



## Software Updating via FTP

bintec-Dm 827-I

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# Chapter 1 Software Updating Via FTP

## 1.1 Introduction

Our routers execute software known as be.CLI, which is made up of various elements:

- **BOOT**

This is a small start-up program recorded in a read-only device. It is almost impossible to lose and allows the user to restore a device under extreme circumstances. This element cannot be updated via software.

- **BIOS FLASH**

It is the basic interface with the router's hardware, detaching (for the most part) the latter from the be.CLI. Variations produced in the hardware (e.g. changing the integrated circuit used to control PSTN) are transparent to the be.CLI

- **be.CLI**

This is the part of the code that handles internetworking processes (IP routing, X.25, IPSec, ATM, etc) and the configuration and monitoring console. This is also known as *application*.

- **Auxiliary Files (\*.BFW, ...)**

In order to simplify the modular updating of routers, as well as to reduce the size of the be.CLI, certain blocks are provided as independent files. The need for these depends on the available hardware. For instance, our devices support various ADSL chipsets that, depending on the one available in your device, will need one firmware (BFW) or another.

- **Image file (\*.img)**

In some devices, the BIOS, be.CLI and FWs are distributed in a single file whose extension is img.

The updating of the software used in our routers is done by replacing one or several of the elements that were previously mentioned. This manual explains how to update the software via FTP.

## 1.2 Updating Process

Our routers have an FTP server to which files for device software updating can be transferred. This server is only accessible if the device has started up correctly (application correctly executed).

### 1.2.1 Distributing with BIOS, be.CLI and FWs files

The steps to execute updating are as follows:

- (1) Extract the distribution content to a directory; if successful, the content will not have altered.
- (2) Connect to the device FTP server (you need a user and a password: default is user **admin** with password **admin**. If no user is configured, default user is **root** without a password).

```
ftp 192.168.0.254
Connected to 192.168.0.254.
220 FTP server ready, 1 active clients of 1 simultaneous clients allowed.
Name (192.168.0.254:admin): admin
331 User name accepted, need password.
Password: ****
230 User login complete.
Remote system type is UNIX.
ftp>
```

- (3) Configure the binary mode through the **bin** command, and optionally, HASH marking through the **hash** command.

```
ftp> bin
200 TYPE is set to IMAGE.
ftp> hash
Hash mark printing on (1024 bytes/hash mark).
ftp>
```

- (4) Transfer the BIOS FLASH through **put <bxxx.bin>**.



```

BIOS          v4.8   HDW LVL 5
fw000013.bfw v3.9   HDW LVL 14
211 COHERENCE results end
ftp>

```

You can also check the integrity of a file by calculating its MD5 signature and contrasting it with that included in the distribution .md5 file.

```

ftp> quote xmd5 fw000013.bfw
250 8a85aee1bb05ab776d3a61f4fa803666
ftp>

```

- (10) Restart the device through the **quote site reload on**; if you exit normally from FTP, the device restarts after some 30 seconds. If you exit FTP through CTRL.-C, the device restarts immediately. You can also restart said device through **load immediate** (console command).

```

ftp> quote site reload on
200 RELOAD mode is set to ON.
ftp> quit
221 Goodbye.
>
load immediate
Are you sure to reload the device (Yes/No)? yes

```



#### Note

Occasionally, a transfer command may fail if the device does not have enough free volatile memory. In this case, activate direct mode through **quote site direct on** before executing said transfer and deactivate it as soon as the transfer has finished (**quote site direct off**). Direct mode causes the transferred file to directly save to Flash (instead of the temporary buffer), prior to recording. If you have a high speed connection, the transfer executes in bursts with pauses when recording to Flash.

