



EmuMon

OEM-PA/OEM-MC/FMC

Version 1.0



REVISION HISTORY

2012/09/10	0.0.14.0	Creation
2013/03/25	1.1.1.0	Support for 64-bit computers and operating systems.
2012/03/25	1.1.1.0	Emulator explanation.
2012/03/25	1.1.2.0	Ethernet "Speed" flash key.
2014/12/12	1.0	General Update



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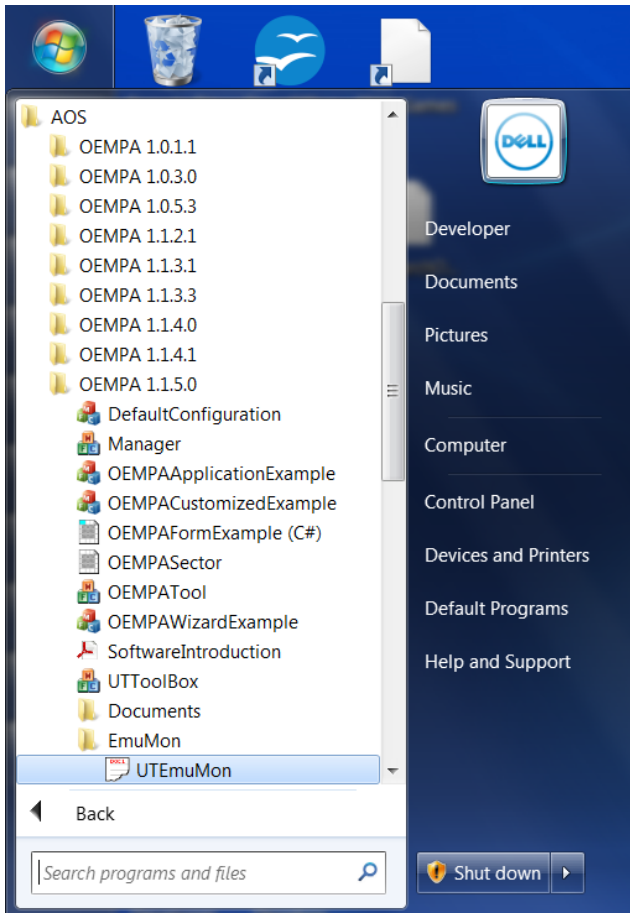


1. Introduction

The main purpose of EmuMon is to debug the application SW and to perform maintenance tasks on the HW. The connection between “EmuMon” and the application SW is a socket, so you can install “EmuMon” on a different computer (or in any folder).

- HW monitoring and maintenance
 - Display streams exchanged between the SW and the HW
 - Acquisition and setup data
 - You don’t need to necessarily analyze the streams, but you can save them to use the “replay” feature of the emulator.
 - Connection with the driver inside your application SW via one socket
 - Available for any custom application
 - Maintenance of the HW
 - Update the firmware with the latest version.
 - Update (read/write) the flash memory, wherein some useful parameters are stored:
 - IP address, net mask, default gateway, mac address, board name etc. The board name is used by the driver as a name for your device kernel object.
- HW Emulator
 - To easily debug a custom software application
 - HW stream or sub-stream breakpoint
 - For sub-stream breakpoint you must have previously converted each sub-stream into stream.

You can run “EmuMon” from the windows menu:



2. Monitor

The following monitoring features are included:

- To get acquisition data and/or setup stream data.
- To display the HW memory (for advanced users).
- To perform some maintenance tasks (update the HW firmware and/or flash).

2.1.1 Prerequisite

Before using “EmuMon” you need to run an application SW, for example, “OEMPATool” or your application SW, and for the device driver the monitor port should be enabled, the default port is 1300. You can change the default configuration with the low-level API.

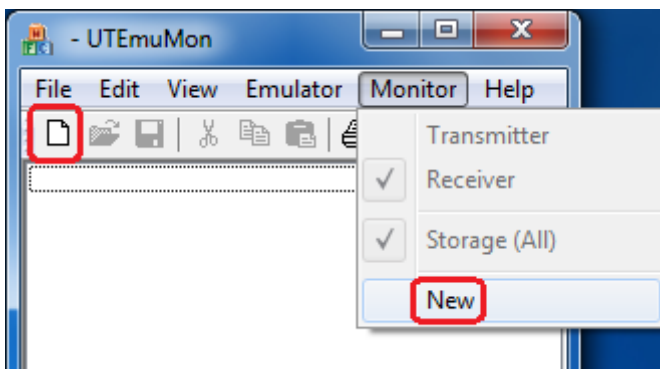
To update the firmware or the flash **special care is required (AOS is not responsible if hardware functionality changes when a user updates firmware or flash settings. It is recommended that you contact AOS before conducting any updates):**

- Switch on the hardware and connect an application SW.
- Don't enable the pulser.
- Don't unplug the Ethernet cable.
- Don't switch off the hardware.

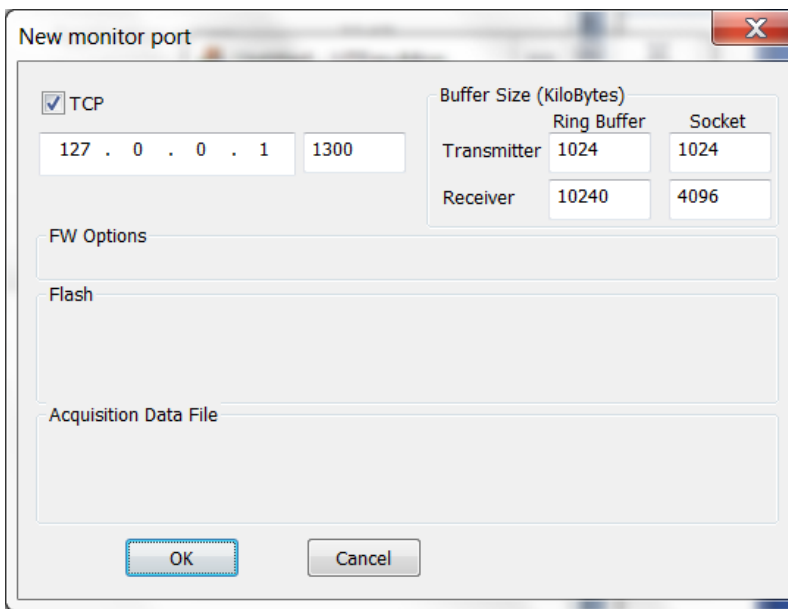
2.2 Connection

You can connect to the device monitor port. There are two ways for displaying the connection dialog:

