Service Bulletin SB84327-50-00-05 Rev B

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SUBJECT: FreeFlight Systems 1203C GPS/SBAS Sensor, System Release 200H

I. PLANNING INFORMATION

A. Applicability

This Service Bulletin applies to FreeFlight Systems 1203C GPS/SBAS Sensor, Part Numbers 84327-50-200B, 84327-50-200C, 84327-50 -200D, and 84327-50-XXXX.

B. Effectivity

This Service Bulletin affects the FreeFlight Systems Model 1203C GPS/SBAS Sensor with the following compatible System Releases:

Compatible System Release Versions[1]		
System Release	**WDIO**	**GPS**
	Version	**Version**
200B	0101	0109
200C	0102	0109
200D	0103	0109
200E	0104	0110
200F	0104	0111
200G	0105	0111

[1]Software modules updated with each system version release are highlighted in green

System version 200H is not mandatory, however, it is highly recommended for all installations, as it provides GPS output enhancements including improved compatibility with other avionics.

C. Reason

This system release updates the previous compatible system release (see table "Compatible System Release Versions" above) with WDIO version 0106.

System Release Version[2]		
System Release	**WDIO**	**GPS**
	Version	**Version**
200H	**0106**	0111

[2]Software module updated with 200H system version release is highlighted in green

With release of system version 200H the 1203C GPS/SBAS sensor will contain the following enhanced feature:

D. Enhancement Summary

Fixes ARINC packet output dropouts when ARINC configured for High speed and 1 Hz output rate. Fixes ARINC Time Mark flag errors in label 141 when ARINC configured for High speed and 5 Hz output rate.

Updates ARINC label 147 to use World Magnetic Model WMM-2020.

E. Description

This service bulletin provides information for release of system version 200H (WDIO version 0106 and GPS Software version 0111). This release consists of updating the previous compatible System Releases with SB84327-50-00-05.

System version 200H is loaded using a special programming cable FFS P/N: 87356-00 (see Section III-B), and a computer running Windows 2000 or higher (32-bit PC recommended), equipped with a serial port or a USB-to-serial adapter, the Flash Magic (see below) software and the GPS SW upgrade Tool. See Section III. ACCOMPLISHMENT INSTRUCTIONS".

Note 1: If the 1203C is interfaced as a GNSS position source for communicating with two or more transponders simultaneously, it is recommended that the modifications documented in hardware service bulletin 84327-5X-34-01 be implemented prior to wiring the aircraft. If hardware service bulletin 84327-5X-34-01 has been implemented on the 1203C system, it can be verified by checking for "**MOD 1"** being marked out on the P/N label.

F. Approval

Operating software version 200H is approved under TSO-C145c (Class Beta 1).

G. 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 SU's	During Routine Maintenance	0.5
All SU's	During Repair	0.5

H. Weight and Balance

Not affected.

I. Electrical Load Data

Not Affected.

J. Reference

FreeFlight Systems Engineering Change Notices (ECN) S21001 and 15180.

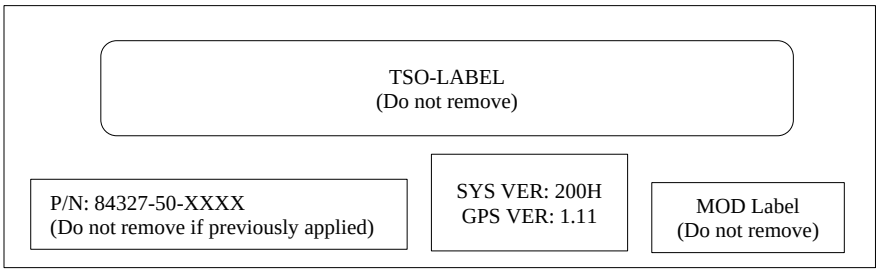
K. Other Publications Affected

Install Manual FFS P/N: 86764

L. Interchangeability and Identification

Modified units are interchangeable, as software version 200H is fully compatible with previously approved versions.

FreeFlight Systems GPS/SBAS Sensors having operating system 200H shall be identifiable by the SW version number label (P/N 87617) on the end of the unit, bearing SYS VER: 200H and GPS VER: 1.11.



Note 2: From version 200E onwards the 1203C Model part number does not include the system or software versions as part of its numbering. The 1203C Model P/N will be uniquely identified as 84327-50-XXXX and will not change due to updates to the system software.

Note 3: Installations that have their current STC's and FAA paperwork tied to Model 1203C P/N: 84327-50-200D may continue to use the same part number and update the system version to 200H. It is highly recommended to update the P/N's and existing paperwork to 84327-50–XXXX as old P/N's will be discontinued to be supported with future system version releases.

