

PT850 FAQ for Update kernel, Shell and AP

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Document SN	TD18200000	
Author	Ricky Zheng, ricky@nlscan.cn	
Company	Newland Automatic Identification Technology Co., Ltd.	
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1 Know the basic concept

In uBase-III, basically, the program is divided into two types: “Kernel” and “Application”:

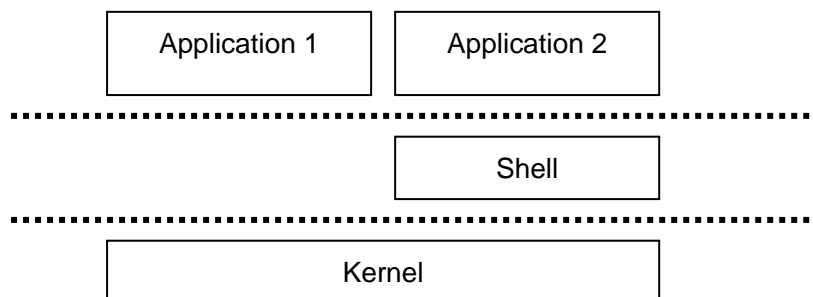


Figure 1: Logic relationship of kernel, shell and apps.

Kernel is directly burned into Kernel Area FLASH ROM, and the beginning address of Kernel is 0, that is, the first instruction is executing from Kernel when reset or power on.

“Shell” is a special application. Like kernel, “Shell” is directly burned into Kernel Area FLASH ROM also, but the address is not 0, generally, in PT850, “Shell” resided in fixed address 416, in PT041, the address is 128. “Shell” is the first program which is executed automatically by kernel when kernel booting up.

Since “Shell” is burned into the fixed position of Kernel Area FLASH, so kernel can find and execute it exactly.

For end user, they normally want to run the application automatically when the device is power on. If you download(burn) your application into Kernel Area FLASH where is “Shell” present, then “Shell” will be overwrite, and Kernel will execute your application instead of “Shell” when boot. Meanwhile, the source codes of “Shell” are opened for all developers, so the developers can simply add the “Shell” codes into application project, so that the application can gain all features of “Shell”.

In PT-850, there is another way to run your application, you can download your application as a file , stored into file system. If you want to run one of these applications, just select it, and run it from “Shell”, “Shell” features an “application manager” in this way.

When the applications are downloaded into file system, there is a risk that all applications will be lost if you format the file system. So, we suggest that you download the applications in file system when in development moment, and burn your application into Kernel Area FLASH overwriting Shell when in final release.