- "Monitor" -> "New"
- OR
- "New" icon on the toolbar



Here is the dialog:



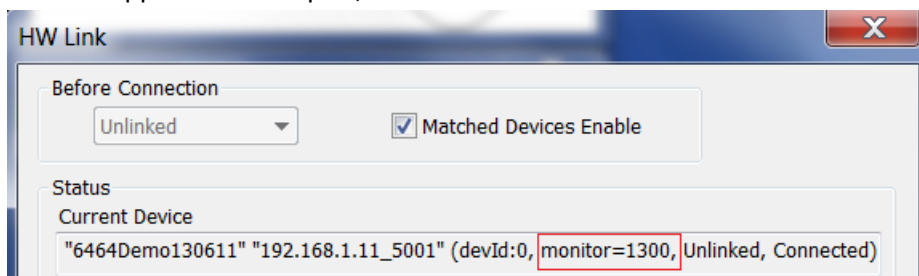


- The IP address should be the IP of the computer on which the application SW is running (the port is 1300 by default). It can be useful to change the port number if you have more than one device.
- The “Receive” ring buffer size is the size of the buffer to store acquisition data and the “setup data” streams.
- Default socket buffer size should be enough. The default buffer size to store stream is 10 Mbytes (10240 Kbytes), it is occasionally necessary to increase it.

To find the port number, you can call the following API of the driver:

API C++ / C#	Comment
“CHWDevice::GetDeviceId” / “csHWDDevice.GetDeviceId” /	To retrieve the device identification number. No input parameter.
“CHWDevice::GetMonitorPort” / “csHWDDevice.GetMonitorPort” /	Those functions are “static” The input parameter is the device identification number.

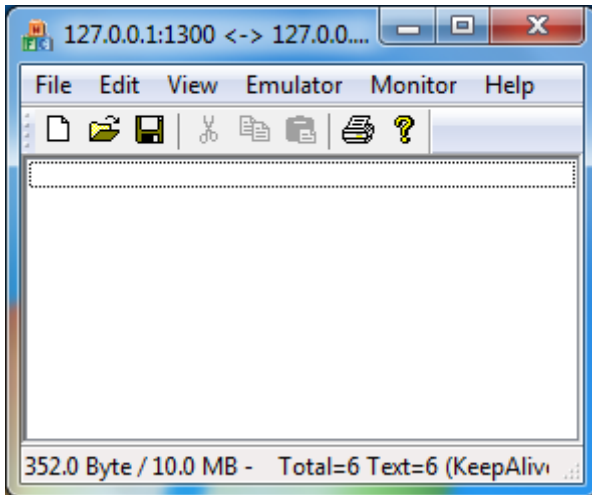
It is also possible to press the button “HW Link” if you are connected with “OEMPATool” or “OEMPAApplicationExample”, and then refer to the value “monitor”:



Let’s take two examples:

- Same computer to run the application software (for example OEMPATool) and “EmuMon”. The IP address of the computer is “192.168.1.33”. In this case you can connect either with the address “192.168.1.33:1300”, or with “127.0.0.1:1300”.
- Two computers A and B: computer A is running the application software (for example OEMPATool) and computer B is running “EmuMon”. IP addresses are: “192.168.1.33” for computer A and “192.168.1.34” for computer B. In this case the address on which “EmuMon” should connect is “192.168.1.33:1300”.

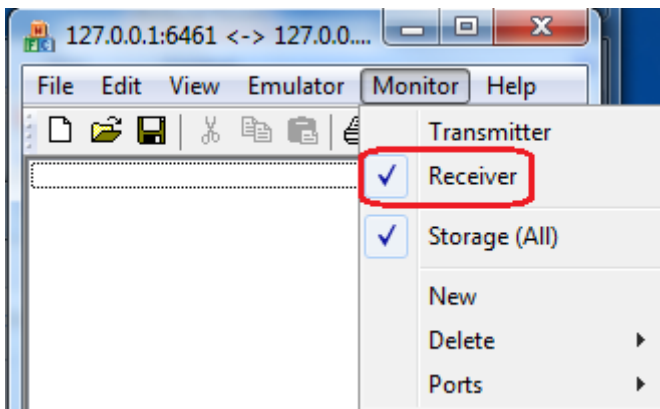
Set the proper IP address and port, and then press the button “OK”. Here is the display after connection:



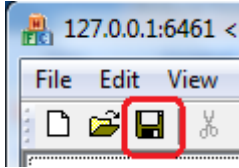
The title of the window displays the IP address connection. The status displays some information about the ring buffer ("352.0 Byte / 10.0 MByte" means that 352 bytes have been used in the ring buffer where the full size is 10.0 MByte).

2.3 Acquisition data file

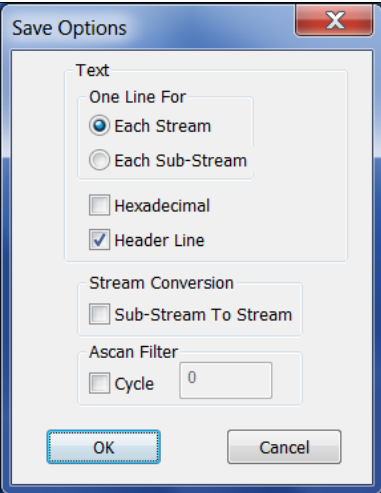
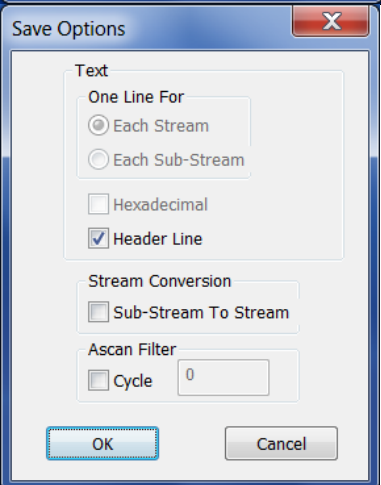
When the pulser of the device is enabled, acquisition data is stored in the "Reception" buffer. To save them in an acquisition data file, first be sure to select the "Reception" buffer by checking the "Receiver" option:



By checking "Storage (All)" in the menu above, data is acquired for all monitoring ports. If you uncheck it you can temporarily stop the acquisition in "Receiver" buffer, you can use the save button of the toolbar to save current data in the "Receiver" buffer.