II. MATERIAL INFORMATION

A. Price and Availability

There is no charge for an upgrade to software version 200H.

Customers have three choices:

- They may upgrade the software at their maintenance facility, while the Sensor is on the aircraft;
- They may elect to send the Sensor to the FreeFlight Systems Factory Service Center;

- They may send units to an authorized Level II Service Center for installation of this software upgrade.

Customers opting to upgrade the software at their facility will need to build a Programming Cable as described below.

Modifications accomplished at the Factory Service Center will be completed within ten (10) working days after receipt of the unit.

Operators or Level II Service Centers wishing to incorporate SB84327-50-00-05 should contact FreeFlight Systems.

B. Parts List

Service Bulletin Kit SB84327-50-00-05-KIT contains:

FFS PN	Qty	Nomenclature
84327-200H	1	CD containing software version 200H: • PN: 89094 (filename WDIO0106.hex) • P/N: 84327-SB0000 (filename WDIO0000.hex) • P/N: 87965 (filename GPSBL.bin) • P/N: 88006 (filename SwugUpgradeTool.exe)
81941	1	Part Number Identification Label
87617	1	System and GPS SW version Identification label
SB84327-50-00-05	1	Service Bulletin Document (this document) *Note : The Service Bulletin is included in the CD*

*Note: HW Service bulletin SB84327-5X-34-01 (referenced in Note 1 above) is not included in the kit and can be requested separately if required from FFS customer support.

C. Ordering Information

To upgrade the operating system on the aircraft or at a Level II Service Center, send a purchase order requesting Service Bulletin Kit P/N SB84327-50-00-05-KIT to:

FreeFlight Systems
7333 Interstate 35.
Robinson, Texas 76706 USA

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

For FreeFlight Systems Factory Service Center modification, send the Sensor and a purchase order requesting incorporation of Service Bulletin SB 84327-50-00-04 to:

FreeFlight Systems
7333 Interstate 35
Robinson, Texas 76706 USA

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

D. Warranty

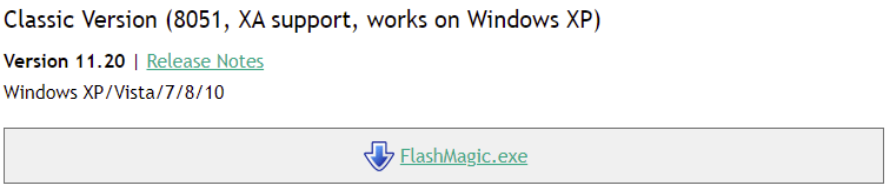
This Service Bulletin does not affect the standard warranty of the unit from date of purchase. For units out of warranty, this modification will be covered for ninety (90) days.

III. ACCOMPLISHMENT INSTRUCTIONS

A. Installing the Flash Magic software.

1. Purchase and download the latest Flash Magic programming software from Embedded Systems Academy (http://www.flashmagictool.com/).

Download the Classic version (11.20) from the above website.



2. Install the software following the instructions provided by the installer.

B. Bench Power Supply and RS-232 Serial communication ports

1. A local 12V DC power supply with a current rating of at least 10A (to minimize the effects of inrush current) is required to accomplish this service bulletin.
2. In the event a RS-232 serial communication port is not available on a PC, a commercial off the shelf USB to RS-232 serial converter (any manufacturer) can be used to accomplish this service bulletin.

C. Creating the Programming Cable (FFS P/N: 87356-00)

1. In order to create the programming cable the following equipment will be required

Manufacturer Part Number	Description	Qty
MFGR P/N: MS27473T14B35S MFGR: Amphenol	Conn 37S Plug Shell With Sockets	1
Any	9 Pin DSUB connector receptacle with back shell for serial connections	1
Any	Momentary Switch or Push Button	1
Any	Banana Plugs for Power and Ground	As Required
Any	24-26 AWG Stranded Wire	As Required
Any	Wire strippers	-

2. The following pins need to be wired in order to program the 1203C sensor.

Pin	Name	Function	Signal
1	Power	Power In	12 VDC
2	Ground	Ground	Ground
7	I/O TX	I/O Maintenance Port	Programming Port
8	I/O RX	I/O Maintenance Port	Programming Port
9	PRG Power	I/O Program Power In	12 VDC when active

10	PRG Enable	I/O Program Enable	Ground when active

3. Pin 7 must be connected to Pin 2 (RX) of the 9 pin DSUB serial connector and Pin 8 must be connected to Pin 3 (TX) of the 9 pin DSUB serial connector.
4. Pin 10 (PRG Enable) should be a momentary push-button connection to ground.
5. Pin 1 (Power) and Pin 9 (PRG Power) may use the same 12 VDC power source.

