



Service Bulletin

SB 81438-XX-00-15

Rev. C

2000 Approach GPS Navigation Systems, Part Numbers 81438-00-XXXX, 81438-01-XXXX, 81438-10-XXXX and 81438-11-XXXX.

Release of operating system -242M.

SUMMARY: FreeFlight Systems has released software system -242M for the 2000 Approach.

I. PLANNING INFORMATION

A. Effectivity

This Service Bulletin applies to the 2000 Approach GPS Navigators; Part Numbers 81438-00, 81438-01, 81438-10 and 81438-11, where XXXX is the system operating software.

Installation of software version -242M will become mandatory. Continued IFR operations after June/2009 will require software version -242M and its support of 4 MB Nav data bases.

Installation of software version -242M also requires implementation of hardware service bulletin 81438-XX-34-14 to support 4 MB Nav data base operation.

If a unit is being updated to software version -242M from a version before -242, the hardware modifications described in Service Bulletin 81438-XX-34-02 are required. That Service Bulletin changes resistor values to provide proper CDI scaling and centering without calibrating during installation. Check the Service Bulletin tag before proceeding. If the number 2 has been stricken, this modification has been implemented. If 2 has not been stricken, Service Bulletin 81438-XX-34-02 must be implemented before this software can be used.

B. Reason

This Service Bulletin advises all users of 2000 Approach GPS Navigators, Part Numbers 81438-00, 81438-01, 81438-10, and 81438-11, of the availability of an optional operating system, version -242M.

The following changes have been incorporated into software version -243M:

- Update software to accept 4 MB Nav database.
- Remove FLY DME arc option from direct-to function
- Prevent expansion of active flight plan beyond 40 waypoint maximum
- Changed the function of the External MSG annunciator to stay lit while internal MSG annunciator is on.
- Correct display of GPS Estimated Error when satellite errors exist

C. Description

Operating system -242M is loaded by replacing EPROMs, U401 and U402, on the IOP CCA and by downloading software from a diskette.

D. Approval

Software Version -242M is a minor modification to version -242B and is covered under the TSO approval of version -242B. Version -242B was approved under TSO C129 (A1). 2000 Approach installations that have been FAA approved with software programs other than -242x must be reevaluated when software version -242M is installed. (Note: Software version -242A is not TSO approved.)

E. Manpower

The following man-hour estimates are based on incorporation concurrent with an unscheduled repair or during a scheduled modification:

Units	Compliance	Man Hours
All RDUs	During Routine Maintenance	2.0
All RDUs	During Repair	2.0

F. Weight and Balance

None

G. Electrical Load Data

Not Affected

H. Reference

ECN S08016

I. Other Publications Affected

- 84918, Rev A FreeFlight 2000 Approach Pilot Guide Supplement
- 84924, Rev A FreeFlight 2000 Approach GPS Receiver Installation and Checkout Manual Supplement

J. Interchangeability and Identification

Modified and unmodified units are not interchangeable.

2000 Approach GPS Navigation Systems that have software version –242M incorporated shall be identifiable by the Identification Label on the rear of the unit bearing part number 81438-XX-242M.

Units that have the required hardware modifications for this Service Bulletin can be identified by a strike across the number 2 and 14 on the Service Bulletin tag.

Additionally, operators who are upgrading from software versions -0228, -0231, -0232, or -0237 need to be aware of the effects of the following changes in software versions –0242, -242B and 242M:

1. In software versions –0242, -242B, and 242M, the functions of internal RAIM and GPS annunciators are disabled and have been replaced with messages announcing the transition between GPS Position/NO GPS Position and RAIM/NO RAIM.
2. The user interface for entering flight plan information has changed substantially in –0242, -242B and 242M. The operator is advised to consult the *2000 Pilot Guide* (PN 83166) and its supplement (PN 84918), before using the new system.

II. MATERIAL INFORMATION

A. Price and Availability

Call FreeFlight Systems for price and availability at time of purchase.

Customers may elect to send Navigators to the FreeFlight Factory Service Center or they may send units to an authorized Level II Service Center for installation of this software upgrade. Modifications incorporated at the Factory Service Center will be completed within fifteen (15) working days after receipt of the unit, depending upon parts availability.