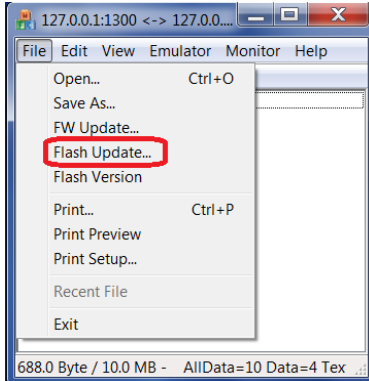
It is better to use a binary file format. This file will be available later to use replay with an emulator port. See section 4 “Emulator”. Before the file is saved, an additional dialog is displayed, with different options available depending on the file type:

File type	Dialog	Comment
Text		<p>If the “Hexadecimal” checkbox is not checked, the saved file is a sum; with one line for each stream or for each sub-stream.</p> <p>Stream Conversion: you can save the streams as they are (no conversion), or you can save each sub-stream into a single stream (useful to replay sub-stream by sub-stream).</p> <p>A-scan filter can be used to save only a specific cycle.</p>
Binary		<p>Stream Conversion: you can save the streams as they are (no conversion), or you can save each sub-stream into a single stream (useful to replay sub-stream by sub-stream).</p> <p>A-scan filter can be used to save only a specific cycle.</p>

3. Maintenance

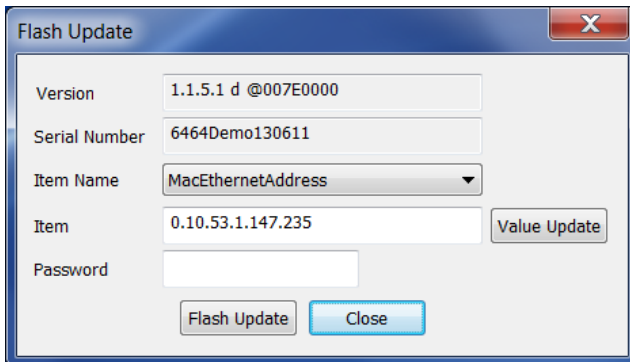
EmuMon is also used to perform certain maintenance tasks (update the HW firmware and/or flash). Special care must be taken in order to **not damage the hardware (see warning in section 2.1.1).**

3.1 Flash update



Click on “Flash Update...” and then you have to wait for the driver to read the flash from the hardware device.

When the flash is being read the following dialog is displayed:

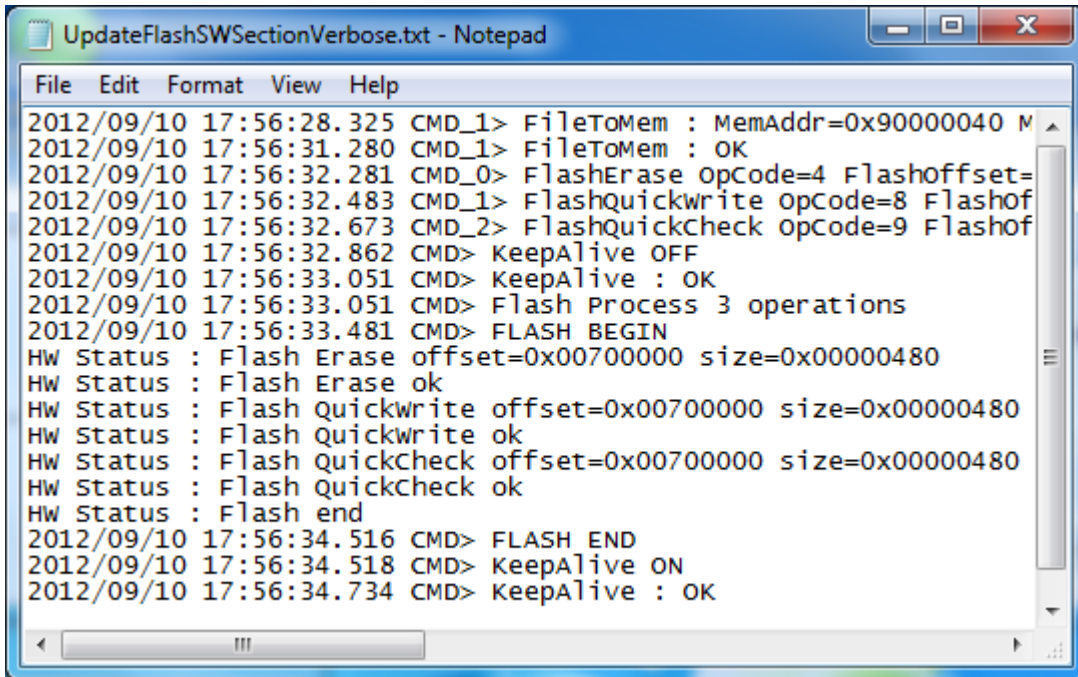


The combo box is filled with a list of all the parameters in the flash. Some parameters are protected - you cannot display them.

The value of each parameter is displayed in the edit box “Item”.

When you have finished editing parameters (see next paragraph), you can click “Flash Update” to update the hardware flash. This process can take time, so please be patient.

If the operation succeeds, the following file is opened at the end:

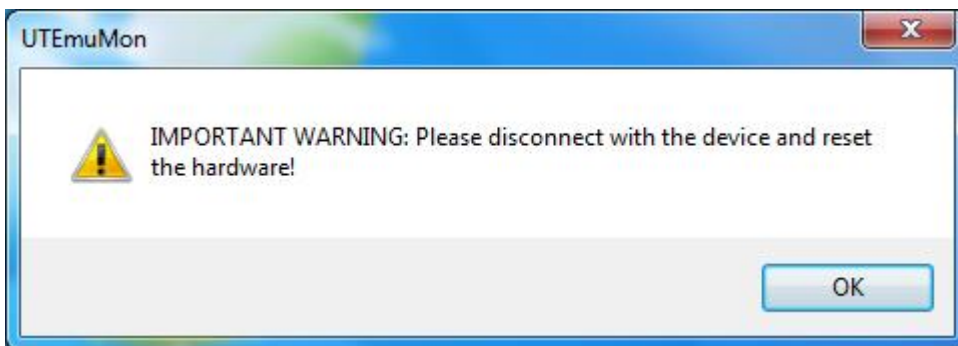


```

File Edit Format View Help
2012/09/10 17:56:28.325 CMD_1> FileToMem : MemAddr=0x90000040 M
2012/09/10 17:56:31.280 CMD_1> FileToMem : OK
2012/09/10 17:56:32.281 CMD_0> FlashErase opCode=4 Flashoffset=
2012/09/10 17:56:32.483 CMD_1> FlashQuickwrite opCode=8 Flashof
2012/09/10 17:56:32.673 CMD_2> FlashQuickCheck opCode=9 Flashof
2012/09/10 17:56:32.862 CMD> KeepAlive OFF
2012/09/10 17:56:33.051 CMD> KeepAlive : OK
2012/09/10 17:56:33.051 CMD> Flash Process 3 operations
2012/09/10 17:56:33.481 CMD> FLASH BEGIN
HW Status : Flash Erase offset=0x00700000 size=0x00000480
HW Status : Flash Erase ok
HW Status : Flash Quickwrite offset=0x00700000 size=0x00000480
HW Status : Flash Quickwrite ok
HW Status : Flash QuickCheck offset=0x00700000 size=0x00000480
HW Status : Flash QuickCheck ok
HW Status : Flash end
2012/09/10 17:56:34.516 CMD> FLASH END
2012/09/10 17:56:34.518 CMD> KeepAlive ON
2012/09/10 17:56:34.734 CMD> KeepAlive : OK

```

You can now close this file, and you will see the following popup:



The hardware must now be reset, otherwise the configuration of the hardware will be corrupted.

