

How to upgrade the AntiLog embedded software using the AntiLog Bootloader



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1. Introduction

The embedded system software for the Anticyclone Systems Ltd AntiLog range of products is held in a reprogrammable non-volatile FLASH store within the device. AntiLog units are supplied with a bootloader application which allows a user to easily upgrade the embedded software using a special distributed text file which can be sent by email. It is also possible to 'downgrade' the unit to a previous version using the same technique.

The bootloader is a robust piece of protected application software which permanently resides in the AntiLog FLASH store. If there is no valid application code in an AntiLog unit, the bootloader will run instead of the AntiLog application to allow upgrades to still take place. In this way, the upgrade process is repeatable and reliable, even after previous failed upgrade attempts.

A top level overview is presented in this guide of the upgrade process. If you understand the steps discussed in the overview, you may not need any further information to begin upgrading your unit. The remainder of the guide gives more detailed information and presents a list of possible problems and solutions.

Note that upgrading the embedded software using the bootloader does not affect the content of any recorded data in the flash media store. However, the upgrade process may reset some user settings depending on the upgrade.

2. Applicability

Any AntiLog or AntiLogPro unit can be upgraded that has the built in bootloader application. AntiLog units supplied with V2.0 or higher of the embedded software and all AntiLogPro units will have the bootloader application built in as standard.

If you are not sure and want to check your AntiLog unit can be upgraded using the bootloader, switch the unit on in playback mode and go into the main menu and type 'G' for the General Menu. If there is a menu item listed which mentions the bootloader then you can upgrade your unit using a distributed upgrade file.

Selecting the "About" menu from the main menu will show the version of the bootloader detected in the product.

```
==== About ====
```

```
HARDWARE: AntiLogPro-GM, Rev=A, MCU=G, Bus=1, ASL/23/012  
FIRMWARE: V6.1, 14-Oct-2018, Build 2048  
(c) Anticyclone Systems Ltd, 2018    WEB www.antilog.co.uk
```

```
- Media detected: SD, FAT (1,972,043,264 Bytes), !! LOCK not set !!  
- Real Time Clock detected: 1372  
- Hardware detected: GNSS RxSim  
- Bootloader detected: AL_BootloaderXM,1.4,13-Feb-2016
```

```
Record          = M:115200,8,N,1,-    GNSS RxSim  
Playback Ch1    = M:115200,8,N,1,-    Real Time  
Menu            = M:115200,8,N,1,-    As Playback  
General        = Dual,ButtonErase,PSave
```

```
<Press a key to return to the main menu>  
?
```

The upgrade procedure is the same for the boxed and for the OEM units as long as you can press and hold the 'On' button for two seconds or more to place the unit in playback mode. For OEM units with the forced power ('P') option, you will need to hold down the 'On' button and then applying power and hold the button for two or more seconds and then release to place the unit in playback mode.

3. Upgrade Overview

The following is a top level overview of the complete upgrade process.

- Ensure you have a good battery fitted or you are running from a reliable external DC supply.
- Set your terminal program (e.g. AntiTermPro^[3]) to 115200 baud, 8 bits, no parity.
- Connect terminal program to primary serial port on AntiLog via NULL modem cable.
- Ensure your AntiLog unit is powered up in playback mode in the menu system at 115200 baud, 8 bits no parity. If you do not know what settings are active, switch the unit on from off by pressing and holding the 'On' button for at least ten seconds and release. This ensures the playback and menu baud rates use the default of 115200.
- Make sure you do not have the options lock switched on in the main menu, if you do, the upgrade procedure will fail.
- Transmit the distributed upgrade file directly to the AntiLog unit using your terminal program's 'Send Text File' type option (e.g. "Send File" in the AntiTermPro application).
- A Green LED will flash while upgrade is in progress (and the lower led will light red for AntiLogPro units).
- Wait for the AntiLog LED to stop flashing and light green continuously. Flashing red indicates an error code.
- The new menu will appear automatically. If not (for older bootloader releases), press the 'On' button (green LED will go out) and hold until green LED is lit again, then release.
- Your AntiLog unit is now running the new embedded software.

4. Problems and Solutions

Note that you cannot upgrade an AntiLog unit with an upgrade file which is not assigned to that unit. So if someone passes you an upgrade file for unit serial number 4000, it will not load on a unit with serial number 4001. You also need to ensure you have an AntiLog upgrade file created for boxed and OEM AntiLog units and an AntiLogPro upgrade file for boxed and OEM AntiLogPro units.

If you do experience a problem upgrading your unit, the cause is almost certainly due to a problem with the PC or the application software used to transmit the upgrade file. There is a lesser chance that the problem relates to a hardware fault (e.g. a faulty NULL modem cable) if you could see and interact with the menu system before the upgrade.

If something does go wrong during the upgrade attempt the chances are you have not broken your unit. You can practically have as many goes as you like at reprogramming the unit (up to a theoretical 100,000 times) before the unit may become damaged. It is very important to stress that a good power source is essential to achieve a reliable upgrade. If an upgrade attempt fails, check the power source.

