

How to upgrade the AntiLog embedded software using the AntiLog Bootloader



AntiLog/UG/2005002_3.0

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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 permanent bootloader application programmed into a special protected area of memory. This bootloader application allows a user to easily upgrade the main 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.

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 or interrupted upgrade attempts.

A top level overview is presented in this guide of the upgrade process (see section 3). 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 menu settings depending on the upgraded software version.

1.1 Automated upgrades

If you are interested in upgrading a unit to the very latest software release, this can easily be done automatically using our free AntiTermPro serial port terminal support application, available on the Anticyclone Systems Ltd website. The AntiTermPro application talks directly to the bootloader on the connected unit and can even perform special high speed upgrades to AntiTermPro units using this new feature in bootloader code V2.0 and later.

AntiTermPro also provides a 'User guide(s)' button as a part of the upgrade user dialogue which can be clicked to connect to all related user guides for the new target software version. The page also dynamically describes any warnings about settings or features that might be affected by the proposed upgrade.

Automated upgrades require an internet connected PC running our AntiTermPro software. See section 4 for more details about this comprehensive upgrade method.

1.2 Requesting an upgrade file

If you require any version of the current software (including the latest) or your system PC policy restricts you from installing new software and possible internet access, you will need to obtain an upgrade ASCII text file manually and perform the upgrade yourself. Simply transmit the special upgrade file(s) you receive to your unit(s) using a terminal application whilst the unit is up and running in the playback menu system (see section 3).

Visit the Anticyclone Systems Ltd website at <http://www.anticyclone.co.uk/upgrades.html> using a standard web browser and follow the links through to submitting a request for one or more upgrade files for any units you have, as required.

2. Applicability

Any AntiLog or AntiLogPro unit can be upgraded that has the built in bootloader application. All current AntiLog and AntiLogPro units have the bootloader application built in as standard.

A few very much older original AntiLog units (shipped with AntiLog embedded software V1.0 up to V1.3b) were not supplied with a bootloader. If you have an old unit 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 an upgrade file.

Selecting the “About” menu from the main menu will show the version of the bootloader detected in the product as well as the current embedded software (firmware) version number. The following example shows a detected bootloader version of V1.5 and firmware of V9.0.

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

HARDWARE: AntiLogPro-GM, Rev=A, MCU=G, Bus=1, ASL/23/012, Supply=10.0V
FIRMWARE: V9.0, 23-Nov-2020, Build 3475
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- Media: SD, FAT (1,973,420,032 Bytes)
- Real Time Clock: Type=1372
- Hardware: GNSS RxSim
- Bootloader: AL_BootloaderXM,1.5,31-Jan-2019

Record          = M:115200,8,N,1,-   Record All,AscTStamp
Playback Ch1    = M:115200,8,N,1,-   RAW
Menu            = M:115200,8,N,1,-   As Playback
General         = 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 menu mode.

For OEM units with the forced power ('P') option, you will need to hold down the 'On' button and then apply power, keeping the 'On' button pressed 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 new battery fitted or you are using a reliable external DC supply.
- Make sure the serial number of the upgrade file matches the unit to upgrade (a single upgrade file can sometimes upgrade more than one unit in a supplied set of serial number ranges).
- Set your terminal program (e.g. AntiTermPro^[3]) to 115200 baud, 8 bits, no parity, and no hardware handshaking where applicable.
- Connect your serial port terminal program to the serial port currently assigned to the playback menu system on your AntiLog or AntiLogPro unit (normally, the primary serial port) using a NULL modem cable.
- If the unit is already running the bootloader code, you can perform an upgrade from any available hardware serial port on the unit.
- Ensure your connected unit is powered up in playback mode and in the menu system at 115200 baud, 8 bits no parity.
- If you do not know what settings are currently active on the connected unit, switch it on by pressing and holding the 'On' button for at least ten seconds and release. This resets the playback and menu baud rates to the default of 115200 baud, 8 bits no parity on the primary serial port (no other settings are changed).
- 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 connected unit using your terminal program's 'Send Text File' type option (e.g. use the 'Send File' button in the AntiTermPro application).



- A Green LED will flash on the unit while the upgrade is in progress (and the lower 'channel 2' led will also 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 AntiLog bootloader releases), press the 'On' button (green LED will go out) and hold until green LED is lit again, then release.
- Your connected unit is now running the new embedded software.