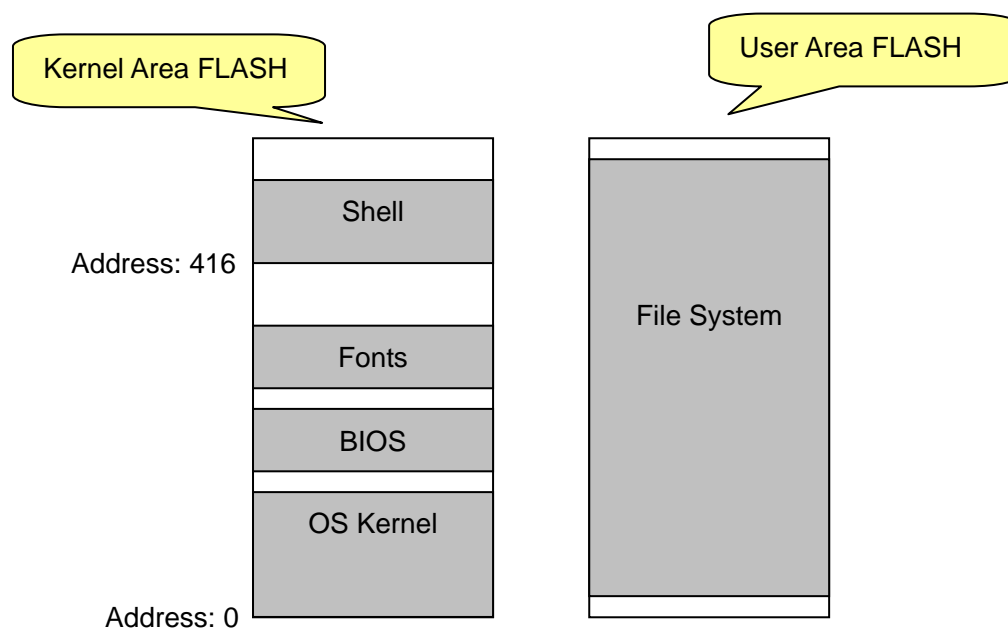


Figure 2: Physical map of FLASH

In PT-850, there are two chips FLASH ROMs, one is for Kernel Area, the other is for User Area. OS Kernel, BIOS, Fonts...and Shell are stored in Kernel Area FLASH, the whole User Area FLASH is formatted as file system, used to store data files, user applications...etc.

When OS Kernel is damaged, or when hardware is new, there must have a way to update the OS Kernel. PT-850 has a "Update Switch", which is used for update OS Kernel from scratch. The "Update Switch" also can be used to update BIOS, Fonts...and the shell. When the OS Kernel and shell is installed on PT-850, there are some more convenience methods to update Kernel or shell.

When we talk about "Shell", it is the GUI Shell, which is automatically executed when boot up. The GUI Shell's source codes are opened for all developer, which can be found in example folder after uTools installed.

There is another simple "Text Shell" build in kernel, which is used to update kernel itself, or download other image files for PT-850. Press and continue hold on the scan key(the biggest one) when power on PT-850, then the kernel will enter the "Text shell". The "Text shell" is a part of kernel, so it don't need to downloaded individual.

2 How to download OS Kernel from scratch with “Update Switch”

To download the OS Kernel into the bare hardware, or the OS Kernel is damaged, the only way is using update switch which is behind the battery slot.

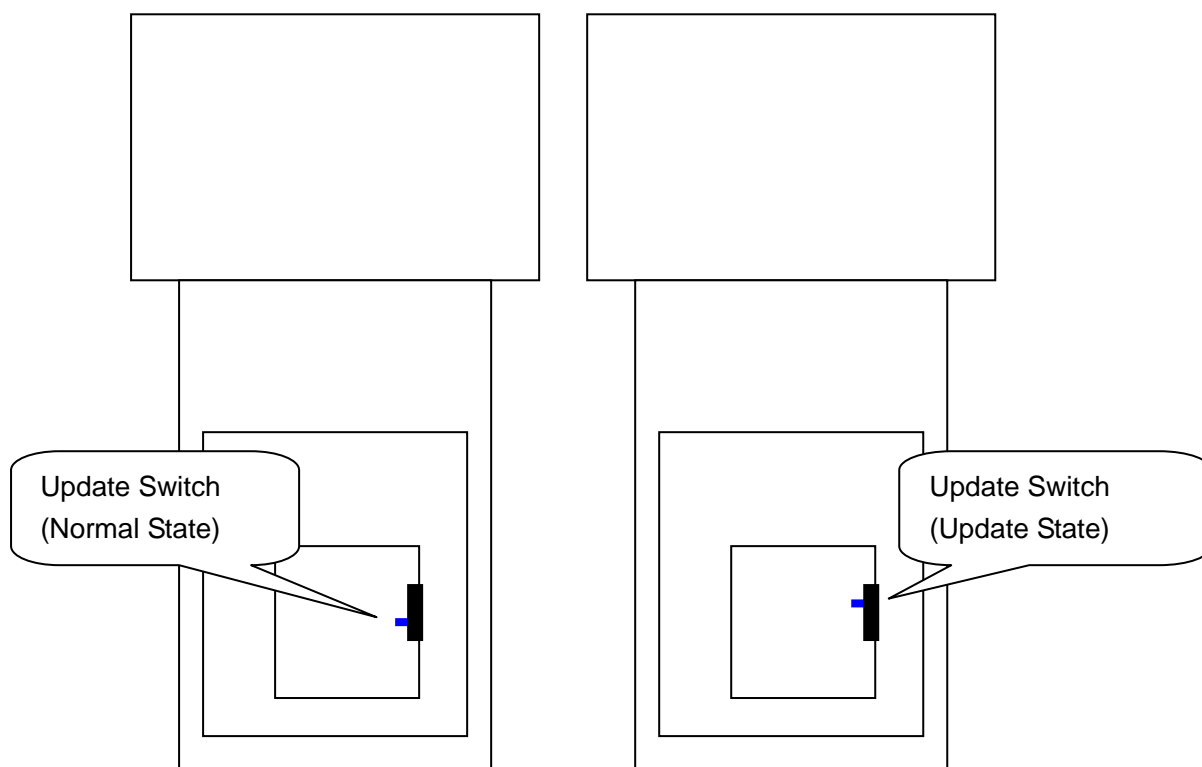
1. Get the OS kernel image file from web, for example: 850krnl.3.02.022.EN.Pre.bin
Please visit NEWLAND download web: <http://down.nlscan.com/update/kernel/>
2. Run this command in PC's console window:

```
Download.exe 850Krn1.3.02.022.En.Pre.bin 1 SST-7312.bin 0 115200 9600
```

