WAAGE MODEL RSPI)		
41	D	CEMEMTING FIXTURE (LITTON P/N T116147)		
42	D			
43	D			
44	D			

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
45	D	ADAPTER (TORQUE WATCH) (LITTON P/N T116148)		
46	D	TORQUE WATCH (WALTERS P/N 651X-4)		
47	D	ALIGN FIXTURE (GIMBAL ASSY) LITTON P/N T116157)		
48	D	MIRROR FIXTURE (PLATFORM) (LITTON P/N T116222)		
49	H,D	THERMAL COVER (LITTON P/N T116722)		
50	D	TORQUE WATCH (WALTERS P/N 651C-3)		
51	D	SUPPORT FIXTURE (LITTON P/N T119006)		
52	D	SUPPORT FIXTURE (LITTON P/N T119009)		
53	D	ADAPTER (LITTON P/N T119018)		
54	D	HEARING INSERTION TOOL (LITTON P/N T119019)		
55	D	NULL FIXTURE (LITTON P/N T119030)		
56	D	HOLDING FIXTURE (LITTON P/N T119300)		
57	D	TOOL INSTALLATION (STATOR) (LITTON P/N T119302)		
58	D	MIRROR FIXTURE (LITTON P/N T119309)		
59	DD	REMOVAL TOOL (HUGHES P/N TWO 22RT002)		
60	H,D	CONTINUITY TEST BOX (CONTINUITYCHECKOUT BOARD NO, 5, LITTON P/N T119319)		
61	H,D	CONTINUITY TEST BOX (CONTINUITYCHECKOUT BOARD NO, 7, LITTON P/N T119322)		
62	D	NULL FIXTURE (LITTON P/N T119699)		
63	D	NULL FIXTURE (LITTON P/N T119706)		
64	D	NULL FIXTURE (LITTON P/N T119712)		
65	D	ADAPTER (LITTON P/N T119724)		
66	D	NULL FIXTURE (LITTON P/N T119898)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
67	D	HOLDING TOOL (HUB) (LITTON P/N T207207)		
68	D	SUPPORTING FIXTURE (LITTON P/N T207209)		
69	D	SUPPORTING FIXTURE (LITTON P/N T207211)		
70	D	LOCATING FIXTURE (LITTON P/N T119998)		
71	D	ASSEMBLY CLAMP (LITTON P/N T207021)		
72	D	PIN LOCATOR (DANIELS P5)		
73	D	PRECISION OVEN	6640-531-4358	
74	H,D	REMOVAL/INSERTION TOOL (AMP INC P/N 69514)		
75	D	SOLDER TIP IRON (MODEL 18)		
76	D	INSERTION TOOL (CANNON P/N CIT-PS-CTA)		
77	H,D	HEX DRIVE	5120-596-0934	
78	H,D	HEX DRIVE (P/N TMA-2)		
79	H,D	HEX DRIVE (P/N TM4-1/2)		
80	H,D	HEX DRIVE (P/N TMP-01)		
81	F,H,D	SOLDERING IRON	3439-907-5806	
82	D	LOCATING FIXTURE (LITTON P/N T207108)		
83	H,D	CRIMPER (AMP INC P/N 69547)		
84	D	DIGITAL MODULE TEST SET AN/ASM-421		
85	D	CEMENT FIXTURE (LITTON P/N T116794)		
86	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO., 9, LITTON P/N T116798)		
87	D	CHECK FIXTURE (LITTON P/N T119007)		
88	D	REMOVAL TOOL, BEARING (LITTON P/N T119017)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
89	D	CEMET FIXTURE (LITTON P/N T119031)		
90	H,D	SUPPORT CLAMP (LITTON P/N T119318)		
91	H,D	SAFETY BLOCKS (LITTON P/N T119323)		
92	D	REMOVAL/INSERTION TOOL (CANNON P/N C1ET-20-HD)		
93	D	P/N LOCATOR (DANIELS P13)		
94	D	TINNING FIXTURE (LITTON P/N T119795		
95	D	CURING FIXTURE (LITTON P/N T119949)		
96	D	AC/DC HIPOTRONICS P/N 301B-MR, OR EQUIV)		
97	D	LEAD CUTTING FIXTURE, FLAT PACK (LITTON P/N T207096)		
98	D	MEGOHMMETER (MEGOHMMETER MODEL 1629, OR EQUIV)		
99	D	BIN ANGLE CHISEL (LITTON P/N T207181)		
100	D	FIXTURE TORQUE CHECK (LITTON P/N T207181)		
101	D	CEMET FIXTURE (LITTON P/N T207182)		
102	D	ELECTRONIC HEIGHT GAGE (FEDERAL P/N 230P-120, OR EQUIV)		
103	D	CONNECTOR DRIVE ADAPTER (LITTON P/N T207193)		
104	D	ADAPTER (TORQUE WATCH) (LITTON P/N T207214)		
105	D	SWAGE TOOL (LITTON P/N T207277)		
106	D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 1, (LITTON P/N T207286)		
107	H,D	SOLDER HEIGHT CHECK TOOL (LITTON P/N T207286)		
108	D	ADJUSTABLE AUTOTRANSFORMER (GENERAL RADIO MODEL W5M, OR		
109	D	EQUIV)		
110	H,D	WRENCH, SPANNER (LITTON P/N T207699)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
111	F,H,D	TRAY EXTRACTOR (LITTON P/N T237889)		
112	F,H,D	TRAY EXTRACTOR (LITTON P/N T870673)		
113	D	P500 TORQUE CARTRIDGE AND GIMBAL BALANCE STATION (LITTON P/N TE118069		
114	D	P500 NULL AND PHASE SECTION (LITTON P/N TE118450)		
115	H,D	INSERTION TOOL (BENDIX P/N 11-8674-24)		
116	H,D	REMOVAL TOOL (BENDIX P/N 11-8675-24)		
117	D	PIN LOCATOR (DANIELS P/N P7 HEAD C SERIES		
118	H,D	PIN LOCATOR (DANIELS P/N P6 HEAD C SERIES		
119	H,D	PIN LOCATOR (DANIELS P/N P4 HEAD C SERIES		
120	H,D	PIN LOCATOR (BENDIX P/N 11-8673-6)		
121	H,D	PIN LOCATOR (BENDIX P/N 11-8673-7)		
122	H,D	TERMI POINT SERVICE TOOL (AMP INC P/N 69535-1)		
123	H,D	MANDREL (AMP INC P/N 69545-1)		
124	H,D	INSERTION TOOL (DEUTSCH P/N M-15513-22A)		
125	H,D	REMOVAL TOOL (DEUTSCH P/N M-15515-22P/S)		
126	H,D	INSERTION TOOL (BENDIX P/N 11-8674-22)		
127	H,D	REMOVAL TOOL (BENDIX P/N 11-8675-22)		
128	H,D	PULL TEST TOOL (AMP INC P/N 69358-6)		
129	H,D	EXRACTOR/LOCATOR (AMP INC P/N 69357-5)		
130	D	CRIMPING TOOL (HUGHES P/N TWO 22CH000)		
131	D	LOCATOR TOOL (HUGHES P/N TWO 22LS000)		
132	D	EXTRACTOR TOOL (CANNON P/N CET-S-CTA-1)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
133	H,D	THERMAL WIRE STRIPPER POWER UNIT (IDEAL IND INC P/N MODEL 45-135)		
134	H,D			
135	H,D	TORQUE WRENCH (TORQUE CONTROLS KIT 2)		
136	H,D	SOCKET LOCATOR (CANNON P/N L-750 CLS)		
137	H,D	7X EYE LOOP (BAUCH AND LOMB INC P/N CAT-81-41-71-7X		
138	H,D	SWING GRIP TOOL, THERMAL STRIPPER (IDEAL IND INC P/N L-6637)		
139	H,D	REPLACEMENT ELEMENTS (IDEAL IND INC P/N L-6637)		
140	H,D	STOP WATCH (MONTE CARLO 1002)		
141	D	VOLTMETER ELEXTRONIC ME-202A/U		
142	H,D	TEMPERATURE POTENTIOMETER (LEEDS NORTHROP P/N 8693, OR EQUIV)	6625-050-8686	
143	D	INSERTION TOOL (HUGHES P/N TWO 22IT000)		
144	H,D	DEKABOX, DECADE RESISTOR (ELECTRO SCIENTIFIC IND MODEL DB 655, OR EQUIV)		
145	H,D			
146	F,H,D	SPIN TIGHT (SNAPON P/N 24F1/8)		
		HEAT GUN (MASTER APPLIANCES P/N HG-751)		
147	F,H,D	TAPE, PUNCHED PROGRAM NCU TEST #1 (DIAGNOSTIC/TEST TAPE, P/N 667921)		
148	F,H,D	TAPE, PUNCHED PROGRAM NCU TEST #2 (DIAGNOSTIC/TEST TAPE, P/N 670960)		
149	F,H,D	TAPE, PUNCHED PROGRAM CIU TEST (DIAGNOSTIC/TEST TAPE, P/N 667923)		
150	F,H,D	TAPE, PUNCHED PROGRAM 0V-1D (OPERATIONAL TAPE, P/N 670945)		
151	F,H,D	TAPE, PUNCHED PROGRAM LAFFING EAGLE, LEFT FOOT, AND LEFT JAB (OPERATIONAL TAPE, P/N 670946)		
		TAPE, PUNCHED PROGRAM CEFIRM LEADER (OPERATIONAL TAPE, P/N 670947)		

GLOSSARY

Acceleration-Rate of change of velocity per unit of time along a predetermined axis.

Attitude--The position of an aircraft, as deter-mined by inclinations about the three reference axes.

Barometric Altitude-Altitude measured by means of changes in atmospheric pressure.

Clear-To restore a storage or memory device to a prescribed state, usually zero.

Core Storage-A storage unit composed of magnetic cores and associated wiring. Each core stores a single bit.

Course Deviation-Steering signal which is a function of the selected course, ground track, and bearing and range to destination.

Course Select Angle-The angle between true north and the desired intercept course through a destination or TACAN station. The course select angle may be inserted on the control-indicator for each destination and TACAN station.

Detent-A spring-loaded catch used to hold the MODE switch in the NAV position.

Direct Approach-With the DIRECT/INTER- CEPT switch set to DIRECT, the aircraft is directed along the shortest track from present position to the selected destination or TACAN station.

Drift Angle-The angle between true heading and track made good, expressed as degrees right or left.

Easting Distance-The distance east within a UTM zone. The distance is measured in kilometers eastward within the UTM zone.

Flag-An indicator used to inform operator of a no-go condition.

Gyro-(Short for gyroscope.) A device consisting of a wheel so mounted that its spinning axis is free to rotate about either of two other axes perpendicular to itself and to each other.