4. Upgrades using AntiTermPro

You can automate the software upgrade of a connected AntiLog or AntiLogPro unit using the free to download and use Anticyclone Systems Ltd AntiTermPro serial port terminal application for the PC. You can even automate the upgrade of all units connected to a multi-unit AntiLogPro configuration in one operation.

AntiTermPro documentation and the installation file are available for download from the Anticyclone Systems Ltd website at <http://www.anticyclone.co.uk/download.html>.

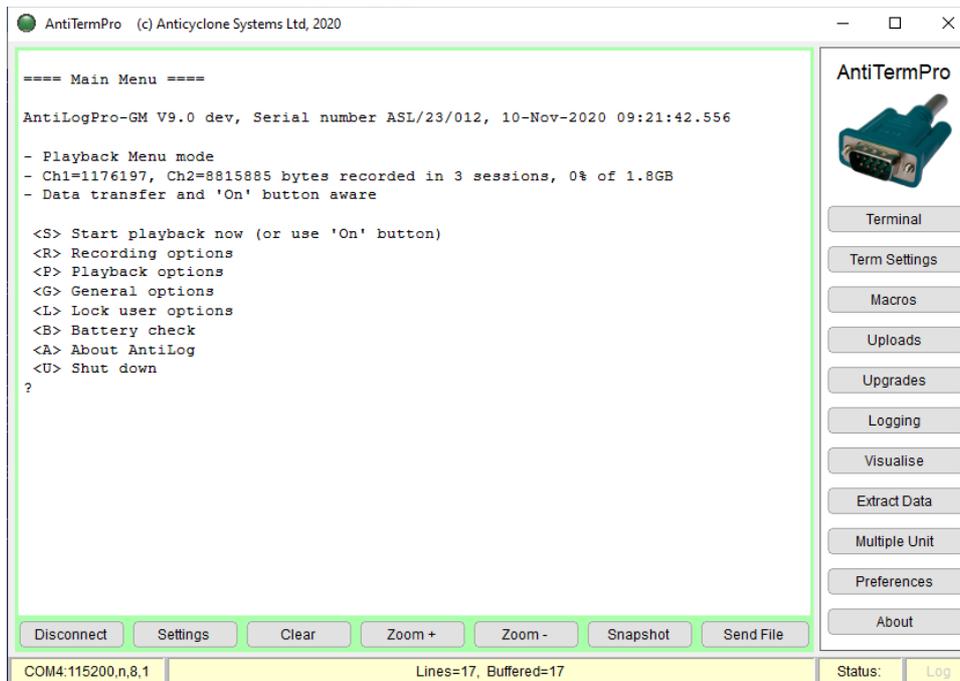


Figure 1: AntiTermPro main display

Simply click on the 'Upgrades' button in the right hand side menu and this will open a user dialogue to check your unit for an upgrade or perform an upgrade now.

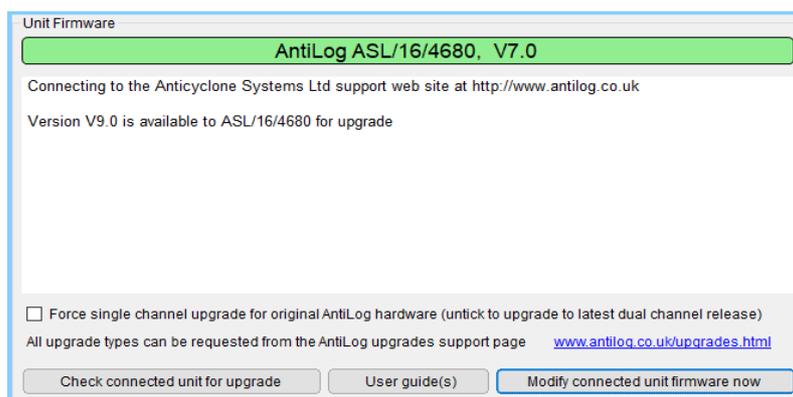


Figure 2: Firmware system software upgrade display

Once you have checked for an upgrade, the 'Open User Guide(s)' button will become available and you can click this to open a web page containing the most recent user guide together with the most recent user guides for any extra options detected in your product. Click on the 'Modify connected unit firmware now' button to complete the upgrade process.

5. Problems and solutions

You cannot upgrade an AntiLog unit with an upgrade file which is not assigned to that unit's serial number. So if someone passes you an upgrade file for unit serial number 4000, it will not load on a unit with serial number 4001. Some distributed upgrade files can cover a range of target units so you may receive a single upgrade file that can upgrade all requested serial numbers from 4000 to 4010 and 5000 to 5002 for example.