3.1.1 IP address

It is recommended that the user not change the IP address to something too different. The default value is 192.168.1.11, so you can then use 192.168.1.12 for your 2nd system, and then increment the last number by 1. As we don't have a tool to recover your IP Address, make sure you write it down. If the address is forgotten, you will not be able to connect to the system, and it will be necessary to ship the unit back to AOS for hard-reset.

The case of the 128/128 device is specific. It is made of two devices: the master and the slave. The flash of the master has two keys to define IP addresses:



- The key “IP Address” of the master device itself.
- The key “MatchedDevice” to define the IP address of the slave device. The value of this key should be the same as the key “IP Address” of the slave device in its flash. It is possible to add the port number if desired (for example “192.168.1.21:5001”), so EmuMon can emulate the 128/128.

3.1.2 Net mask

Default net mask is “255.255.255.0”.

3.1.3 Default gateway

Default gateway is “192.168.1.1”.

3.1.4 MAC address

Default value is “0.10.53.0.1.2” is specific to each board, it is not recommended to change it.

3.1.5 Speed

Four different values are available: 10, 100, 1000, auto. (1000 Mbit/sec available by upgrade)

Speed	Comment
10	10 Mbit/sec
100	100 Mbit/sec
1000	1000 Mbit/sec
auto	Auto negotiation of the speed.

3.1.6 Options

These are the options for the communication link, no need to change the value.

3.1.7 MatchedDevice

This item is useful for 128/128 systems. These systems are made of two devices, the master and the slave. The master only uses this item to store the IP address (and port number) of the slave. During connection to the master, the driver is able to connect at the same time to the slave.

3.1.8 Board name

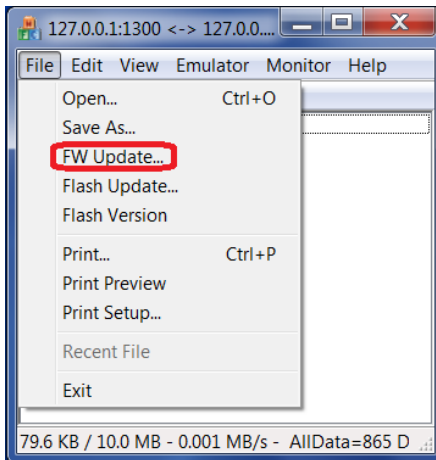
This is the default name of your device. For the software, it is better to have a name independent of the communication layer (IP address, USB name, etc.). At the factory, the default board name is the serial number. You can change it to have a significant name for your application.

This item is the last of the list.

3.2 FW update

Please see the warning in section 2.1.1 before attempting to update the FW.

To update the FW you need to select a “.zip” file from the following menu:

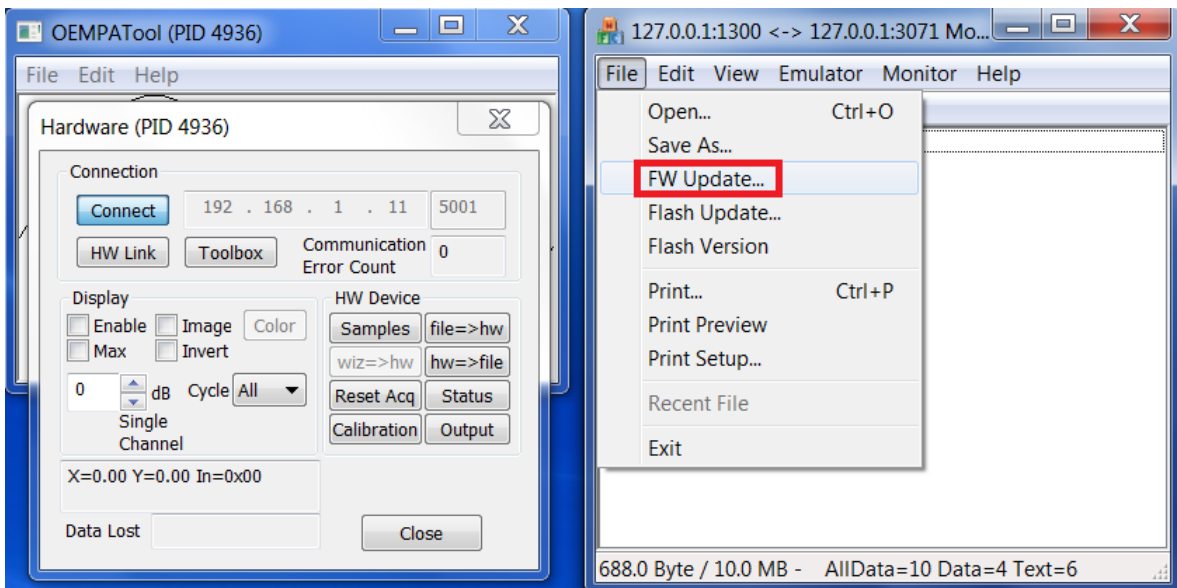


The “.zip” file is automatically uncompressed, so you have to wait for the operation to end in the same way as the update of the flash described previously, but the FW update can take **several minutes** so be patient and **don't touch the system or the software before the operation has been completed.**