## 1.2.2 Distributing with the be.CLI Image file (IMG)

The steps to execute updating are as follows:

- (1) Decompress the distribution content to a directory: if successful, the content won't have altered.
- (2) Connect to the device FTP server (you'll need a user and password: default is user **admin** with password **admin**. If no user is configured, the default user is **root** without a password).

```

ftp 192.168.0.254
Connected to 192.168.0.254.
220 FTP server ready, 1 active clients of 4 simultaneous clients allowed.
Name (192.168.0.254:admin): root
331 User name accepted, need password.
Password:
230 User login complete.
Remote system type is UNIX.
ftp>

```

- (3) Configure the binary mode through the **bin** command, and optionally, HASH marking through the **hash** command.

```

ftp> bin
200 TYPE is set to IMAGE.
ftp> hash
Hash mark printing on (1024 bytes/hash mark).
ftp>

```

- (4) Transfer the be.CLI image through **put <be.cli-model-profile-version.img>**.

```

ftp> put be.cli-rm5000-11.01.2.img
local: be.cli-rm5000-11.01.02.img remote: be.cli-rm5000-11.01.02.img
200 PORT is set to IP ADDR = 192.168.1.50  PORT = 55878
150 Data connection open, checked file transfer in process...
#####
#####
#####
#####
226 STOR completed, 8500566 bytes processed, data connection is closed.
8500566 bytes sent in 3.67 secs (2261.1 kB/s)
ftp>

```

- (5) Once the transfer is complete, execute the **recording** command through **quote site savebuffer**.

```
ftp> quote site savebuffer
200 SAVEBUFFER completed O.K.
ftp>
```

- (6) Finally (and optionally), there is a command that lets you check if the device has all required files and if the element versions are coherent with each other.

```
ftp> quote site coherence
211-COHERENCE results
  be.CLI      v11.1.2 ID 0x00000039   HDW LVL 17
  BIOS       v4.8   HDW LVL 5
  fw000013.bfw v3.9   HDW LVL 14
211 COHERENCE results end
ftp>
```

- (7) Restart the device through **quote site reload on**; if you exit normally from FTP, the device restarts after some 30 seconds. If you exit FTP through CTRL-C the device restarts immediately. You can also restart the device using the console command **load immediate**.

```
ftp> quote site reload on
200 RELOAD mode is set to ON.
ftp> quit
221 Goodbye.
>
load immediate
Are you sure to reload the device(Yes/No)? yes
```



#### Note

Occasionally, a transfer command may fail if the device does not have enough free volatile memory. In this case, activate direct mode through **quote site direct on** before executing said transfer and deactivate it as soon as the transfer has finished (**quote site direct off**). Direct mode causes the transferred file to directly save to Flash (instead of the temporary buffer), prior to recording. If you have a high speed connection, the transfer executes in bursts with pauses when recording to Flash

## 1.3 FTP Features

### 1.3.1 INTEGRITY Test

A system in the device lets you check the integrity or coherency of the main file system contents. The following command is used to check if the device is capable of booting with the available software:

- **SITE COHERENCE**

This command returns the complete software check as response. Said response begins with a numerical figure (see the RFC). If the figure begins with a **2**, checking is OK. If not, the device reports the problem (to correct it) in the response.



#### Note

This operation is limited to checking all necessary software is present and the interdependence of the different modules regarding the software release needs is correct. A positive response does not mean the device is remotely accessible as this implies the configuration is correct (this isn't checked). Likewise, a negative response does not necessarily imply the device cannot boot or isn't remotely accessible.

Other commands used to obtain information:

- **SITE GETAPPNAME**

This returns the application file name used to boot the device. This tells you which file is used when there are various files with a BIN extension.

- **SITE GETBIOSVER**

Returns the device BIOS version number.



- **SITE GETCFGNAME**

Returns the configuration file name used to boot the device. This tells you which file is used when there are various files with a CFG extension.

- **SITE GETFILEVER**

This requires a parameter (file name) and returns the file version number when it has the bintec application format. This tells clients (if they support this) the application release version.

- **SITE GETHDWLVL**

Returns the device hardware version number. This consists of two numbers: one for the BIOS and the other for applications.

- **SITE LISTFIRMWARES**

Returns the firmware file list needed by the device so certain devices can operate. This tells clients (if they support this) the necessary firmware modules to ensure the device operates correctly.

- **SITE SYSTID**

Returns the system identifier. Said identifier indicates the type of device you are dealing with. Lets clients (who support this) know what software has to be sent.

