



## Tutorial: Software download on the WMP100 Development kit

11-February-2009

# Index

1.	Introduction .....	2
2.	Hardware and Software requirements .....	3
3.	Development kit and PC Set-up .....	5
4.	Download into a blank flash (empty flash) .....	6
	Start DWLWIN.....	6
	Setup of the 'Download' tab .....	6
	Setup the 'General' tab .....	7
	Set-up the 'Advanced' Tab.....	8
	Connect the Dongle .....	9
	Start the download .....	10
	Set-up the pop-up configuration windows.....	10
	Check that the firmware is correctly working .....	14
5.	Update the flash content with Software already loaded .....	16
6.	Generate a flash image used for "pre-programmed flash" .....	17
	Download the firmware .....	17
	Upload the binary image .....	17
	Option behaviours on pre-programmed flash image .....	19
7.	Verify that the image is correctly generated .....	20
	Erase the flash completely .....	20
	Verify that the uploaded binary image is correct.....	21

## 1. Introduction

To operate the WMP100 development kit, the user has to load the relevant firmware into the flash memory connected to the WMP100 Wireless Microprocessor®.

The tutorial lists the different steps required to:

- Download into a blank flash (empty flash)
- Update a flash content with software already loaded
- Generate a flash image used for "pre-programmed flash"

## 2. Hardware and Software requirements

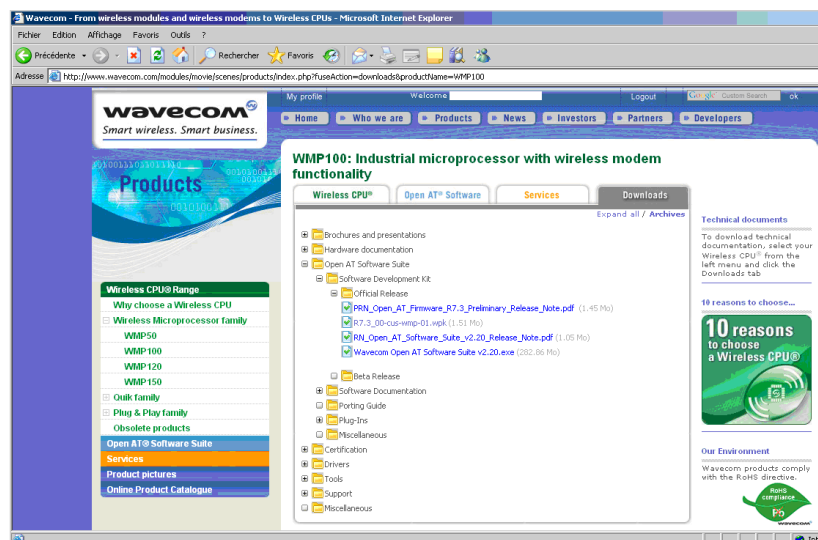
The material required includes:

- a Personal Computer
- the WMP100/WMP50 Development kit including:
  - o the Wireless Microprocessor® motherboard
  - o the WMP100 socket-up (or WMP50 depending on the Wireless CPU used)
  - o the memory board with combo Flash/RAM memory (32/16, 64/16 for e.g.)
  - o the serial cable to connect on the COM interface of the PC (and supporting the Hardware flow control)
  - o the dongle (Secured key looking like a USB key to allow the download)

The software required should be downloaded from the wavecom web site at: [www.wavecom.com](http://www.wavecom.com)  
<http://www.wavecom.com/modules/movie/scenes/products/index.php?fuseAction=downloads&productName=WMP100>

It includes:

- The firmware package with the extension file '.wpk'. to be saved on your working directory.
- Note:** in case the file name extension is added with the .zip extension (ex: R7[1].3\_00-cus-wmp-01.wpk.zip) , please remove the '.zip' extension to be recognised by the DWLWIN software (ex: R7[1].3\_00-cus-wmp-01.wpk)



- The downloader program : DWLWIN ([DWLWIN v4.1.6.9.exe](#))

**Note:** Use always the latest version uploaded on the [www.wavecom.com](http://www.wavecom.com) web site (Toll section)

- The driver for the Dongle ([Sentinel\\_Protection\\_Installer\\_7\\_1\\_4.0\\_Drivers\\_Only.zip](#))

The Dongle is a secured key (looks like a USB key), that should be connected to the PC in order to allow the download of the firmware into the flash memory

Wavecom - From wireless modules and wireless modems to Wireless CPUs - Microsoft Internet Explorer

Fichier Edition Affichage Favoris Outils ?

Précédente Recherche Favoris

Adresse http://www.wavecom.com/modules/movie/scenes/products/index.php?fuseAction=downloads&productName=WMP100

My profile Welcome Logout

Home Who we are Products News Investors Partners Developers

**wavecom**  
Smart wireless. Smart business.

Products

**Wireless CPU® Range**

Why choose a Wireless CPU

Wireless Microprocessor family

- WMP50
- WMP100
- WMP120
- WMP150

Quik family

Plug & Play family

Obsolete products

Open AT® Software Suite

Services

Product pictures

Online Product Catalogue

**WMP100: Industrial microprocessor with wireless modem functionality**

Wireless CPU® Open AT® Software Services Downloads

Expand all / Archives

- Brochures and presentations
- Hardware documentation
- Open AT Software Suite
- Certification
- Drivers
- Tools
- DWL WIN (GSM)
  - DWL WIN v1.1 & 9.exe (4.03 Mo)
  - DWLWin\_Download\_Application\_User\_Manual-Rev001.pdf (1.35 Mo)
  - Sentinel\_Protection\_Installer\_7\_1\_4\_0\_Drivers\_Only.zip (1.76 Mo)
  - WMP50-100-150 Dongle description 2007-09-10.pdf (53.22 Ko)
- WPST (CDMA)
  - Development toolkit
  - Demos and sample code
- Support
- Miscellaneous

**Technical documents**

To download technical documentation, select your Wireless CPU® from the left menu and click the Downloads tab.

**10 reasons to choose...**

**10 reasons to choose a Wireless CPU®**

**Our Environment**

Wavecom products comply with the RoHS directive.

RoHS compliance

### 3. Development kit and PC Set-up

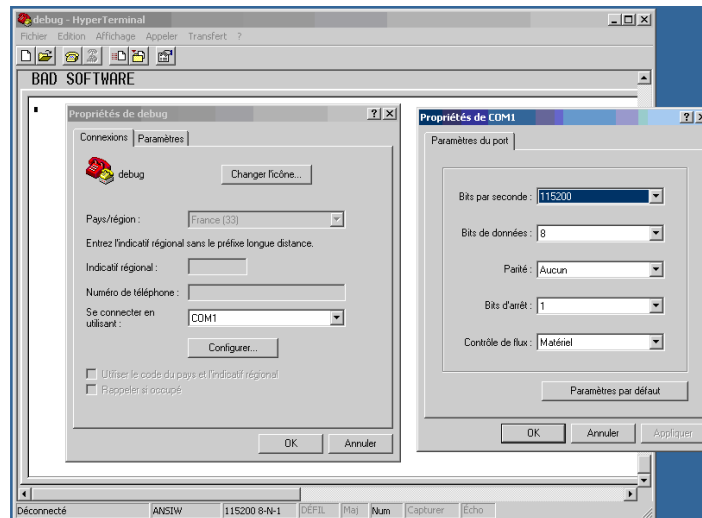
- 1 - Connect the serial cable on UART1 (left connector) from the development kit mother board
  - 2 - Connect WMP100 socket-up and the memory board on the development kit motherboard
- Note:** the memory board is usually delivered pre-load with the development kit
- 3 - Antenna connection and SIM card are not required

Default Development kit switch configuration:

Switch name	Setup	Switch function
ON/OFF	ON	Activate the ON/OFF mode
BOOT	OFF	Select the boot mode from the WMP100. For normal operation, it should be OFF.
Ring indicator	OFF	
UART1	ON	Select UART1 output on SUB9-D connector (if OFF , output is on J1100 connector)
UART2	N/A	Select UART2 output on SUB9-D connector

Set-up the Hyper Terminal as follows:

- Configuration: 115200-8-N-1
- PORT: COM1
- Speed: 115200 bps (default value from Wavecom firmware package)
- Parity: No
- Stop bit: 1
- Hardware Flow Control: Enable (Required for download through UART1 interface of the WMP100)



Different behaviours can be seen on the development kit depending of the software.