Gyro Bias 1-North-seeking alignment of Y-axis prior to setting Y- and Z-gyro bias.

Gyro Bias 2-Ninety-degree-seeking alignment prior to setting X- and Z-gyro bias.

Gyrocompass-The process by which the platform stable element is aligned to true north.

Heading Memory Alignment-Platform stable element is aligned to true north with previously stored heading as a reference.

Intercept Approach-With the DIRECT/INTER- CEPT switch set to INTERCEPT, the aircraft is directed along a preselected (course select) course to the selected destination or TACAN station.

Local Vertical-Coincident with gravity vertical. Location-The storage position in the internal memory or storage for one computer word. Magnetic Heading Servo-Amplifier assembly located in the platform.

Northing Distance-The northing distance is the distance, in kilometers, north of the equator. The equator is referenced as 0 kilometer.

Octal Format-A numbering system that uses eight admissible marks; a number system with a radix of 8.

Pitch-Angular displacement of an aircraft about the lateral axis (positive for aircraft nose up).

Position Fix-Visual check of present position using known location coordinates.

Program-A list of all instructions which the dig- ital computer is prepared to perform or is capable of performing.

Roll-Angular displacement of an aircraft about the longitudinal axis (positive for aircraft right wing down).

Southing Distance-Southing distance is the distance, in kilometers, north of the south pole. The equator is referenced as 10,000 kilometers. The southing distance is determined by subtracting the distance, in kilometers, south of the equator from 10,000.

Track Angle-The angle between true north and the projection on the earth's surface of the path along which the airplane is actually flying.

True Airspeed Feedback Converter-Digital to synchro converter located in the computer.

True Heading-Angle measured clockwise from true north to the aircraft longitudinal axis.

X-Axis-The stable element axis initially oriented in east-west direction.

Y-Axis-The stable element axis initially oriented to true north.

Z-Axis-The stable element oriented to the geodetic vertical.

Zone Number-The number representing one of 60 UTM zones. The earth is divided into 60 zones (6° of longitude each). The zones are numbered consecutively eastward from the 180th meridian.

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By Order of the Secretary of the Army:

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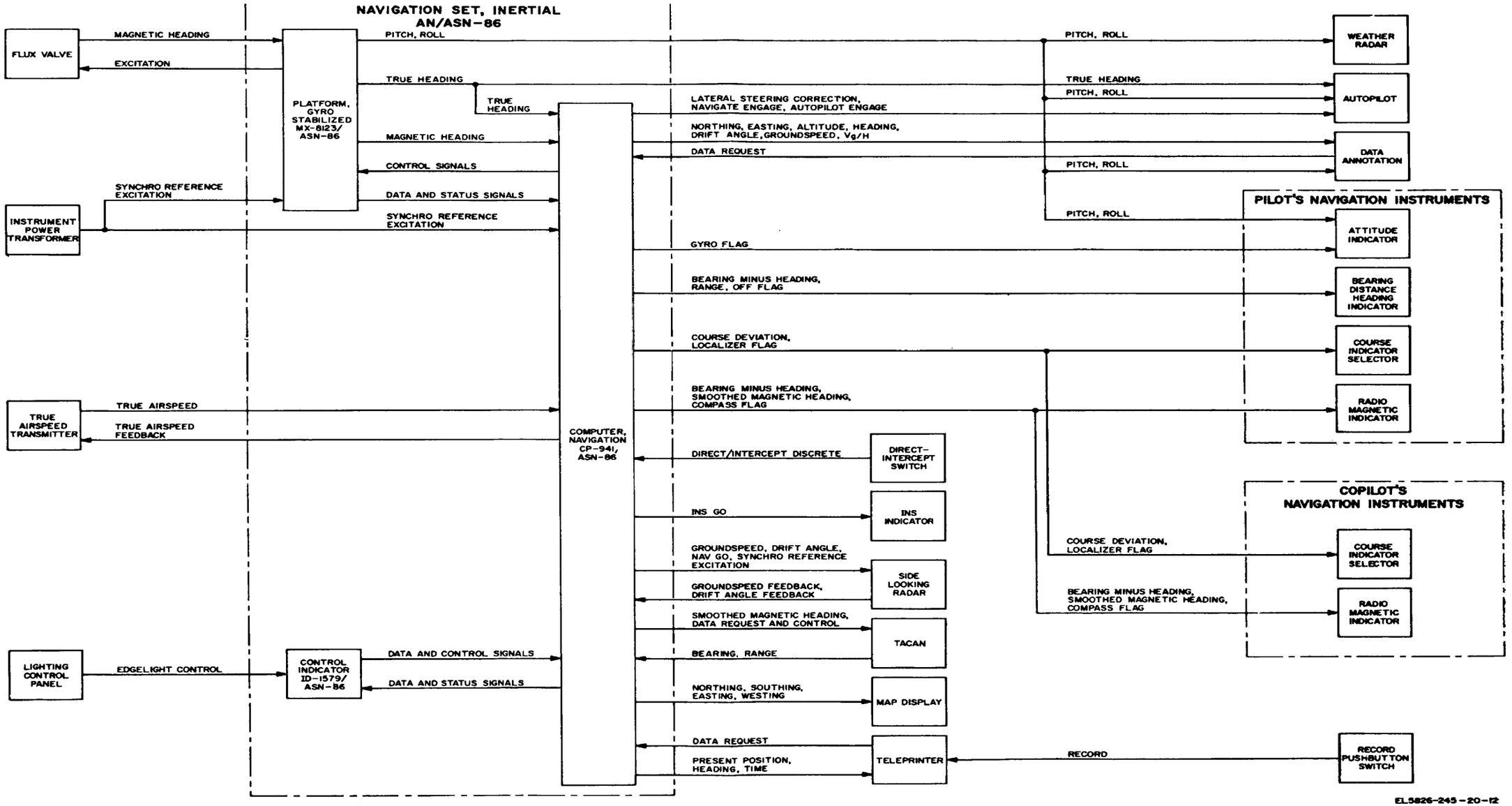

Figure FO-1. Navigational Set, Inertial AN/ASN-86, typical aircraft configuration interface block diagram

CHAPTER 3

ORGANIZATIONAL MAINTENANCE

Section I. GENERAL

3-1. Scope of Organizational Maintenance The organizational maintenance duties for the navigation set are listed below with a paragraph reference for each specific function. The duties include inspection, testing, and servicing instructions for performing preventive maintenance services.

a. Intermediate maintenance checks and services (para 3-5).

b. Cleaning (para 3-7).

c. Repainting and refinishing instructions (para 3-8).

d. Operational checks (para 3-10).

e. Periodic maintenance checks and services (para 3-12).

f. General troubleshooting (para 3-14).

g. Supplementary troubleshooting (para 3-16).

h. Gyro bias adjustment (para 3-17).

i. Removal and replacement (para 3-18).

3-2. Tools, Test Equipment, and Materials Required

a. Tools. Tool Kit, TK-101/G and TK-90/G.

b. Test Equipment. Multimeter AN/USM-223. (Use AN/URM-105 until AN/USM-223 is avail- able.)

c. Materials.

(1) Sandpaper, No. 000.

(2) Cloth, clean, dry, lint-free.

(3) Brush, soft bristle.

(4) Compound, cleaning (FSN 7930-395-9542).

(5) Enamel, lusterless (MIL SPEC TT-E-527).

(6) Paste, antistatic.

3-3. Special Tools Required

No special tools are required for organizational maintenance.

Section II. PREVENTIVE MAINTENANCE

3-4. Preventive Maintenance

Preventive maintenance of the navigation set is the systematic care, inspection, and service that prevents breakdowns and insures maximum operational capability. Preventive maintenance includes the inspection, testing, and replacement of components of the navigation set that inspection indicates would probably fail before the next scheduled periodic service. Preventive maintenance checks and services are made at intermediate and periodic intervals unless otherwise directed by the commanding officer. Preventive maintenance services should be performed concurrently with the inspection schedules of the air- craft.

a. Systematic Care. The routine systematic care and cleaning essential to proper upkeep and operation of the navigation set are specified in para- graphs 3-5 through 3-13.

b. Maintenance Checks and Services. The maintenance checks and services charts (para 3-6 and 3-13) outline inspections to be made at specific intervals to determine combat serviceability of the navigation set; that is, to determine that the equipment is in good physical condition and operating condition, and likely to remain combat serviceable. The charts specify what to inspect, how to inspect it, and list appropriate references. Records and reports of these checks and services must be made in accordance with TM 38-750. If the defect cannot be remedied at organizational maintenance, a higher category of maintenance of repair is required. When a component is removed from the aircraft, it is replaced by an equivalent serviceable component from maintenance float stock or on a direct exchange basis from higher category of maintenance.

3-5. Intermediate Maintenance Checks and Services

The intermediate maintenance checks and services chart (para 3-6) provides verification of satisfactory operation of the navigation set at intervals between the periodic inspections. The intermediate maintenance checks and services will be accomplished at intervals of 25-flying hours. The intermediate maintenance checks and services are performed concurrently with the intermediate maintenance performed on the aircraft. Equipment maintained in aircraft in a standby (ready for immediate operation) condition must have intermediate maintenance checks and services perform on it concurrently with the intermediate maintenance performed on the aircraft. Equipment in limited storage (requires service before operation) does not require intermediate checks and services.

3-6. Intermediate Maintenance Checks and Services Chart

Seq No.	Item	Procedure	Reference
Caution.	**Do not touch connector pins; static electricity discharge from body may cause damage to equipment**		
1	Cable connectors	Check connections to all components of navigation set and insure that connections are clean, intact, and not loose fitting.	None.
2	Exterior surfaces	Remove all dirt, grease, and moisture. Inspect Inspect for scratched paint, missing screws, and bent or broken hardware. Repair as necessary.	Paragraphs 3-7 and 3-8.
3	Indicators	Make sure that plastic surfaces are clean and not cracked or damaged.	Paragraph 3-7.
4	knobs, pushbuttons, and switches.	See that mechanical action is positive without backlash, binding, or scraping.	None.
Caution.	**Do not exceed 39 inch-pounds torque when tightening platform V-block mount screws.**		
5	Mountings	Inspect seating and stability of mountings. Check for loose or missing hardware and replace and tighten as necessary. See that shock-mounted components are securely mounted with sufficient clearance. See that al other components are securely mounted. Inspect all bonding for good electrical and mechanical connection.	None.
6	Operational check	See that navigation set operates in accordance with operational checks.	Paragraph 3-10.

3-7. Cleaning

Inspect the exterior surfaces of the navigation set. The surfaces should be free of moisture, dirt, grease and fungus. To clean the exterior surfaces of the navigation set, proceed as follows:

WARNING

Prolonged breathing of cleaning compound is dangerous; provide adequate ventilation. Cleaning compound is flammable; do not use near open flame.