Level II Service Centers wishing to incorporate Service Bulletin 81438-XX-00-15 should issue a purchase order to FreeFlight Systems for the number of Service Bulletin kits required.

B. Parts List

Service Bulletin Kit 81438-XX-00-15 contains:

FFS PN	Qty	Nomenclature	Notes
80418-242M	1 set of 2	EPROMs, U401 and U402, with NIOP software version 2.841	
83306-00-242M	1	Floppy disk loaded with GPS9 v. 4.06-0227, spdrive.com, and rgl.exe	
81461-XX	1	4 MB data base	1
81441	1	Serial Number Identification Plate	2
SB 81438-XX-00-15	1	Service Bulletin Document (this document)	
84918, Rev. A	1	FreeFlight 2000 Approach Pilot Guide Supplement	
84924, Rev. A	1	FreeFlight 2000 Approach GPS Receiver Installation and Checkout Manual Supplement	

Note 1: Please state which database is required: North America (81461-10), Eurasia (81461-12) or Pacific South America (81461-13).

Note 2: When ordering, please include the serial number of each unit to be upgraded. The serial number will be printed on the Serial Number Identification tag.

C. Ordering Information

Operators of the 2000 Approach may send units to an approved Level II Service Center or they may return units to the FreeFlight Systems Factory Service Center for the upgrade. To upgrade the operating system at a Level II Service Center, send a purchase order requesting Service Bulletin kit P/N 81438-XX-00-15 to:

FreeFlight Systems
3700 Interstate 35 S.
Waco, TX 76706 USA

Attn.: Sales Dept.
Telephone 1 (254) 662-0000
Fax 1 (254) 662-9451

For FreeFlight Factory Service Center modification, send the Navigator and a purchase order requesting incorporation of Service Bulletin 81438-XX-00-15 to:

FreeFlight Systems
3700 Interstate 35 S.
Waco, TX 76706 USA

Attn.: Repair Dept.
Telephone 1 (254) 662-0000
Fax 1 (254) 662-9452

D. Warranty

This Service Bulletin does not affect the standard warranty of the unit from date of purchase. For units out of warranty, this modification will be covered for ninety (90) days.

E. Tooling

Installation of operating system –242M requires a personal computer, cables, and a test set. See the *2000 Approach GPS Navigation System Component Maintenance Manual* (PN 82442), paragraph 2.0, for specifications.

III. ACCOMPLISHMENT INSTRUCTIONS

Installation of the revised software may be accomplished at the Factory Service Center or at a FreeFlight Systems approved Level II service center. Updating the operating software requires installing EPROMs and downloading software from a 3.5-inch diskette.

CAUTION

All work must be performed on a static free work area!

A. Record Configuration Settings

Once the revised software has been installed the configuration settings must be restored. Therefore, the settings must be recorded before the modification. Refer to the *2000 Approach Installation and Checkout Manual* (PN 81450) Section III, Checkout, and follow steps 1 and 2.

Following the instructions found in the *2000 Approach Installation and Checkout Manual*, access the **Installation Set Up** submenu.

Record the configuration settings on the Configuration Record Sheet found in Section III of the manual.

B. Disassembly of Chassis

NOTE: Save all hardware for reassembly.

1. Place the unit on an anti-static mat.
2. Remove the NavData card if in the unit and place the card in an anti-static bag.
Refer to Figure 1.
3. Remove 2 screws (Item 15) from top.
4. Slide the top cover (Item 3) towards the rear and lift off cover.
5. Unscrew mounting shaft (Item 6) and carefully remove from unit taking care not to bring shaft into contact with components inside unit.
6. Remove 2 screws (Item 15) from bottom (Item 5). Slide bottom towards rear of unit and lift off.
7. Remove 8 screws (Item 16), 4 from each side. Remove side rails (Item 2).
8. Remove Display Assembly (Item 1) by pulling straight forward.
Refer to Figure 2.
9. To reduce the possibility of electric shock, discharge capacitors C9-C11.
10. Disconnect wires (Item 50) from connector P4 on Power Interrupt CCA (Item 100).

11. Remove screw (Item 13) from the Power Interrupt CCA (Item 100).
12. Carefully lift Power Interrupt CCA, unsnapping standoff (Item 18) and unplugging 36-pin connector. Set aside.

C. Install EPROMs

Refer to Figures 2 and 3.