## 1.3.2 CHECK Mode

This command enables the device to execute a series of automatic checks and actions to manage the received files, making them easily detectable as known files. Detected known files a .BIN, .BFW or .IMG extension. Various actions can be controlled through this command. Checks on files (detected as known) can only be executed when **test** mode is disabled.

- **SITE CHECK ALL OFF | ON**

Activates/deactivates all checks and actions.

- **SITE CHECK BIOS OFF | ON**

Activates/deactivates the rejection of applications, which need a newer version of the BIOS than the one currently running on the system.

- **SITE CHECK CRC OFF | ON**

Activates/deactivates software integrity checking (CRC). **WARNING:** in **direct on** mode (please [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3), if the CRC file is erroneous, the file will be recorded in the file system and the old one eliminated.

- **SITE CHECK DELETE OFF | ON**

Activates/deactivates automatic deleting of the temporary buffer content once **site savebuffer** has executed correctly. This occurs when the operation is configured to accept simultaneously connections from one client only. Said operation affects all files (not just those detected as known).

- **SITE CHECK FIRMWARE OFF | ON**

Activates/deactivates the checking on the necessity and compatibility of firmware received with the applications and the current operating environment.

- **SITE CHECK HARDWARE OFF | ON**

Activates/deactivates the rejection of applications whose imprinted hardware version (or hardware level) is prior to that marked in the device. When activated, this ensures the software received is capable of supporting or rectifying any known hardware problems in the device. **ATTENTION:** if this is deactivated, the device may malfunction after the restart and start up.

- **SITE CHECK LENGTH OFF | ON**

Activates/deactivates software integrity check (Length). **ATTENTION:** in **direct on** mode (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3), if the file length is erroneous (different from a multiple of 128), it will have been recorded in the file system and the old one eliminated.

- **SITE CHECK PATH OFF | ON**

Activates/deactivates automatic sending of acknowledged files received (BIOS to the BIO system) when the system is in **direct off** mode (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3) when **site savebuffer** is executed instead of sending them to the active system.

- **SITE CHECK PROFILE OFF | ON**

Activates/deactivates the dropping of files when their profile extension is different from the file currently active in the device.

- **SITE CHECK RENAME OFF | ON**

Activates/deactivates automatic renaming of received file. When this is active, it uses the name imprinted on the inside of the file instead of using the name received through the **stor** command.

- **SITE CHECK SYSTEM OFF | ON**

Activates/deactivates automatic files system selection. Default is active. Said command actually has no effect as the operation executes on establishing a connection with the client and cannot be modified during the session. This is implemented as a mirror of the command in the configuration, which is effective. When activated (and when the files system - activated by default - isn't configured), the first system activates on establishing a connection with the client depending on device availability. Priority (higher to lower) is as follows:

DSK FDA SMC FCO BIO MEM TST TS1 NUL

- **SITE CHECK UNKNOWN OFF | ON**

Activates/deactivates rejection of files detected as unknown. Said files have a .BIN, .BFW or .IMG extension but do not have a software format recognized by the device. With this rejection active, the files are not accepted and an error message appears (if they are received).

- **SITE CHECK VERSION OFF | ON**

Activates/deactivates rejection of files whose version is prior to that currently active in the device.

The **sat** command lets you view the state of the checks. Each active check appears with its initial letter while inactive ones are represented by a hyphen. Where all or none are active, ALL or NONE appears respectively.

## 1.4 Known Problems

### 1.4.1 Error writing file (550)

This error message is normally sent by the server to the client when the latter sends a file and the file system has insufficient space to store it or, an internal error has been produced.

- When this happens in **direct on** mode (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3), this means the file system has insufficient space to store said file. Check to see if you should delete files from the file system so you can send the new one.
- When this happens in **direct off** mode (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3), this means the temporary memory buffer is full and cannot fully store the file. For more information, execute command:

```
SITE STATBUFFER
```

The information received is interpreted in the following way:

```
MAX
```

If the figure is less than the total file length, the temporary buffer is incapable of storing the file. To resolve this, configure the temporary buffer size (to store the file) using **temp-buff** (console command). You could also try downloading again in **direct on** mode (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3).

```
REQ
```

If the figure is less than the total file length, the temporary buffer cannot get more memory from the system and, in turn, this implies the device does not have sufficient memory to execute secure downloads. or resolve this, deactivate the **direct on** mode (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3) and try resending the file.