CAUTION

Do not use cleaning compound on the control-indicator front panel. To prevent harmful chemical reaction, use only a clean, dry, lint-free cloth or soft-bristle brush to remove accumulated dust and dirt.

a. Use a clean, dry, lint-free cloth to remove moisture and loose dirt.

b. Use a clean, lint-free cloth dampened (not wet) with cleaning compound to remove grease, fungus, and ground-in dirt from the cases.

CAUTION

Do not touch connector pins; static electricity discharge from body may cause damage to equipment.

c. Use a soft-bristle brush to remove dirt from connectors; use a clean, dry, lint-free cloth to remove moisture.

d. Use a clean, dry, lint-free cloth to clean the indicator faces. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning.

WARNING

When using compressed air to clean the heat exchanger, pressure must not exceed 10 pounds per square inch (psi). Higher pressure may damage parts and present a hazard to personnel.

e. Use compressed air to clean the heat exchanger on top of computer. Where dirt cannot be dislodged with compressed air, use a soft-bristle brush.

3-8. Repainting and Refinishing

NOTE

Refer to the applicable cleaning and refinishing practices specified in TB 746-10.

To repaint and refinish the navigation set, proceed as follows:

a. Remove rust and corrosion from metal surfaces by lightly sanding with No. 000 sandpaper.

b. Brush two thin coats of lusterless enamel (para 3-2c) on bare metal to protect it from further corrosion.

3-9. Lubrication Instructions

No lubrication is required at organizational maintenance category.

3-10. Operational Checks The following operational check is performed with external power connected to the aircraft. To connect external power, refer to the applicable organizational maintenance manual covering the aircraft.

a. Preliminary Control Settings. Refer to paragraph 2-8 for preliminary control settings.

b. Operational Check. Perform the procedure in the operational check list (para 3-11). If the normal indication is not obtained, refer to the troubleshooting chart (para 3-15) for corrective action.

NOTE

Unless otherwise specified, all referenced controls and indicators are located on the control-indicator (fig. 2-4).

3-11. Operational Checklist

Sequence No.	Procedure	Normal indication
1	Energize all circuit breakers that supply power to navigation set and vent air blowers.	*a.* See that INS indicator lamp on aircraft warning panel is on. *b.* Control-indicator HDG MEM, SL, SR, data entry indicators and edgelighted panel lamps light.

NOTE

Edge-lighted panel lamps include MODE and SELECT switch placarding, DIM, and DEST, and NAV INERTIAL placarding.

CAUTION

Do not move MODE switch from the OFF position before aircraft navigation junction box control-indicator circuit breakers are energized or fuses installed. Loss of data, stored in computer, may result.

Sequence No.	Procedure	Normal indication
2	Set the control-indicator MODE switch to STBY.	a. If MEM indicator lamp lights, depress MEM HDG pushbutton switch; MEM indicator lamp goes off. Disregard other indicators while performing this step. b. INS indicator lamp on aircraft warning panel remains on. c. Both MAL and AD indicator lamps remain off.
3	Press and hold DIM pushbutton-switch control.	a. MAL, RDY, MEM, DEST, TAC, INS, and AD indicator lamps light. b. STA, POS FIX, and INSERT indicator lamps brighten. c. All 8's appear in the left display and the E, W, colon, degree and decimal point lamps light. All 8's appear in the right display and the N, S, degree, and decimal point lamps light.
4	While pressed, turn DIM pushbutton-switch control.	All lamps listed in sequence 8 vary in intensity.
5	Release DIM pushbutton-switch control.	a. MAL, RDY, MEM, DEST, TAC, INS, and AD.

Sequence No.	Procedure	Normal indication
		b. The left and right displays read out data selected by the SELECT switch, DEST thumbwheel switch, and STA pushbutton switch.
		c. STA, POS FIX, and INSERT indicator lamps go dim.
6	Insert present position and local magnetic variation as specified in paragraph 2-9*e* and *f*.	Same as paragraph 2-9*e* and *f*.

Note. Do not move aircraft while operating in the align mode.

7	Set MODE switch to ALIGN. Set SELECT switch to MON and DEST thumbwheel switch to 4.	*a.* The following number sequence is read out on the right display as the navigation set proceeds automatically through five stages of alignment.

Alignment stage	Number
Cage	10
Level	20
Gyrocompass 1	30
Gyrocompass 2	40
Gyrocompass 3	50

Note. During the first two stages, the right digit will be 1 if the platform coarse heaters are on. Before stage three begins, the right digit must change to 0, indicating that the platform is up to operating temperature and platform coarse heaters are off.

		b. INS indicator lamp on aircraft warning panel remains on.
		c. MAL and AD indicator lamps remain off.

Note. The alignment time given in d below is correct when operating at an ambient temperature of 70 degrees F. When operating at lower temperatures, the alignment time will increase by one minute for each 35 degrees F below 70 degrees F.

		d. RDY indicator lamp flashes when the number sequence above reaches 50. The time required is approximately 12 minutes.
8	When RDY indicator lamp lights, set MODE switch to NAV.	a. MAL and AD indicator lamps remain off.
		b. INS indicator on control-indicator lamp lights.
		c. INS indicator lamp on aircraft warning panel goes off.

Note. Do not move aircraft after performing sequence No. 9 or while performing sequences No. 10 and 11.

Sequence No.	Procedure	Normal indication
		d. RDY indicator lamp goes off.
9	Press and hold HDG MEM pushbutton switch until MEM indicator lamp lights.	MEM indicator lamp lights.
10	Set MODE switch to OFF.	a. All lamps go off.
		b. INS indicator lamp on aircraft warning panel lights.
11	Set MODE switch to STBY.	a. MEM indicator lamp lights.
		b. Same as sequence No. 2b, c, and d.
12	Set MODE switch to ALIGN.	a. MEM indicator lamp remains on.
		b. Same as sequence No. 7b, c, and d above.
		c. The following sequence number is read out on the right display as the navigation set proceeds automatically through three stages of alignment.

Alignment stage	Number
Cage	10
Level	20
Fine level	60

Note. During the first two stages, the right digit will be 1 if the platform coarse heaters are on. Before the third stage (50) begins, the right digit must change to 0 to indicate that the platform is up to operating temperature and platform coarse heaters are off.

Note. The alignment time given in d below is correct when operating at an ambient temperature of 70 F. When operating at lower temperatures, the alignment time will increase by 1 minute for each 35°F below 70°F.

		d. RDY indicator lamp will flash when the navigation set is ready for the navigate mode of operation. Time required is approximately 4 minutes.
13	When RDY indicator lamp flashes set MODE switch to NAV.	Same as sequence No. 8 above and MEM indicator lamp goes off.
14	Set MODE switch to OFF.	a. All lamps go off.
		b. INS indicator light on aircraft warning panel comes on.

3-12. Periodic Maintenance Checks and Services

In accordance with the requirements of TM 38-750, the periodic maintenance checks and services on the navigation set should be scheduled concurrently with the periodic maintenance service schedule of the aircraft in which the equipment is installed. (Refer to the applicable aircraft technical manual for the hours between service periods.) All deficiencies or shortcomings will be immediately reported to a higher category of maintenance as specified in TM 38-750. A deficiency that cannot be corrected by organizational maintenance should be deadlined in accordance with TM 38-750. Perform all the checks and services listed in the periodic maintenance checks and services chart (para 3-13).

3-13. Periodic Preventive Maintenance Checks and Services Chart

Seq No.	Item	Procedure	Reference
1	Installation	Check to see that the navigation set components and the platform mount are installed in accordance with instructions in aircraft configuration manual.	Configuration manual of applicable aircraft.
2	Publications	a. Check to see that pertinent publications with no missing pages are on hand. Requisition pertinent publications not on hand.	a. Appendix A.
		b. Check to see whether pertinent publications are up to date.	b. DA Pam 310-4.
3	Modification work orders	a. Check to determine whether new applicable MWO's have been published.	a. DA Pam 310-7.
		b. Make sure that all URGENT MWO's have been applied to equipment.	b. DA Pam 310-7.
		c. Make sure that all NORMAL MWO's have been scheduled.	c. DA Pam 3107.

Section III. TROUBLESHOOTING

3-14. General Troubleshooting

Troubleshooting of the navigation set is based on the operational check in paragraph 3-10. When an abnormal condition or result is observed, refer to the troubleshooting chart. The paragraph references given in the *Reference paragraph No.* column of the troubleshooting chart correspond to the paragraph numbers of the operational checklist (para 3-11). Perform the corrective actions specified in the troubleshooting chart. If the corrective actions do not correct the trouble, higher category of maintenance is required. In all cases, the corrective action calls for replacement of a component suspected of being faulty. Paragraph 3-18 contains component removal and replacement procedures.

3-15. Troubleshooting Chart

Item No.	Reference Paragraph No.	Symptom	Probable trouble	Corrective action
1	3-11, 1*a*	a. INS indicator on aircraft warning panel is off.	*a.* Probable trouble are as follows: (1) No power applied to INS indicator breakers. (2) Lamp defective	*a.* Corrective actions are as follows: (1) Check appropriate aircraft circuit (2) Replace lamp (para 3-18*e*).
		b. Symptoms are as follows: (1) HDG, MEM, SL, SR, data entry indicators, and edgelighted panel lamp do not come on. *Note*. Edgelighted panel lamps include MODE SELECT switch, placarding DIM, and DEST and NAV INERTIAL placarding.	*b.* Probable troubles are as follows: (1) Proceed as follows: (a) No edgelighted panel power applied to control-indicator. (b) Control-indicator defective	*b.* Corrective actions are as follows: (1) Proceed as follows: (a) Check appropriate aircraft circuit breakers and switches. (b) Replace control-indicator (para 3-18*c*).
		(2) HDG MEM, SL SR, or one or more data entry indicator lamps do not come on.	(2) Lamps defective	(2) Replace lamps (para 3-18*e*).
		(3) Edgelighted panel lamps do not come on.	(3) Control-indicator defective	(3) Replace control-indicator.(para 3-18*c*).
2		*a.* Disregard indicators	*a.* None	*a.* None.
	3-11, 2*b*	*b.* INS indicator on aircraft warning panel goes off.	*b.* Lamp defective	*b.* Replace lamp (para 3-18*e*).
	3-11, 2*c*	*c.* Both MAL and AD indicator lamps come on.	*c.* Platform, computer, or control-indicator	*c.* Set MODE switch to AD. If MAL indicator lamp goes off and AD indicator lamp remains on, replace platform. If MAL indicator remains on, perform the corrective action in *d* below.
		Note. If present position and local magnetic variation have been inserted previously, they do not have to be inserted again when performing the corrective action in *d*(2) below.		
	3-11, 2*d*	*d.* MAL indicator lights	*d.* Computer platform, or control-indicator malfunction.	*d.* Corrective actions are as follows: (1) Set select switch to MON; set DEST thumbwheel switch to 0If left display read out is 1 or 3, replace computer (pars 5-18a)If left display readout is 2, replace control-indicator (para 3-18:)If left display readout is 4 or 5, replace platform (para 3-18d)If left display readout is not 1, 2, 3, 4, or 5, proceed with the corrective action in (2) below. (2) Set MODE switch to COMPT. Insert present position and local magnetic variation. Set DEST thumbwheel switch to 4. Wait approximately 2 minutes; the left display readout should be 11111.1.