The following instructions apply to the top of the IOP/PWR SUPP CCA (Item 107).

1. Locate EPROMs (U401 and U402) on the IOP/PWR SUPP CCA (Item 107).
2. With a chip-pulling tool, remove the EPROMs U401 and U402.
3. Install supplied EPROMs, P/N 80418-242M, into the U401 and U402 sockets on the IOP/PWR SUPP CCA. Install EPROMs with notch in same orientation as notch on socket.

CAUTION

Improperly installed EPROMs may damage ICs!

4. Carefully examine EPROMs and verify that:
 - a. each EPROM has been installed into the proper socket,
 - b. the notch (key) on each EPROM is oriented correctly,
 - c. each EPROM is properly seated,
 - d. pins are not bent.

D. Partial Reassembly

Refer to Figure 2.

1. Connect red and white wires (Item 50) to P4 on Power Interrupt CCA (Item 100). (Verify that wires are oriented correctly.)
2. Replace screw (Item 13) on Power Interrupt CCA (Item 100).

Refer to Figure 1.

3. Install the side rails (Item 2). Attach screws (Item 16) to side rails at the rear (2 places).
4. Install the Display Assembly (Item 1), carefully inserting pins into connector.
5. Attach screws (Item 16) to side rails and Display Assembly at front (2 places).
6. Install the bottom cover (Item 5) by sliding forward.
7. Attach 2 screws (Item 15) at rear of bottom cover.

Note: Section E should be performed ONLY when upgrading from a software version before -0242. If software version -0242 or -242B has been installed previously, skip Section E and go directly to Section F.

E. Download the GPS Software from the Floppy Disk

Loading the GPS software requires 1) the 3.5-inch diskette that is supplied in the Service Bulletin kit, 2) a PC, and 3) a Test Set. The PC, Test Set, and the unit must be connected by cables according to the following instructions.

1. Connect Serial Port 1 of the Test Set to COM 1 of the PC.
2. Connect the 24-pin cable of the Test Set to the 24-pin connector at the rear of the unit.
3. Set Serial Port switch on the Test Set to Serial Port 1 BIP.
4. Insert diskette (PN 83306-00-242M) into 3.5 inch drive of computer.
5. Turn ON the power supply and test set.
6. Turn ON the unit. Wait while the Navigator goes through its startup procedures.
7. Press **AUX** repeatedly to go to the **CONFIGURE** page.

The display shows

PTK OFF AUTO CANCEL
X.^{XX} RIGHT

8. Turn small, inner knob clockwise 3 clicks to go to **DISPLAY DIAGNOSTICS** page. Dashed lines will scroll up the screen.
9. Press, in sequence, **D-> D-> ENT D->** to access the **INSTALL SETUP SCREEN**.

INSTALL SETUP SCREEN
DISABLED

NOTE: It may be necessary to enter the **D-> D-> ENT D->** sequence more than once. Enter as many times as necessary until the **INSTALL SETUP SCREEN** is displayed.

10. Press **ENT**.

INSTALL SETUP SCREEN
DISABLED

will be displayed and **DISABLED** will be blinking.

11. Rotate small, inner knob 1 click clockwise.

INSTALL SETUP SCREEN
ENABLED

will be displayed and **ENABLED** flashes.

12. Press **ENT**.

The **ENABLED** message stops flashing.

13. Press the **AUX** key until **INSTALL SETUP SCREEN** is displayed. The display below is shown briefly.

INSTALL SETUP

14. Rotate small, inner knob until the display shows

SERIAL I/O SETUP
TURN OUTER KNOB

15. Rotate the large, outer selector knob clockwise until the following port is shown

SERIAL-1 I/O none
RATE: _ _ _ _ _ _ _ _ _ _ baud

16. Press, in sequence, D-> D-> D-> ENT. Rotate small, inner knob 1 click clockwise. Press ENT. The letter N (for none) on the top line blinks.
17. Rotate small, inner knob to select GPS0. (When selected, the “G” blinks.)
18. Press ENT
19. Press MSG key repeatedly to clear messages. (When all messages have been cleared, MSG light on the display stops blinking.)
20. On the PC, go to the floppy drive (usually the A drive).
21. At the a:\> prompt type:

spdrive <ENTER>

NOTE: This step is not necessary if spdrive is already installed. Go to step 22.

