



Service Bulletin

SB 81439-XX-00-14

Rev. C

2101 Approach GPS Navigation Systems, Part Numbers 81439-00-XXXX, 81439-01-XXXX, 81439-10-XXXX and 81439-11-XXXX.

Release of operating system -242M.

SUMMARY: FreeFlight Systems has released software system -242M for the 2101.

I. PLANNING INFORMATION

A. Effectivity

This Service Bulletin applies to the 2101 Approach GPS Navigators, Part Numbers 81439-00-XXXX, 81439-01-XXXX, 81439-10-XXXX and 81439-11-XXXX, 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 81439-XX-34-14 to support 4 MB Nav data base operation.

If a unit is being updated from a software version before -0242, the hardware modifications described in Service Bulletin 81439-XX-34-01 are required and must be implemented before this software can be loaded. That Service Bulletin changed resistor values to provide proper CDI scaling and centering without the need to calibrate during installation. Check the Service Bulletin modification tag before proceeding. If the number 1 on the Service Bulletin modification tag has been stricken, this modification has been implemented.

B. Reason

This Service Bulletin advises all users of 2101 Approach Navigators, Part Numbers 81439-00, 81439-01, 81439-10 and 81439-11 of the availability of a revised operating system, -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

Operating 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). 2101 installations that have been FAA approved with software programs other than -242x must be re-evaluated when software version -242M is installed.

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

- 84920, Rev A FreeFlight 2101 Approach Pilot Guide Supplement
- 84926, Rev A FreeFlight 2101 Approach GPS Receiver Installation and Checkout Manual Supplement

J. Interchangeability and Identification

Modified and unmodified units are not interchangeable.

2101 Approach GPS Navigation Systems having operating system -242M are identifiable by the Identification Label on the top of the unit bearing part number 81439-XX-242M.

Units that have the required hardware modifications for this Service Bulletin can be identified by a strike across the numbers 1 and 14 on the Service Bulletin tag.

Additionally, operators who are upgrading from software versions prior to -0242 need to be aware of the effects of the following changes that were effective in software versions -0242, -242B and 242M:

1. In software versions -0242, -242B and 242M, the functions of GPS and internal RAIM annunciators are disabled and have been replaced with messages announcing the transition between DEAD RECKONING, ENTER GS & TRACK/GPS POSITION RESTORED and RAIM UNAVAILABLE/RAIM AVAILABLE.
2. The user interface for entering flight plan information has changed substantially. The operator is advised to consult the *2101 Pilot Guide* (PN 83164) and its supplement (84920) 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 accomplished 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 81439-XX-00-14 should issue a purchase order to FreeFlight Systems for the number of Service Bulletin kits required.

B. Parts List

Service Bulletin Kit 81439-XX-00-14 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.4.06-227, spdrive.com, rgl.exe	
81461-XX	1	4 meg data base	1
81442	1	Serial Number-Part Number Identification Plate	2
SB 81439-XX-00-14	1	Service Bulletin Document (this document)	
84920, Rev. A	1	FreeFlight 2101 Approach Pilot Guide Supplement	
84926, Rev. A	1	FreeFlight 2101 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 Identification Plate.

C. Ordering Information

Operators of the 2101 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 81439-XX-00-14 to:

FreeFlight Systems	Attn.: Sales Dept.
3700 Interstate 35 S.	Telephone 1 (254) 662-0000
Waco, TX 76706 USA	Fax 1 (254) 662-9451

For FreeFlight Factory Service Center modification, send the Navigator and a purchase order requesting incorporation of Service Bulletin 81439-XX-00-14 to:

FreeFlight Systems	Attn.: Repair Dept.
3700 Interstate 35 S.	Telephone 1 (254) 662-0000
Waco, TX 76706 USA	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 (PC), cables, and a test set. See the *2101 Approach GPS Navigation Component Maintenance Manual* (PN 82407), paragraphs 2.0 and 3.0 for specifications.

III. ACCOMPLISHMENT INSTRUCTIONS

Installation of the revised software may be accomplished at the FreeFlight Systems Factory Service Center or at a 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 *2101 Approach Installation and Checkout Manual* (PN 81452), Section III, Checkout and follow steps 1 and 2.