				If all ones do not read out, replace computer (para 3-18a)If all ones are read out, proceed with corrective action in (3) below. (3) Set MODE switch to PLATWait approximately 12 minutes; the left display readout should be 11111.1. If all ones are not read out, replace platform (para 3-18d).
3	3-11, 3*a*	*a.* One or more of the following indicator lamps do not come on: MAL, RDY, MEM, DEST, TAC, INS, AD.	*a.* Control-indicator defective	*a.* Replace control-indictor (para 3-18c).
	3-11, 3*b*	*b.* STA, POS FIX, or INSERT indicator lamps do not come on.	*b.* Lamps defective	*b.* Replace lamps (para 3-18e).
	3-11, 3*c*	*c.* Symptoms are as follows: (1) The left or right display is clear (all lamps out).	*c.* Probable troubles are as follows (1) SL or SR pushbutton switch pressed to clear display, or the control indicator is defective.	*c.* Corrective actions are as follows: (1) Press SL or SR pushbutton switch. If displays do not light, replace control-indicator (para 3-18c).
		(2) One or more lamps on the left or right display does not come on.	(2) Lamps defective	(2) Replace lamps (para 3-18e).
4	3-11, 4	Lamps do not vary in intensity	Control-indicator defective	Replace control-indicator (para 3-18c
5	3-11, 5*a*_	*a.* MAL, RDY, MEM, DEST, TAC, INS, AD, STA, POS FIX, and INSERT indicator lamps do not go off.	*a.* Probable troubles are as follows: (1) Control-indicator defective (2) Computer defective	*a.* Corrective actions are as follows: (1) Replace control-indicator(para 3-18c). (2) Perform the corrective action in item No. 2d(2).
	3-11, 5*b*	*b.* The left and right displays do not read out data selected by the select switch, DEST thumbwheel switch, and STA pushbutton switch.	*b.* Probable troubles are as follows: (1) No data has been inserted (2) Control-indicator defective (3) Computer defective	*b.* Corrective actions are as follows: (1) Insert data. (2) Replace control-indicator (para 3-18c). (3) Perform the corrective action in item No. 2d(2).
6	3-11, 6	Present position and local magnetic variation data cannot be inserted	*a.* Computer defective *b.* Replace control-indicator	*a.* Perform the corrective action in item No. 2d(2). *b.* Replace control-indicator (para 3-18c).
7	3-11, 7*a*	*a.* Number sequence does not appear as listed	*a.* Computer or platform defective	*a.* Perform the corrective action in item No. 2d.
	3-11, 7*b*	*b.* INS indicator light goes off	*b.* Lamp defective	*b.* Replace control-indicator (para 3-18c).
	3-11, 7*c*	*c.* Both MAL and AD indicator lamps come	*c.* Platform or computer defective	*c.* Perform the corrective action in item No2c.
	3-11, 7*d*	*d.* indicator lamp comes on	*d.* computer or platform defective	*d.* Perform the corrective action in item No2d.
	3-11 7*e*	*e.* RDY indicator lamp does not flash when number sequence reaches 50,	*e.* Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	*e.* Corrective actions are as follows: (1) Perform the corrective action in item No. 2d. (2) Replace control-indicator(para 3-18c).
8	3-11, 8*a*	*a.* Both MAL and AD indicator lamps come	*a.* Platform or computer defective	*a.* Perform the corrective action in item No. 2c.
	3-11, 8*b*	*b.* MAL indicator lamp comes on	*b.* Computer or platform defective	*b.* Perform the corrective action in item No. 2d.

	3-11, 8*c*	*c.* INS indicator on control-indicator remains off.	*c.* Probable troubles are as follows: (1) Computer defective (2) Control-indicator defective	*c.* Corrective actions are as follows: (1) Perform corrective action in item (2) Replace control-indicator (para 3-18*c).*
	3-11, 8*d*	d. INS indicator on aircraft warning panel	d. Computer or platform defective	d. Perform the corrective action in item No. 2*d.*
	3-11, 8*e*	*d.* RDY indicator lamp does not go out.	*d.* Probable troubles are as follows: (1) Computer defective (2) Control-indicator defective	*d.* Corrective actions are as follows: (1) Perform corrective action in item No. 2*c*(2). (2) Replace control-indicator (para 3-18*c*
9	3-11, 9	MEM indicator lamp does not come on	Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	Corrective actions are as follows: (1) Perform the corrective action in item No. 2*d.* (2) Replace control-indicator (para 3-18).
10	3-11, 10*a*	*a.* All lamps do not go off	*a.* Control indicator defective	*a.* Replace control-indicator (para 3-18*c*).
	3-11, 10*b*	*b.* INS indicator on aircraft warning panel goes off.	*b.* Lamp defective	*b.* Replace lamp (para 3-18*e*).
11	3-11, 11*a*	*a.* MEM indicator lamp does not come on	*a.* Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	*a.* Corrective actions are as follows: (1) Perform corrective action in item No. 2*d.* (2) Replace control-indicator (para 3-18*c*).
	3-11, 11*b*	*b.* Same as item No2 except for *a*	*b.* Same as Item No. 2 except for a	*b.* Same as item No. 2 except for *a.*
12	3-11, 12*a*	*a.* MEM indicator lamp goes off	*a.* Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	*a.* Corrective actions are as follows: (1) Perform corrective action in item No, 2*d.* (2) Replace control-indicator (para 3-18*c*).
	3-11, 12*b*	*b.* Same as item No. 7 b thru d	*b.* Same as item No7 b through d	*b.* Same as item No. 7 b through d.
	3-11, 12*c*	*c.* Number sequence does not appear as listed	*c.* Computer or platform defective	*c.* Perform the corrective action in item No. 2*d.*
	3-11, 12*d*	d. RDY indicator lamp does not flash	d. Probable troubles are as follows: (1) Computer or platform defective (2) Control-indicator defective	d. Corrective actions are as follows: (1) Perform corrective action in item No. 2*d.* (2) Replace control-indicator (para 3-18*c*).
13	3-11, 12	Same as item No. 8	Same as item No. 8	Same as item No. 8.
14	3-11, 13*a*	*a.* All lamps do not go off	*a.* Control-indicator defective	*a.* Replace control-indicator (para 3-18*c*).
	3-11, 13*b*	*b.* INS indicator on aircraft warning panel goes off.	*b.* Lamp defective	*b.* Replace lamp (para 3-18*e*).

3-16. Supplementary Troubleshooting

To select the contents of any one of 4096 core storage locations for readout on the left and right display, proceed as follows:

(1) With the control-indicator MODE switch set to any position other than OFF, set the SELECT switch to MON.

(2) Set the DEST thumbwheel switch to 8.

(3) Press the SR pushbutton switch. Make sure that the right display clears and the INSERT indicator lamp brightens.

NOTE

As the data entry pushbutton switches are pressed, the data will be shifted from right to left on the right display.

(4) Use the data entry pushbutton switches to insert core storage location number in octal format.

(5) Press the INSERT pushbutton switch to store information in the computer. Make sure that the INSERT indicator light goes dim and the inserted number is read out on the right display.

(6) Set the DEST thumbwheel switch to 9.

(7) Read out the contents of the core storage location selected on the left and right displays.

NOTE

The sign of the particular word is indicated by the first (high-order) position of the left display. Numeral 1 indicates a minus, 0 indicates a plus. The contents of the selected location are read out in octal form on the remaining five positions of the left display, and the four high-order positions of the right display. The low-order position of the right display will be blank.

3-17. Gyro Bias Adjustment

The platform gyro biases should be checked when the aircrew report excessive terminal error. Gyro biasing of maintenance float stock platforms is performed by a higher category of maintenance and is not required after installation. To check and adjust the gyro bias values, proceed as follows:

a. Energize the navigation set in accordance with instructions given in paragraphs 28 and 29a, b, c, and d.

b. Set the control-indicator MODE switch to COMPT.

c. Insert the present-position coordinates as specified in paragraph 2-9e.

d. Insert local magnetic variation as specified in paragraph 2-9f.

e. Set the MODE switch to GB 2.

f. Set the SELECT switch to MON.

g. Set the DEST thumbwheel switch to 4.

h. Allow the navigation set to operate for 90 minutes after the right hand display reads 7.

NOTE

The X-gyro bias correction readout on the left display will be E or W followed by the number of divisions and tenths of a division that the X-bias potentiometer must be turned for adjustment. The Z-bias correction and readout on the display will be N or S followed by the number of divisions and tenths of a division the Z-bias potentiometer must be turned for adjustment.

i. Set DEST thumbwheel switch to 2.

j. Record the X- and Z-gyro bias correction read-outs.

NOTE

The gyro bias potentiometers are 10-turn potentiometers with 50 divisions per turn. There are five divisions between numerals on the dial (fig. 1-2A). Tenths of a division must be approximated between the division markers.

k. Turn the Z-gyro bias potentiometer on the platform (fig. 1-2) the number of divisions and tenths of a division recorded in j above. If S pre- ceded the indication, turn the potentiometer counterclockwise. If N preceded the indication, turn the potentiometer clockwise.

l. Turn the X-gyro bias potentiometer on the platform (fig. 1-2) the number of divisions and tenths of a division recorded in j above. If W preceded the indication, turn the potentiometer counterclockwise. If E preceded the indication, turn the potentiometer clockwise.

m. If the X- or Z-gyro bias potentiometer requires more than 10 divisions of change, repeat e through I above.

n. Set the MODE switch to GB 1.

o. Set DEST thumbwheel switch to 4.

p. Allow the navigation set to operate for 30 minutes after the right hand display reads 7.

q. Set DEST thumbwheel switch to 1.

NOTE

The Y-gyro bias correction readout on the left display will be E or W followed by the number of divisions and tenths of divisions that the Y-bias potentiometer must be turned for adjustment.

r. Record the Y-gyro bias correction readout.

s. Turn the Y-gyro bias potentiometer on the platform (fig. 1-2) the number of divisions and tenths of a division recorded in r above. If W preceded the indication, turn the potentiometer counterclockwise. If E preceded the indication, turn the potentiometer clockwise.

t. If the Y-gyro bias requires more than 10 divisions of change, repeat e through s above.