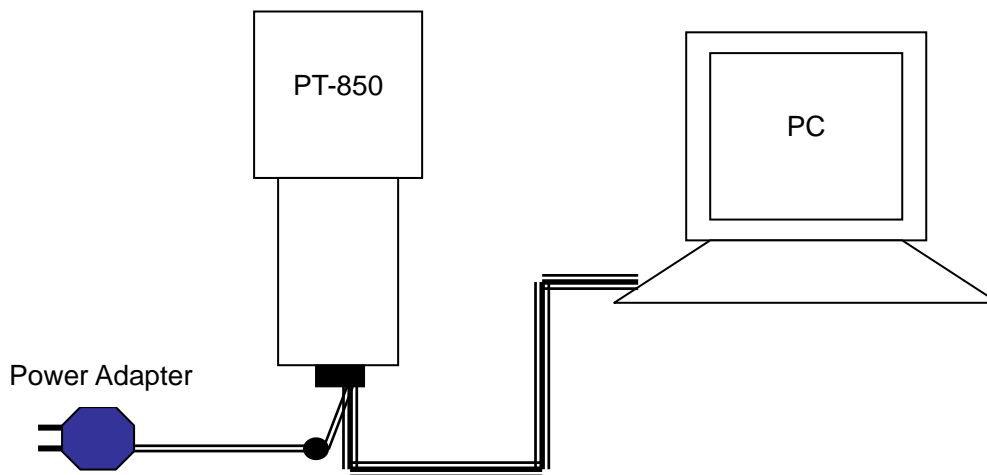
NOTE: The first parameter is the kernel image file name. The second parameter “1” means COM1, if you use COM2, it should be “2” The third parameter “SST-7312.BIN” is the so called “Proxy file”, which is used to burn file into Flash. The forth parameter “0” means the target address is 0. The value of target address is fixed 0 for “kernel”. For “Shell”, the value may be variable in different device. For example, 416 for PT-850 device, 128 for PT-041. The fifth parameter 115200 is the baud rate of data transfer, you can select from 9600 to 115200. The sixth parameter 9600 is the initialize baud rate, it is fixed to 9600 when you use “Update Switch”, and can't be change to any value else.

You can get these utilities from: <http://down.nlscan.com/Update/utills/>

3. You will see prompt message like: "...waiting for '<'..."
4. Unlock and take off the battery cover, take off battery, you will see the “Update Switch” in the left site(the blue one in the following figure):



5. Turn the "Update Switch" from "Normal State" to "Update State"
6. Connect the serial cable between PC and PT-850, and connect the Power Adapter:



If you use CD-850 cradle, please connect the serial cable between CD-850 and PC. Remember to power on CD-850. And put PT-850 on CD-850

7. Press the POWER key of PT-850 (the red one)
8. Now, on the PC site, you will see the begging of download process...
9. It needs about 60-70 seconds to finish download process.
10. When all are done, take off cable, and remember turn the "Update Switch" on the "Normal State", take on battery, take on battery cover and lock it. And now, you got the new kernel.

3 How to update OS Kernel when kernel has been installed

NOTE: Be sure the kernel is already installed on PT-850

1. Power off PT-850
2. Run this command in PC's Console window :
`Download.exe 850Krn1.3.02.022.En.Pre.bin 1 SST-7312.bin 0 115200 115200`

NOTE: the first 115200 is the data transfer baud rate, the second 115200 is the initialize baud rate. The first 115200 can be changed from 9600 to 115200, but the second 115200 is the fixed parameter, can't be change to anything else when you use text shell to download.