1. Following the instructions found in the *2101 Approach Installation and Checkout Manual*, access the Installation Set Up submenu.
2. Record the configuration settings on the Configuration Record Sheet found in Section III of the manual.

B. Disassembly of Housing

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 8 screws (Item 25), 4 on each side of housing (Item 3). Refer to Figure 2.
4. Remove 2 screws (Item 25) from bottom (Item 2).
5. Remove 6 screws (Item 29) from back.
6. Using a 5/8" box-end wrench, remove nut (Item 10) and washer (Item 11) from antenna connector (Item 6).
7. Align the flat spot on the antenna connector with the flat side of the opening and push antenna connector inside unit. Refer to Figure 1.
8. Remove top of housing (Item 3).

9. Remove the 4 screws (Item 27) that attach the Keyboard/Display assembly (Item 4) to the housing.

10. Remove the Keyboard/Display assembly (Item 4).

Refer to Figure 3.

11. Disconnect the cable assembly (Item 51) from Filter CCA (Item 102). Note orientation of non-white wire for reassembly.

12. Remove Filter CCA (Item 102).

Refer to Figures 1 and 3.

13. Remove 2 screws (Item 25) that attach Power Supply (Item 104) to side of housing.

14. Remove Power Supply (Item 104).

15. Disconnect cable assembly (Item 52) from connector on Power Interrupt CCA (Item 101).

16. Remove the 5 screws (Item 28) from Power Interrupt CCA (Item 101).

17. Carefully unplug 36-pin connector and remove the Power Interrupt CCA (Item 101).

18. Remove 5 long standoffs (Item 5) from GPS CCA (Item 103).

19. Carefully unplug GPS CCA (Item 103) and remove.

C. Install EPROMs

Refer to figures 3 and 4.

The following instructions apply to the top of the Processor CCA (Item 107).

1. Locate EPROMs (U401 and U402) on the Processor CCA.
2. With a chip-pulling tool, remove the EPROMs U401 and U402.
3. Install supplied EPROMs, PN 80418-242M, into the U401 and U402 sockets on the Processor CCA. Install EPROMs with notch in same orientation as the notch on the socket.

CAUTION

Improperly installed EPROM's 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 3.

1. Plug in 36-pin connector and install the GPS CCA (Item 103) on the Processor CCA (Item 107).

2. Replace 5 long standoffs (Item 5).

3. Plug in 36-pin connector and install the Power Interrupt CCA (Item 101) on the GPS CCA.
4. Replace 5 screws (Item 28).
5. Carefully align pins with connectors and install Power Supply CCA (Item 104) on the Processor CCA.

Refer to Figure 1.

6. Attach the Power Supply CCA to the side of chassis with 2 screws (Item 25).

Refer to Figures 2 and 3.

7. Carefully align pins on Filter CCA (Item 102) and install on the Processor CCA. Note routing of antenna cable (Figure 2, Item 50).

Refer to Figure 3, Detail A.

8. Attach cable assembly (Item 51) from Filter CCA to connector P500 on Power Supply. Note orientation of non-white wire.
9. Attach cable assembly (Item 52) to connector P2 on Power Interrupt CCA. Note orientation of non-white wire.

Refer to Figure 1.

10. Carefully align pins and connector and install Keyboard/Display assembly (Item 4).
11. Attach with 4 screws (Item 27).

Note: Performing Section E (Download GPS Software from the Floppy Disk) is necessary only for units that are being upgraded from software versions before -0242. If version -242M is being loaded over version -0242 or 242B, 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. Leave the cover off while loading the software

Refer to Figure 2.

2. To stabilize the 37-pin connector while loading the software, attach 2 screws (Item 29) to the connector: one on the top right and one on the bottom left.
3. Connect Serial Port 1 of the Test Set to COM 1 of the PC.
4. Connect the 37-pin cable of the Test Set to the 37-pin connector at the rear of the unit.
5. Set Serial Port switch on the Test Set to Serial Port 1 BIP.
6. Insert diskette (PN 83306-00-242M) into 3.5 inch drive of computer.
7. Turn ON the power supply and test set.
8. Turn ON the unit. Wait while the Navigator goes through its startup procedures.
9. Press AUX repeatedly to go to the CONFIGURE page.