Status	Flash-LED	CHARGER LED	Comment
blank flash (no firmware in the memory)	ON (green)	ON (green)	No firmware starts inside the WMP100. Nothing happens. No AT prompt
Incorrect pairing between WMP100 and flash memory	blinking (green)	blinking (green)	Terminal prompt: 'BAD SOFTWARE' display. The software starts then reboots due to incorrect CRC content
Flashed loaded with firmware and correctly paired with the WMP100	ON (green)	ON (green)	The firmware starts inside the WMP100 and AT commands are accessible. AT prompt answer ok (>AT -> OK)

## 4. Download into a blank flash (empty flash)

The download should be done with the DWLWIN downloader to activate the pairing process.

### *Pairing process*

The download process on a blank flash pairs the Wireless Microprocessor® ID with the flash ID to generate a unique firmware signature. As a result the flash image created will only work with the associated Wireless Microprocessor®.

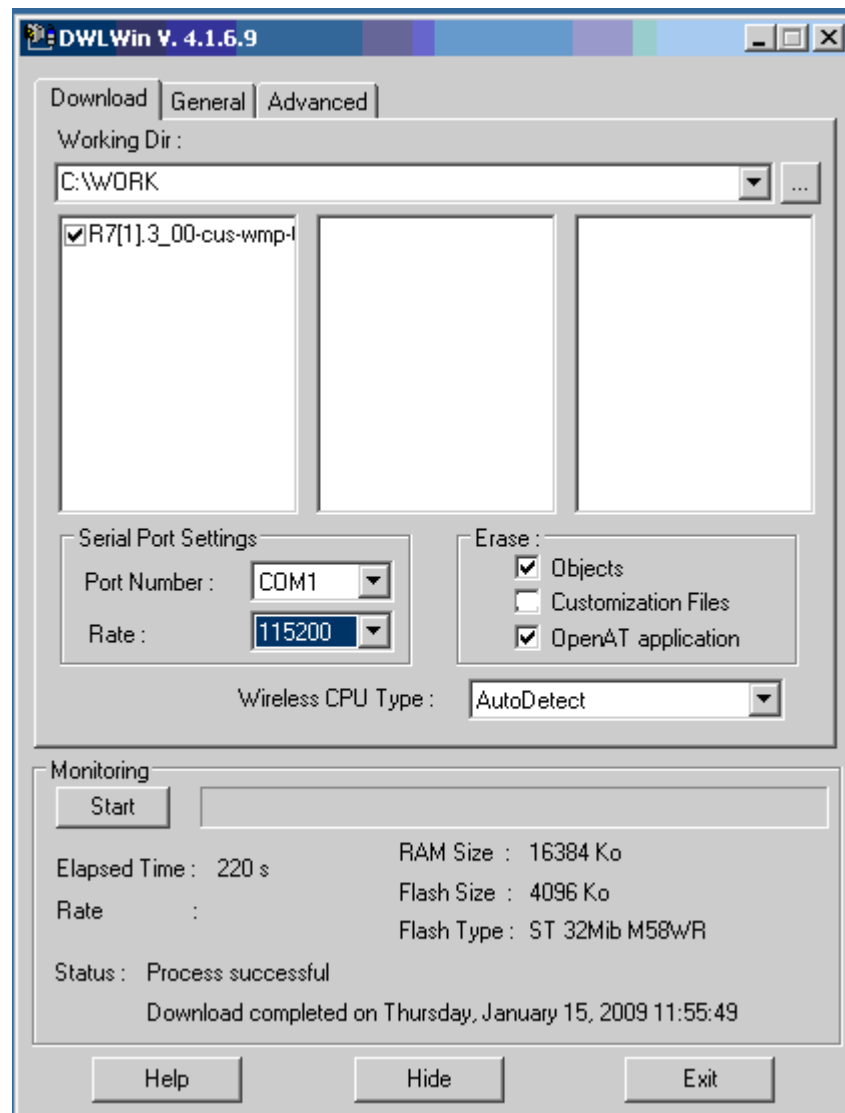
The dongle provides the secret key to DWLWIN to authorize this process.

Once the pairing process is done, the dongle is not anymore required.

Follow the following procedure

### **Start DWLWIN**

### **Setup of the 'Download' tab**



- Point to the 'working' directory where the wpk package has been loaded (as mentioned previously). You should see the wpk package in the left area.

- Select the wpk file

In the Serial Port Setting area

- Select: Port number at COM1 (Port selected is depending on your PC configuration)
- Select: Rate at 115200. (you can select 921600 to have the fastest download speed) with WMP

In Erase area:

- Select: Objects
- Do **NOT** Select: Customisation Files
- Select: OpenAT application

**Notes:**

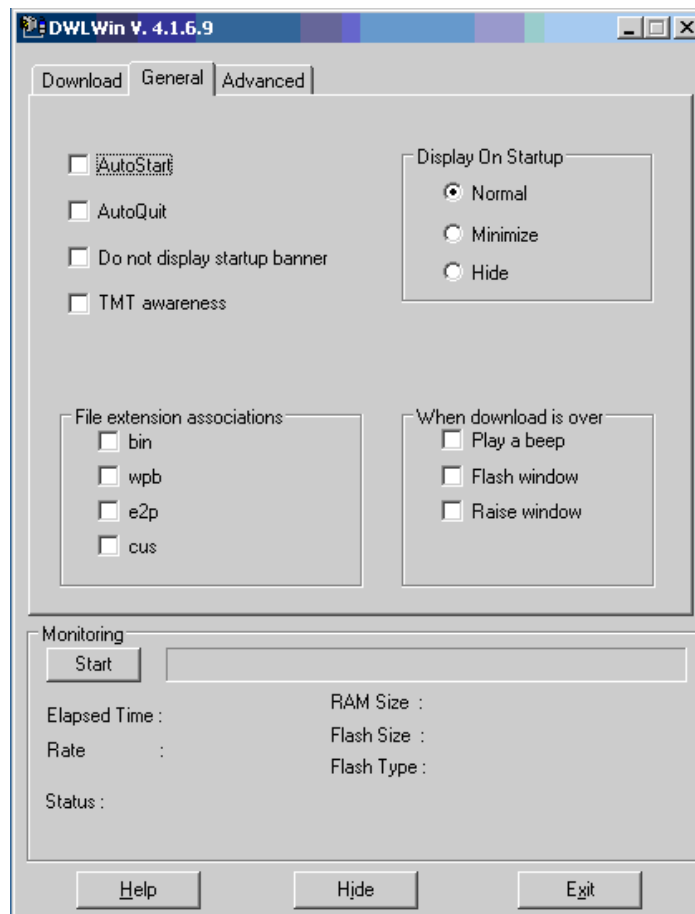
'Erase' area represents the software structure of the memory including:

- Objects: represents the Wavecom firmware part. If not selected, the firmware part is not updated (e.g.: not selected when customer just need to update his own OpenAT application without changing the firmware version)
- Customization files: represents set-up files acting on the configuration options of the WMP and his firmware.
- OpenAT application: represents the customer application (binary with wpb extension) (ex: gcc\_Hello\_World\_256KB.wpb). It should be selected if OpenAT application from customer has to be loaded or updated. Note: OpenAT application (wpb) is optional when the user only require firmware functions