Do not apply a voltage greater than 12VDC on the program power pin as this may cause the sensor to malfunction)

D. Updating the 1203C GPS Sensor Operating System

Note: If the GPS software version is already updated to version 1.11 then continue to E else follow steps in this section first.

1. Insert the provided CD, P/N 84327-200H into the PC disk drive and verify that it contains a file called WDIO0000.hex under the 84327-SB0000 folder.
2. Remove 1203C sensor from Aircraft.
3. Connect the programming cable to the 1203C sensor.
4. Connect the PC serial port (or USB to serial converter) to the programming cable serial port.
5. Connect power and programming power on the programming cable to a 12 VDC source (powered off).
6. Press and hold the Program Enable push button on the programming cable while turning on the power on the power source(s).
7. After 1 second, release the Program Enable button.
8. Start Flash Magic, and then configure it as shown in Figure 1.

Ensure appropriate hex file is selected from -200H folder

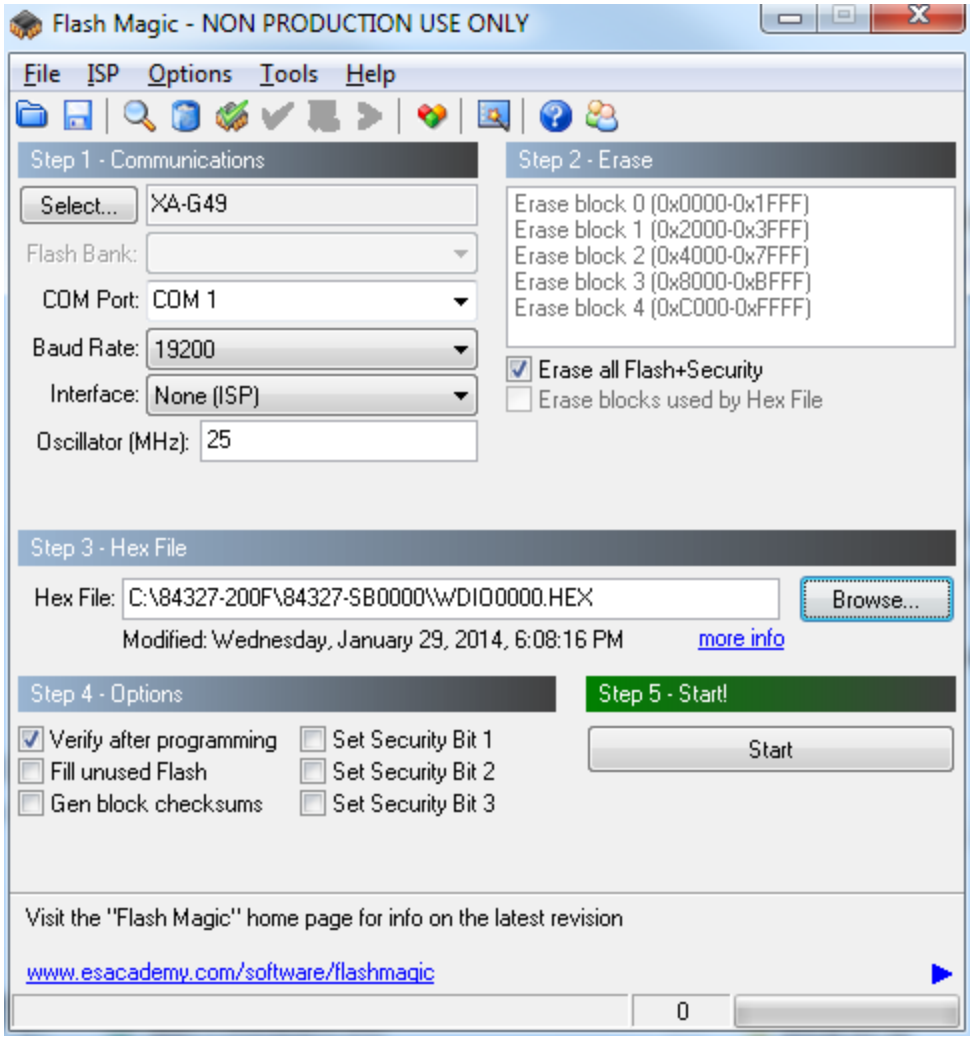


Figure 1: Flash Magic Configuration

9. Ensure that the proper COM port is selected.
10. In Flash Magic, use the “Browse” button to locate the WDIO0000.HEX file on the CD.
11. Select the HEX file then click on “Open”.
12. Select the “Start” button.
13. Wait for the programming operation to complete. Observe the ‘Status Display’ window at the bottom of the Flash Magic window until “Finished” is displayed.