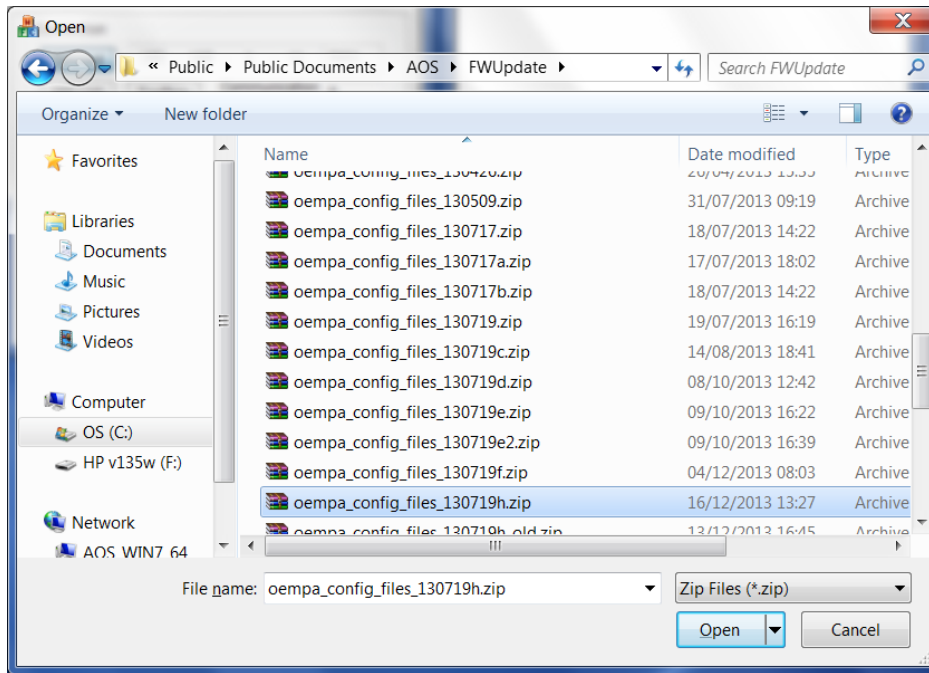
You will see the step by step memory copy and write of the new FW in the “UTKernelError” message box. Don't be alarmed, as it isn't an error; it is just a box to display the status.

Here are the steps to update FW:

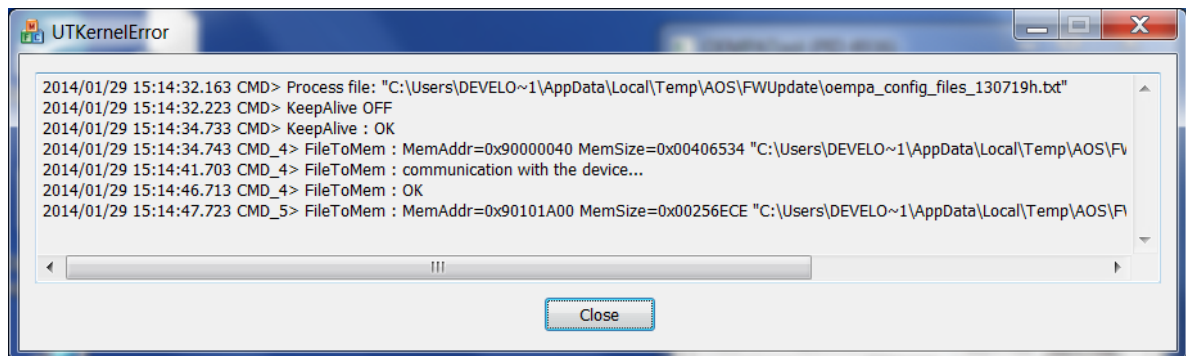
- 1- Run “OEMPATool” and connect with the device.
- 2- Run “EmuMon” and connect with “OEMPATool”.
- 3- Select the menu “FW Update” and select the zip file.



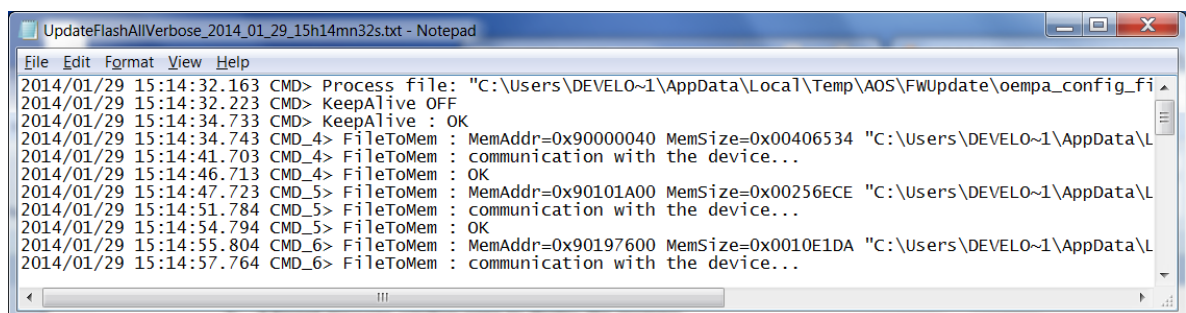
- 4- Select the “zip” file.



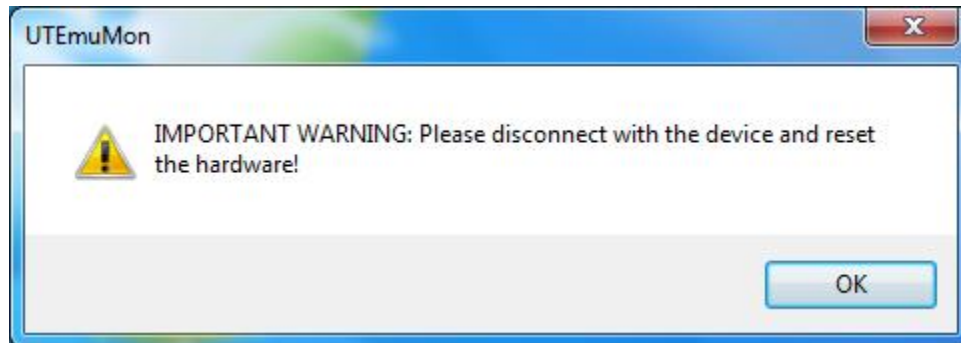
5- A Kernel message window open to display the progress



6- At the end the content of this window is dumped in a file that is displayed with notepad:



7- The following popup will also be displayed:



- Please reset the hardware and software after you see the above message.