The display shows

PTK OFF AUTO CANCEL
X.XX RIGHT

10. Turn small, inner knob clockwise 3 clicks to go to DISPLAY DIAGNOSTICS page. Dashed lines will scroll up the screen.
11. 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.

12. Press ENT.

INSTALL SETUP SCREEN
DISABLED

will be displayed and DISABLED will be blinking.

13. Rotate small, inner knob 1 click clockwise.

INSTALL SETUP SCREEN
ENABLED

will be displayed and ENABLED flashes.

14. Press ENT.

ENABLED stops flashing.

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

INSTALL SETUP

16. Rotate small, inner knob until the display shows

SERIAL I/O SETUP
TURN OUTER KNOB

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

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

18. 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.

19. Rotate small, inner knob to select GPS0. (When selected, the "G" blinks.)

20. Press ENT

21. Press MSG key repeatedly to clear messages. (When all messages have been cleared, MSG light on the display stops blinking.)

22. On the PC, go to the floppy drive (usually the A drive).

23. At the a:\> prompt type:

spdrive <ENTER>

NOTE: This step is not necessary if spdrive is already installed. Go to step 23.

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.

24. At the a:\> prompt type:

rgl gps9-406.abs <ENTER>

The computer responds:

Press Y to perform load or other key to abort.

25. Type Y to respond. < ENTER >

The computer begins downloading the software code from the diskette to the 2101 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

26. Reset SERIAL - 1 I/O back to none by carrying out steps a - e below.

- i. Press, in sequence, D-> D-> D-> ENT.
- ii. Rotate the small, inner knob 1 click clockwise.
- iii. Press ENT. (The "G" in "GPS0" blinks.)
- iv. Rotate the small knob 1 click counterclockwise. The "n" in "none" blinks.
- v. Press ENT.

27. Press MSG key repeatedly to clear messages. (When all messages have been cleared, MSG light on the display stops blinking.)

28. 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 message CLEAR BATTERY BACK MEMORY appears.
 - c. Release keys.

- d. 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
DATA BASE OK (or DATA BASE EXPIRED or DATA BASE N/A)

3. Press AUX to go to the SYSTEM STATUS page.
4. Rotate the small knob 4 clicks clockwise.
5. Verify

REVISION:: NAV2.841
GPS4.06-0227

6. Turn OFF 2101 Approach.
7. Turn OFF test set.
8. Disconnect 37-pin cable.
9. Remove two (2) screws from connector.

G. Reassemble the 2101 Approach

Refer to Figure 2.