### 1.4.2 Connection closed by remote host

This error is produced by the Windows FTP client. This implies the connection has been closed by the server but in fact it has been closed by the client. This error usually occurs under the following circumstances.

- The Server is executing a **site savebuffer** command. The device continues executing the operation normally even though the connection has been cut off. This happens because the execution time can be quite long and the client assumes the server has lost the connection as the latter takes so long in replying.

```
226 STOR completed, 9414766 bytes processed, data connection is closed.
ftp> 9414766 bytes sent in 5.85Seconds 1609.64Kbytes/sec.
ftp> quote site savebuffer
Connection closed by remote host.
ftp>
```

In [FTP Clients on page 10](#), we have provided details on some FTP clients that can be used to transfer files to or from the router as an alternative. We have also explained how to update the software through each of them.

- The problem occurs in the middle of transmitting a file. This could be a problem with the traffic control systems, which do not allow transmission if one of the TCP ports involved in the transfer is not port 20. The client therefore needs to send a **port** command to the server, as the device tries to ensure one of the ports is port 20.

### 1.4.3 File transfer has stopped

Occasionally (with some files) a problem arises that stops the file being sent. While this does not occur with all files, when it does happen, it always happens. This problem arises when the Windows FTP client sends TCP packets with an erroneous checksum and, consequently, cannot send the file. We don't know why this behavior occurs with specific files but it can be resolved by using a different FTP client.

### 1.4.4 Unable to open file (550)

This is an error response normally sent by the server to the client (when a file is sent) indicating the file cannot be opened in the server.

Some clients only send the file name to the remote server while others send both the name and the local path.

This effect appears when the server is in **direct on** mode (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3) and the client includes the local path in the file name it's sending.

Example with a Linux client:

```
ftp> put ../_xxxxx/rxxxx.bin
local: ../_xxxxx / rxxxx.bin remote: ../_xxxxx / rxxxx.bin
200 PORT is set to IP ADDR = 172.24.75.193 PORT 50021
150 Data connection open, checked file transfer in process...
#####
netout: Connection reset by remote peer
550 Unable to open file.
```

The storage system where the server is operating and in **direct on** is "/DSK"; when sending the file name as "../\_85xx/becli.bin" the device will try and open said file in "/\_85xx/becli.bin". As "/\_85xx" doesn't exist, the file cannot be opened so the available storage systems request an address from the root system.

To resolve this problem, use specific client commands to manage the file name in remote systems (each client has their management) or, specify the name the remote system must use as shown below:

Example with Linux client:

```
ftp> put ../_xxxxx / rxxxx.bin rxxxx.bin
local: ../_xxxxx / rxxxx.bin remote: rxxxx.bin
200 PORT is set to IP ADDR = 172.24.75.193 PORT 50021
150 Data connection open, checked file transfer in process...
#####...
226 STOR completed, 7214720 bytes processed, data connection is closed.
7214720 bytes sent in 41.73 secs (169.1 kB/s)
```

### 1.4.5 Unix Clients (ASCII mode)

Warning: ftp clients from the World of Unix, Linux and other similar operating systems, by default use ASCII to send files. Binary files the devices need must be sent in **binary** mode, which must be activated in the client through the corresponding command (usually **binary**). Even though this is not necessary in Window environments; it's a good idea to always activate it.

If **binary** mode is not activated to transfer files to the device, the following problems may arise:

- DIRECT ON Mode (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3):
  - CHECK LENGTH | CRC ON (COMPATIBLE ON) mode: If this is binary file acknowledged as application or firmware, this is considered incorrect and a length error or a CRC error is produced. At this point, the file that has been sent and saved is incorrect and it's possible the device *won't start up*.
  - CHECK LENGTH | CRC OFF (COMPATIBLE OFF) mode: In this case, an error is not produced so the problem is underlying. At this point, the file that has been sent and saved is incorrect and it's possible the device *won't start up*.
- DIRECT OFF Mode (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3) :
  - CHECK LENGTH | CRC ON (COMPATIBLE ON) Mode: If this is a binary file acknowledged as application or firmware, this is considered incorrect and a length error or a CRC error is produced. The file is located in the system/MEM and nothing happens until the **site savebuffer** command has been sent. At this point, a corrupt file is saved and it's possible the device *won't start up*.
  - CHECK LENGTH | CRC OFF (COMPATIBLE OFF) Mode: If this is a binary file acknowledged as application or firmware, this is considered incorrect and a length error or a CRC error is produced. The file is located in the system/MEM and nothing happens until the **site savebuffer** command has been sent. At this point, a corrupt file is saved and it is possible the device *won't start up*.