Note: Do not interrupt power to the 1203C during step 13. Else the system will have to be returned to FreeFlight Systems for repair.

14. Remove power from the programming cable.
15. Close the Flash Magic application.

16. Open a terminal application, such as HyperTerminal or Terra Term, on the same COM port and open a connection at 19200 baud, 8 data bits, 1 stop bit, and no parity or hardware flow control.
17. Apply power to the 1203C sensor.
18. Verify that the sensor reports “WDIO SW 0000” over the terminal connection. If not, repeat steps D.6 through D.17 above. Close terminal application after verification.
19. Open the 87965 folder located on the CD and verify that it contains a file called GPSBL.bin
20. Open the 88006 folder located on the CD and verify that it contains the file SwugUpgradeTool.exe. Double click on the SwugUpgradeTool.exe file. The following dialog box opens:

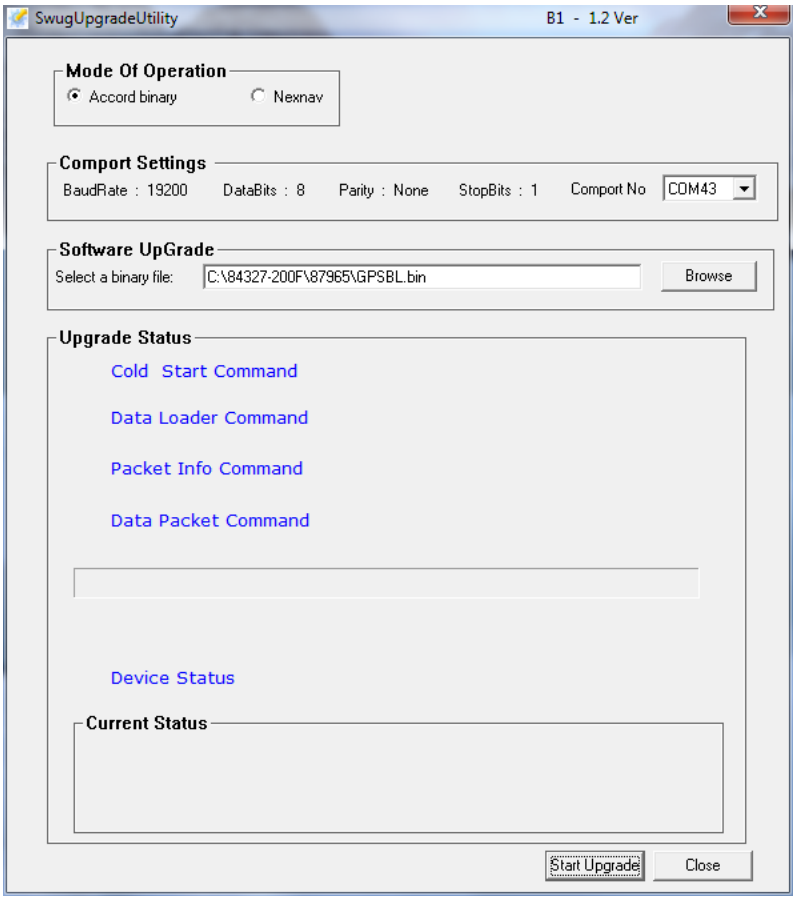


Figure 2

21. Select the Mode of Operation as Nexnav.
22. In the Comport settings select the correct Comport No. (Note that, if the Host PC does not have the COM port, then a RS232 Cable + RS232 to USB Converter shall be used and connected to the USB port of the HOST PC and the Comport No. should be the one which is mapped to the USB port). This is also the same COM port that was used

to program the WDIO0000.hex code as well from above.

23. In the software Upgrade field select a binary file i.e. the path of the bin file (GPSBL.bin) using Browse option.

24. Click on Start Upgrade button. The progress can be tracked through the following steps and the status can be observed in the current status. This may take up to 30 minutes, DO NOT INTERRUPT the software loading process during this time. The task in progress will be indicated with a RED arrow mark. The task completed will be indicated with a GREEN arrow mark.

    Note: If SwugUpgradeTool is closed before the completion of all the steps mentioned above, then perform power re-cycle to GPS receiver (Power re-cycle indicates switching OFF the power of the receiver and switching ON the power to the receiver immediately). Then re-start from step D.20.