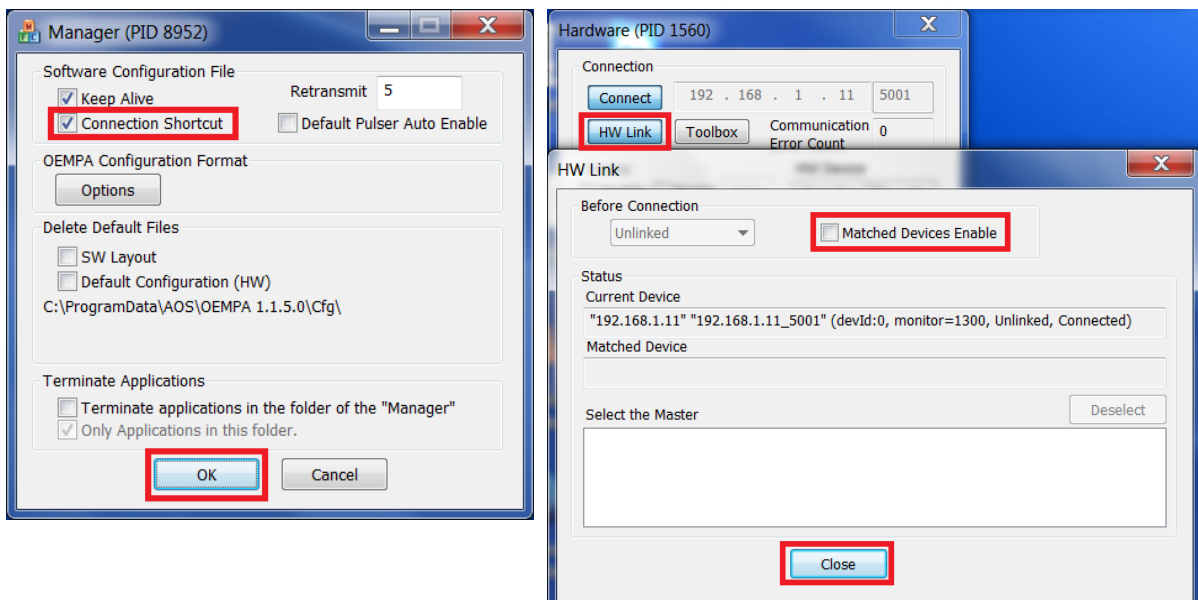
3.3 Old version

To update old FW, special operations may be required; in this case, AOS can perform the FW update remotely with TeamViewer or other remote software.

3.4 128/128

In the case of a 128/128 system, two devices must be updated: the master and the slave. You have to update each device one at a time. To connect only with one device, you need:

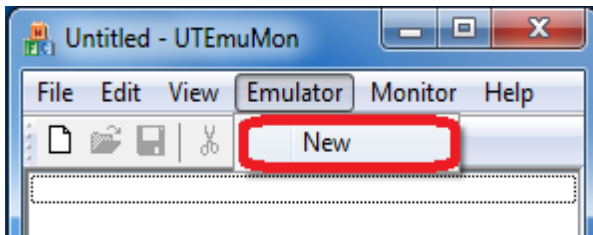
- To check the “Shortcut Connection” checkbox (SW “Manager”).
- To uncheck the “Matched Device Enable” checkbox (SW “OEMPATool”).



After updating FW it is necessary to restore the previous parameters.

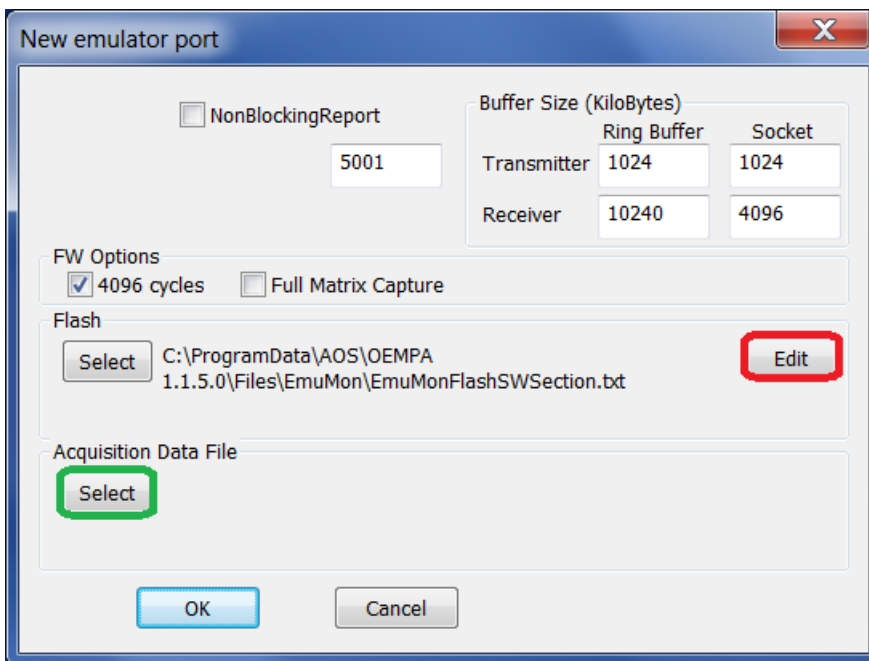
4. Emulator

Here is the menu that you must select to install a new emulator to emulate an OEM-PA device:



4.1 Options

This menu is used to open the following dialog:



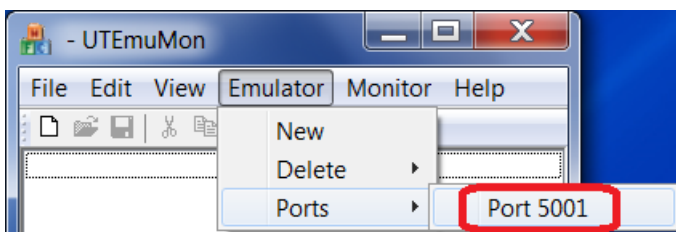
In this dialog:

- 5001 is the default port number of OEM-PA device. If you want to emulate more than one device you should increase the port number. With hardware devices, the port number is

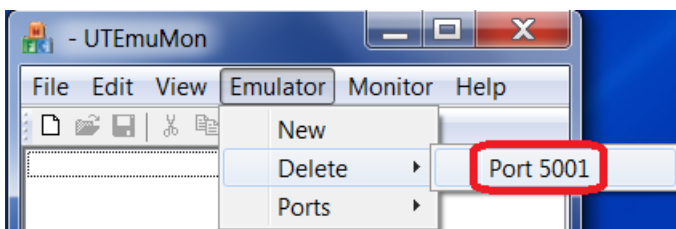
the same and the IP address is different; with EmuMon the IP address is the same and the port number is different.