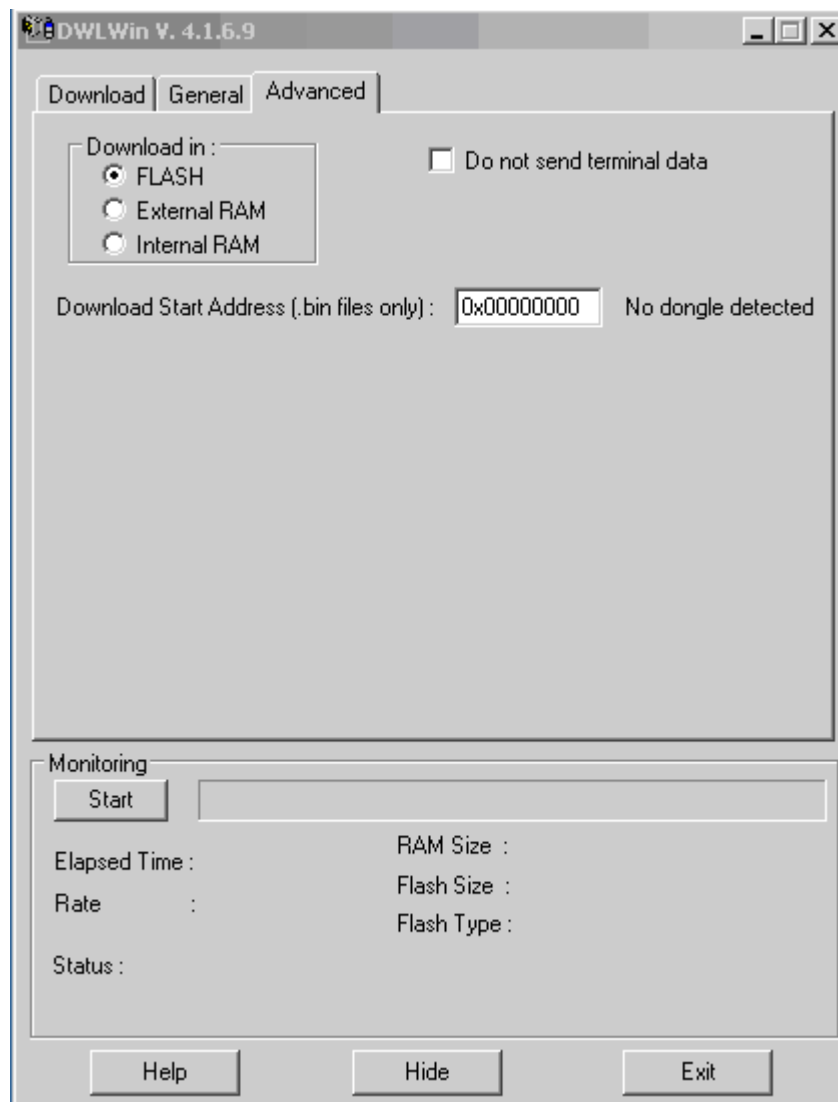
In Wireless CPU Type area:

- Select: AutoDetect or WMP1x0/WMP50

**Setup the 'General' tab**



## Set-up the 'Advanced' Tab



In the 'Download in' area: select FLASH

In the 'Starting address' area:

- Select 0x00000000 for the starting address.

Note: This field is the starting address from where a .bin file is loaded

Keep the field 'Do not check the terminal data' empty

Note: By keeping this field empty, the DWLWIN will generate and load the secured boot package for blank flash download. This package is part of the pairing process as explain earlier on. This field should be activated when the pairing process is not required (ex: when loading raw image into the flash for the pre-programmed flash process)

On the right of the 'address field', you should see the text 'No dongle detected'

**For the first download of firmware into a blank flash, the pairing process requires the dongle to be connected on the PC and recognised by DWLWIN.**

## Connect the Dongle

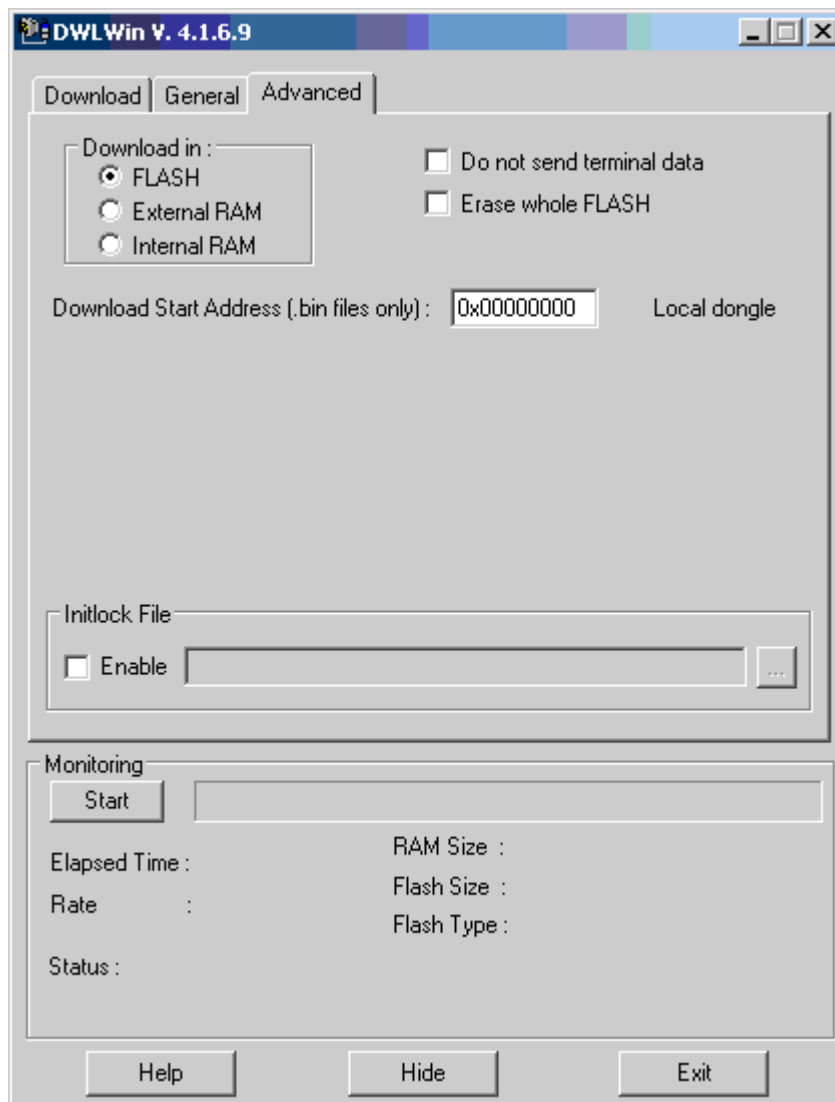
- Connect the Dongle (USB key delivered with the WMP development kit)
  - o install the dongle driver (previously downloaded from the [www.wavecom.com](http://www.wavecom.com) web site)

Note that the driver for the dongle should be installed on your PC otherwise the dongle may not be recognised and the message 'No dongle detected' will still be displayed.

Also if not recognised, the message "**Dongle exhausted may also appear**" during the firmware download.

- o 'exit' DWLWIN
- o Relaunch DWLWIN

You should now see the message 'local Dongle'



Now the two following options should appear

- The option 'erase all flash' should not be selected

**Note:** when selected it allows to erase the complete flash (as described later on)

**Note:** if the checkbox 'erase whole flash' does not appear, your dongle may be faulty. Please contact your Wavecom representative for immediate exchange

- The Init lock file message also appears and should not be selected

## ***Start the download***

Now everything is ready for the download of the Wpk file into the memory

On the devkit:

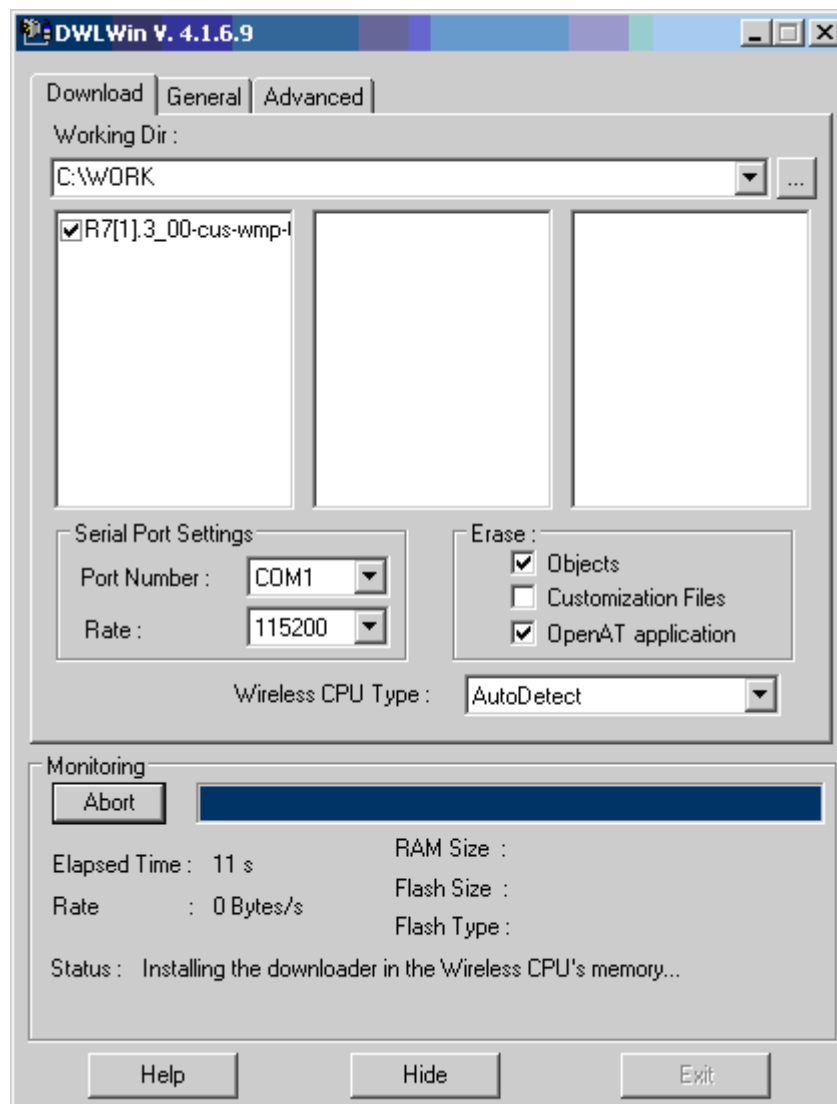
- Select the switch BOOT to ON

This allows the WMP100 to start from his own boot mode at the next reset

- Click on the start button on the DWLWIN

- Press the reset button on the development kit

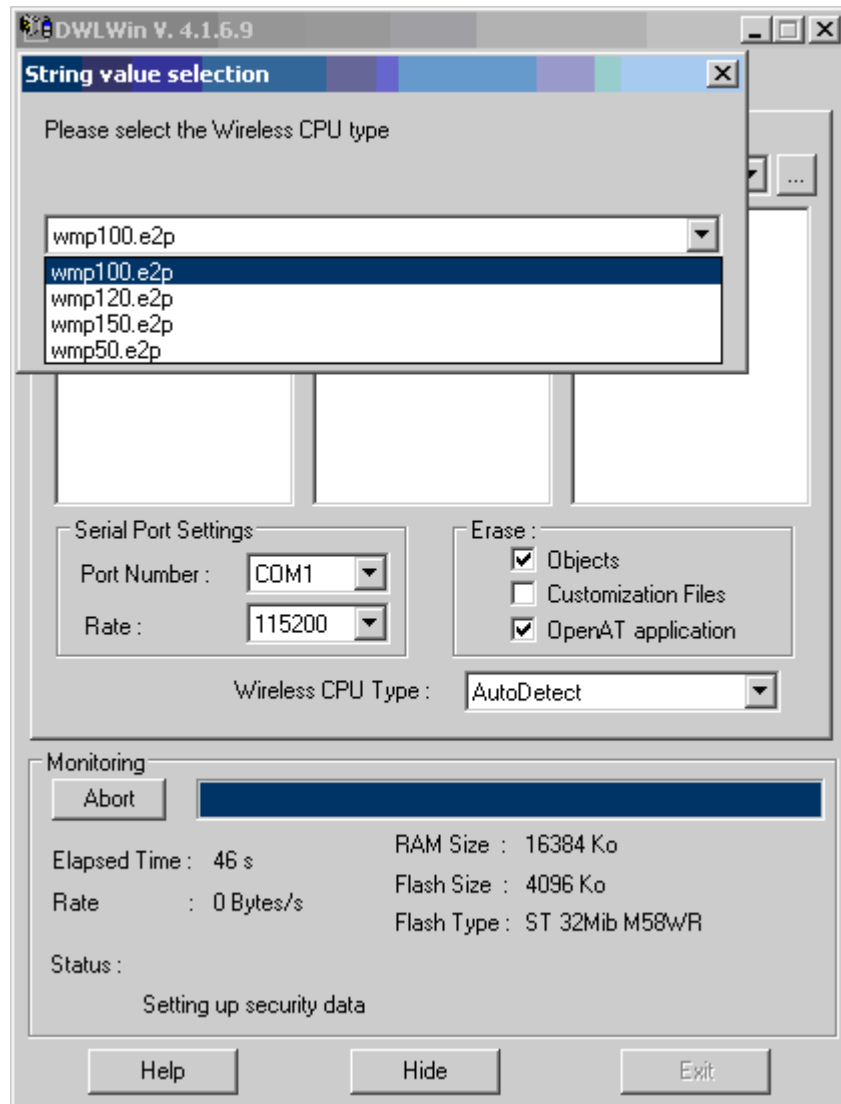
When reset is pressed, the DWLWIN is loading the downloader into the RAM memory. It should take few seconds.



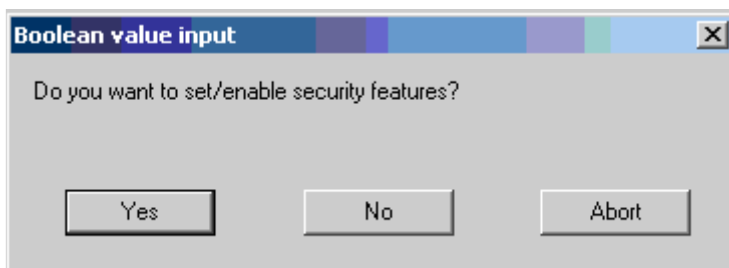
At this time the RAM size, Flash size and flash type should be displayed.  
A sequence of different pop-up configuration windows will appear.  
The FLASH-LED light is off on the development kit.

## ***Set-up the pop-up configuration windows***

- Select the configuration file (e2p file) in the pop-up windows corresponding to the WMP used and click on OK

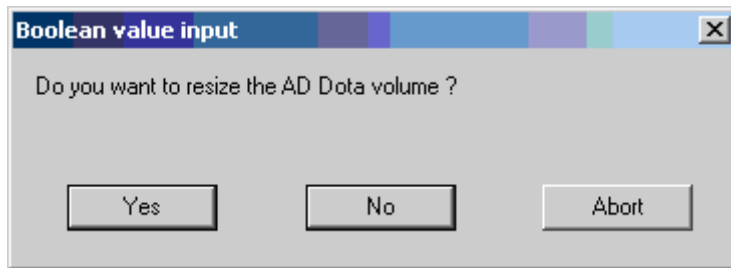


- Set/Enable the security features (optional)  
If selected, this option allows the user to load a secured key into the firmware (SDS Secured Data Storage). Refer to the customer release note for more details.

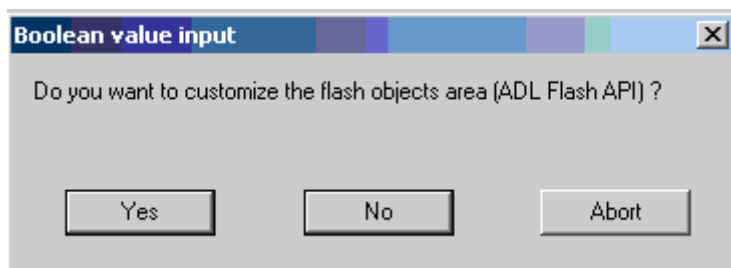


- Resize the A&D area (optional)  
The AD&D area is an area in the flash that can be used to store data. It is accessible through an OpenAt application.  
Please select 'No' if you do not need to resize the AD&D area. Please refer to the Firmware release note to know the default value of the area.

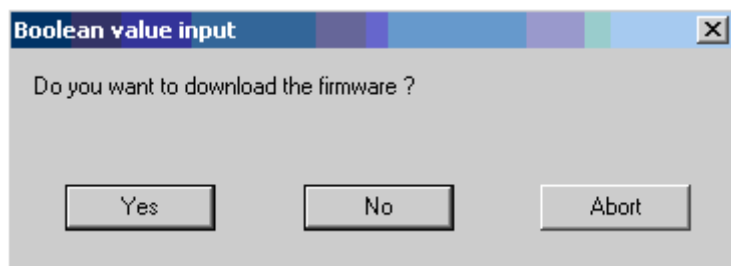
If selected, you should enter the size of the AD&D chosen in kBytes. Note: if the size entered does is not compatible with the real size available in the memory, the system may not work. The WMP PTS/CDG gives the memory mapping between the different memory area (firmware, A&D area, IDS Area, OpenAT Area,etc...)