The PC responds:

Installing buffered serial port driver on COM1

NOTE: If Test Set has serial port selection, verify that it is set to 1.

22. At the a:\> prompt type:

rgl gps9-406.abs <ENTER>

The computer responds:

Press Y to perform load or other key to abort.

23. Type Y to respond. <ENTER>

The computer begins downloading the software code from the diskette to the 2000 Approach. The loading process will take approximately 5 minutes. Progress is reported on the PC screen:

SENDING ADDRESS XXXXXXXXXX XX%

When downloading is complete, the PC reports:

FINAL ADDRESS = 00040000 100%

RETURNED CHECKSUM = 2E 74

GPS SOFTWARE ABSOLUTE FILE CLOSED

24. Reset SERIAL - 1 I/O back to none by carrying out steps a - e below.
- Press, in sequence, D-> D-> D-> ENT.
 - Rotate the small, inner knob 1 click clockwise.
 - Press ENT. (The “G” in “GPS0” blinks.)
 - Rotate the small knob 1 click counterclockwise. The “n” in “none” blinks.

- e. Press ENT.
- 25. Press **MSG** key repeatedly to clear messages,. (When all messages have been cleared, **MSG** light on the display stops blinking.)
- 26. Turn **OFF** power to unit.

F. Verification

- 1. Perform a 3-key reset:
 - a. Hold down the **NAV**, **APT/VOR**, **D->** keys.
 - b. Turn **ON** the unit and hold down the 3 keys until the following message is displayed (about 30 seconds).

CLEAR BATTERY BACKED
MEMORY SUCCESFUL
 - c. Release keys.
 - d. Wait for the system to display

READY FOR NAVIGATION
 - e. Turn off the unit.
- 2. Turn **ON** power to unit. As the unit goes through its startup procedures, verify the following:

NAV COMPUTER -OK
GPS COMPUTER -OK
DATABASE OK (or DATABASE EXPIRED or DATABASE N/A)
- 3. Press **AUX** to go to the **SYSTEM STATUS** page.
- 4. Rotate the small knob 4 clicks clockwise.
- 5. Verify on the display

REVISION:: NAV2.841
GPS4.06-0227
- 6. Turn **OFF** unit.
- 7. Turn **OFF** test set.
- 8. Disconnect 24-pin cable.

G. Complete Reassembly of the 2000 Approach

Refer to Figure 1.