3. You will see PC Console window prompt message like: "....waiting for '<'..."
4. Connect the serial cable with PT-850 and PC, connect the power adapter for PT-850.
5. Press and continue hold on "Scan" key, Power on PT-850
6. About 5 second later, you will see PT-850 run the text shell in kernel, the prompt message would be:

```
Kernel Compiled On:  
Mar 10 2005 1:16:44  
Shell begin!
```

```
OK – load & exec  
ENT – Download
```

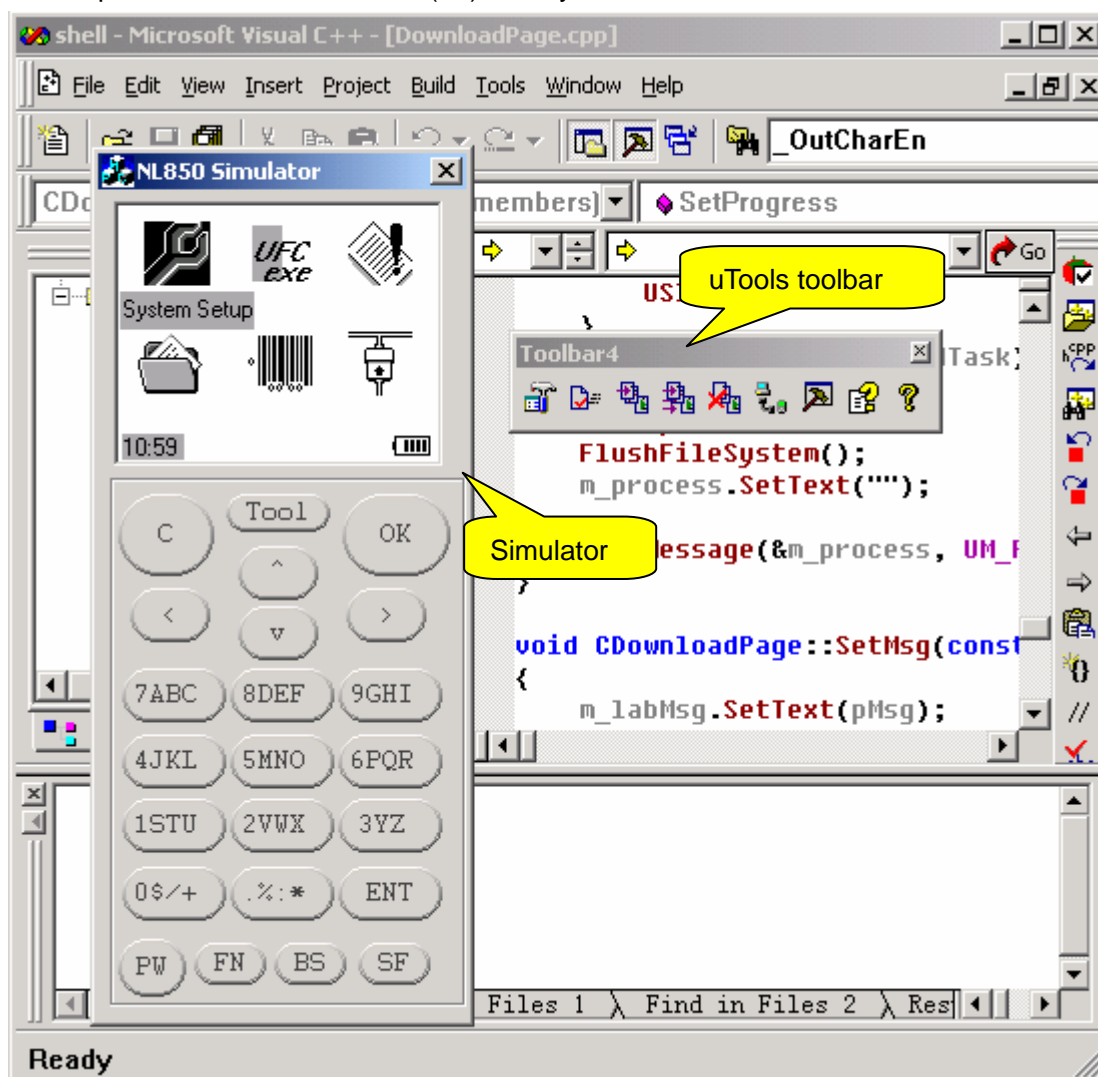
Press "OK" key will load and execute the GUI Shell, Press "ENT" key will go to download state.