## 1.5 Information required for updating

### 1.5.1 How to determine the appropriate distribution and the appropriate binary

To update a device, you need to know its identifier and the current license. This information can be obtained as follows:

- In console (local or bintec) through the monitoring command **configuration (RM5000)**.

```
*monitor
+configuration
bintec elmeg's Router, RM5000 S/N: 848/00110
SWL:BASE
ID: RM5000
Boot ROM release:
  BIOS CODE VERSION: 01.02  May  3 2016 10:33:19 L0
System Info:
PCB:0x14B PVR:0x80241021 SVR:0x85480010 T1024
CLKs: PLAT=400 CPU0/1/2/3=1400/1400/1400/1400 DDR(clk)=1584 LBUS=50 PCI0/1/2/3=0/0/0/0
Watchdog:Enabled
MMU Mode:Dynamic
ICache:ON DCache:ON Write-Back L2Cache:ON
Time Base: frequency = 25000 KHz period = 40.000 ns
Software release: 11.01.02-Beta-1b08f55+ Nov 22 2016 11:38:20
Loaded from primary partition
Hostname:                Active user: admin
Date:  Tuesday, 11/23/10  Time: 12:23:59
Router uptime: 24m10s
Name      Protocol
IP        Internet Protocol
IP6       IPv6
ARP       Address Resolution Protocol
CFM       Connectivity Fault Management
ASRT      Adaptive Source Routing Transparent Enhanced Bridge
DLS       Data Link Switching
dot1X     Extensible Authentication Protocol Over LAN
RIP       Route Information Protocol
OSPF      Open SPF-Based Routing Protocol
BGP       BGP
BFD       Bidirectional Forwarding Detection
NHRP      Next Hop Resolution Protocol
DHCP      Dynamic Host Configuration Protocol
```

```

L2TP      L2TP
SNMP      SNMP
IGMP      Internet Group Management Protocol
PIM       Protocol Independent Multicast
MSDP      Multicast Source Discovery Protocol
RPNP      RIPng
OSPFv3    OSPFv3
DHCPv6    DHCPv6
1 interfaces:
Connector Interface          MAC/Data-Link      Status
EXP/SWITCH ethernet0/0          Ethernet/IEEE 802.3 Up
SNMP OperStatus:
Interface      OperStatus
ethernet0/0    Up
Cellular Driver Version: 00.09
WLAN Driver Version: 9.5.0.35.1
+

```

### Or with another type of license:

```

M1-CLI *monitor
Console Operator
M1-CLI +configuration
bintec elmeg's Router, RSM501 4GESW 34 4001 S/N: 819/54295
ID: RSM501-31F128R L34.4001
Boot ROM release:
  BIOS CODE VERSION: 04.08 Sep 15 2016 14:24:32 L0
System Info:
PCB:0x13A GPPORCR:0x00000000 PVR:0x80212151 SVR:0x80F90110
CLKs: CCB=396000 CPU0/1=792000/0 DDR(clk)=330000 LBUS=99000 PCI0/1=0/0
Watchdog:Enabled
MMU Mode:Dynamic
ICache:ON DCache:ON Write-Back L2Cache:ON
Time Base: frequency = 49500 KHz period = 20.202 ns
Software release: 11.01.02-Beta-1b08f55+ Nov 22 2016 13:22:43
Loaded from primary partition
Hostname: M1-CLI Active user:
Date: Thursday, 10/12/00 Time: 00:08:33
Router uptime: 8m32s
Name Protocol
IP Internet Protocol
IP6 IPv6
ARP Address Resolution Protocol
CFM Connectivity Fault Management
ASRT Adaptive Source Routing Transparent Enhanced Bridge
dot1X Extensible Authentication Protocol Over LAN
RIP Route Information Protocol
OSPF Open SPF-Based Routing Protocol
BGP BGP
BFD Bidirectional Forwarding Detection
NHRP Next Hop Resolution Protocol
DHCP Dynamic Host Configuration Protocol
L2TP L2TP
SNMP SNMP
IGMP Internet Group Management Protocol
PIM Protocol Independent Multicast
MSDP Multicast Source Discovery Protocol
RPNP RIPng
OSPFv3 OSPFv3
DHCPv6 DHCPv6
3 interfaces:
Connector Interface          MAC/Data-Link      Status
EXP/SWITCH ethernet0/0          Ethernet/IEEE 802.3 Up
ANT1 cellular1/0          Async serial line   Down
ANT1 cellular1/1          NIC interface       Down
SNMP OperStatus:
Interface      OperStatus
ethernet0/0    Up