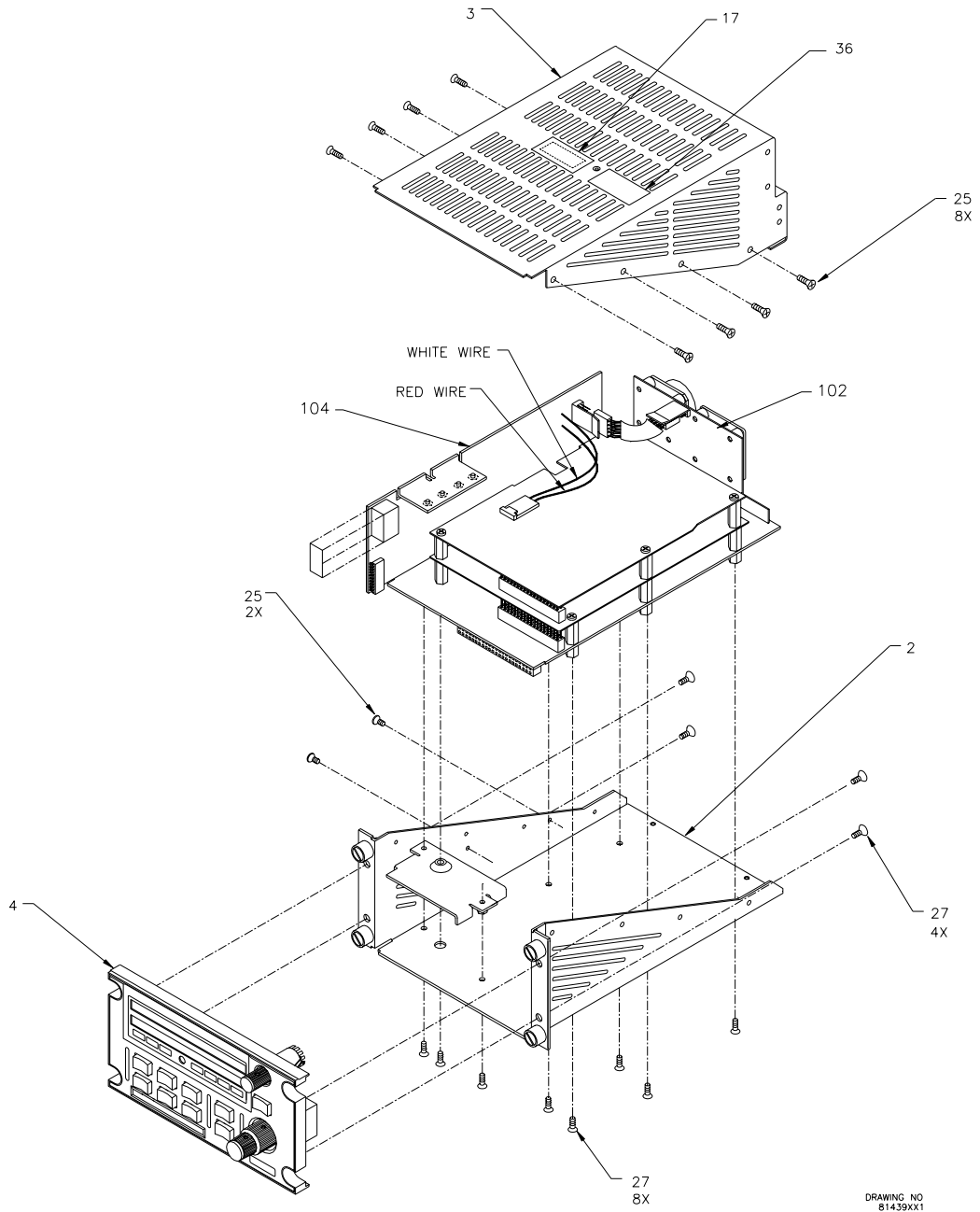
1. Align flat side of antenna (Item 6) with flat side of opening in top of chassis and insert antenna through opening. Replace top of chassis.
2. Attach washer (Item 11) and nut (Item 10) to antenna connector (Item 6) and tighten using a 5/8 inch box-end wrench.
3. Attach 8 screws (Item 25), 4 on each side of chassis (Item 3).
4. Attach 2 screws (Item 25) on bottom of chassis.
5. Attach 6 screws (Item 29) to back of chassis.

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 2101 Approach Installation and Checkout Manual, PN 81452.
3. The Factory Service Center and Level II Repair Centers shall perform the functional test as described in Acceptance Test Procedure (ATP) 81439-XXTP.