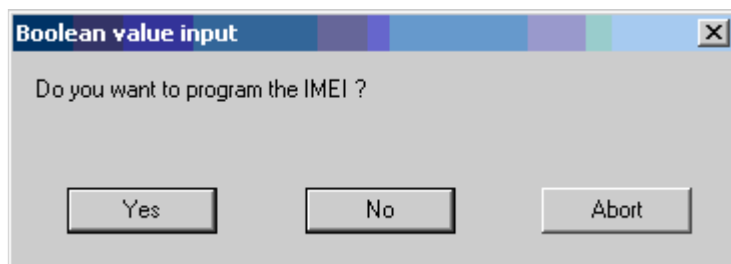
- Similar option is available for the Flash Object area  
The flash Object area is a specific memory area formatted to access object format



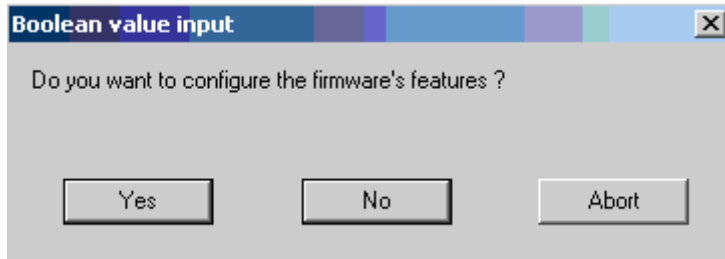
- Ok to download the firmware  
Select yes  
Note: Clicking on 'No' allows to only pairing the flash with the WMP without loading the firmware



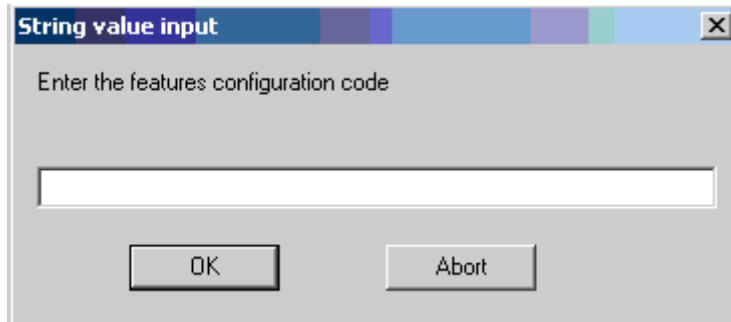
- Select the EMEI number  
Click no.  
If yes you will be requested to enter a new EMEI number  
Refer to the customer release note for more details



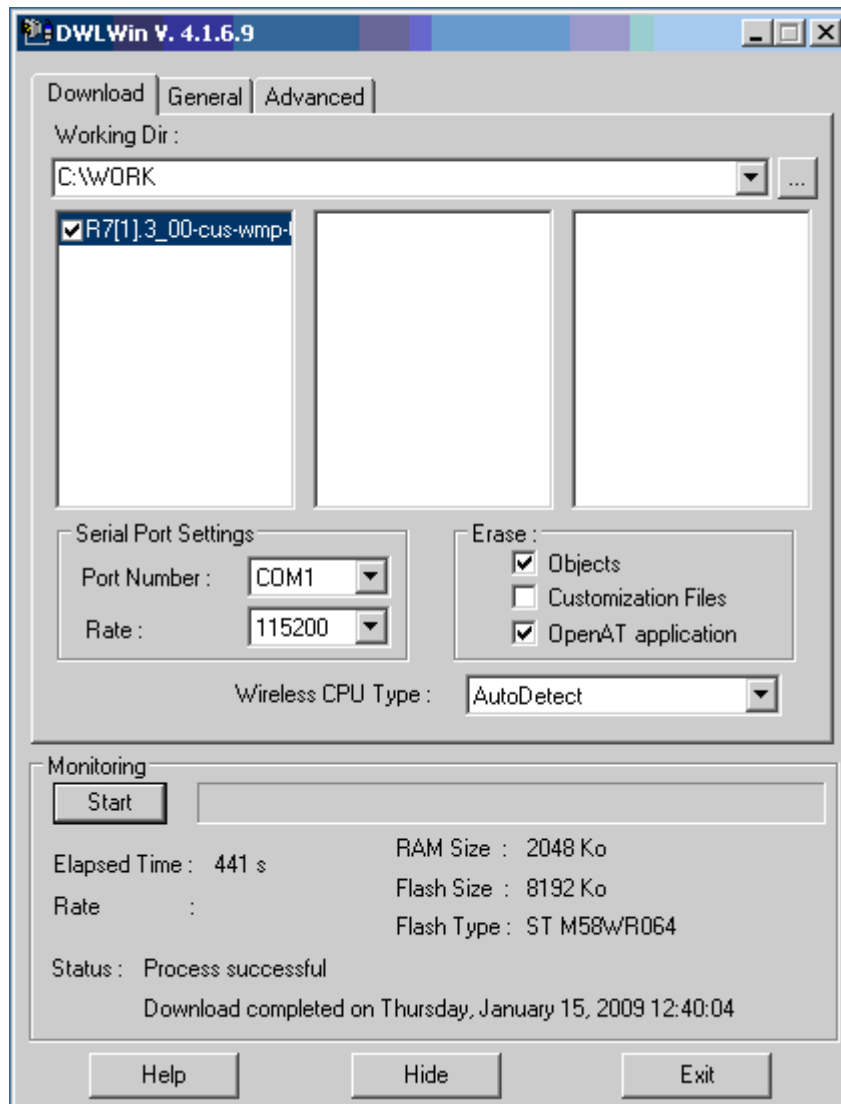
- Configuration of the 'firmware features'  
This option allows the use to modify the default 'non commercial' features of the Wireless Microprocessor®. For example, this field is used to select the US bands by Default



The associated crypted vector is requested in the below pop-up



Once selected the download of the firmware is starting  
The downloading time depends on the COM speed selected (the fastest speed is at 921600 bps)  
Once finalised, you should see the status message: 'Process successful'



The WMP100 is resetting itself and restarts again  
The Flash-LED is ON

### ***Check that the firmware is correctly working***

- Set the BOOT switch to OFF
- Open the Hyper terminal
- -Type
  - o >AT (you should see ok)
  - o >ati3 (give the WMP version) you should see the answer as indicating below

```
debug - HyperTerminal
Fichier Edition Affichage Appeler Transfert ?
BAD SOFTWARE
at
OK
ati3
R73_00gg.WMP100 2087432 121208 15:34
OK
-
```

## 5. Update the flash content with Software already loaded

If the user wants to update the flash content in his memory where the pairing is already done, the option **Erase customisation files should be activated.**

The usage of the dongle is not required anymore in this case

Only the binary files and configuration files (E2P files) are loaded, similar to the pro-lib.dwl in xmodem download mode.

**Note:** if this mode is selected but the memory is empty (blank flash), the download process will be blocked in download mode.

## 6. Generate a flash image used for "pre-programmed flash"

This process explains the way to create a flash image that can be provided to a third party capable of preloading the flash. Pre-programmed flash allows to skip the download/pairing process part during the manufacturing.

The pairing process is done on the target system on the first boot.

The concept for getting the flash image (raw data in binary format) is to download **only once** the wpk files into the memory of the target system (the development kit in this case) and upload the generated image from the target.

For verification, we download again this image on a 'blank' flash from the development kit but without the dongle this time.

The additional requirements are:

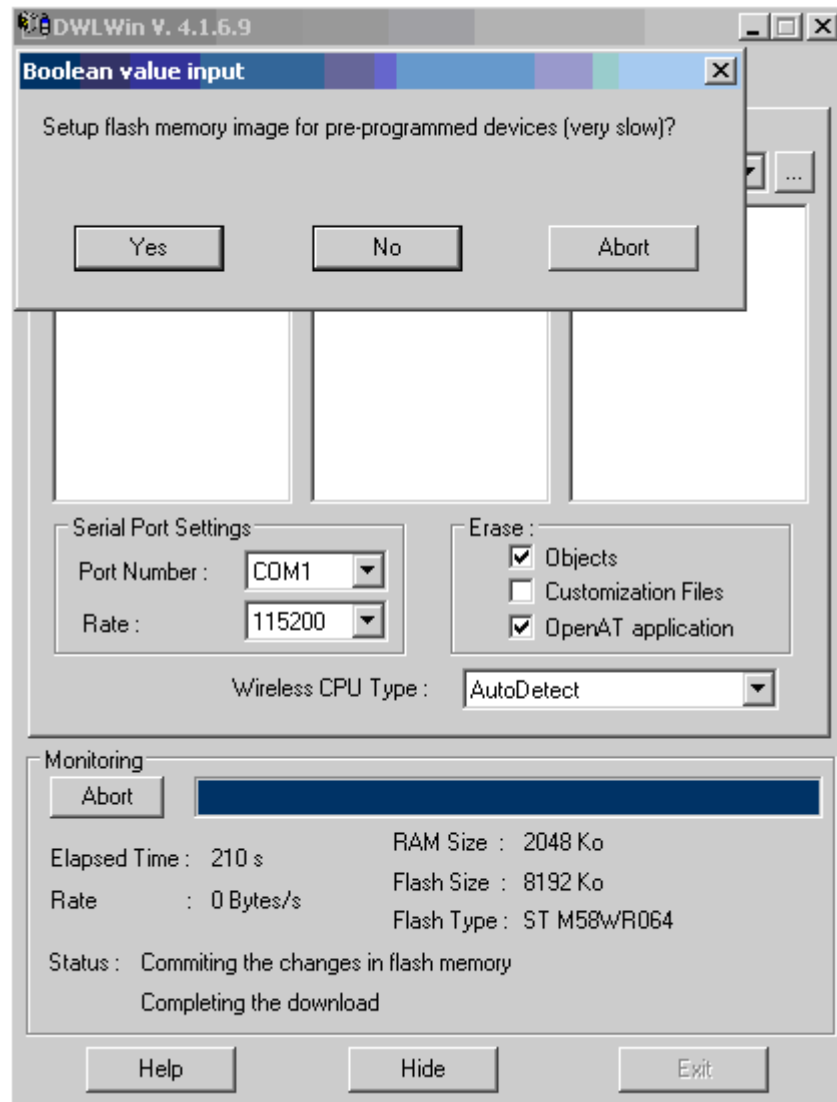
- A wpk file supporting the pre-programmed flash option (available from OASiS2.20 onward). We use the file called R7xx-cus-wmp-preprog.wpk
- The target used to generate the binary file should support the same flash as on the final system

### ***Download the firmware***

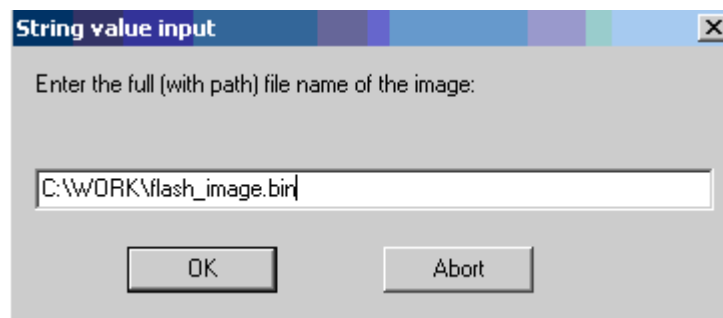
Repeat the steps from the previous chapter (**Download into a blank flash (empty flash)**)

### ***Upload the binary image***

At the end of the download, you will get the option to upload the generated image present in flash of the the development kit. Select yes



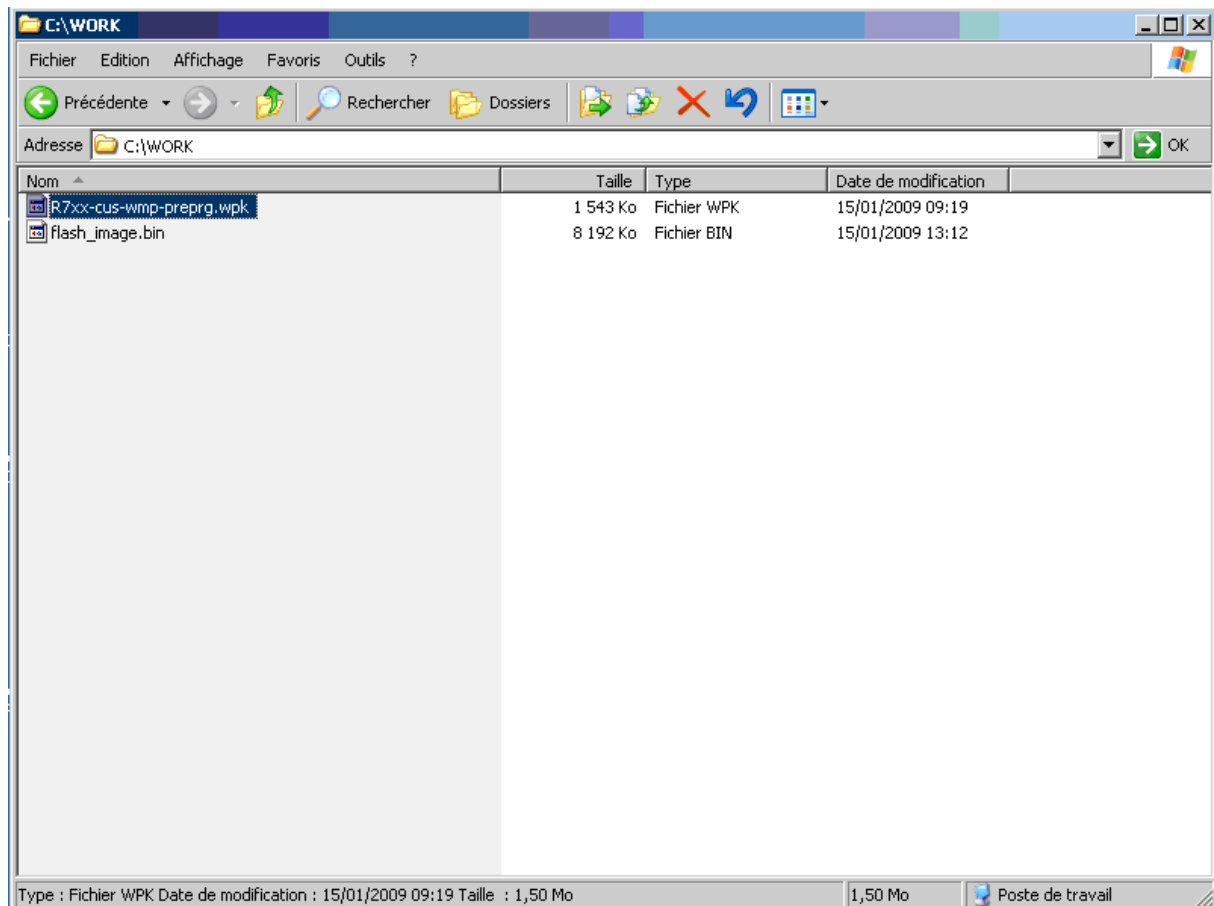
Then provide the full path and name of the binary flash image that will be uploaded. Remember to use the .bin extension to be recognised by the DWLWIN tool.



Click OK.

The retrieving of the binary image is starting. As the uplink speed is low, the upload process could take several minutes. Be patient.

At the end of the upload you should see the new file appearing in your directory. The binary file should have the size of the memory flash size used.



## ***Option behaviours on pre-programmed flash image***

### - Security features

You can't configure the security features (i.e. Secured Data Storage) using a pre-programmed image. The use of the dongle is mandatory because this feature requires a modification of the internal EEPROM through DWLWin.

### - AD Dota and flash objects

The WPK allows to resize the flash memory partitioning to increase the size of the DOTA volume or the size of the flash objects area. This settings are set in the flash memory during the download of the WPK. The pre-programmed image therefore contains those settings

**Note:** the pre-programmed image carries the same flash objects as the module the WPK is download into. This is a good way to get customer data pre-set in the flash objects in factory.

### - IMEI

If there is '**no IMEI**' in the WMP (ordered without IMEI order code),

- the same IMEI entered by the user at WPK download time will be set in **all the modules** programmed with the image. (which is not recommended)
- We recommend to set the IMEI using AT+WIMEI at 1st startup

### - Firmware features / crypted vector (ex: US band by default)

The features set by the vector will be replicated in all the modules using the image (those features are stored in the virtual EEPROM).