```

```
cellular1/0          Down
cellular1/1          Down
Cellular Driver Version: 00.09
WLAN Driver Version: 9.5.0.35.1
M1-CLI +
```

- Via FTP, using the **quote site systid** command.

```
ftp> quote site systid
211 RM5000
ftp>
```

To identify the distribution corresponding to the device, simply check the first part of the identifier (old system licenses) or the entire identifier (new system licenses):

- (1) RM5000, all the identifier (new system licenses)
- (2) RSM501-31F128R L34.4001, the first part of the identifier (old system licenses)

To determine how much available Flash there is, check the number preceding the letter F (for Flash) and for SDRAM, the number preceding the letter R (for RAM), both quantities are expressed in Megabytes.

To identify what application binary should be downloaded in your device, check the version\_map.txt file included in the distribution and find the first condition this fulfills.

```
RM5000, *F, *R, *, rm5000.bin, RM5000
```

### 1.5.1.1 How to determine the necessary firmware

There are two options to determine what firmware(s) a device needs:

- (1) The FTP server command **quote site listfirmwares**, which returns a list with the firmware file names included in the distribution that must be sent.

```
ftp> quote site listfirmwares
211 fw000013.bfw
ftp>
```

- (2) The **system firmwares-required** command.

```
*monitor
Console Operator
+system firmwares-required

List of required firmwares for detected hardware
-----
Filename                Description                Version/Subv
-----
fw000013.bfw            Broadcom 63268-TSS VDSL2/ADSL2+ POTS            Not present
```

## 1.6 FTP Clients

As already mentioned in previous chapters, there are several commands in FTP that due to their nature, take quite a long time to execute. Because of this, some FTP clients decide to cut off connections when they don't receive a response in the established time, believing that there is a problem with the server. The Windows FTP client is among these clients. In the following paragraphs, we have explained how to use and configure determined FTP clients to avoid this problem in processes as critical as software updating. Here the process is explained using the **site save-buffer** command; however the same method can be applied if you activate direct mode through **site direct on** command (please see [Distributing with BIOS, be.CLI and FWs files](#) on page 1 and [Distributing with the be.CLI Image file \(IMG\)](#) on page 3).