You cannot send data 'too fast' to an AntiLog unit with any PC configuration, regardless of processor speed. Even if you could sent the data at the theoretical maximum data rate for 115,200 baud (11,520 bytes per second) the AntiLog bootloader would still work.

4.1 PC Application Software Issues

If you use a PC to send the upgrade file, there are also known issues with the serial ports and application software such as Microsoft Windows Hyperterminal. If Hyperterminal crashes constantly or it appears to be outputting data vary slowly, use our recommended AntiTermPro application or a third party terminal program instead to perform software upgrades.

4.2 Observed Fault Conditions

4.2.1 When I switch on, I now only get a fast flashing red LED

If the unit starts the programming process and there is a problem (say a power failure in the middle of the upgrade or the PC sending the data stops working) then your unit may not have a valid embedded program image in it any more. The next time you power up AntiLog, it will enter straight into the bootloader directly instead of the normal AntiLog application software. The LED flashes red at double speed to show you the unit is running the bootloader code directly. This is perfectly normal operation. Simply transmit your upgrade file again to the AntiLog unit in this mode to complete the upgrade process.

4.2.2 When the upgrade finishes, I get a number of red LED flashes

When all of the upgrade file has been sent to AntiLog, the led (top LED for AntiLogPro units) will stay lit green for very old bootloader versions waiting for the user to press and hold the 'On' button to start the unit in playback mode. For later versions of the bootloader, the unit will automatically start in playback mode and the menu system is displayed.

If instead a number of red flashes are observed followed by a gap, then the number of red flashes indicates an upgrade error code. The following table lists the possible flash code combinations.

<i>Red flashes</i>	<i>Error Condition</i>
1	User has aborted the upgrade
2	Serial number mismatch between upgrade file and AntiLog unit
3	Missing serial number in upgrade file
4	Upgrade file header checksum error
5	Upgrade file data checksum error
6	Upgrade file data format error
7	Upgrade file data sequence is corrupt
8	FLASH code verification failure
9	Upgrade image size too big
10	Power source failure detected during upgrade attempt
11	Serial number not valid
12	Upgrade file checksum not valid
13	Upgrade file is not an AntiLog upgrade file (wrong product)
14	Upgrade already in progress when another upgrade attempt was started.

4.2.3 The unit is now transmitting old data or performing a battery check

If the AntiLog unit is in the middle of a battery check, replaying recorded data or at the old main menu when you have finished sending the upgrade file then you may have the options lock still activated. If the lock is still activate, no upgrade will be possible and instead the upgrade file is taken to be a series of menu option commands. See the AntiLog User Guide^[1]^[2] for instructions on how to set and remove the settings lock.

5. Frequently asked questions

5.1 Can I go back to a previous version of the embedded software?

A. Yes. Contact Anticyclone Systems Ltd for a copy of the 'upgrade' file for your original version release.

5.2 Can I add options at the same time as upgrading?

A. Yes. You can upgrade a standard unit to a unit with the 'M' option added for example with one single upgrade file. You cannot obviously add hardware capabilities with a software upgrade e.g. trying to change to a Forced Power 'P' unit or adding the 'G' option for AntiLogPro units.

5.3 How many times can I perform an upgrade using AntiLog?

A. The theoretical limit is 100,000 times. Therefore you should never experience any problems, even if you need to regularly update you unit with special custom releases of the AntiLog software.

5.4 Can I corrupt my unit if the upgrade goes wrong?

A. No. The bootloader cannot be overwritten by the upgrade process. If an attempt fails, you may well find the only application left running on the AntiLog unit is the bootloader. Simply re-transmit your upgrade file again at the bootloader.

5.5 If I do have a serious problem, can I force the bootloader ?

A. Yes. There is a way to force the bootloader to run if for some reason the main FLASH image becomes corrupted and the unit crashes each time it is switched on. If this ever happens to you, contact Anticyclone Systems Ltd and we will inform you how to force the bootloader code.

5.6 Can I upgrade an AntiLog unit from another serial port?

A. Yes. You are not restricted to performing the upgrade via the primary serial port. If you configure the menu system to operate at 115200 baud, 8 bits, no parity on the secondary port, the upgrade process will work from there.

If you have a multi-bus AntiLogPro OEM setup, you can upgrade all units in your system at once with just the one upgrade file transmitted to the multi-unit bus (Auxiliary) port.

6. References

- 1 AntiLog RS232 Data Logging System User Guide (single channel), UG/2003001_3.8
- 2 AntiLog RS232 Data Logging System User Guide (dual channel), UG/2003001_6.1
- 3 AntiTermPro User Guide, UG/2016003_1.4

7. Abbreviations

LED	Light Emitting Diode
OEM	Other Equipment Manufacturer
PCB	Printed Circuit Board
USB	Universal Serial Bus