25. Cold start command is transmitted and it waits for the receiver to boot as shown in Figure 3 below:

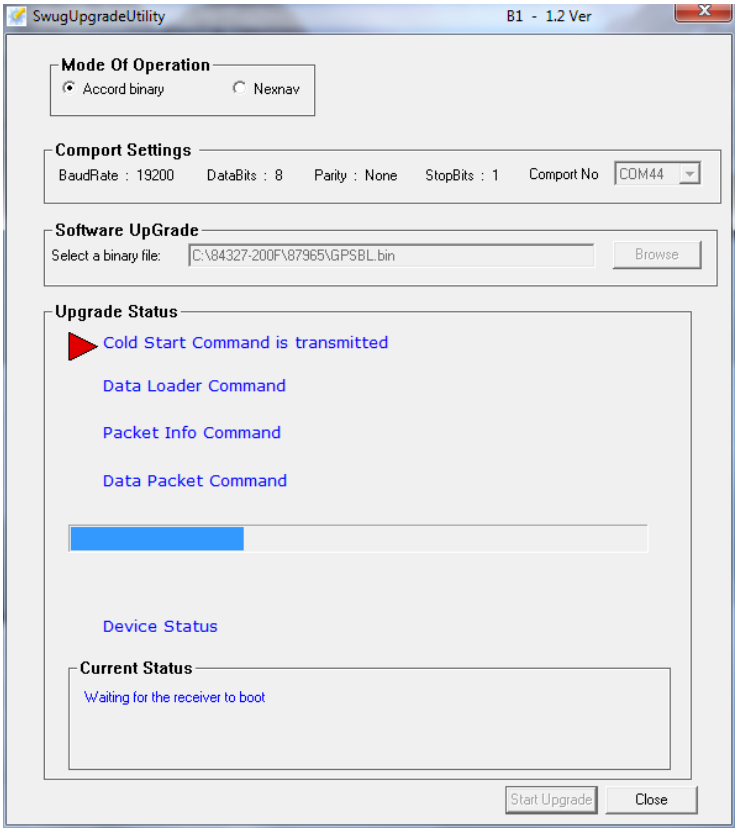


Figure 3

26. The data loader command is then transmitted, and it waits for Data Loader Acknowledgement as shown in Figure 4 below:

Figure 4

Note: If the Data Loader Acknowledgement is not received from the receiver, the tool displays an error message as shown in the Figure 5 below:

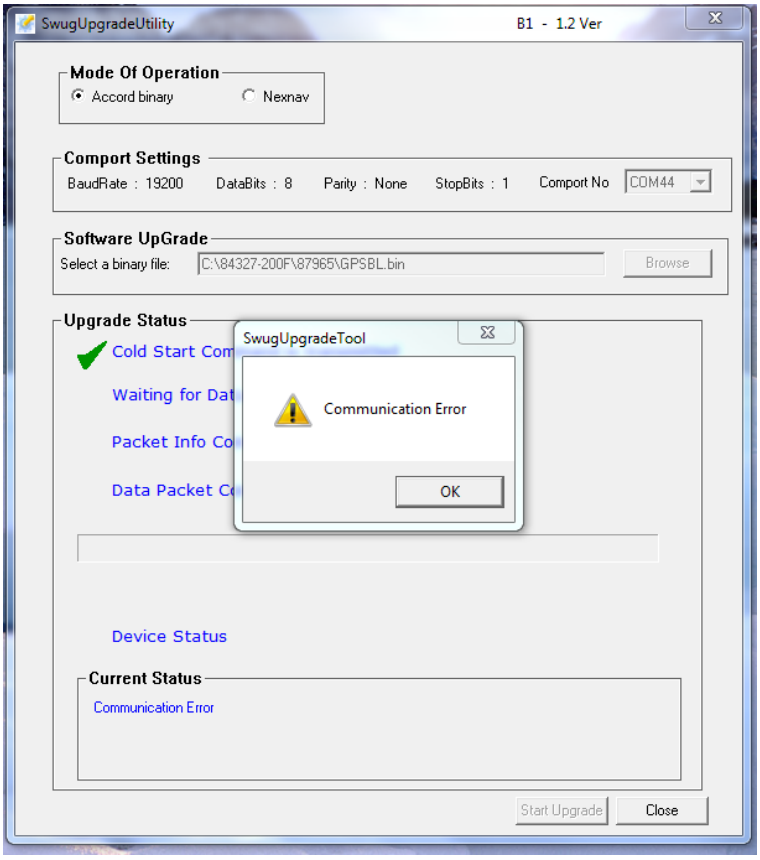


Figure 5

27. If there is a Communication Error, close the SwugUpgradeTool and perform power re-cycle to GPS receiver (Power re-cycle indicates switching OFF the power of the receiver and switching ON the power to the receiver immediately). Then start from step D.20.