3-18. Removal and Replacement

WARNING

Be sure that all navigation set circuit breakers are at OFF and all navigation set fuses are removed before removing or replacing the equipment.

CAUTION

Do not touch connector pins; static electricity discharge from body may cause damage to equipment.

a. Computer.

(1) Remove the computer from the computer mount as follows:

(a) Disconnect the five electrical cables from the front panel connectors.

(b) Remove the screw that attaches the ground strap to the computer front panel.

(c) Disengage the two screw clamps from the holddown brackets on front of the computer by turning the thumb nuts counterclockwise.

(d) Allow the screw clamps to drop free.

CAUTION

Use extreme care while performing the procedures given in (e) below to prevent damaging air seal between the computer and the computer mounting.

(e) Use handles on the front of the computer to pull the computer forward and away from the computer mount.

(2) Replace the computer on the computer mount as follows:

CAUTION

Use extreme care while performing (a) below to prevent damaging the computer mount air seal.

(a) Use handles on the front of the computer to position the computer on the computer mount, and slide the computer to the rear to engage the guide pins at the rear of mount.

(b) Be sure that the computer is firmly seated against the rear of the computer mount. Engage the screw clamps in the holddown brackets at the front of the unit and tighten the thumb nuts securely.

(c) Secure the ground strap to the computer front panel with the attaching screw.

(d) Connect the five electrical cables to the computer front panel connectors.

b. Computer Mount.

(1) Remove the computer mount from the aircraft as follows:

(a) Remove the four screws that secure the aircraft exhaust air duct to the computer mount.

(b) Remove the 16 screws that secure the four isolators to the aircraft.

(c) Lift the computer mount from the support.

(2) Replace the computer mount in the aircraft as follows:

(a) Position the computer mount on the support.

(b) Install the 16 mounting screws.

(c) Secure the aircraft exhaust air duct to the mount with the four mounting screws.

c. Control-Indicator.

(1) Remove the control-indicator as follows:

(a) Loosen the six Dzus fasteners on the front of the control-indicator.

(b) Lift the control-indicator out of the compartment.

(c) Disconnect the cable connector on the rear of the control-indicator.

(2) Replace the control-indicator as follows:

(a) Connect the cable to the connector on the rear of the control-indicator.

(b) Place the control-indicator in its compartment.

(c) Tighten the six Dzus fasteners on the front of the control-indicator.

d. Platform.

(1) Remove the platform from its mount as follows:

(a) Remove the air hose from the front of the platform.

(b) Disconnect the electrical cable from the connector on the front of the platform.

(c) Remove the screws from the three mounting clamps; swing the clamps away from the platform mounts.

(d) Carefully lift the platform off the V-block mounts to prevent damaging mounts.

(2) Replace the platform on its mount as follows:

CAUTION

Use extreme care while performing (a) and (b) below to prevent damaging the platform mount and the mounting springs.

(a) Be sure that the mounting clamps are clear of the platform mount V-block mounts and place the platform on three V-block mounts.

(b) Position three mounting clamps and secure them by tightening down the screws; do not overtighten.

(c) Connect the electrical cable to the connector on the front of the platform.

(d) Replace the air hose on the front of the platform.

e. Lamps.

NOTE

The control-indicator left display face-plate (fig. 2-4) is made up of seven sections. The right display faceplate is made up of six sections. Each section is secured to the control-indicator front panel with two screws. The E and W and the N and S sections of the display contain four lamps each. The numeral sections of the displays contain seven lamps each. The degree and decimal points are illuminated by one lamp each.

(1) Remove a display lamp as follows:

(a) Remove and retain the two screws that secure the display faceplate section to be removed.

(b) Pull the section straight out to expose the lamp socket.

(c) Pull the defective lamp straight out from its socket.

(2) Replace a display lamp as follows:

(a) Push the new lamp straight into the socket.

(b) Place the faceplate section on the display faceplate.

(c) Secure the section with the two screws.

(3) Remove the HDG MEM, STA, POS FIX, SL, SR, INSERT and data entry pushbutton lamps as follows:

(a) Use the slots on both sides of the lens to pull the lens straight out from the panel to expose the lamp socket.

(b) Pull the lamp straight out from the lamp socket.

(4) Replace the HDG MEM, STA, POS FIX, SL, SR, INSERT and data entry pushbutton lamps as follows:

(a) Push the new lamp straight into the lamp socket.

(b) Line up the key on the lens with the keyway on the panel and push the lens into the socket.

NOTE

The MAL, RDY, MEM, DEST, TAC, INS, AD indicator lamps and the edge- light panel lamps are not replaceable by the organizational repairman.

CHAPTER 4

EQUIPMENT INTERFACE

4-1. General This chapter contains a block diagram description of the navigation set interfaces with aircraft navigation and ancillary equipment for a typical air- craft configuration. Figure FO-1 illustrates navigation set interfaces with a typical aircraft configuration.

4-2. Flux Valve

The platform supplies excitation voltage for the aircraft flux valve which in turn develops a magnetic heading output to the stabilized platform. The platform sends this magnetic heading, in addition to the true heading, to the computer where, by using true heading as a reference, the magnetic heading fluctuations are damped to pro- vide smoothed magnetic heading output. The smoothed magnetic heading functions to provide drive voltage for the compass cards on the pilot's and copilot's radio magnetic indicators as well as a reference signal for use by TACAN. In the event the computer or platform malfunctions, pre- venting the damping process, magnetic heading will continue to be supplied to the radio magnetic indicators and TACAN through the navigation set, but will not be smoothed. In this case, the computer sends a compass flag signal to the pilot's and copilot's radio magnetic indicators to indicate that the magnetic heading being utilized is not smoothed.

4-3. Instrument Power Transformer

The aircraft instrument power transformer provides synchro reference excitation voltage for the computer digital-to-synchro converters and for the platform pitch, roll, true heading and magnetic heading synchros.

4-4. True Airspeed Transmitter The true airspeed transmitter sends true airspeed to the computer. The computer returns a true air- speed feedback signal to provide closed-loop operation. The computer calculates groundspeed from data received from the platform. The computer uses the true airspeed input from the true air- speed transmitter, calculated groundspeed, and true heading input from the platform to calculate windspeed and direction for display on the control-indicator. When the air data mode of operation is manually selected, or automatically initiated by a platform failure preventing operation in the navigate mode, the computer will store the last reliable windspeed and direction, and local magnetic variation data calculated. During the air data mode of operation, windspeed and direction, in addition to local magnetic variation data in the computer, must be updated by manual insertion using the control-indicator. This will enable the computer to use the latest true airspeed input to provide up-to-date aircraft groundspeed and true heading.

4-5. Lighting Control Panel The edgelight power control signal from the air- craft lighting control panel, determines the intensity of control-indicator lamps. The control-indicator placarding and HDG MEM, SL, SR, and data entry pushbutton indicators are under edge- light control.

4-6. Pilot's Navigation Instruments

The pilot's navigation instruments may include an attitude indicator, bearing distance heading indicator, course indicator selector, and radio magnetic indicator. Pitch and roll signals are developed by the platform and applied to the attitude indicator for display of aircraft attitude. A gyro flag signal is also generated by the computer and applied to the attitude indicator when the pitch and roll data being displayed is accurate. The computer provides bearing minus heading, range, and an off flag signal to the bearing distance heading indicator during the mission. The bearing minus heading signal is the fly-to distance between aircraft heading and true bearing to the destination selected and is utilized for a visual display of aircraft guidance data to that destination.

The range signal provides for a visual display of distance, in nautical miles, from the air- craft to a selected destination. The off flag signal is sent from the computer to indicate that the navigation set is operating properly. The course indicator selector receives course deviation and a localizer flag signal from the computer. The course deviation signal is developed from bearing minus track angle. This signal is used to drive the course deviation bar thereby indicating the course deviation angle between the aircraft heading and the selected track. The localizer flag signal indicates that the navigation set is operating properly. Smoothed magnetic heading, bearing minus heading, and a compass flag signal are sent from the computer to the radio indicator. The smoothed magnetic heading drives the compass card. The bearing minus heading signal provides visual display for guiding the aircraft to the selected destination. The compass flag signal indicates that the navigation set is operating properly.

4-7. Copilot's Navigation Instruments

The copilot's navigation instruments are normally a slaved course indicator selector and a radio magnetic indicator. Their operation is identical to the pilot's course indicator selector and radio magnetic indicator described in 4-6 above.

4-8. Direct-Intercept Switch

When provided, the direct/intercept discrete switch permits a choice between a direct or intercept approach to a selected destination. If a direct approach is chosen, the computer steering control signals sent to the pilot's and copilot's navigation instruments, and to the autopilot, will guide the aircraft to the selected destination on the shortest direct track. When an intercept approach is chosen, the computer steering control signals sent to the pilot's and copilot's navigation instruments, and to the autopilot, will guide the aircraft on a course which will intercept the selected destination at the true course select angle inserted by the control-indicator for the destination.

4-9. INS Indicator

Normally the INS indicator lamp on the aircraft warning panel is illuminated when the navigation set is not in the navigate or air data mode of operation, or when the navigation set is in the navigate mode and the control-indicator MAL indicator lamp is on. If the INS indicator on the aircraft warning panel, and the control-indicator MAL and AD indicator lamps are on, the INS indicator lamp on the aircraft warning panel and the' control-indicator MAL indicator lamp will go out when the air data mode of operation is selected. The control-indicator AD indicator lamp will remain on to indicate that the navigation set is operating in the air data mode.

4-10. Autopilot

The platform sends pitch, roll, and true heading to the autopilot for attitude and heading reference. The computer sends lateral steering correction, navigate engage, and autopilot engage signals to the autopilot. The lateral steering correction signal is used by the autopilot to guide the aircraft to the selected destination. The navigate engage signal indicates that the lateral steering correction data is accurate. The autopilot engage signal indicates that the pitch, roll, and true heading data are accurate and that the navigation set is operating properly.

4-11. Weather Radar

Pitch and roll signals are sent from the platform to the weather radar, where a stabilization signal is developed to position the radar antenna to compensate for the pitch and roll motion of the aircraft.

4-12. Data Annotation

The data annotation receives data from the navigation set and conditions it for use by other air- craft equipment. The platform sends pitch and roll data to the data annotation. The data annotation sends a data request signal to the computer to request one of seven parameters. After reading the data request, the computer provides the appropriate data. The seven parameters are northing, easting (including zone number), altitude, heading, drift angle, groundspeed, and ground- speed-to-altitude ratio (Vg/H).