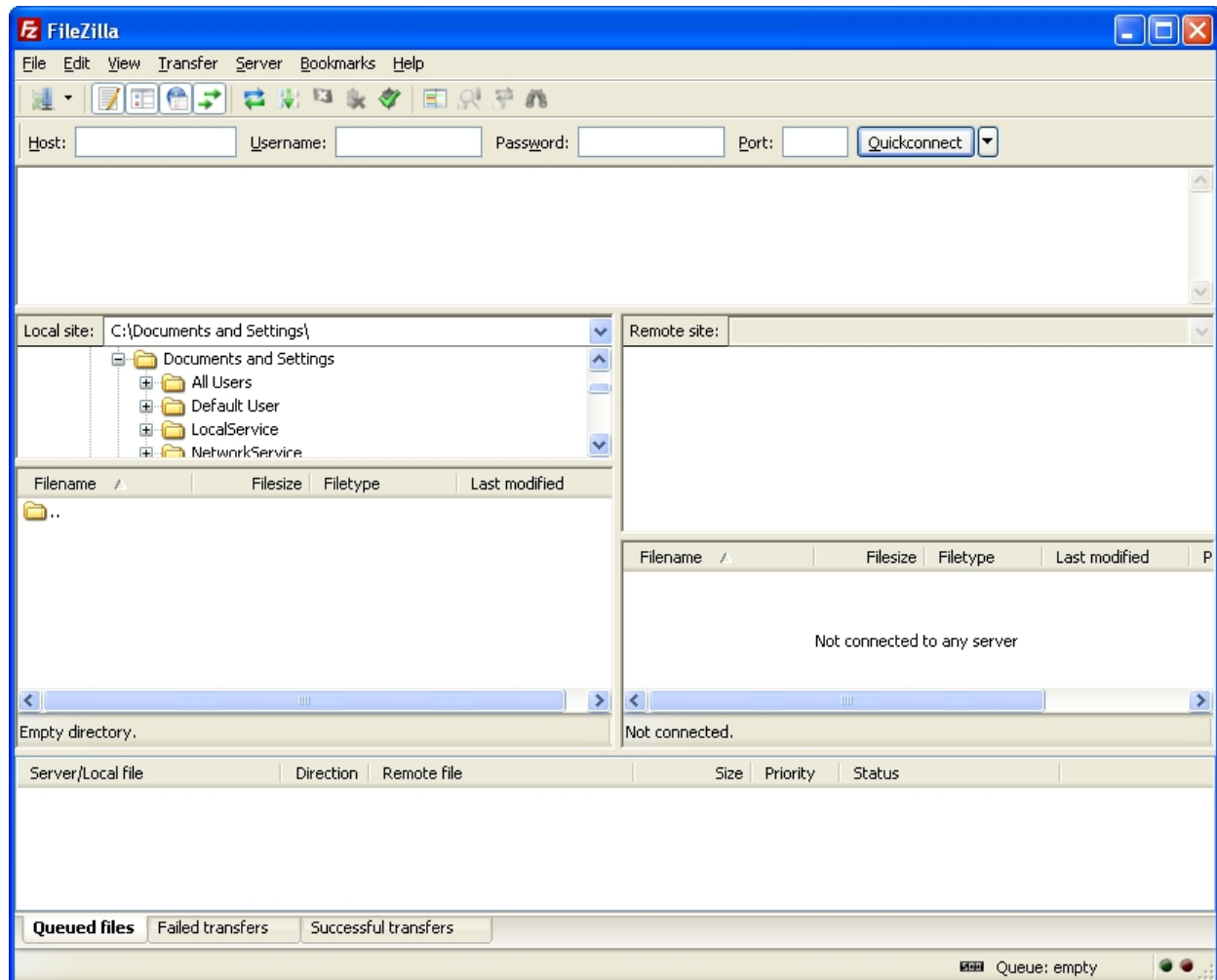
### 1.6.1 FileZilla Client

FileZilla is an open code multiplatform FTP client with free software, licensed under the GNU General Public License. It supports FTP, SFTP and FTP over SSL/TLS (FTPS) protocols.

Its user friendly and intuitive interface shows the local and the remote windows, allowing files to be passed from one to another through multiple techniques including drag and drop.

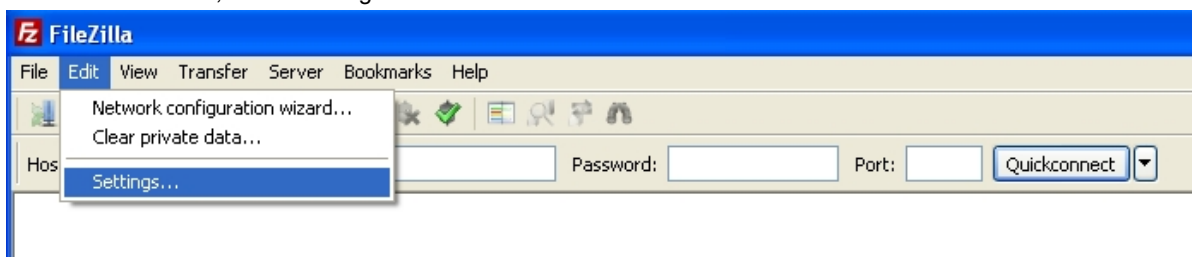
**Note**

The images shown here are for the Windows version, however the operating mode is the same for both Windows and Linux operating systems.



