

H0420

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

Firmware Update: Version 1.10 Build 4613

[For upgrading to the new firmware, please see page 4 for the procedure.](#)

This document describes the changes that version 1.10 of the firmware (build 4613) brings to the previous release (version 1.9, build 4299). 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. Improved file writing performance

File writing operations (whether it be text files or binary files) have become faster. This applies to files written by the script, as well as to files transferred on a network.

2. INI file support improved

The various functions to read settings from and INI file, and to write settings to an INI file have improved. Especially writing to the INI file is improved in speed, and at the same time, “wear” of the Flash memory media is minimized.

3. New function `clearioqueue()` to drop switch or I/O events

If the H0420 is busy (for example with running a time-consuming script function), the H0420 queues switch events and I/O events. These events will then arrive and be handled by the appropriate event functions when the “lengthy procedure” has finished running. If you wish to disregard any switches that were pressed during the lengthy procedure, you can now call the native function `clearioqueue()`.

4. Native `spi()` function can now also return arrays of data

In previous releases, the native `spi()` function returned only a single byte of data: the last byte received. This is inconvenient for external devices that return multiple bytes of data on each request. Function `spi()` has been modified to be able to return an array of data.

5. The latest version of the Poly-Raster Image format is now supported

The poly-raster image format changed from the initial release and the release 1.0 (now current). The H0420 firmware was adapted to be compatible with the new format and the new tools for the format.

6. Better “start of packet” detection in packet reception

When using functions `packetfilter()` and `@receivepacket()`, the start of a packet could be missed if other data bytes preceded the packet with no delay before the start of the packet. This issue has now been fixed.

7. Support for additional serial ports

If the appropriate hardware is present, the script can now use extra serial ports. The native functions `setserial()`, `sendbyte()`, `sendstring()` and `receivebyte()` now have an additional (optional) parameter to specify the port to use. For backward compatibility, the public functions `@receive()` and `@receivebyte()` do not have this parameter by default; the port for which the event was generated can still be obtained with the native function `getarg()`.

8. Correction in file / directory name collision

In some circumstances, the H0420 failed to open a file if a directory with the same name (but a different extension) also existed at the same level. This issue has now been corrected.

9. Correction in native function mkdir()

When running the “CheckDisk” utility on a CompactFlash card after having created a subdirectory on the H0420 (through a script), CheckDisk would sometimes complain that the “parent” directory entry was not set correctly. This issue has been corrected. As an aside, Microsoft Windows and Linux do not appear to use the parent directory entry, so this correction is largely “cosmetic”.

New functionality & modifications for the network extension

10.FTP client

The new firmware can now also download files over FTP. Both standard transfers (with user name and password) and anonymous transfers are supported.

11.Improved transfer performance

Especially on TCP transfers, the transfer speed has improved due to a larger download window and optimizations in data transport.

12.Improved script responsiveness on large downloads

On large downloads (which are written to the CompactFlash card), the script might become temporarily unresponsive, as all processing time was spent on handling the download and writing to the CompactFlash card. This has been improved by toggling the script to a high priority on a regular basis.

13.Support for downloading from “shared hosting” web site

When a file resides on a shared hosting site, or when a server is configured to share a single IP address between several (sub-)domains, the IP-address of that domain is insufficient to locate the correct file (because multiple domains map to the same IP-address). The firmware now passes original host name to the HTTP server, so that the web server can redirect to the appropriate “virtual root” of the intended site.

14.Improved handling of DNS queries

When opening a network connection through a domain name, the TCP/IP stack does a DNS look-up in the background, asking for the IP address that matches the domain name. Some DNS servers return additional information, specifically redirection information via CNAME records. The presence of CNAME records could lead to a failure to resolve the DNS query. That error has now been corrected.

The DNS support has also been enhanced with support for a secondary DNS server. Specifying a second DNS server is optional.

15.Two general purpose “listening” sockets may be created

In the previous release, only a single socket could be created for incoming general purpose connections. In this new version, you can create one socket for incoming UDP connections and one socket for incoming TCP connections, and both may be active at the same time. Note that a single UDP socket can receive packets from multiple hosts concurrently (and can also reply to multiple hosts).

16.UDP & TCP checksum verification on received packets

In the previous release, the checksums in incoming packets were not verified. To improve the reliability of data transfers, the checksums can now optionally be verified. Checksums are always set on outgoing packets. Note that on UDP transfers, checksums are optional.

17.Aborted transfers are now signalled as an event

When a transfer (upload or download) is aborted, an event is now sent to the `@netstatus()` function in the script. The event is for the completion of the transfer, but the “success” flag is set to false.