7. Press "ENT" key, enter the download state.
8. Now, you can see the beginning of download progress, the download progress will take about 50-60 seconds.
9. When complete, reboot (power off, and power on) the PT-850, the new kernel is updated.

4 How to get and compile GUI Shell

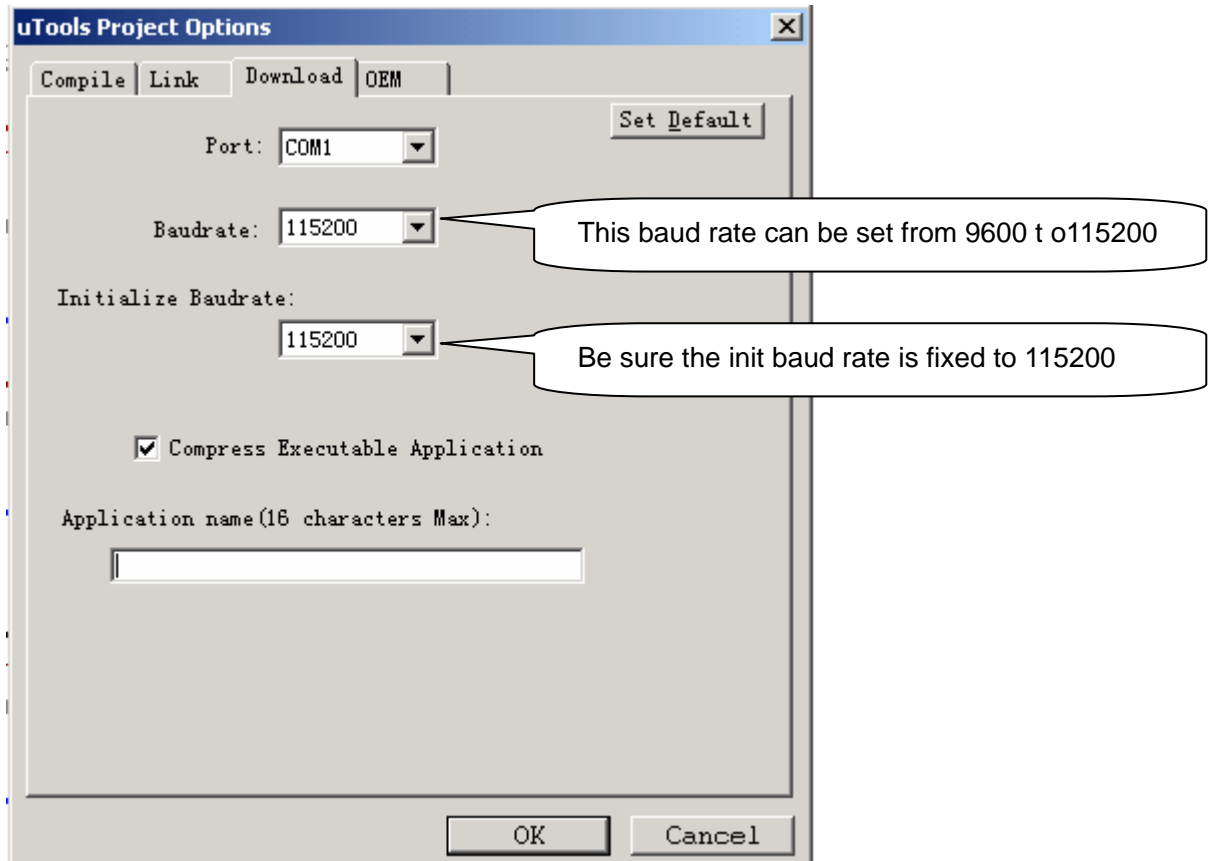
1. Download the newest uTools from web: <http://down.nlscan.com/Update/uTools/>
2. Install uTools on driver C:\
NOTE: You should had installed Microsoft Visual C++ 6.0 before you install uTools 2.x
3. Open Shell project with uTools, the Shell project is resided on the example folder, for example:
C:\Nlscan\uTools2\examples\850\Shell850.en\shell.dsw