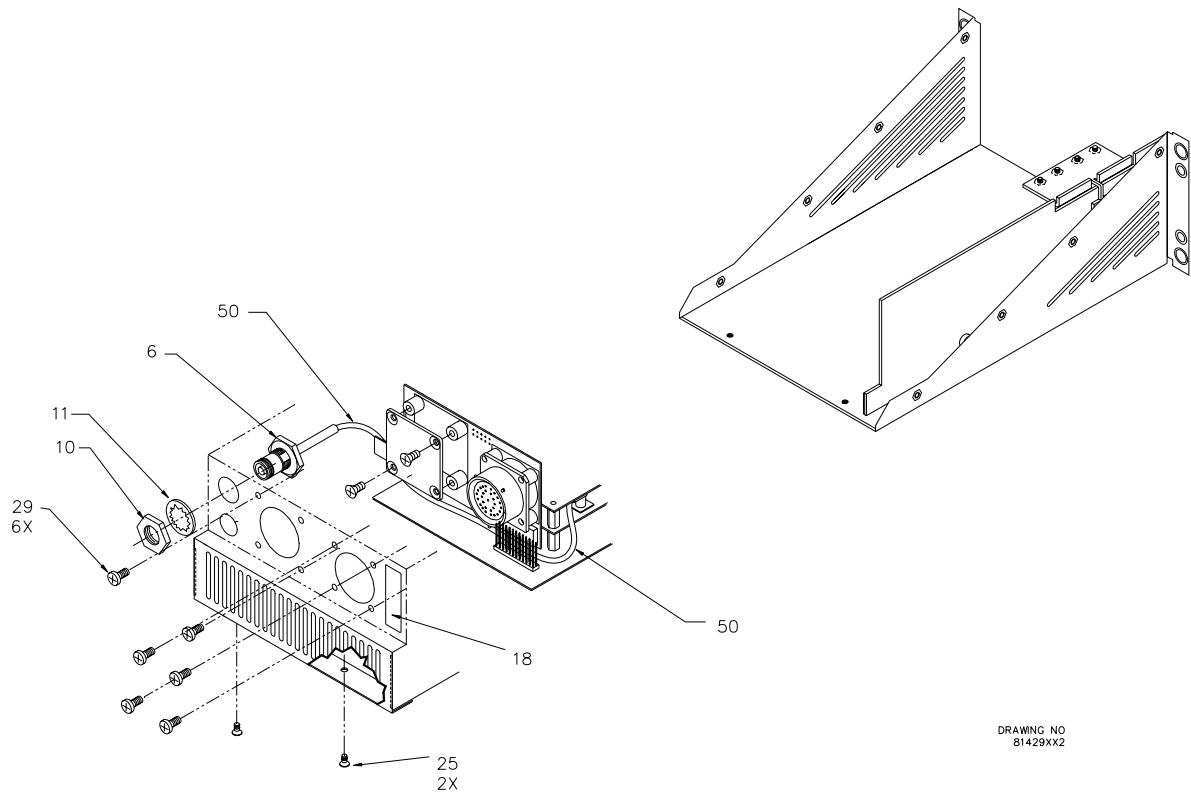
I. Identification

When the unit has passed Checkout satisfactorily, refer to Figure 1 and replace the old Identification Label with the supplied Identification Label (Item 17) in the middle of the top cover.