4-13. Side Looking Radar

The computer sends groundspeed and drift angle signals to the side looking radar where a signal is developed to compensate for aircraft groundspeed and drift. The computer provides synchro reference excitation and the side looking radar returns groundspeed feedback and drift angle feedback to provide closed-loop operation. The computer sends a nav-go signal to the side looking radar to indicate that the navigation set is operating properly.

4-14. TACAN

The computer sends smoothed magnetic heading and data request and control signals to the TACAN. Upon request, the TACAN sends bearing and range data to the computer. The computer evaluates the TACAN bearing and range data and, if required, updates the navigation set present-position data.

4-15. Map Display

The computer sends northing and southing pulses to the map display to move the map display forward or backward, and easting and westing pulses to move the map marker right or left. The map display provides a visual record of aircraft flight.

4-16. Teleprinter

When the operator presses the record pushbutton switch, the teleprinter sends a data request signal to the computer. Upon request, the computer sends present position (UTM coordinates), heading, and elapsed time in the navigate mode to the teleprinter.

CHAPTER 5

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

5-1. Disassembly of Equipment

Equipment disassembly is not required. The procedures for removing the navigation set components from the aircraft are specified in paragraph 3-18.

5-2. Repackaging of Equipment

Repackaging of equipment for shipment or limited storage normally will be performed at a pack- aging facility or by a repackaging team. If practicable, the original packaging materials should be stored and used for repackaging. Should emergency packaging be required, select the materials from those listed in SB 38-100. Package the equipment in accordance with the original pack- aging, so far as possible with the available materials.

a. Packaging Materials. The platform, computer, and control-indicator are packed in double-wall fiberboard boxes and padded with polyurethane ester and polyethylene foam. Each component is wrapped in a waterproof container. The computer mount is packed in a single-wall fiberboard box with protective wrapping.

b. Packaging Instructions.

CAUTION

The platform, computer, and control-indicator are sensitive electronic units containing fragile components. Use extreme care in packing each unit. Do not toss or drop the unit in its container.

(1) Platform. Pack the platform in accordance with figure 2-1.

(2) Computer. Pack the computer in accordance with figure 2-2.

(3) Control-indicator. Pack the control-indicator in accordance with figure 2-3.

(4) Computer mount. Cushion the computer mount with cellulosic cushioning material and pack in a fiberboard box.

Section II, DEMOLITION TO PREVENT ENEMY USE

5-3. Authority .for Demolition

Demolition of the equipment will be accomplished only upon order of the commander. Use the destruction procedures outlined in paragraph 5-4 to prevent further use of the equipment.

5-4. Methods of Destruction

Any or all of the methods of destruction given below may be used. The time available will deter- mine the order and methods of destruction. Also, the tactical situation will determine how the destruction will be carried out. In most cases, it is preferable to demolish completely the computer rather than partially destroy all the components of the navigation set.

a. Smash. Smash the navigation set components; use sledges, axes, hammers, crowbars, and any other heavy tools available.

b. Cut. Cut the interconnecting cables and equipment internal cable harnesses; use axes, handaxes, machetes, and similar tools.

c. Burn. Burn as much of the equipment as is flammable; use gasoline, oil, flamethrowers, and similar flammables. Burn the technical manuals first. Pour gasoline on the cut cables and internal wiring and ignite it. Use a flamethrower to burn spare parts or pour gasoline on the spares and ignite them.

WARNING

Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

d. Explode. Use explosives to complete demolition or to cause maximum damage, before burning, when time does not permit complete demolition by other means. Powder charges, fragmentation grenades, or incendiary grenades may be used. Incendiary grenades usually are most effective.

e. Dispose. Bury or scatter destroyed parts or throw them into nearby waterways. This is particularly important if a number of parts have not been completely destroyed.

5-5. Report of Destruction

Report of equipment destruction will be made through command channels.

APPENDIX A

REFERENCES

The following publications contain information applicable to the organizational maintenance of the navigation set.

DA Pam 310-4	Military Publications: Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	U.S. Army Equipment Index of Modification Work Orders.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies and Equipment Used by the Army.
TB 746-10	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 5-241-8	Universal Transverse Mercator Grid.
TM 11-6625-203-12	Operator and Organizational Maintenance Manual: Multimeter AN/URM-105, including Multimeter ME-77/U.
TM 38-750	Army Equipment Record Procedures.
TM 740-90-1	Administrative Storage of Equipment.

APPENDIX C

MAINTENANCE ALLOCATION

Section 1. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for AN/ASN-86. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. INSPECT. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

b. TEST. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This is accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.

c. SERVICE. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. ADJUST. To rectify to the extent necessary to bring into proper operating range.

e. ALIGN. To adjust two or more components or assemblies of an electrical -- mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

f. CALIBRATE. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. INSTALL. To set up for use in an operational environment such as an encampment, site, or vehicle.

h. REPLACE. To replace unserviceable items with serviceable like items.

i. REPAIR. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. OVERHAUL. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. REBUILD. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. SYMBOLS. The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

C-3. Explanation of Format

a. Column 1, group number. Column 1 lists arbitrary group numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly.

b. Column 2, functional group. Column 2 lists the noun names of components, assemblies, subassemblies and modules on which maintenance is authorized.

c. Column 3, maintenance functions. Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to per- form that function at higher categories. The codes used represent the various maintenance categories
as follows:

Code	*Maintenance Category*
C----------	Operator/Crew
0 ----------	Organizational Maintenance
F ----------	Direct Support Maintenance
H----------	General Support Maintenance
D----------	Depot Maintenance

d. Column 4, tools and test equipment. Column 4 specifies, by code, those tools and test equipment required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in table I.

e. Column 5, Remarks. Self-explanatory.

C-4. Explanation of Table I, Tool and Test Equipment Requirements

The columns in Table I, Tool and Test Equipment Requirements are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the Maintenance Allocation Chart. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number of the specific tool or test equipment.

e. Tool Number. Not used.

SECTION II. MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A	INERTIAL NAVIGATION SET AN/ASN-86	O	O	O	O				O	O			1,7 7 1 1 1	Isolate failure to black box.
1A1	NAVIGATIONAL COMPUTER UNIT CP-941/ASN-86	O	F	O					O	F	H		2 THRU 4,9, 11,12,146,147, 7 1 2 THRU 4,9, 11,12,112 2 thru 4,9, 11,12,115, 116,118,121, 122,123,128, 129,133,134, 136,137,142	
	TRAY ASSY'S A1 THRU A11; ELECT	F												4k memory module to be returned
	SUP (+5V +30V); REG BOARDS)-6V, ±15V, -25V, +12V,+25V); 30V DC/DC CONV ;VOLT MONITOR BOARD;OVERVOLT SENSOR; 4K MEMORY MODULE		D						F	D			2 THRU 5,8,9, 10,12,24,34 thru 37,84 3,4,112,149, 150,151 2 thru 5,8, 9,10,24,25, 34 thru 37, 73,74,75,81, 84,92 thru 99,108	to contractor for test and repair.

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A2	CONTROL INDICATOR UNIT ID-1579/ASN-86	O	F	O					O	F	H	D	7 3,4,9,148 1 3,4,9,11 3,4,9,11,81, 120,122,123, 126 thru 129, 133,134,137, 145 3,4,5,7,9,11, 12,34 thru 38,73,74,75, 81,82,93 thru 99,108, 109	
	PWR SUP MODULE; TRAY ASSY MODULES (CONT NO. 1 & 2);DIGITAL DISPLAY DRIVER	F	D						F	D			12,34,84 3,4 12,34 thru 38,73,74,75, 81,84,92 thru 99,108	

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A3	GYRO STABILIZED PLATFORM MX-8123/ASN-86		O H										7 3,4,5,7,8,15, 23,25,27,28, 31,32,33,77 thru 80	
				O					O	H			1 2 thru 5,7, 8,15,17,18, 23,25,27,28, 31 thru 33, 40,77 thru 80,116,118 thru 121,124 thru 127,133, 134,136,137, 139,142,145	
												D	2 thru 8,12 thru 17,19 thru 22,24 thru 72,77 thru 89,91, 97,100,101, 102,104 thru 107,109,110	
	TRANSFORMER BUFFER AMPL; MAG HEADING SERVO MODULE;PWR SUPPLY; DUMMY ACCELEROMETER	H	H										2 thru 5,8, 12,25,31,32, 33	Isolate failures to one of the following; elect ckt card assy; buffer ampl ckt card assy; mag heading servo ampl assy; pwr supply ckt card assy; dummy accelerometer resistor heater.
or			D										2 thru 6,8, 12,31, thru 34,39,58,104	Isolate failure to a discrete component, integrated circuit, dummy acceler heater.

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
									H	H			2 thru 4 2 thru 5,8, 25,31,32,33, 140	Repair by replacement of following: elect ckt card assy buffer ampl ckt card assy; mag heading servo amp assy: pwr supply ckt card assy; dummy accel resistors.
										D			2 thru 6,8, 12,24,25,26, 34 thru 39, 73,81,92 thru 99,108	Repair by replacement of discrete components, integrated circuits, dummy acceler heaters.
	ELECT CKT CARD ASSY; BUFFER AMPL; CKT CARD ASSY MAG HEADING SERVO AMPL ASSY; PWR SUPP;Y CKT CARD ASSY; MODE ASSY; CONVERT CARD; ±15V REGULATOR;TEMP CONTROL BOARD; SERVO AMPL ,MODULE; GYRO SPIN PWR AMP MODULE	H	D						H	D			3 thru 7,12, 23 thru 26, 34 2 THRU 4 3 TKRU 7,12, 23 THRU 26, 34 THRU 38, 81,91 THRU 99,108	
	HEATER EXCHANGER	H		D						D			7,39,96,99 3,4,7,85,134	Replace by whole new chassis; no repair
	STABLE ELECTRICAL ASSY; STABLE ELEMENT SUBASSY; TEMP SENSOR; ELEC COMPONENT ASSY; BIAS RESISTOR ASSY	H	H						H	H			2 THRU 5,9, 12,25,27,28, 31 THRU 33, 140 3,4 3,4,86	