2. Compile Shell with uTools toolbar "ReBuild All"
3. Compile Shell with VC++ "Build(F7)", and you can simulate in PC.

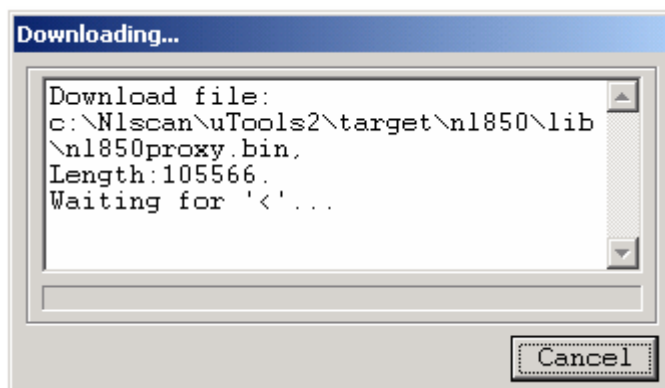


5 How to download GUI Shell when GUI Shell has not been installed

1. Setup the download options from uTools toolbar after you build Shell successfully with uTools:



4. Power off PT-850
5. Click the "Download" button in uTools toolbar:



6. Connect the serial cable with PT-850 and PC, connect the power adapter for PT-850.
7. Press and continue hold on "Scan" key, Power on PT-850
8. About 5 second later, you will see PT-850 run the text shell in kernel, the prompt message would be:

```
Kernel Compiled On:  
Mar 10 2005 1:16:44  
Shell begin!
```

```
OK  – load & exec  
ENT – Download
```

Press "OK" key will load and execute the GUI Shell, Press "ENT" key will go to download state.

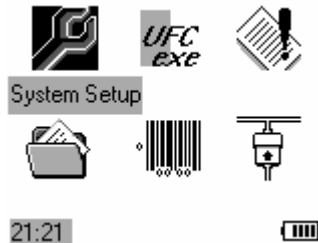
9. Press "ENT" key, enter the download state.
10. Now, you can see the beginning of download progress, the download progress will take about 50-60 seconds.
11. When complete, reboot (power off, and power on) the PT-850, the new kernel is updated.

As soon as PT-850 has installed GUI Shell, updating kernel, updating shell itself, downloading applications would be much more convenience.

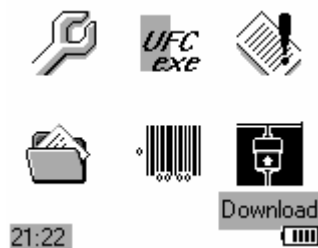
6 How to update shell or overwrite shell with your application when shell has been installed

NOTE: Be sure the GUI shell is installed on PT-850

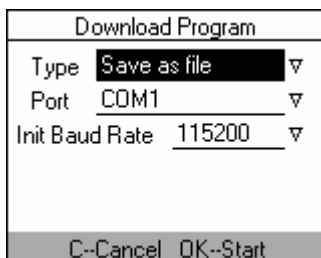
1. Power on PT-850, and run Shell:



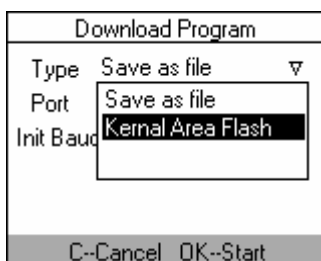
2. select "Download"



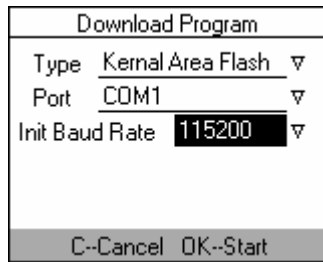
3. Enter "Download"



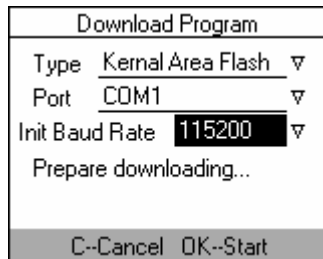
4. Select the store type: "Kernel Area Flash"