DRAWING NO
81439XX1

Figure 1
Disassembly of Housing



DRAWING NO
81429XX2

Figure 2
Disassembly of CCAs

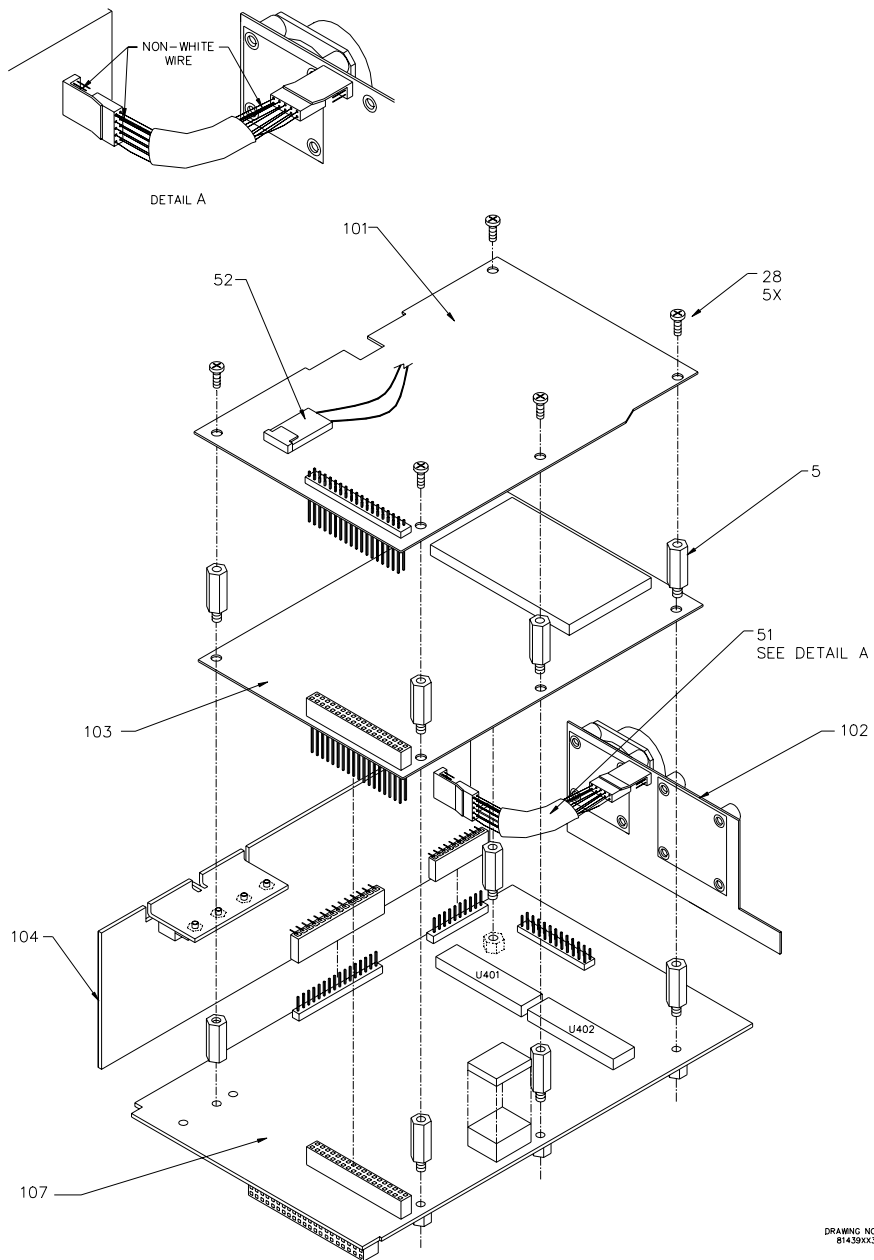
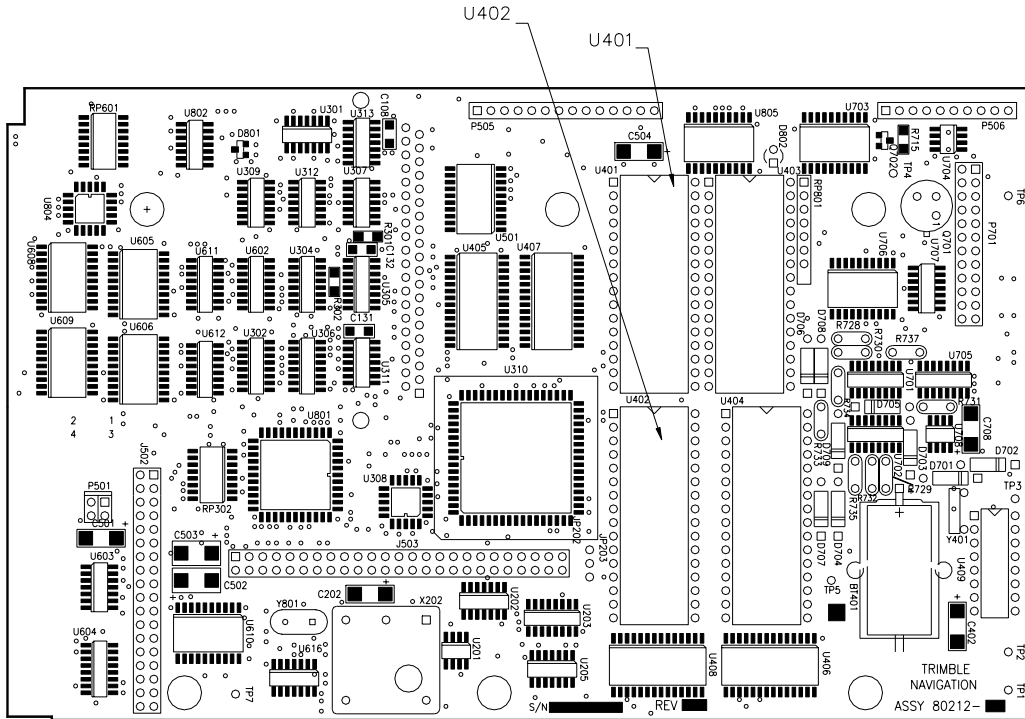


Figure 3
Disassembly of CCAs



COMPONENT SIDE

DRAWING NO
802121

Figure 4
Processor CCA
Detail Showing Location of EPROMs