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	FUNCTIONAL GROUP COMPONENT ASSEMBLY	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
	GYROS AND ACCELEROMETERS	**H**												
			H										2 thru 5,9, 12,23,25,27, 28,31,140	
									H				2 thru 5,9, 12,23,25,27, 28,31,140	
										D	D	D		Return to contractor for repair.
	STABLE ELEMENT TEMP CONTROL	H												
			H										2 thru 5,12, 25,27,28,31, 32,33,140	
									H				3,4	
	AZ ASSY UPPER; AZ CART ASSY LOWER; PITCH CART ASSY (TRANSOLVER); PITCH CART ASSY (TORQUER); IR CART ASSY 9 RESOLVER); IR CART ASSY (TORQUER)	H	H										2 thru 5,9, 12,13,25,27, 28,31,90,140	
									H				2 thru 4	
										D			2 thru 4,13, 19,21,22,42 thru 47,49, 51 thru 57, 59 thru 61, 65,68,69,82, 83,88,90,91, 105,113,114, 140	
	OUTER ROLL CART ASSY	H												
			H										2 thru 5,9, 12,23,25,27, 28,31,90,140	
										D			2 thru 4	
											D		2 thru 4,20, 21,43,46,47, 59,63,82,87, 88,90,113,114	

TABLE I. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
1	O	TOOL KIT,ELECTRONIC EQUIPMENT TK-101/G	5180-610-8177	
2	O,F,H,D	TORQUE WRENCH (P/O TK-90/G)	5180-542-5812	
3	F,H,D	TOOL KIT,ELECTRONIC EQUIPMENT TK-100/G	5180-605-0079	
4	F,H,D	TOOL KIT,ELECTRONIC EQUIPMENT TK-105/G	5180-610-8177	
5	H,D	OSCILLOSCOPE AN/USM-281	6625-179-8441	
6	D	OSCILLOSCOPE PLUG IN (HP 1803A		
7	O,F,H,D	MULTIMETER AN/USM-223	6625-999-7465	
8	H,D	PHASE ANGLE VOLTMETER ME-223	6625-810-3917	
9	F,H,D	TAPE READER AN/USA-34	6625-491-3491	
10	D	POWER SUPPLY, 28VDC (HP-6268A W/NO. 26 OPTIION, OR EQUIV)		
11	F,H,D	NAVIGATIONAL COMPUTER CONTROL INDICATOR TEST SET AN/ASM-386	6625-404-3280	
12	F,H,D			
13	H,D	VOLTMETER DIGITAL (NON LINEAR SYSTEM, MODEL X-2)		
14	D	CONNECTOR SUPPORT FIXTURE (LITTON P/N T119363)		
15	H,D	PIN LOCATOR (CANNON P/N L750CL)		
16	H,D	EXTRACTOR TOOL (HUGHES P/N TWO 22RT000)		
17	H,D	EXTRACTOR TOOL (CANNON P/N CET-P-CTA-1)		
18	H,D	CRIMPING TOOL (DANIELS TOOL CO. P/N MH 750-(C HEAD))		
19	H,D	HANDLING FIXTURE (LITTON P/N T119311)		
20	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 2, LITTON P/N T119301)		
21	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 4, LITTON P/N T119317)		
22	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 6, LITTON P/N T119320)		
		CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 8, LITTON P/N T119324)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
23	H,D	COUNTER, ELECTRONIC DIGITAL READOUT AN/USM-207	6625-911-6368	
24	D	VOLTMETER (FLUKE 887A)		
25	H,D	DECADE SYNCHRO BRIDGE (GERTSCH P/N DSK-5C-4R)		
26	D	OSCILLATOR SG-621/U	6625-606-9727	
27	H,D	RECORDER AN/USM-365(V1)	6625-230-3834	
28	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 3, LITTON P/N T119315)		
29	D	CEMENT FIXTURE (LITTON P/N T116790)		
30	D	CEMENT FIXTURE (LITTON P/N 207273)		
31	H,D	GYRO STABILIZED PLATFORM TEST SET AN/ASM-385	6625-404-3281	
32	H,D	PURGE AND FILL UNIT, GYRO STABILIZED PLATFORM MX-8474/ASN-86 GYRO STABLIZE PLATFORM TEST STAND MT-4145/ASN-86	6605-022-3739	
33	H,D	ANALOG MODULE TEST SET AN/ASM-404	6605-522-3740	
34	D	FLAT PACK REMOVAL TOOL (LITTON P/N T116154)		
35	D	LEAD CUTTING FIXTURE, FLAT PACK (LITTON P/N T119808)		
36	D	LEAD CUTTING FIXTURE, FLAT PACK (LITTON P/N T207202) ADAPTER (LITTON P/N TE112236)		
37	D	HEATER TESTER (LITTON P/N TE112236) HOLDING FIXTURE (LITTON P/N T116118)		
38	D	NULL FIXTURE (LITTON P/N T116135)		
39	D	ADAPTER, TORQUE (LITTON P/N T115938)		
40	H,D	SOLDER POT (WAAGE MODEL RSPI)		
41	D	CEMEMTING FIXTURE (LITTON P/N T116147)		
42	D			
43	D			
44	D			

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
45	D	ADAPTER (TORQUE WATCH) (LITTON P/N T116148)		
46	D	TORQUE WATCH (WALTERS P/N 651X-4)		
47	D	ALIGN FIXTURE (GIMBAL ASSY) LITTON P/N T116157)		
48	D	MIRROR FIXTURE (PLATFORM) (LITTON P/N T116222)		
49	H,D	THERMAL COVER (LITTON P/N T116722)		
50	D	TORQUE WATCH (WALTERS P/N 651C-3)		
51	D	SUPPORT FIXTURE (LITTON P/N T119006)		
52	D	SUPPORT FIXTURE (LITTON P/N T119009)		
53	D	ADAPTER (LITTON P/N T119018)		
54	D	HEARING INSERTION TOOL (LITTON P/N T119019)		
55	D	NULL FIXTURE (LITTON P/N T119030)		
56	D	HOLDING FIXTURE (LITTON P/N T119300)		
57	D	TOOL INSTALLATION (STATOR) (LITTON P/N T119302)		
58	D	MIRROR FIXTURE (LITTON P/N T119309)		
59	DD	REMOVAL TOOL (HUGHES P/N TWO 22RT002)		
60	H,D	CONTINUITY TEST BOX (CONTINUITYCHECKOUT BOARD NO, 5, LITTON P/N T119319)		
61	H,D	CONTINUITY TEST BOX (CONTINUITYCHECKOUT BOARD NO, 7, LITTON P/N T119322)		
62	D	NULL FIXTURE (LITTON P/N T119699)		
63	D	NULL FIXTURE (LITTON P/N T119706)		
64	D	NULL FIXTURE (LITTON P/N T119712)		
65	D	ADAPTER (LITTON P/N T119724)		
66	D	NULL FIXTURE (LITTON P/N T119898)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
67	D	HOLDING TOOL (HUB) (LITTON P/N T207207)		
68	D	SUPPORTING FIXTURE (LITTON P/N T207209)		
69	D	SUPPORTING FIXTURE (LITTON P/N T207211)		
70	D	LOCATING FIXTURE (LITTON P/N T119998)		
71	D	ASSEMBLY CLAMP (LITTON P/N T207021)		
72	D	PIN LOCATOR (DANIELS P5)		
73	D	PRECISION OVEN	6640-531-4358	
74	H,D	REMOVAL/INSERTION TOOL (AMP INC P/N 69514)		
75	D	SOLDER TIP IRON (MODEL 18)		
76	D	INSERTION TOOL (CANNON P/N CIT-PS-CTA)		
77	H,D	HEX DRIVE	5120-596-0934	
78	H,D	HEX DRIVE (P/N TMA-2)		
79	H,D	HEX DRIVE (P/N TM4-1/2)		
80	H,D	HEX DRIVE (P/N TMP-01)		
81	F,H,D	SOLDERING IRON	3439-907-5806	
82	D	LOCATING FIXTURE (LITTON P/N T207108)		
83	H,D	CRIMPER (AMP INC P/N 69547)		
84	D	DIGITAL MODULE TEST SET AN/ASM-421		
85	D	CEMENT FIXTURE (LITTON P/N T116794)		
86	H,D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO., 9, LITTON P/N T116798)		
87	D	CHECK FIXTURE (LITTON P/N T119007)		
88	D	REMOVAL TOOL, BEARING (LITTON P/N T119017)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
89	D	CEMET FIXTURE (LITTON P/N T119031)		
90	H,D	SUPPORT CLAMP (LITTON P/N T119318)		
91	H,D	SAFETY BLOCKS (LITTON P/N T119323)		
92	D	REMOVAL/INSERTION TOOL (CANNON P/N C1ET-20-HD)		
93	D	P/N LOCATOR (DANIELS P13)		
94	D	TINNING FIXTURE (LITTON P/N T119795		
95	D	CURING FIXTURE (LITTON P/N T119949)		
96	D	AC/DC HIPOTRONICS P/N 301B-MR, OR EQUIV)		
97	D	LEAD CUTTING FIXTURE, FLAT PACK (LITTON P/N T207096)		
98	D	MEGOHMMETER (MEGOHMMETER MODEL 1629, OR EQUIV)		
99	D	BIN ANGLE CHISEL (LITTON P/N T207181)		
100	D	FIXTURE TORQUE CHECK (LITTON P/N T207181)		
101	D	CEMET FIXTURE (LITTON P/N T207182)		
102	D	ELECTRONIC HEIGHT GAGE (FEDERAL P/N 230P-120, OR EQUIV)		
103	D	CONNECTOR DRIVE ADAPTER (LITTON P/N T207193)		
104	D	ADAPTER (TORQUE WATCH) (LITTON P/N T207214)		
105	D	SWAGE TOOL (LITTON P/N T207277)		
106	D	CONTINUITY TEST BOX (CONTINUITY CHECKOUT BOARD NO. 1, (LITTON P/N T207286)		
107	H,D	SOLDER HEIGHT CHECK TOOL (LITTON P/N T207286)		
108	D	ADJUSTABLE AUTOTRANSFORMER (GENERAL RADIO MODEL W5M, OR		
109	D	EQUIV)		
110	H,D	WRENCH, SPANNER (LITTON P/N T207699)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
111	F,H,D	TRAY EXTRACTOR (LITTON P/N T237889)		
112	F,H,D	TRAY EXTRACTOR (LITTON P/N T870673)		
113	D	P500 TORQUE CARTRIDGE AND GIMBAL BALANCE STATION (LITTON P/N TE118069		
114	D	P500 NULL AND PHASE SECTION (LITTON P/N TE118450)		
115	H,D	INSERTION TOOL (BENDIX P/N 11-8674-24)		
116	H,D	REMOVAL TOOL (BENDIX P/N 11-8675-24)		
117	D	PIN LOCATOR (DANIELS P/N P7 HEAD C SERIES		
118	H,D	PIN LOCATOR (DANIELS P/N P6 HEAD C SERIES		
119	H,D	PIN LOCATOR (DANIELS P/N P4 HEAD C SERIES		
120	H,D	PIN LOCATOR (BENDIX P/N 11-8673-6)		
121	H,D	PIN LOCATOR (BENDIX P/N 11-8673-7)		
122	H,D	TERMI POINT SERVICE TOOL (AMP INC P/N 69535-1)		
123	H,D	MANDREL (AMP INC P/N 69545-1)		
124	H,D	INSERTION TOOL (DEUTSCH P/N M-15513-22A)		
125	H,D	REMOVAL TOOL (DEUTSCH P/N M-15515-22P/S)		
126	H,D	INSERTION TOOL (BENDIX P/N 11-8674-22)		
127	H,D	REMOVAL TOOL (BENDIX P/N 11-8675-22)		
128	H,D	PULL TEST TOOL (AMP INC P/N 69358-6)		
129	H,D	EXRACTOR/LOCATOR (AMP INC P/N 69357-5)		
130	D	CRIMPING TOOL (HUGHES P/N TWO 22CH000)		
131	D	LOCATOR TOOL (HUGHES P/N TWO 22LS000)		
132	D	EXTRACTOR TOOL (CANNON P/N CET-S-CTA-1)		

