

H0420

Programmable MP3-player for scale models, broadcast systems and special applications

Firmware Update: Version 1.8 Build 4110

[For upgrading to the new firmware, please see page 3 for the procedure.](#)

This document describes the changes that version 1.8 of the firmware (build 4110) brings to the previous release (version 1.7, build 4045). For changes in earlier revisions, see the relevant documents that are available on the web site <http://www.compuphase.com>.

New basic functionality & modifications

1. Large SYLT field (synchronized lyrics) are now supported

The H0420 supports ID3 tags with synchronization events. These events are stored in a “SYLT” field inside the ID3 tag of a track. When such an event fires, the script function `@sync()` runs. Previously, the complete SYLT field needed to fit in the available memory. As of version 1.8, the SYLT fields may be arbitrarily large.

2. Function `reset()` can execute asynchronously

After calling function `reset()`, the board resets within 1.5 seconds. The function `reset()` now has an optional parameter, that indicates whether the function must wait for the reset to occur, or whether to return so that the script continues running for another 1.5 seconds.

3. Limited support for Unicode in ID3 tags

ID3 tags with Unicode layout are supported. However, the H0420 only supports the Basic Multilingual Plane.

4. Function `getiopin()` now optionally returns a bit mask with all pins

Similarly to function `button()` that can either return the state of a single designated switch, or the state of all 16 switches as a bit mask, function `getiopin()` can now also return the state of all 16 digital I/O pins as a bit mask. See the reference guide for details.

5. Function `setiopin()` can now set all 16 digital I/O pins in a single call

To complement the new functionality of `getiopin()`, function `setiopin()` can change all I/O pins in one call (provided that these pins are defined as output).

6. Correction and behaviour modification of fade-in and fade-out

The “volume fade duration” parameters of the functions `play()` and `stop()` did not take the volume bounds into account. In addition, the fade duration was only accurate when the normal volume was set to 100 (full volume). Both issues have been fixed.

7. Correction: `clreol()` could hang

If the cursor (of the LCD) was out of the valid range and “wrap mode” was active, the function `clreol()` would drop in an endless loop. This has been corrected.

8. Correction: `fmatch()` would not always match directories

Function `fmatch()` failed to return directory names for CompactFlash cards that were laid out with recent versions of Microsoft Windows. The core issue was whether the size of a directory was marked in the entry of the parent directory. This has been corrected (`fmatch()` now returns directories regardless of the size field).

9. PAWN scripting language & tools

The compiler and toolkit have been improved in various areas. The Quincy IDE has gained code completion, and a log window for messages sent over an RS232 link. The FileLink utility now supports a port scan to find the appropriate RS232 port (if none is specified).

New functionality & modifications for the network extension

10.Improved option negotiation in the TFTP client & server

When transferring files with TFTP, the embedded client and server no longer mandate that the other TFTP host support all standard options. For transferring files onto the H0420, the TFTP host still needs to support the “tsize” option (transfer size), because the H0420 needs to reserve the file (with the correct size) before the transfer starts.

11.New native function netlookup()

The new function **netlookup()** converts a domain name to an IP address. By using this function, you may avoid repetitive DNS lookups, and this may reduce latencies in setting up a connection.

12.New native function netarp()

Mapping IP addresses to hardware addresses (i.e. MAC addresses) happens transparently while setting up a connection, using the protocol “ARP”. This address resolution takes time, and if the remote host does not reply, it takes several seconds before it drops out with a time-out. The new function **netarp()** checks whether an IP address is in the ARP cache and add it asynchronously if not. This function avoids the wait for time-out, in case that the remote host may be expected to be unreachable.

Upgrading the Firmware

When upgrading firmware, the scripts in the PAWN language should also be recompiled with the latest release of the PAWN compiler. Any “**amx**” file built for earlier versions of the firmware may not function accurately with the new firmware. The new release of the PAWN toolkit is included in each firmware update.

The procedure below describes how to upgrade the firmware using a PC running Microsoft Windows. When you do not run Microsoft Windows, please contact us for an alternative upgrade procedure.

We advise you to read through this procedure before starting the upgrade, so that you have a mental picture of the steps that are involved in the procedure.

1. Install the software

If you have not done so already, download the firmware update and then “open” or “run” the file. The firmware update file is a *setup* program that installs the required components. If you received the firmware update on CD-ROM, you can install it directly from the CD-ROM.

2. Connect the H0420 to a PC & remove the CompactFlash card

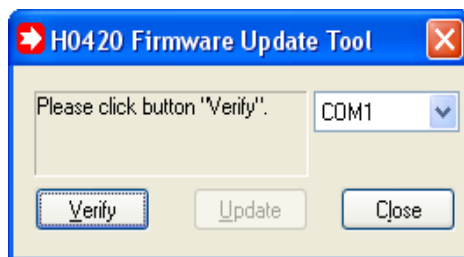
First unplug the H0420 MP3 player from the 5V power. Then remove the CompactFlash card from the H0420, and connect a standard RS232 cable (not a null-modem cable) between a PC and the H0420. Plug the power connector back into the H0420 once the serial cable is connected. Do not re-insert the CompactFlash card (this is done in step 5).

If you are using a simulated RS232 port (for example, through an USB-to-RS232 adapter), it is best to wait a few seconds between inserting the RS232 plug and the power plug —10 seconds should always be sufficient. Note that “simulated RS232” is less reliable than hardware RS232; it is advised to use a real RS232 port for the firmware update.

If the device was already connected to the PC through the RS232 cable and the CompactFlash card had already been removed, it is still advised to remove the power plug for a few seconds, so that the device does a full restart.