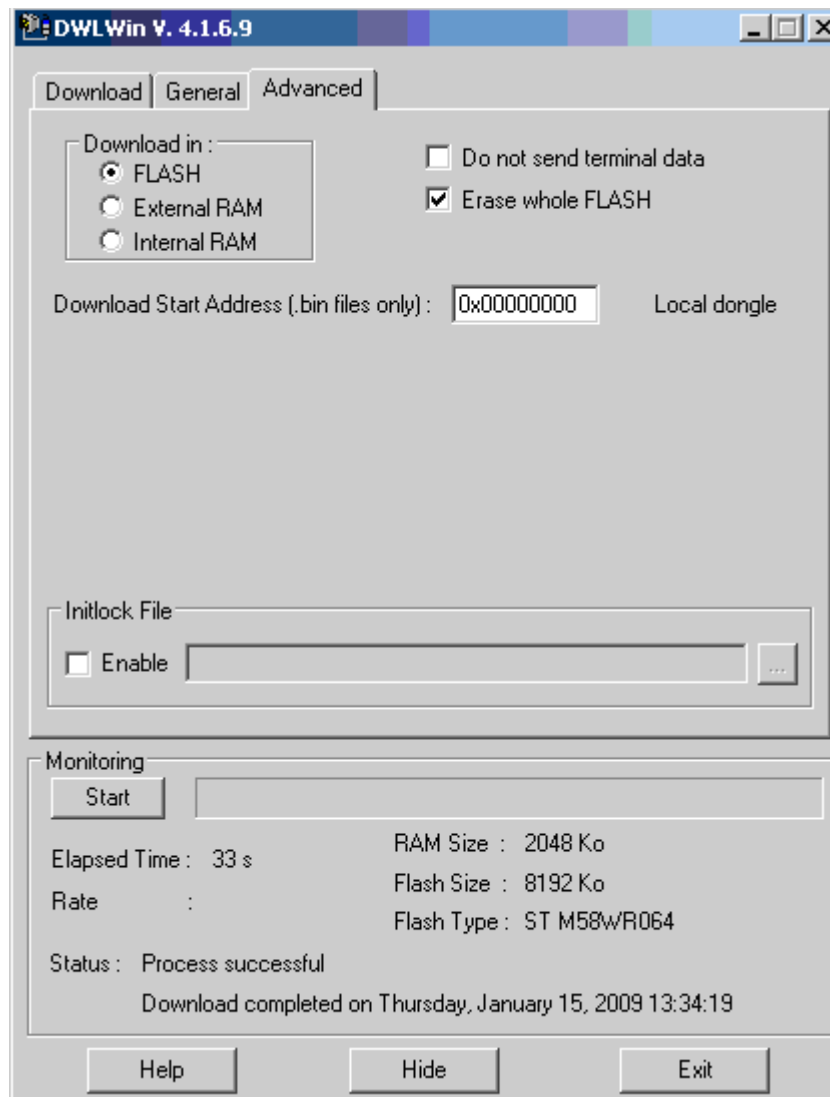
### - Commercial features (feature lock corresponding to the WMP order code)

The commercial features are always copied from the internal EEPROM of the WMP to the flash image. As a result, the image's do not matter.

## 7. Verify that the image is correctly generated

### *Erase the flash completely*

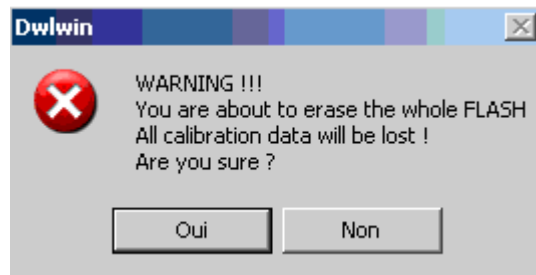
- Connect the dongle
- Select erase all flash in the advanced tab



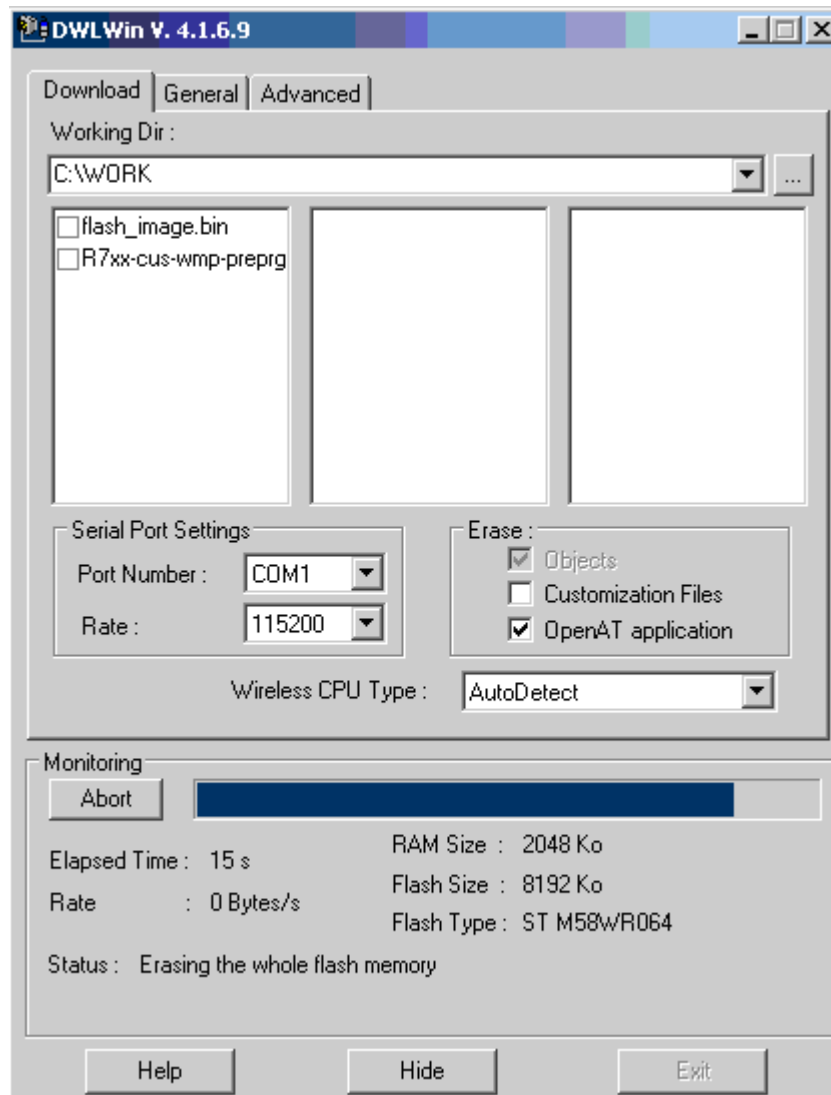
**Note:** if the checkbox 'erase whole flash' does not appear, your dongle may be faulty. If this is the case, please contact your Wavecom representative for immediate exchange.

- launch start  
This will remove all the pairing configuration data

A warning will appear, as the process erases the complete content of the flash. The calibration parameter of the WMP100 in the flash will also be erased but reloaded from an internal EEPROM in the WMP100 at the next boot process (**This is not true for Q26 for example**)



Once yes selected, the erase process starting.



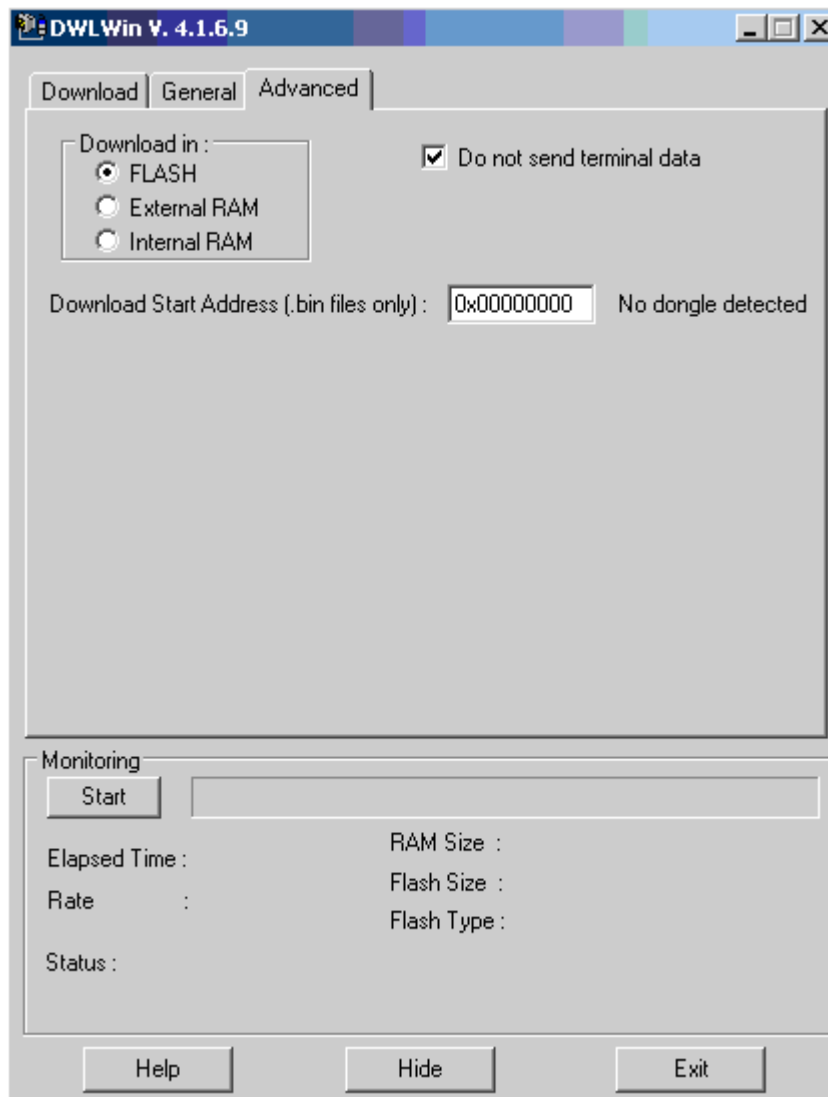
At the end of the process the flash is completely blank