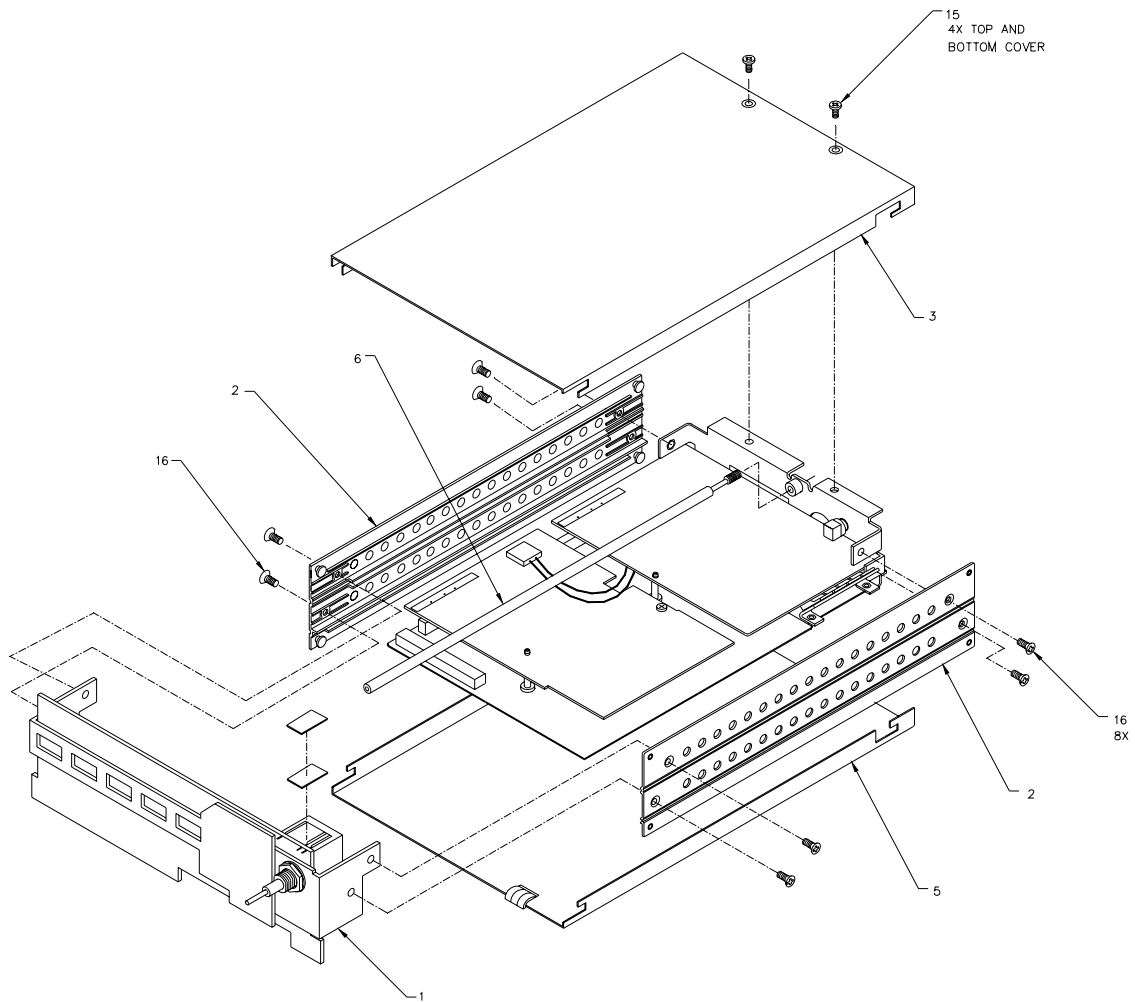
1. Install the mounting shaft (Item 6), taking care not to bring it into contact with components inside the unit.
2. Install the top cover (Item 3) by sliding the front lip under the edge of the Display Assembly (Item 1).
3. Attach 2 screws (Item 15) at rear of top cover.

H. Functional Test

1. Restore the configuration settings that were recorded on the Configuration Record Sheet.
2. The Factory Service Center and Level II Repair Centers shall perform the tests as described in Section III, Checkout, of the 2000 Approach Installation and Checkout Manual, PN 81450, Rev. F or later.
3. The Factory Service Center and Level II Repair Centers shall perform the functional test as described in Acceptance Test Procedure (ATP) 81438-XXTP.

I. Identification

When the Checkout has been performed and the unit has passed satisfactorily, refer to Figure 4 and replace the old Identification Label with the supplied Identification Label (Figure 4, Item 9) on the rear panel.