28. After receiving packet info command Acknowledgement, the HOST starts transmitting the data packets.

29. During transmission of data packets, the Current Status will display the data packet transmission in progress as shown in the Figure 6 below:

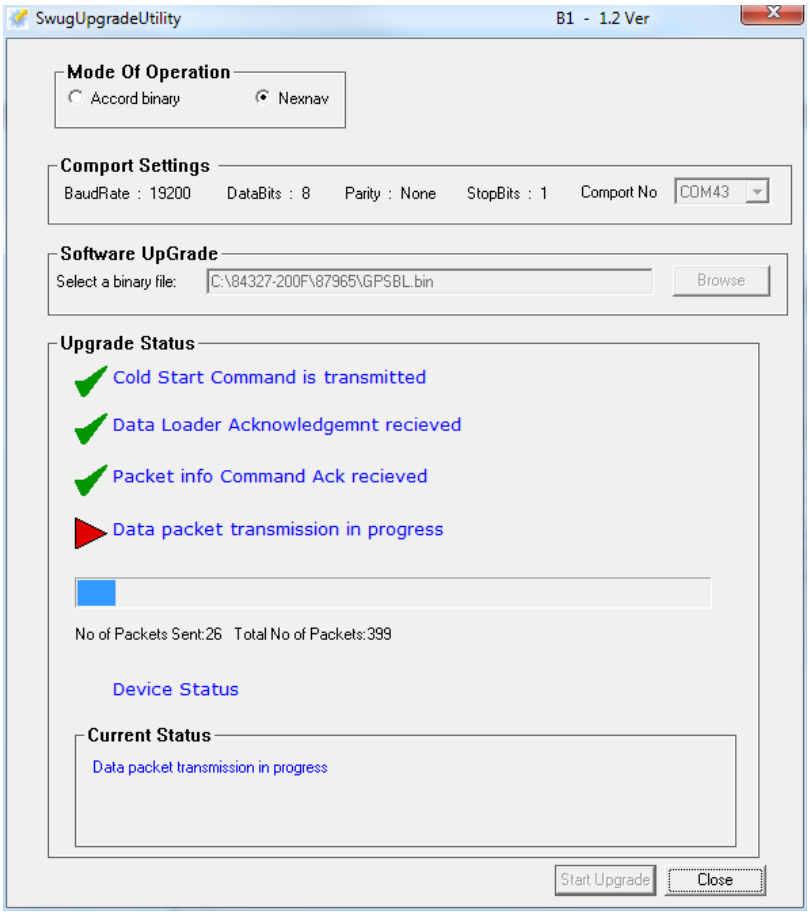


Figure 6

30. Approximately after 10-15 minutes, after transmission of all data packets, the Current Status will display Flash erase in progress and after that Flash program in progress as shown in Figure 7 below:

Note: Do not interrupt power to the 1203C during this stage. Else the system will have to be returned to FreeFlight Systems for repair.