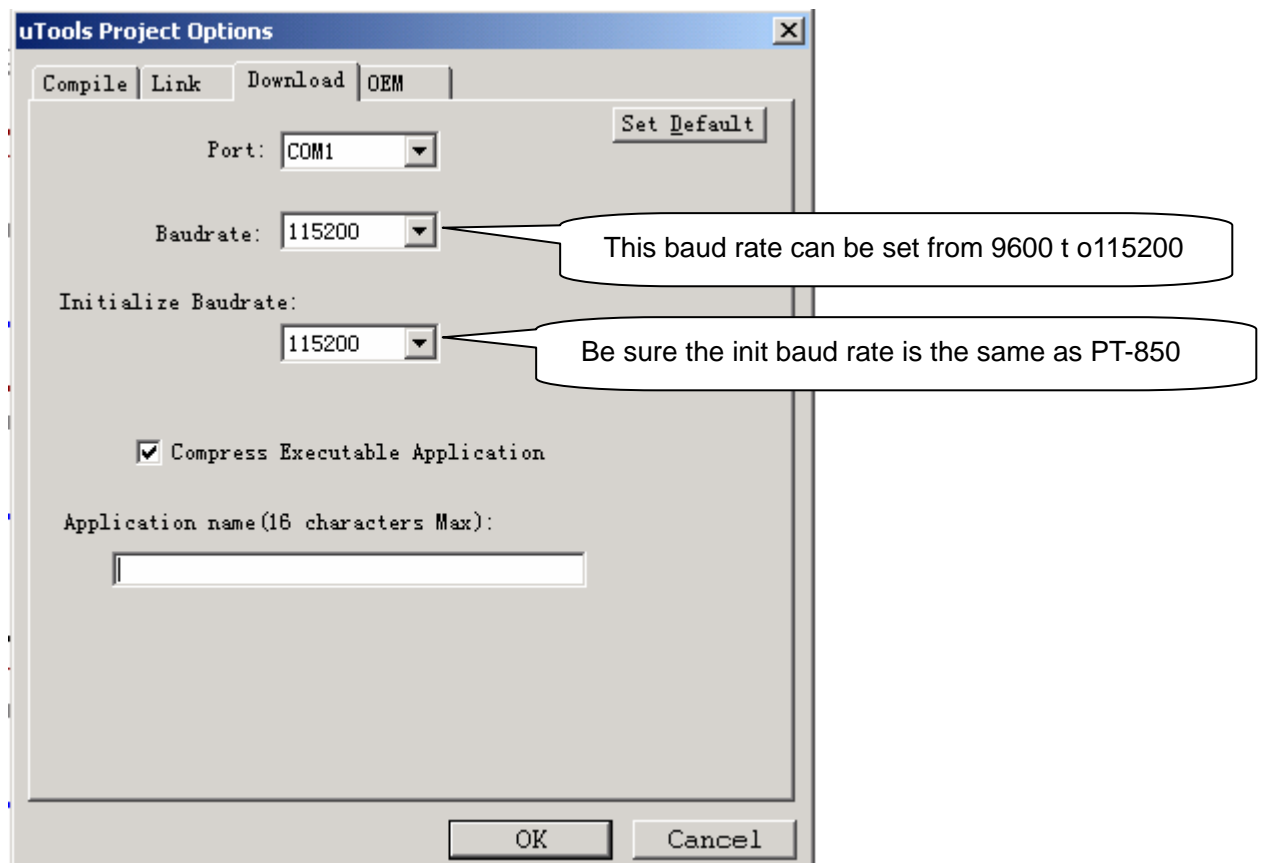
5. Be sure the init baud rate is selected the same value as uTools download setting.



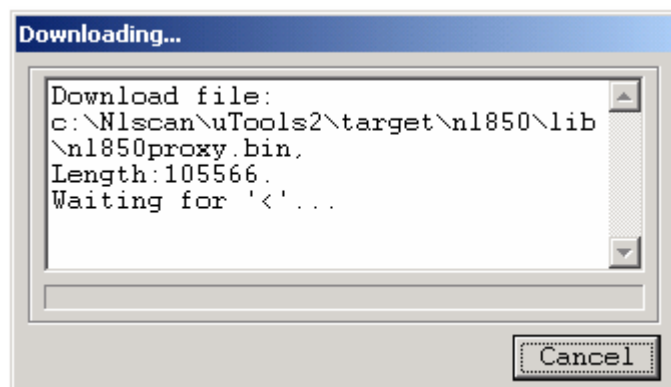
6. Press "OK" begin to start download progress



7. Setup uTools download options



8. Connect the cable with PC and PT850
9. Click “Download” button on uTools toolbar, you can see the download processing...