### ***Verify that the uploaded binary image is correct***

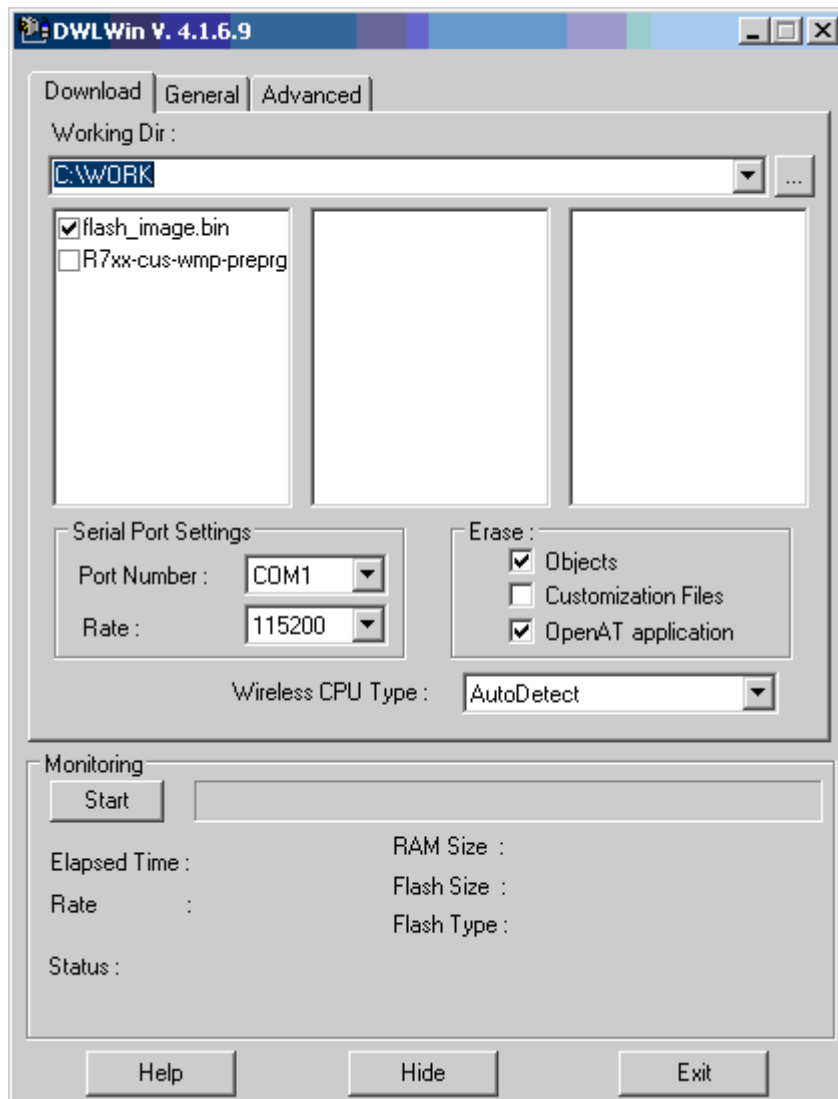
To download a binary image in the development kit, you do not use anymore the dongle and the pairing process.

- Remove the dongle
- Activate the 'Do not send terminal data' in the advanced tab of DWLWIN

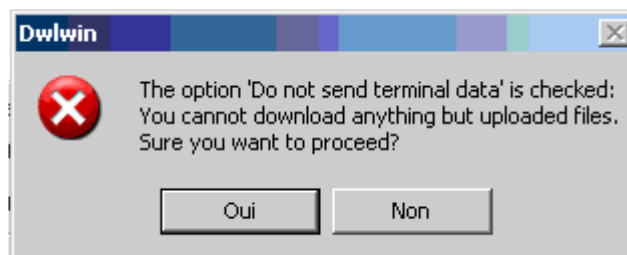
This option allow to send raw data (.bin file typically) without activating the pairing process



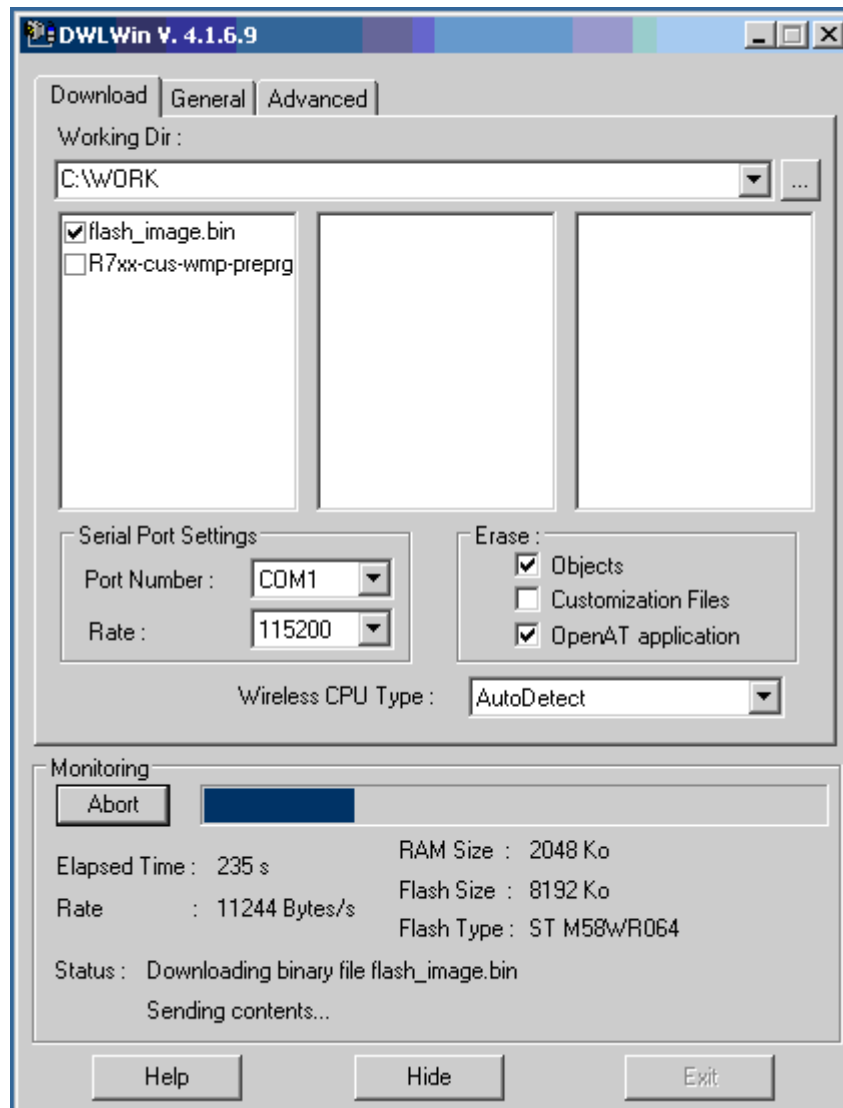
Select the binary image



Click yes to validate sending the .bin file



The downloading process is now starting



Once finalized, should see the following message: Process successful

- Put the BOOT Switch to OFF
- Reset the development kit (automatic pairing will happen)
- Start terminal
- Confirm the target is answering to AT13 command