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ACOUSONDE™ FIRMWARE UPDATING GUIDE

Model B003A and B003B

Firmware version 3.0.3, PalmOS client app version 3.0.2
August 2022

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1 FIRMWARE UPDATING

1.1 REQUIRED EQUIPMENT AND SOFTWARE

Users wishing to update their Acousonde™ firmware will require the following:

- Apple Macintosh computer running MacOS X, version 10.5 (“Leopard”) or later.
- Actisys ACT-IR224UN-L+ USB-to-infrared dongle with built-in USB-to-serial adapter hardware, available from www.actisys.com
- OR
Actisys ACT-IR220L+ serial-to-infrared dongle combined with a separate USB-to-serial adapter. Separate USB-to-serial adapters that have been found to work well include the Keyspan USA-19HS and the Cables Unlimited USB-2920. ***Caution: The IOGEAR GUC232A USB-to-serial adapter could not be made to work for this application during testing in December 2011 and cannot be recommended.***
- MacOS X driver for your USB/Serial adapter hardware. If you are using a separate USB-to-serial adapter combined with the ACT-IR220L+, this is the driver that came with that USB-to-serial adapter. If you are using the Actisys ACT-IR224UN-L+, it is the “PL2303 Serial” driver from Prolific Technology, Inc., available via Apple’s App Store (this is because the USB-to-serial adapter chip embedded in the ACT-IR224UN-L+ is a Prolific 2303). ***Caution: Do NOT install any infrared or IrDA software from Actisys or any other third party! The ONLY driver you need is the low-level driver for the USB/serial adapter hardware. We provide complete infrared/IrDA management in the “aobex” application.***
- aobex command-line OS X application (available to customers on request).
- The latest Acousonde firmware file (available to customers on request).
- The latest Acousonde PalmOS “.prc” app file (available to customers on request).

1.2 SAVE DATA BEFORE YOU BEGIN

Before you update an Acousonde’s firmware, **be sure all data you wish to save have been copied off the Acousonde!** There are two reasons for this:

- New firmware may change how directory information is allocated on the built-in storage cards, resulting in loss of data recorded with prior firmware.
- It is essential to erase storage immediately after rebooting the Acousonde with new firmware. This is because the new firmware may change filesystem structures and self-test procedures.

You need not erase storage before updating the firmware.

1.3 INITIAL PREPARATION

Initial preparation is only necessary once for a given computer.

1. Your USB-to-infrared hardware will not work until you have installed the appropriate USB-to-serial hardware driver software on your Mac (see Section 1.1). Do NOT install any third-party infrared/IrDA software! The **aobex** software we supply supports all necessary infrared protocols. Only third-party driver software for your USB-to-serial hardware is necessary.
2. Create a new folder under your home folder, i.e., at the same level as the Mac-standard folders **Documents**, **Music**, **Downloads**, etc. Name this new folder **bin**, all lower-case like that.
3. Drag-and-drop **aobex.zip** to the new folder **bin** you created in Step 2.
4. Double-click **aobex.zip** to unzip it. This will place the **aobex** program in the **bin** folder.

1.4 FINAL PREPARATION

5. Zipped Acousonde firmware files have names like **b003_xxxx.s19.zip**, where the **xxxx** is the version number without periods. For example, the zipped filename for firmware version 2.0.19 is **b003.2019.s19.zip**. Place the zipped file in the **bin** folder that you created in Step 2 and unzip it by double-clicking it. Take note of the unzipped firmware filename. In the example just stated, it would be **b003.2019.s19**.
6. If you have a separate ACT-IR220L+ serial IR dongle, as part of a USB/Serial + Serial/IR combination, attach it to the USB-to-serial adapter. Otherwise you can skip this step.
7. Plug the USB side of the infrared/serial cabling gear into the Mac's USB port. If the USB-to-serial driver has been installed correctly, this will enable a virtual serial port within the Mac operating system.
8. The rest of the process is done with a command line, so you need to open a command-line window. The **Terminal** program is located in the **Utilities** subfolder of the Mac's main **Applications** folder. Once you find the **Terminal** icon, double-click it to start it.
9. Type this command in the **Terminal** window and press return: `cd bin`
10. Type this command in the **Terminal** window and press return: `chmod +x aobex` (this step only needs to be done once after **aobex** is first installed and unzipped. After that it can be omitted, but there is no harm in repeating it.)