DRAWING NO
81438xx2

Figure 1
Disassembly of 2000 Approach Chassis

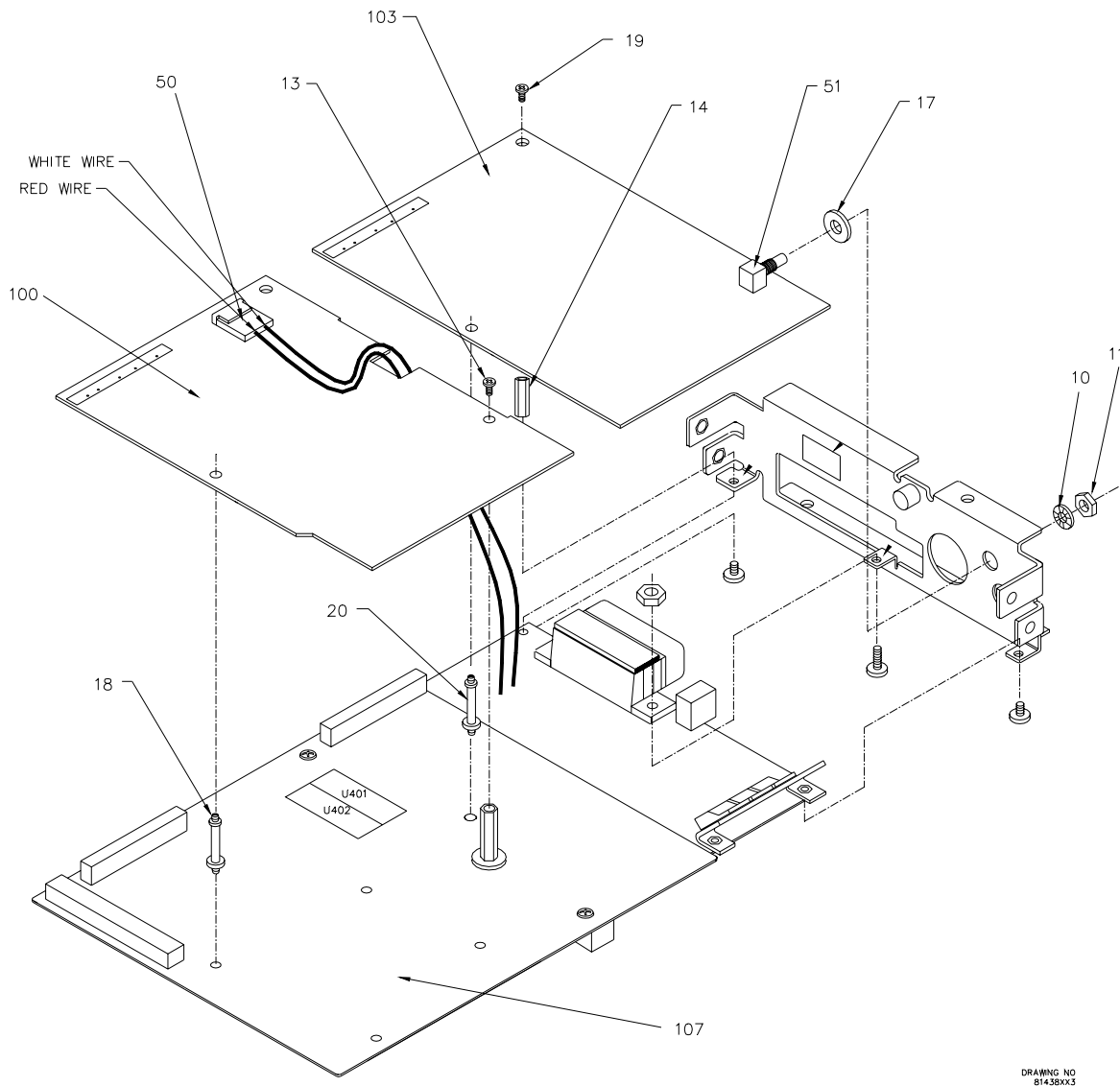


Figure 2
Disassembly of CCAs

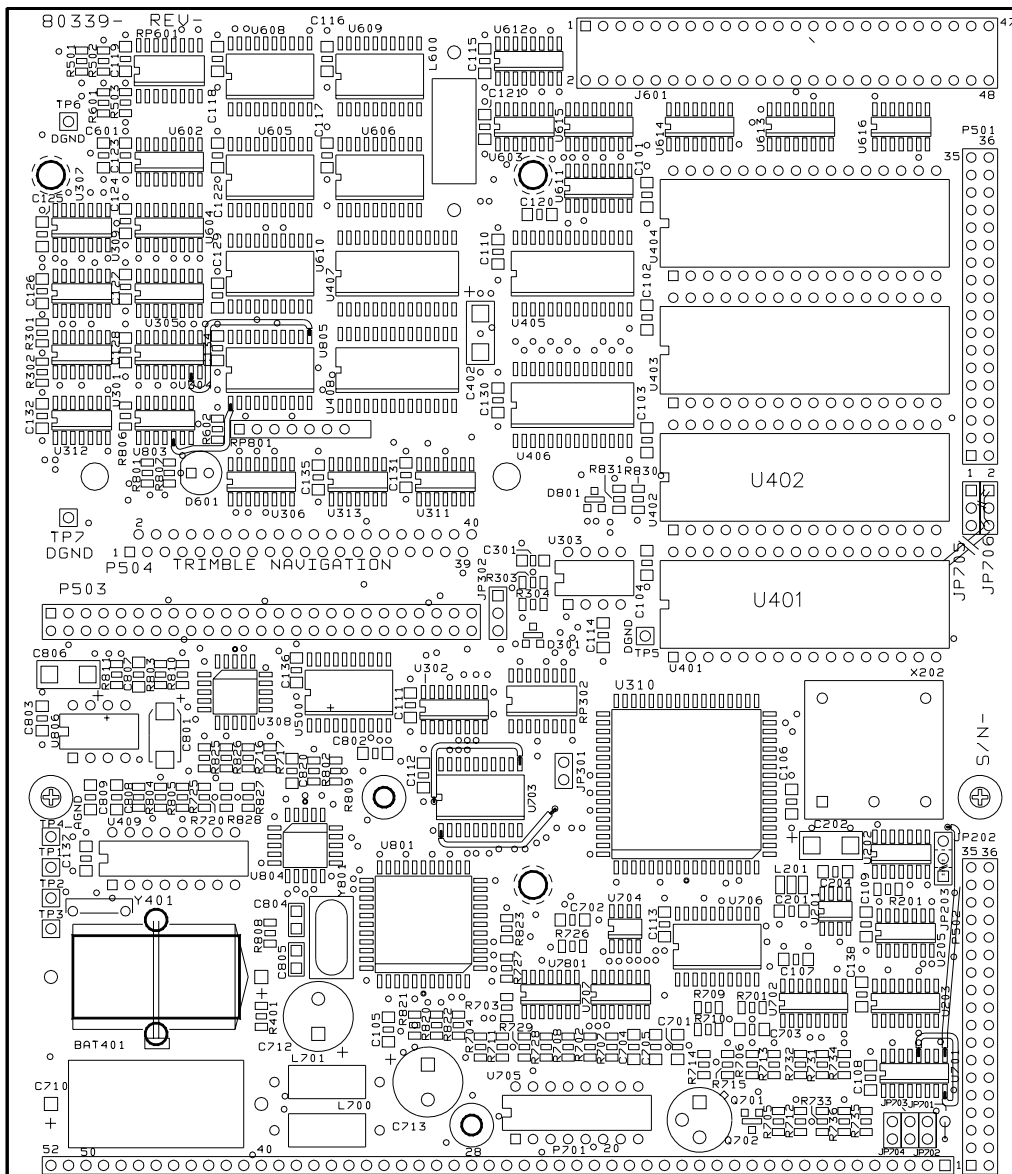