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	**MAINTENANCE CATEGORY**	**NOMENCLATURE**	**FEDERAL STOCK NUMBER**	**TOOL NUMBER**
133	H,D	THERMAL WIRE STRIPPER POWER UNIT (IDEAL IND INC P/N MODEL 45-135)		
134	H,D			
135	H,D	TORQUE WRENCH (TORQUE CONTROLS KIT 2)		
136	H,D	SOCKET LOCATOR (CANNON P/N L-750 CLS)		
137	H,D	7X EYE LOOP (BAUCH AND LOMB INC P/N CAT-81-41-71-7X		
138	H,D	SWING GRIP TOOL, THERMAL STRIPPER (IDEAL IND INC P/N L-6637)		
139	H,D	REPLACEMENT ELEMENTS (IDEAL IND INC P/N L-6637)		
140	H,D	STOP WATCH (MONTE CARLO 1002)		
141	D	VOLTMETER ELEXTRONIC ME-202A/U		
142	H,D	TEMPERATURE POTENTIOMETER (LEEDS NORTHROP P/N 8693, OR EQUIV)	6625-050-8686	
143	D	INSERTION TOOL (HUGHES P/N TWO 22IT000)		
144	H,D	DEKABOX, DECADE RESISTOR (ELECTRO SCIENTIFIC IND MODEL DB 655, OR EQUIV)		
145	H,D			
146	F,H,D	SPIN TIGHT (SNAPON P/N 24F1/8)		
		HEAT GUN (MASTER APPLIANCES P/N HG-751)		
147	F,H,D	TAPE, PUNCHED PROGRAM NCU TEST #1 (DIAGNOSTIC/TEST TAPE, P/N 667921)		
148	F,H,D	TAPE, PUNCHED PROGRAM NCU TEST #2 (DIAGNOSTIC/TEST TAPE, P/N 670960)		
149	F,H,D	TAPE, PUNCHED PROGRAM CIU TEST (DIAGNOSTIC/TEST TAPE, P/N 667923)		
150	F,H,D	TAPE, PUNCHED PROGRAM 0V-1D (OPERATIONAL TAPE, P/N 670945)		
151	F,H,D	TAPE, PUNCHED PROGRAM LAFFING EAGLE, LEFT FOOT, AND LEFT JAB (OPERATIONAL TAPE, P/N 670946)		
		TAPE, PUNCHED PROGRAM CEFIRM LEADER (OPERATIONAL TAPE, P/N 670947)		

GLOSSARY

Acceleration-Rate of change of velocity per unit of time along a predetermined axis.

Attitude--The position of an aircraft, as deter-mined by inclinations about the three reference axes.

Barometric Altitude-Altitude measured by means of changes in atmospheric pressure.

Clear-To restore a storage or memory device to a prescribed state, usually zero.

Core Storage-A storage unit composed of magnetic cores and associated wiring. Each core stores a single bit.

Course Deviation-Steering signal which is a function of the selected course, ground track, and bearing and range to destination.

Course Select Angle-The angle between true north and the desired intercept course through a destination or TACAN station. The course select angle may be inserted on the control-indicator for each destination and TACAN station.

Detent-A spring-loaded catch used to hold the MODE switch in the NAV position.

Direct Approach-With the DIRECT/INTER- CEPT switch set to DIRECT, the aircraft is directed along the shortest track from present position to the selected destination or TACAN station.

Drift Angle-The angle between true heading and track made good, expressed as degrees right or left.

Easting Distance-The distance east within a UTM zone. The distance is measured in kilometers eastward within the UTM zone.

Flag-An indicator used to inform operator of a no-go condition.

Gyro-(Short for gyroscope.) A device consisting of a wheel so mounted that its spinning axis is free to rotate about either of two other axes perpendicular to itself and to each other.

Gyro Bias 1-North-seeking alignment of Y-axis prior to setting Y- and Z-gyro bias.

Gyro Bias 2-Ninety-degree-seeking alignment prior to setting X- and Z-gyro bias.

Gyrocompass-The process by which the platform stable element is aligned to true north.

Heading Memory Alignment-Platform stable element is aligned to true north with previously stored heading as a reference.

Intercept Approach-With the DIRECT/INTER- CEPT switch set to INTERCEPT, the aircraft is directed along a preselected (course select) course to the selected destination or TACAN station.

Local Vertical-Coincident with gravity vertical. Location-The storage position in the internal memory or storage for one computer word. Magnetic Heading Servo-Amplifier assembly located in the platform.

Northing Distance-The northing distance is the distance, in kilometers, north of the equator. The equator is referenced as 0 kilometer.

Octal Format-A numbering system that uses eight admissible marks; a number system with a radix of 8.

Pitch-Angular displacement of an aircraft about the lateral axis (positive for aircraft nose up).

Position Fix-Visual check of present position using known location coordinates.

Program-A list of all instructions which the dig- ital computer is prepared to perform or is capable of performing.

Roll-Angular displacement of an aircraft about the longitudinal axis (positive for aircraft right wing down).

Southing Distance-Southing distance is the distance, in kilometers, north of the south pole. The equator is referenced as 10,000 kilometers. The southing distance is determined by subtracting the distance, in kilometers, south of the equator from 10,000.

Track Angle-The angle between true north and the projection on the earth's surface of the path along which the airplane is actually flying.

True Airspeed Feedback Converter-Digital to synchro converter located in the computer.

True Heading-Angle measured clockwise from true north to the aircraft longitudinal axis.

X-Axis-The stable element axis initially oriented in east-west direction.

Y-Axis-The stable element axis initially oriented to true north.

Z-Axis-The stable element oriented to the geodetic vertical.

Zone Number-The number representing one of 60 UTM zones. The earth is divided into 60 zones (6° of longitude each). The zones are numbered consecutively eastward from the 180th meridian.

Glossary 2

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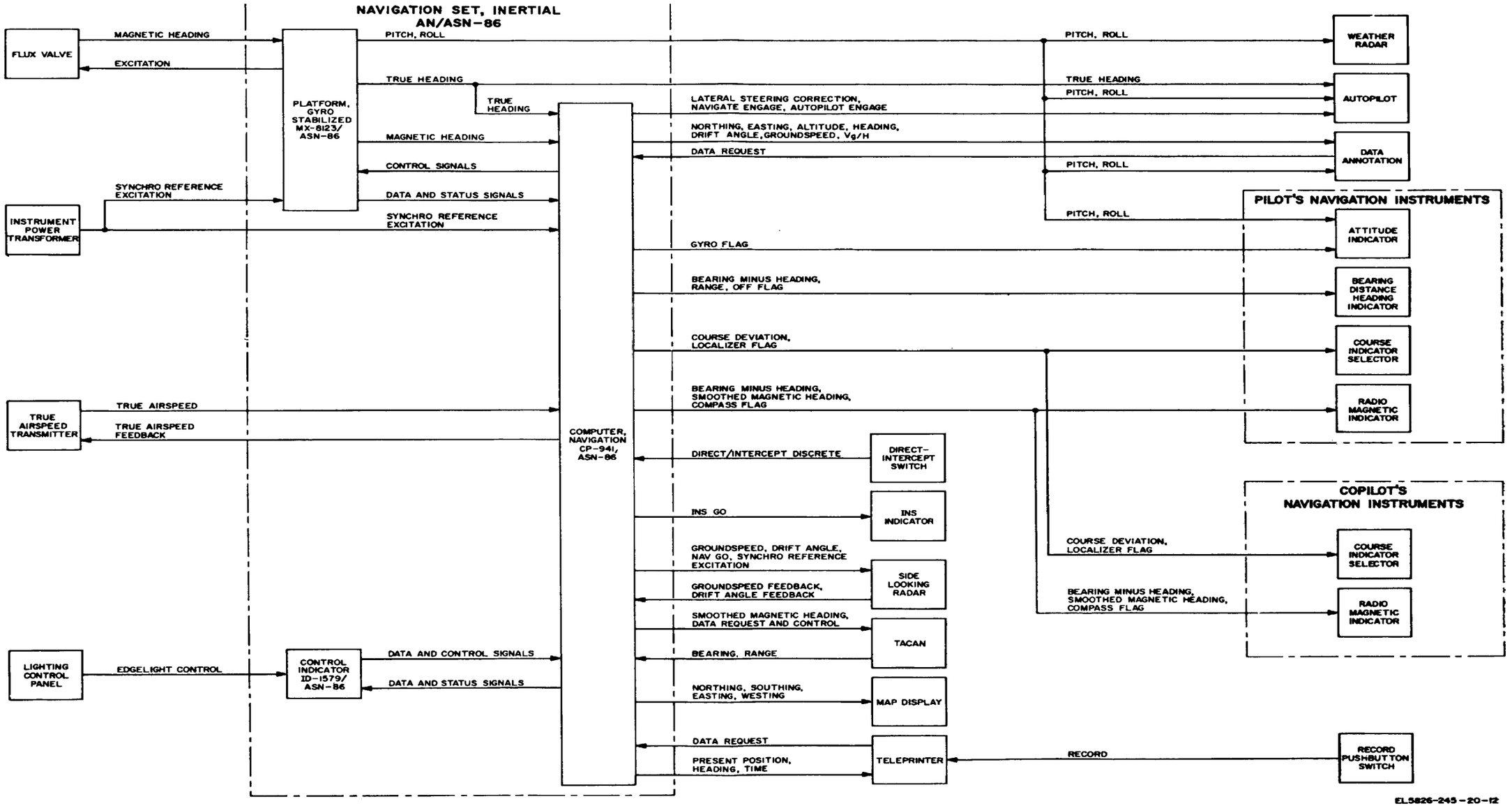

Figure FO-1. Navigational Set, Inertial AN/ASN-86, typical aircraft configuration interface block diagram

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