You also need to ensure you have the correct type of upgrade for your unit. An AntiLog upgrade file is required for all AntiLog variants (e.g. OEM and boxed) and an AntiLogPro upgrade file is required for all AntiLogPro units.

If you do experience any other 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 or a supply failure. 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 started then it is unlikely there is a cable or wiring fault.

If something does go wrong during the upgrade attempt, the chances are you have not damaged your unit in any way. 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 PC processor speed. AntiLog units do not require any form of handshaking to slow down transfers at the standard 115200 baud serial port setting.

5.1 PC application software issues

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

6. Observed fault conditions

6.1 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 a valid upgrade file again to the AntiLog unit in this mode to complete the upgrade process.

6.2 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 will stay lit green for 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. See Appendix A for a full description of all the possible red LED error flash codes.

6.3 The unit is playing back 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.

7. Frequently asked questions

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

A. Yes. Use this link <http://www.anticyclone.co.uk/upgrades.html> to the Anticyclone Systems Ltd website to request an 'upgrade' file for your unit and specify a software version you require.

7.2 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.

7.3 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.

7.4 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 valid upgrade file again at the bootloader.

7.5 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.

7.6 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 (or auxiliary port on AntiLogPro), the upgrade process will work from there. If the bootloader is running, it will detect an upgrade request on any of the available serial ports at 115200 baud regardless of any menu settings that were active in the main code.

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 (Auxiliary) bus port.

Appendix A. Bootloader LED flash error codes

The following tables lists all the possible red LED error flash code combinations depending on the product type and bootloader version.

Appendix A.1 AntiLog bootloader up to V2.0

<i>Red flashes</i>	<i>Error Condition</i>
1	User has aborted the upgrade
2	Serial number mismatch between upgrade file and target unit
3	Missing serial number in upgrade file or upgrade is for the wrong product
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 or AntiLogPro upgrade file (wrong product)
14	Upgrade already in progress when another upgrade attempt was started.

Appendix A.2 AntiLog bootloader V3.0+, AntiLogPro bootloader up to V1.6

<i>Red flashes</i>	<i>Error Condition</i>
1	User has aborted the upgrade
2	Serial number mismatch between upgrade file and target unit
3	Wrong 'from' number. Serial number in upgrade file does not match unit number
4	Serial number missing from upgrade
5	Supplied upgrade command data checksum error
6	Data checksum error
7	Data sequence error
8	Microcontroller FLASH code verification failure
9	A problem has been detected with the power source
10	Upgrade is for the wrong product (e.g. AntiLog rather than AntiLogPro)
11	Part of an upgrade file has been seen without the first header section
12	Bad command arguments
13	Wrong number of command arguments
14	Target image is not valid
15	Hexadecimal data in upgrade file invalid

<i>Red flashes</i>	<i>Error Condition</i>
16	Upgrade image size is too big
17	Bootloader not in engineering mode
18	Broadcast command required

Appendix A.3 AntiLogPro bootloader V2.0+

<i>Red flashes</i>	<i>Error Condition</i>
1	User has aborted the upgrade
2	Serial number mismatch between upgrade file and target unit
3	Upgrade is for the wrong product (e.g. AntiLog rather than AntiLogPro)
4	A problem has been detected with the power source
5	Part of an upgrade file has been seen without the first header section
6	Microcontroller FLASH code verification failure
7	Wrong 'from' number. Serial number in upgrade file does not match unit number
8	Bootloader command checksum error
9	Supplied upgrade command data is out of sequence
10	Supplied upgrade command data checksum error
11	Bad command arguments
12	Wrong number of command arguments
13	Target image is not valid
14	Hexadecimal data in upgrade file invalid
15	Upgrade image size is too big
16	Bootloader does not support this supplied upgrade file version

Appendix B. Glossary of terms, abbreviations and acronyms

ASCII	American Standard Code for Information Interchange
COM	Serial communications port
DC	Direct current
LED	Light Emitting Diode
OEM	Original Equipment Manufacturer
PC	Personal Computer
PCB	Printed Circuit Board
RS232	A common physical interface standard specified by the Electronic Industries Association (EIA) for the interconnection of devices
USB	Universal Serial Bus

Appendix C. 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_9.0
3. AntiTermPro User Guide, UG/2016003_4.0