

## How to upgrade the AntiLog embedded software using the AntiLog Bootloader



DOC/AntiLog/UG/2005002\_1.0

27-Jan-2005

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## 1. Introduction

The embedded system software for the Anticyclone Systems Ltd AntiLog product is held in a reprogrammable FLASH store within the device. If your AntiLog unit contains the AntiLog bootloader software then you can easily upgrade the AntiLog embedded software using a special distributed upgrade file. 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 AntiLog, 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 DOES NOT ERASE the content of any recorded data in the flash media store. However, the upgrade process may set default user settings.

## 2. Applicability

Any AntiLog unit can be upgraded that has the built in bootloader application. AntiLog units supplied with V2.0 or higher of the embedded software will have the bootloader application built in. It is possible to add the bootloader to any previous releases (e.g. 1.2 and 1.3) of the hardware and software through the internal hardware programming header. Contact your AntiLog supplier or Anticyclone Systems Ltd directly for details of this service.

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.

The upgrade procedure is the same for the boxed and for the OEM units as long as you can activate the 'On' button in your OEM embedded design.

If you are attempting to upgrade AntiLog units from Microsoft Windows XP which has not had service pack 2 applied, see section 4.1 below as there are known problems with the serial port under Windows XP.

## 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 to 115200 baud, 8 bits, no parity.

- Connect terminal program to primary serial port on AntiLog via NULL modem cable.
- Press AND HOLD the 'On' button for at least FIVE 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 distributed upgrade file directly to AntiLog unit using your terminal program's 'Send Text File' type option (e.g. 'Transfer' menu in Microsoft's Hyperterminal program).
- Green LED will flash while upgrade is in progress.
- Wait for the AntiLog LED to stop flashing and light green continuously. Flashing red indicates an error code.
- Press '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

If you do experience a problem upgrading your unit, the cause is almost certainly due to a problem with the PC and 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 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 AntiLog 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 Microsoft Operating System Issues

#### 4.1.1 Windows XP

If you are using Windows XP and you have not applied XP service pack 2 to your system, you may well experience problems trying to upgrade AntiLog. Applications such as Microsoft Hyperterminal which use the system serial port appear to output data at an extremely slow rate or not at all when asked to transmit a file to the serial port.

The problems show up most when trying to use USB to serial port adapters. They appear to work perfectly normally using the AntiLog menu system for example, but when an attempt is made to transmit a file to the port, the PC corrupts the data transfer and the bootloader reports header and data checksum errors.

Try to use another PC with another operating system (e.g. Microsoft Windows 98) or use a third party terminal program which directly talks to the PC serial port.

Please note these issues are entirely down to problems in Microsoft software and have nothing to do with software in the AntiLog design. AntiLog is of course one of the reasons why you wouldn't use a PC for reliable serial port data logging in the first place!

## 4.1.2 Access to required resources

If you are using Windows NT, 2000 or XP, you may need to have administrator privileges to gain access to certain hardware and software resources. If your operating system complains about restricted access to resources, log in as administrator to send the upgrade file.

## 4.2 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 a third party terminal program instead to perform upgrades.

There are several free terminal programs you can download from the Internet which are suitable. All you need is the ability to transmit a disk file to the serial port at 115200 baud, 8 bits, no parity.

## 4.3 Observed Fault Conditions

### 4.3.1 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 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 transmitting your upgrade file again to the AntiLog unit in this mode will start the upgrade process.

### 4.3.2 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 should light continuously green. 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

<i>Red flashes</i>	<i>Error Condition</i>
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.

### **4.3.3 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<sup>[1]</sup> for instructions on how to set and remove the settings lock.

## **5. Frequently asked questions**

### **5.0.1 Q. 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.

### **5.0.2 Q. 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, e.g. The RTC option.

### **5.0.3 Q. 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.

### **5.0.4 Q. 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.

### **5.0.5 Q. If I do have a serious problem, can I force the bootloader to run?**

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. We have only ever seen evidence of this happing once in a unit which had more than 20V applied to the DC feed in error. In this particular case, the unit was not damaged, but the FLASH image needed to be reloaded using the special forced bootloader method.



## 6. References

- 1 AntiLog RS232 Data Logging System User Guide, DOC/AntiLog/UG/2003001\_3.1

## 7. Abbreviations

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