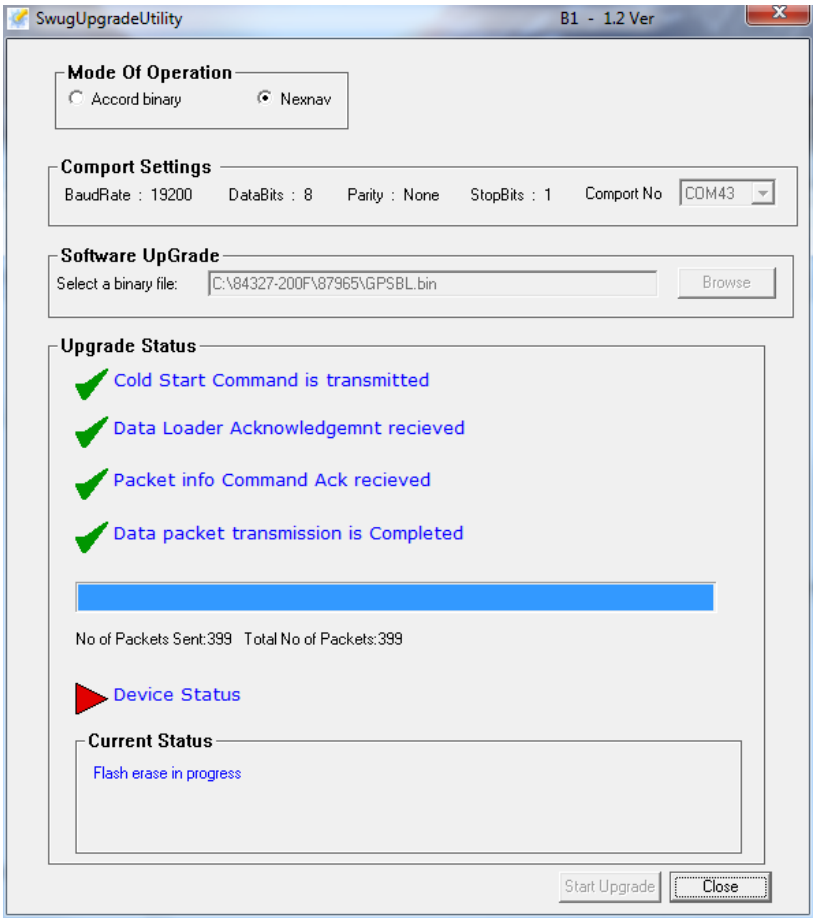


Figure 7

31. After completion of software upgrade, Upgrade Status box will display 'Flash erase successful, Flash program successful' and the CRC of the upgraded software will be displayed in current status box as shown in the Figure 8 below:

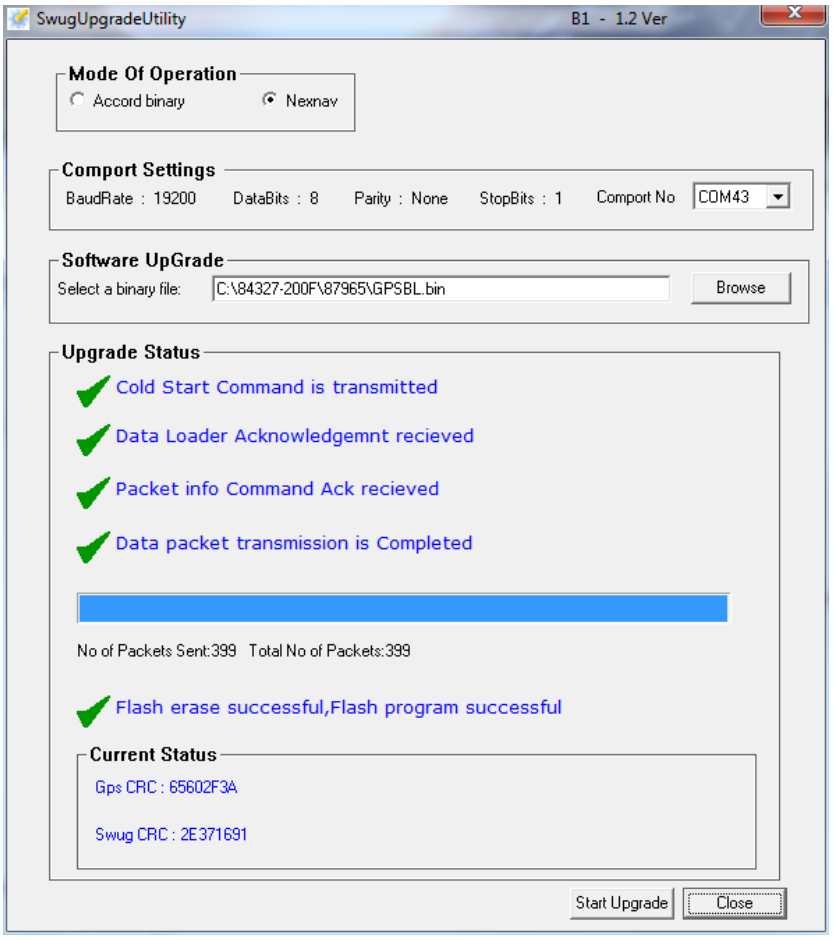


Figure 8

32. Close the SwugUpgradeTool.
33. Once GPS software is updated, remove power from the programming cable and remove the programming cable from the 1203C and continue to section E.

E. Updating the 1203C Motherboard Operating System

Note: If the GPS software version is already updated to version 1.11 then follow the steps below else update the GPS software first prior to updating the Motherboard software.

1. Insert CD, P/N 84327-200H into the PC compact disk drive. Locate the 89093 folder and verify that it contains a file called WDIO0106.hex.
2. Remove 1203C sensor from Aircraft.
3. Connect the programming cable to the 1203C sensor.
4. Connect the PC serial port (or USB to serial converter) to the programming cable serial port.
5. Connect power and programming power on the programming cable to a 12 VDC source

(powered off).

6. Press and hold the Program Enable push button on the programming cable while turning on the power on the power source(s).
7. After 1 second, release the Program Enable button.
8. Start Flash Magic, and then configure it as shown in Figure 9.