- 10 When all are done, reboot PT850, and you got the new shell or your application.

7 Update OS Kernel when GUI Shell has been installed

In PT850 site, all steps are the same as the topic “How to update shell or overwrite shell with your application when shell has been installed”

In PC site, you should use the Download.exe utility instead of uTools.

For example, run this command in PC’s console window:

```
Download.exe 850Krnl.bin 1 SST-7312.bin 0 115200 115200
```

the first “115200” is data transfer baud rate, the second “115200” is initialize baud rate which must be the same with PT850’s setting.

8 How to overwrite GUI Shell with your application when GUI Shell has not been installed

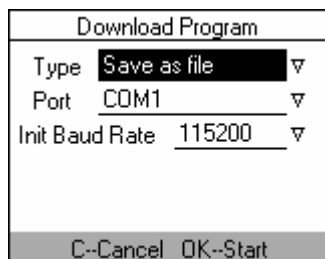
All steps are completely the same as topic “How to download GUI Shell when GUI Shell has not been installed” if your want to overwrite GUI Shell with your application, or update your application which reside in kernel area flash.

9 How to download application to file system

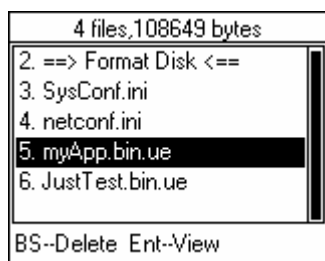
1. Create a project named “MyApp” in uTools
2. Build “MyApp” project with uTools “BuildAll” button

- Setup uTools and PT850, and the rest steps are the same as topic “How to update shell or overwrite shell with your application when shell has been installed”, the only different is: when you setup download type in PT-850, the type should choose “Save as file” instead of “Kernel area Flash”.

Once you choose “Save as file”, the downloaded file will be store into file system.



- When finish, back to main page, and enter “File Browse”:

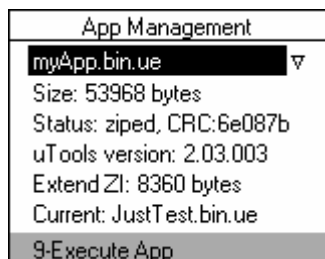


Now, you can find the file “myApp.bin.ue” on file system.

You may notice that the kernel image file’s suffix is “.BIN”, and Shell or Application’s is “.UE”. Kernel is a plane binary file, and “Shell” or your application program is a uBase-III executable file, so the file’s suffixes are different.

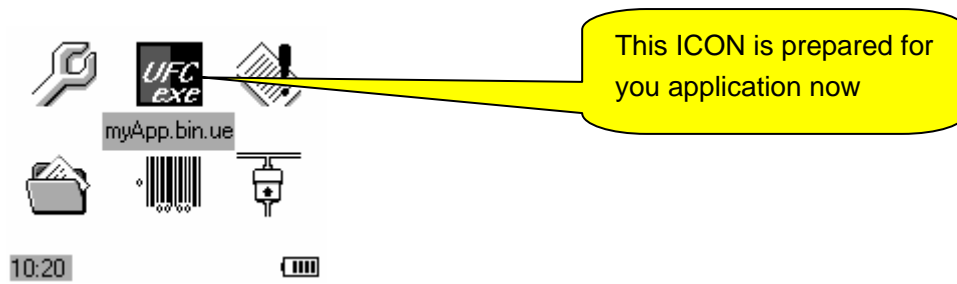
10 How to run application from file system

- Create a project named “myApp”, build it and download to file system, see topic “How to download application to file system”
- From main page, Enter “System setup”->”App Management”, choose “myApp.bin.ue”:



Now, you can see the detail information about myApp.bin.ue

- Press ‘9’ you will run this application immediately, or Press “OK” link current chose application to Main page’s “UFC” icon. See below.
- Now back to main page, move cursor to “UFC” icon, and you will see the icon’s tips messages become “myApp.bin.ue”



5. Press "OK" on this icon will run myApp.bin.ue