- **“Edit”** Button (Circled in Red): to define the type of OEM-PA device you want to emulate. Some HW features are enabled in the flash section: the options “4096 cycles” and “Full Matrix Capture” are available from checkboxes of the dialog.
- **“Select”** Button (Circled in Green): to select the acquisition data file.
 - For example, if the evaluation kit has been installed on Windows 7: “C:\ProgramData\AOS\Evaluation\OEMPA [version]\Files\EmuMon\data.bin”.
 - Don’t forget to load the right configuration file associated with this acquisition data file from the driver. For example, if the evaluation kit has been installed on Windows 7: “C:\ProgramData\AOS\Evaluation\OEMPA [version]\Files\OEMPA\setup.txt”

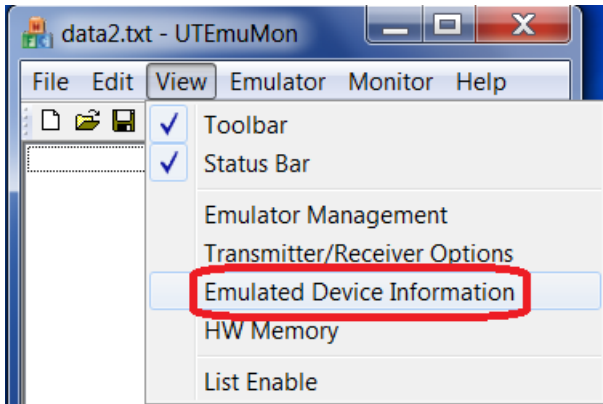
Before clicking the button “OK”, you can change some options (OEM-PA type or acquisition data file); refer to the next paragraph to see how to change the OEM-PA type. After options are selected, you can click “OK” and a new emulator port is created. If you want to change OEM-PA options (OEM-PA type or acquisition data file), you can use the menu “Ports” to display the dialog again (but the port number cannot be changed):



If you want to change the port number, you must first “Delete” the current port to create a new one:

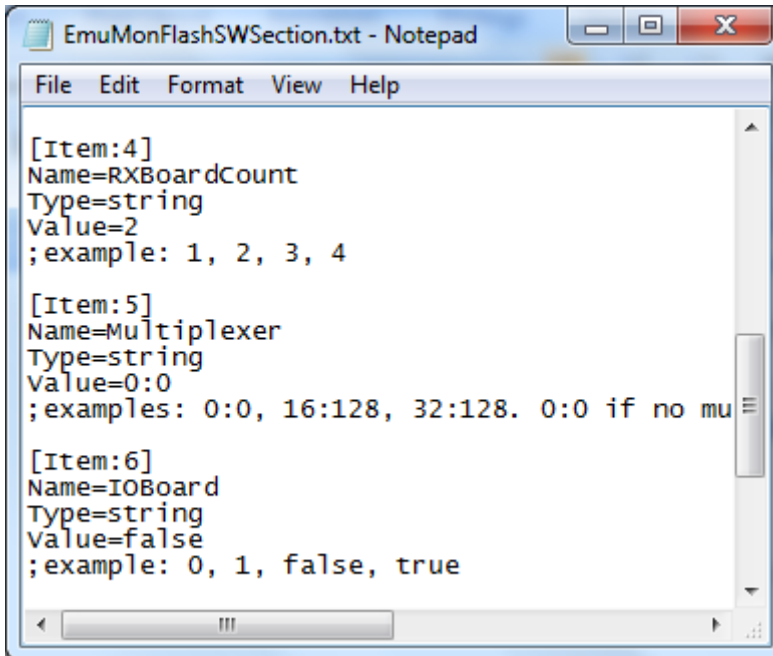


After connection, the properties of the device are fixed. You can retrieve them from the following menu:



4.2 OEM-PA device type

If you press “Edit” in “Flash” group you can define your OEM-PA device:



In this file, the key “Value” of each of the following sections are important:

- Item for which the key “Name” is “RXBoardCount”.
- Item for which the key “Name” is “Multiplexer”.
- Item for which the key “Name” is “IOBoard”.
- Item for which the key “Name” is “MatchedDevice”.

Depending on your device there are different available values that you can use:

OEM-PA Device Type	“Value” for item “RXBoardCount”	“Value” for item “Multiplexer”	“Value” for item “MatchedDevice”
--------------------	------------------------------------	-----------------------------------	-------------------------------------

16/16		1	0:0	Not Applicable
32/32		2	0:0	NA
48/48		3	0:0	NA
64/64		4	0:0	NA
16/128		1	16:128	NA
32/128		2	32:128	NA
128/128 (two devices required)	master device	4	64:64a	IP address:port number of the slave (example 127.0.0.1:5002)
	slave device	4	64:64b	NA

For the “Value” of the item “IOBoard” two values are available:

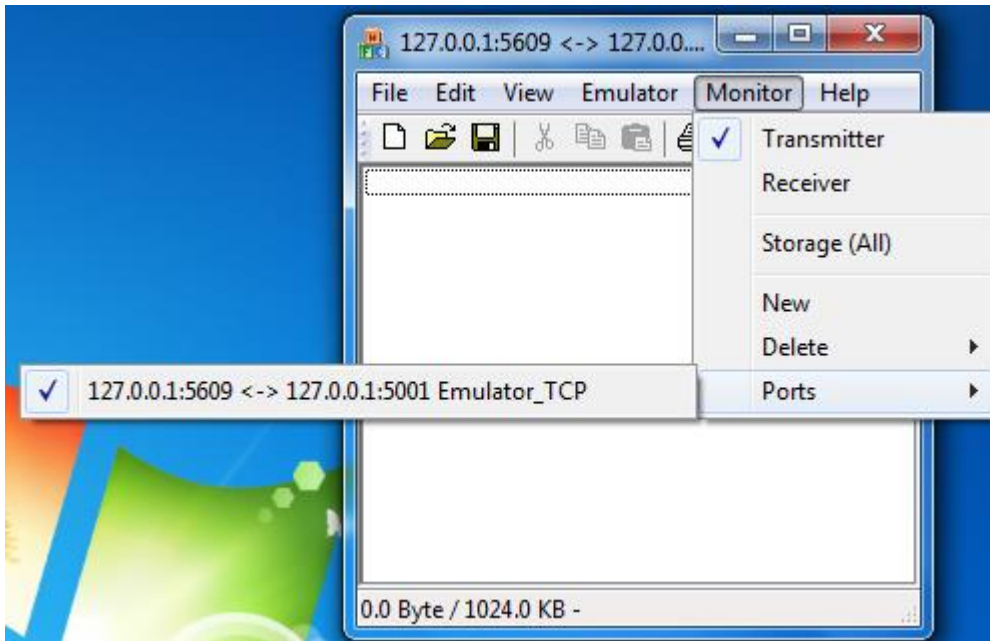
- “true” if you want to use an IO board.
- “false” if you don’t want to use an IO board.

The IO board is required to use an encoder.

4.3 Acquisition data file

You can define the acquisition data file as an option to create the emulator port (see button “Select” in group “Acquisition Data File”) - this is the simplest way. Once the connection is done with the application software, this file will be automatically loaded.