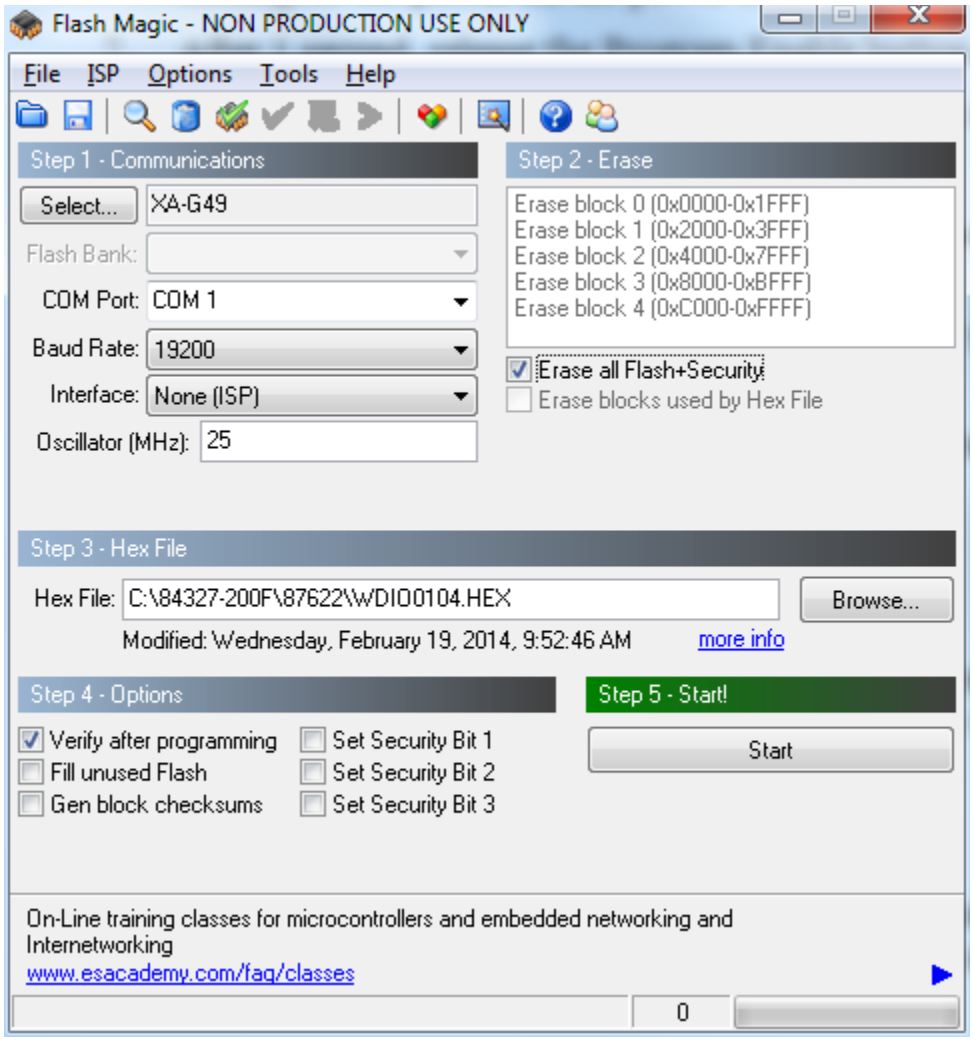


Figure 9: Flash Magic Configuration (select appropriate hex file)

9. Ensure that the proper COM port is selected. It's the same COM port selected in section C above.
10. In Flash Magic, use the "Browse" button to locate the WDIO0106.HEX file on the CD.
11. Select the HEX file then click on "Open".
12. Select the "Start" button.

13. Wait for the programming operation to complete. Observe the 'Status Display' window at the bottom of the Flash Magic window until "Finished" is displayed.

Note: Do not interrupt power to the 1203C during step 13. Else the system will have to be returned to FreeFlight Systems for repair.

14. Remove power from the programming cable.
15. Close the Flash Magic application.
16. Open a terminal application, such as HyperTerminal or Terra Term, on the same COM port and open a connection at 19200 baud, 8 data bits, 1 stop bit, and no parity or hardware flow control.
17. Apply power to the 1203C sensor.
18. Verify that the sensor reports "WDIO SW 0106 and GPS SW 0111" over the terminal connection. If not, repeat steps E.6 through E.17 above.
19. Remove power from the programming cable and remove the programming cable from the 1203C. Close terminal connection.

F. Identification

1. When the software has been successfully loaded, the flash update procedure is complete and the Mother board operating system software version 200H (WDIO 0106 and GPS 0111). Remove the old part number label on the end of the unit and replace it with the new label, P/N 81941 (if necessary, see Section II L), supplied in the kit. Apply the software version label, P/N 87617, supplied in the kit in between the P/N label and MOD label. See paragraph Interchangeability and Identification in Section I above.

Caution: Do not remove the S/N-TSO label.

2. Reinstall 1203C into Aircraft.