3. Run the “Firmware Update Tool”

Locate the “Firmware Update Tool” in the *Start Menu* (under *Programs / H0420 MP3 Controller*), and run it —this tool was installed in step 1. See the screen shot below for the appearance of the Firmware Update Tool.



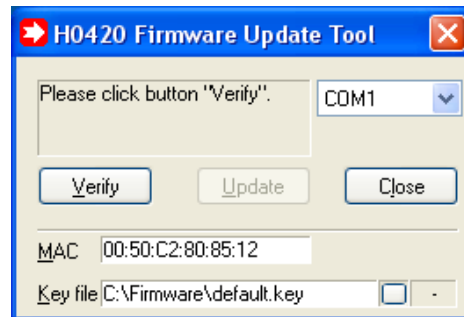
Make sure that the correct COM port (RS232) is selected in the update tool.

If you have a custom key file (for encrypted MP3 tracks or encrypted CompactFlash cards), or if you have an Ethernet extension board for the H0420, the Firmware Update Tool shows up to two additional rows with entry fields: one for the MAC address and one key file. The field for the MAC address is initially empty —it is updated when you click on the button “Verify”. The field for the key file may contain the path to a key file, if one was found in the program directory.

4. First click “Verify”, then click “Update”

Click on the button “Verify” and allow it to complete. This function checks the current firmware version and the device model and reports these to you. If all is well, it will tell you the version number of the firmware that is currently in the H0420, as well as the version number of the latest firmware. If the device already has the latest firmware, this tool will tell you so.

If you have a H0420 board with Ethernet extension, clicking the “Verify” button will also have updated the MAC address field with the address that is currently in the device. Unless you want to assign a different address, there is no need to change it.



If the “Verify” button found no error, you can click on the button “Update”. Updating the firmware may take a minute. Do not abort the program while the firmware update is processing.

After the update has completed, the program will inform you that the device will automatically reset itself after a time-out of a few seconds. If you wish to check that the firmware has indeed been uploaded correctly, you will have to wait at least this number of seconds before clicking on the button “Verify” again.

5. Recompile the PAWN script

Although any existing script on the CompactFlash card will still run, it is advised to recompile the source code of the script with the updated PAWN compiler. After compiling the script and storing the resulting file AUTORUN.AMX on the CompactFlash card, you can now re-insert the CompactFlash card in the H0420 player.

Trouble shooting — when uploading fails

If the “Verify” button times out and responds with the error message:

**Unable to synchronize with the device.
Please check the serial connection.**

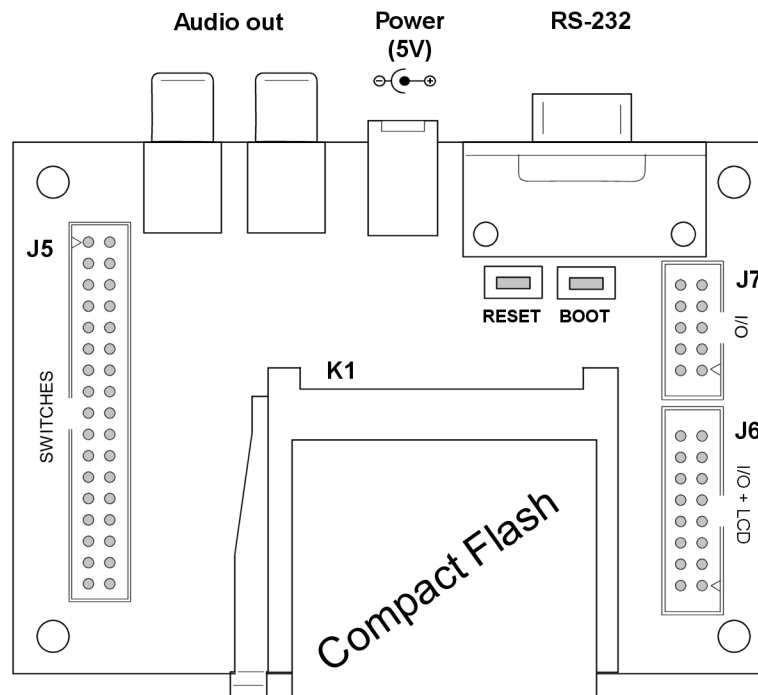
- check the RS232 cabling
- “power cycle” the H0420 MP3 player (remove the power plug from the device for a few seconds and then re-insert it)
- run the update procedure (on the previous page) again.

If this fails again, try to reset the H0420 while the Update Tool is busy verifying the device. That is: click on the button “Verify” and then press the “**RESET**” switch on the H0420. See below for the location of the reset button. You may also want to try to perform the procedure after rebooting the PC, or from a different PC.

If all fails, a last option that you can try is to set the H0420 in “Boot Loader mode” (see below), and run the procedure again. In this case, the “Verify” button will inform you that it cannot find the “current” version of the firmware in the H0420, but it still allows you to update to the latest revision. Resetting the H0420 to Boot Loader mode is typically necessary when an earlier upload has been aborted or interrupted.

Resetting the H0420 to “Boot Loader mode”

The H0420 has two switches, behind the connector of the RS232. In order to gain access to these switches, it may be necessary that you open the case in which the H0420 is mounted.



These switches must be pressed and released in the correct order:

- Press (and hold) “**RESET**”
- Press (and hold) “**BOOT**”
- Release “**RESET**”
- Release “**BOOT**”

It is advised to “power cycle” the device before resetting it to boot loader mode, and to remove the CompactFlash card. (Do *not* power-cycle the device *after* switching it to boot loader mode, because this would reset the device to normal mode.)