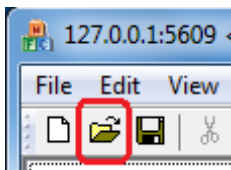
It is also possible to load an acquisition data file directly. You have to wait for a connection with the application software. For example: after creating the emulator port, you press “Connect” from “OEMPATool” or “OEMPASector” and a new monitor port is created in “EmuMon”. The display will look as the following:



In the menu “Monitor”, the following sub menus are available:

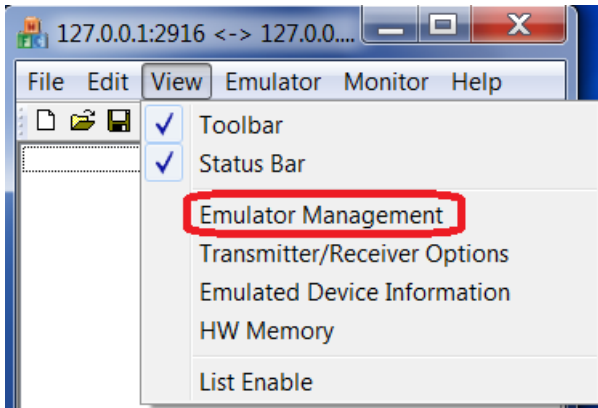
- “Transmitter”: to select the emission buffer (this buffer is used to replay acquisition data).
- “Receiver”: to select the reception buffer. It is used for monitoring purposes, but not to replay acquisition data (emulator feature).

To directly load an acquisition file, first select the buffer “Transmitter” from the above menu and then click the “Open File” button on the toolbar to select your file:

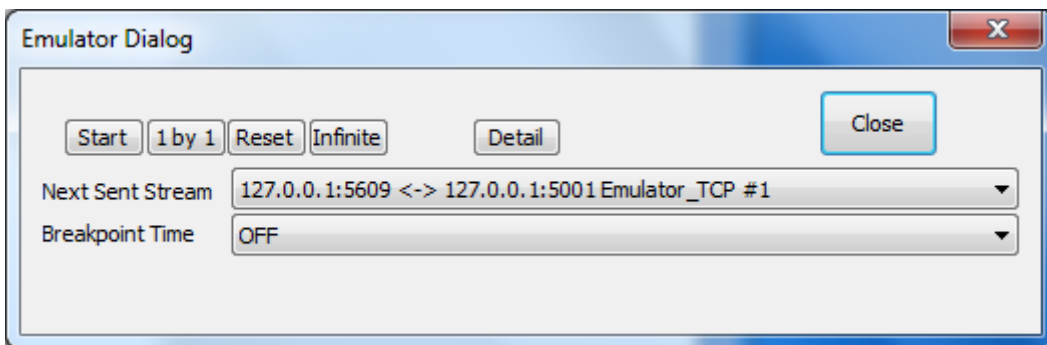


4.4 Replay

When an appropriate acquisition data file has been loaded, it is possible to display the “Emulator” dialog from the menu:

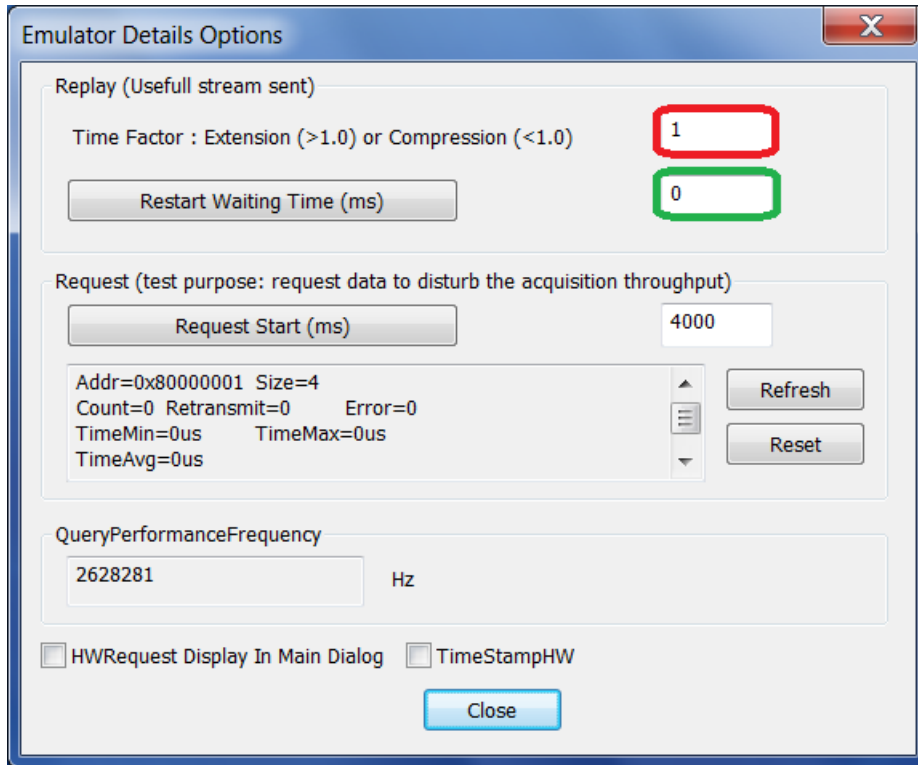


The following dialog will be shown:



The controls are as follows:

- Button "Start" to run replay.
- Button "1 by 1" to send stream by stream (useful for debugging).
- Button "Reset" to restart replay from the first stream.
- Check box "Infinite" to automatically loop the stream.
- Combo box "Next Sent Stream": current next stream that will be sent to the driver.
- Combo box "Breakpoint Time": to set a breakpoint on a specific stream.
- Button "Detail": to display replay options ("Emulator Details Options" dialog)
 - Time factor (to accelerate or to decelerate the replay). See the edit box below circled in red.
 - Sleep Time between two replays when "Infinite" is checked. See the edit box circled in green below.



Emulator Details Options

Replay (Usefull stream sent)

Time Factor : Extension (>1.0) or Compression (<1.0)

Request (test purpose: request data to disturb the acquisition throughput)

Addr=0x80000001 Size=4
Count=0 Retransmit=0 Error=0
TimeMin=0us TimeMax=0us
TimeAvg=0us

QueryPerformanceFrequency

Hz

☐ HWRequest Display In Main Dialog ☐ TimeStampHW

5. Compatibility

EmuMon 1.1.1.0 cannot be used with previous versions, the protocol to exchange flash and FW update data has been updated and improved.