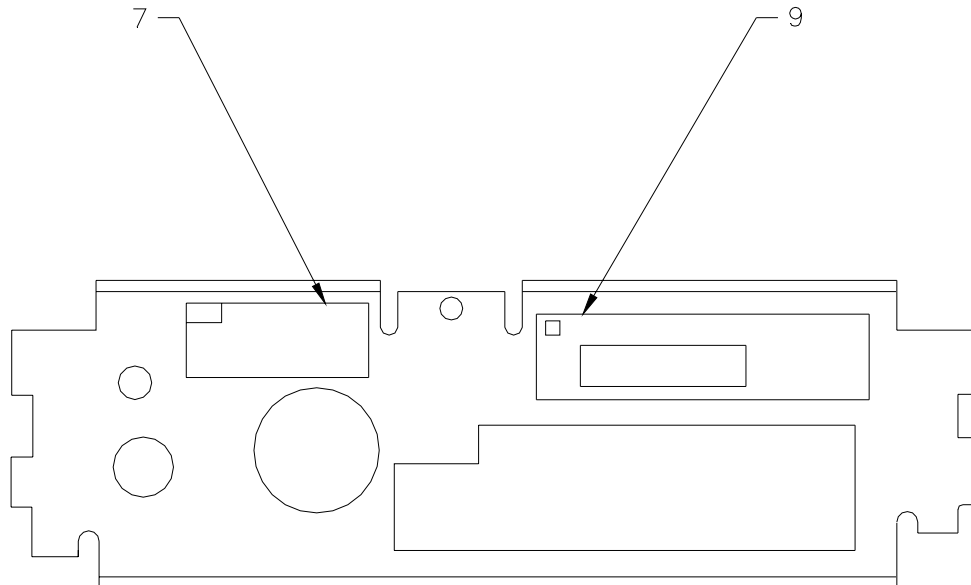


Figure 3
IOP CCA Showing Location of EPROMs U401 and U402



DRAWING NO
81438XX4

Figure 4
Back View of Rear Panel
Service Bulletin Label and Identification Label