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. When upgrading from revision 1.9, copy the firmware file to a CompactFlash card

Upgrading from version 1.9 to 1.10 requires only that a CompactFlash card with a file containing the new firmware is inserted in the H0420. If you are upgrading from a version of the H0420 firmware *before* 1.9, please skip this step (step 2) and proceed with step 3.

After installing the software, you will find the files in the “firmware” directory below the directory where you installed the software. The default location is:

```
C:\Program Files\H0420 Development\firmware
```

The H0420 requires one of the files in this directory, depending on what extensions are present. The easiest option is to copy all files in this director to the root directory of a CompactFlash card, insert that CompactFlash card into a H0420, power it up and wait for approximately 30 seconds. The H0420 will start up, pick the correct firmware file and upgrade automatically. You can now skip to step 6.

The firmware files are:

```
H0420C_4613.bin   for the H0420 without extension boards or with just the amplifier extension
H0420CE_4613.bin for the H0420 with an Ethernet extension board
```

3. 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 6).

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; if you have a choice, we advise you 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.

4. 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.

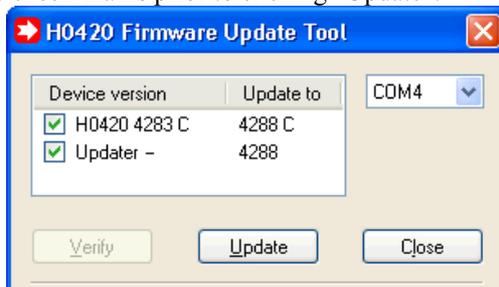


Make sure that the correct COM port (RS232) is selected in the update tool.

5. 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 the Firmware Update Tool tells you that it cannot connect, or synchronize to the H0420 device, please verify that the cabling is correct and that you have selected the correct COM port.

If “Verify” completed successfully, it will present you with a list of firmware components that has found in the device and what updates are available. There may be 1,2 or 3 items in the list. If the Firmware Update Tool proposes that a component must be updated, it has placed a check-mark on the row; if the Firmware Update Tool detects that the device already has an up-to-date component, it will remove the check-mark from the row. You can overrule the proposed updates by toggling the check-marks prior to clicking “Update”.



The revision/build numbers in the screen shots may differ from the ones that you are seeing. For example, the “Update to” value for the H0420 firmware will be 4299 for the current firmware release.

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 for a key file. You may need to adjust the MAC address, with one that was provided with the network extension board.



If the “Verify” button found no error, you can click on the button “Update”. Updating the firmware may take several minutes. Do not abort the program while the firmware update is processing. The update process may involve several steps. The Firmware Update Tool will inform you about its progress.

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 until that message box disappears before clicking on the button “Verify” again.

6. 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.**

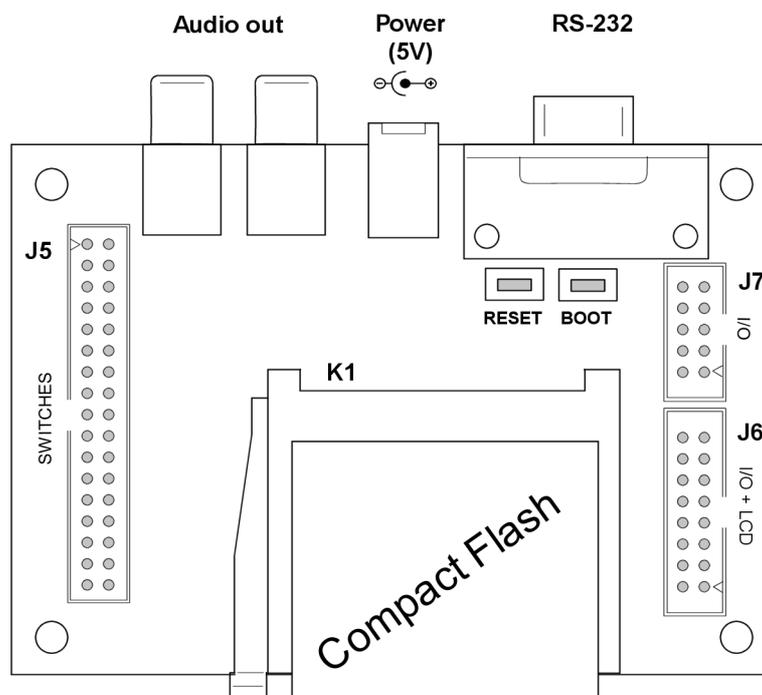
- check the RS232 cabling
- “power cycle” the H0420 MP3 player (remove the power plug from the device for a few seconds and then re-insert it)
- run the update procedure (on the previous page) again.

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.)

When you click the “Verify” button in boot loader mode, the Firmware Update tool will say that it cannot detect the version of the firmware that is already in the H0420. This is a limitation of boot loader mode. You can ignore this message and click on the “Update” button.