1.5 UPDATING THE ACOUSONDE™ FIRMWARE

11. Physically place the IR dongle and the Acousonde you wish to update out of the optical path of sources of infrared interference. Such sources include flat-panel computer monitors, televisions, and compact fluorescent light fixtures.
12. Power the Acousonde via USB cable (i.e., “shore power”), as you will need USB power to erase storage after rebooting with the new firmware. If the Acousonde’s USB cable is plugged into a computer, wait until the computer has finished mounting the Acousonde’s storage, so that the Acousonde is otherwise idle.
13. **Make sure no other powered-up Acousonde units are in the line of sight of either the IR dongle or the Acousonde to be updated, or their firmware might be corrupted!** We commonly put any nearby Acousonde units into a box or drawer.
14. Note the name of the firmware file you unzipped in Step 5 (e.g. b003_2019.s19), then type this command in the **Terminal** window (substituting the actual filename where it says *<filename>*) and press return: `./aobex -1 <filename>`
Note: -1 is a dash and numeral one (not the letter ell), and identifies the index of the virtual serial port to use. If multiple ports are enabled, you may need to use 2, 3, or 4.
15. The **aobex** program will run, find the USB-to-infrared hardware, make an infrared connection with the Acousonde, and begin transferring the new firmware. The Acousonde’s yellow system LED will flash, very briefly, at approximately 1-second intervals as the firmware file is transferred. If it does not seem to work, it is possible your computer is configured with multiple serial ports. Try a larger numeral (e.g. 2, 3, or 4) after the first attempt times out (about 30 seconds).
16. Wait until **aobex** confirms completion and the yellow-LED flashing ceases. **Caution: If aobex warns you that the transfer did not complete properly, repeat Step 14 immediately! Do not reboot the Acousonde until the transfer completes successfully!** If the transmission failures continue, remove any possible sources of infrared interference and keep trying. Again, **do not reboot or disconnect power to the Acousonde until the transfer completes successfully!**
17. If **aobex** reports the number of bytes transferred without any obvious warnings, the Acousonde has been updated. Reboot the Acousonde by swiping a magnet past the LED ports (3B and newer 3A units) or past the embedded magnetic switch painted white (earlier 3A units), or simply by power cycling. **Caution: Do not use a more powerful magnet than necessary, and do not bring the magnet close to any other part of the Acousonde. If the magnet comes too close to the compass, permanent damage may result.** Allow the reboot to complete, then verify the version of the operating system using a **Query** command from the **STORAGE** pane of the PalmOS **Acousonde** app.
18. Once the Acousonde is rebooted running the new firmware, erase storage using the **Erase** command on the **STORAGE** pane of the PalmOS **Acousonde** app. This requires the Acousonde to be on USB power. For large storage capacities an erase operation may take about 30 minutes, but **it is important not to skip this step** unless you have been specifically advised it is not necessary.

1.6 UPDATING THE PALM “ACOUSONDE” APP (IF NECESSARY)

Some new features cannot be accessed without the latest companion PalmOS **Acousonde** app. Each Acousonde unit stores an onboard copy of the PalmOS app that it can upload directly to Palm devices on request. So, when you update the firmware on an Acousonde, you should ensure it is storing the most recent version of the **Acousonde** PalmOS app as well.

19. You may be able to download the latest PalmOS application file (with a “.prc” filename extension) from the Acousonde.com website. Alternately you may have been sent the file, zipped. In either case, place the file in the bin folder that you created in Step 2, and, if it came to you zipped, unzip it so its filename extension is “.prc”.
20. Follow the above instructions for a firmware update exactly, with one exception: use the .prc file’s filename instead of the firmware filename. For example, if the **Acousonde** PalmOS application file is called `Acousonde206.prc`, transmit this file with the **Terminal** command: `./aobex -1 Acousonde206.prc`
21. As with the firmware file, **aobex** should not report any errors. If it does, repeat the transfer, perhaps trying a different numeral instead of 1 to select a different serial port.
22. You may now transfer the app from the Acousonde directly to your Palm via infrared, following the instructions in the Quick Start Guide.

1.7 UPDATING THE BOOTCODE (ONLY IF ADVISED)

The Acousonde’s bootcode loads the operating system from the onboard firmware file at boot time. It also provides a failsafe capability to boot the Acousonde from a firmware file via infrared instead of from the onboard firmware file. The bootcode changes rarely, and it is seldom recommended to update it. ***Caution: Making certain mistakes when updating the bootcode may render the Acousonde nonfunctional! DO NOT UPDATE THE BOOTCODE UNLESS YOU HAVE BEEN EXPLICITLY ADVISED TO DO SO AND COMPLETED ALL OTHER STEPS IN THIS UPDATE GUIDE SUCCESSFULLY.***

23. Prepare your updating setup all as before, except using the bootcode .s19 file. Have the **aobex** command in the **Terminal** ready to send the file, but do not execute it yet.
24. Reset the Acousonde, either by power-cycling it or by swiping a magnet past its reset switch, as in Step 17. The yellow system LED light will come on for a moment.
25. Within 3 seconds of resetting the Acousonde, execute the command to send the bootcode file via infrared. As always, the yellow system LED should flash very briefly at approximately 1-second intervals as the file is transferred. When the bootcode update is complete, the yellow system LED will continue to flash at about 1-second intervals, but each flash will be much longer (approximately 50% duty cycle).
26. If the transfer does not begin in a few seconds, the window has been missed. You must return to Step 24 and reset the Acousonde before issuing the **aobex** command again. *Note: It may be necessary to try several times to “catch” the window.*
27. Once the yellow sytem LED flashes in the long-flash pattern, reboot the Acousonde and verify version as in Step 17.

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PREFACE

This standalone firmware updating guide was released on 27 September 2011 and updated 17 August 2022, in advance of the Acousonde™ User Guide. It will be superseded by the User Guide when the latter is released.

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