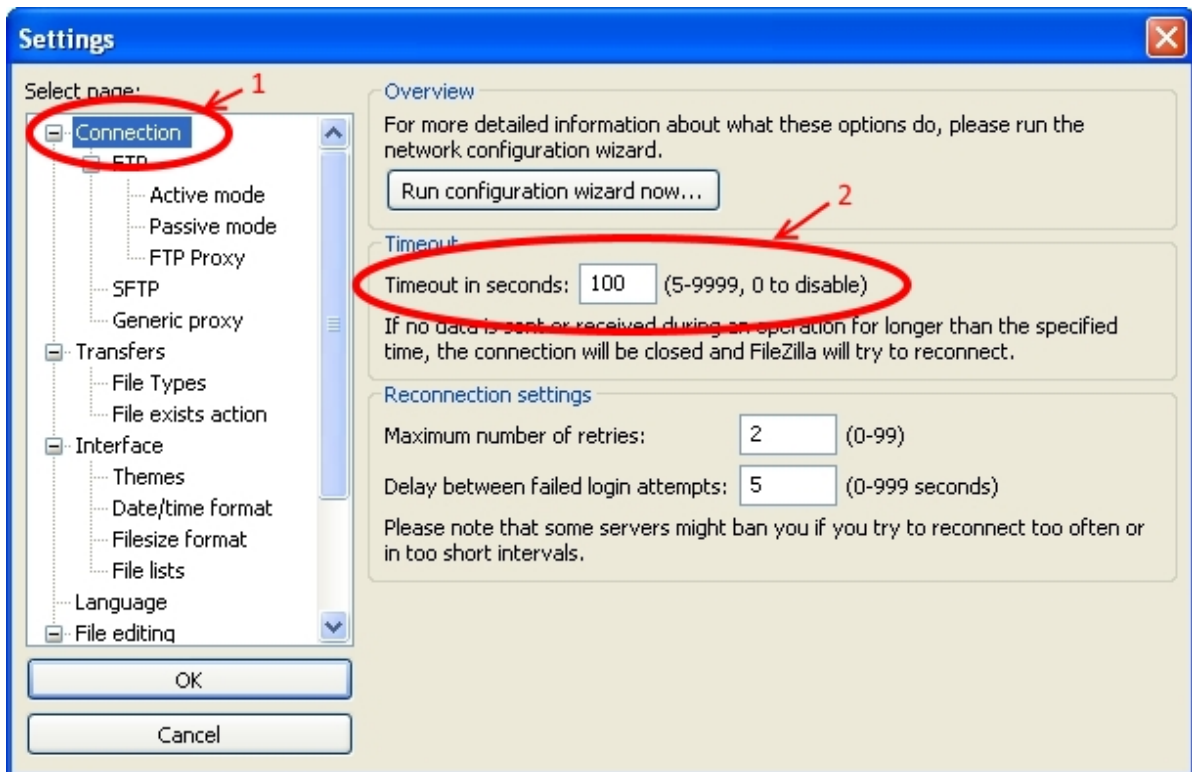
Before beginning the updating process, increase the response wait time to prevent connections from being cut off while **site savebuffer** is executing. To do this, carry out the following:

- (1) From the Edit menu, select Settings.



- (2) Click on the *Connection* option and modify *Timeout in seconds* by assigning it a value of at least 100 seconds.





(3) Click on *OK*.

Once this change has been made, update the software by executing the steps below:



#### Note

Always use FTP protocol.

(1) *Connecting to the router's FTP server*

To do this, use the *Quickconnect* bar. Here, specify the router's IP address in the *Host* field, the user in *Username* (using user *root* when there are no users defined in the router) and the password if required (user *root* does not have a password).

The *Port* field can be left empty unless a specific port, other than 21, has been configured in the router's FTP server.

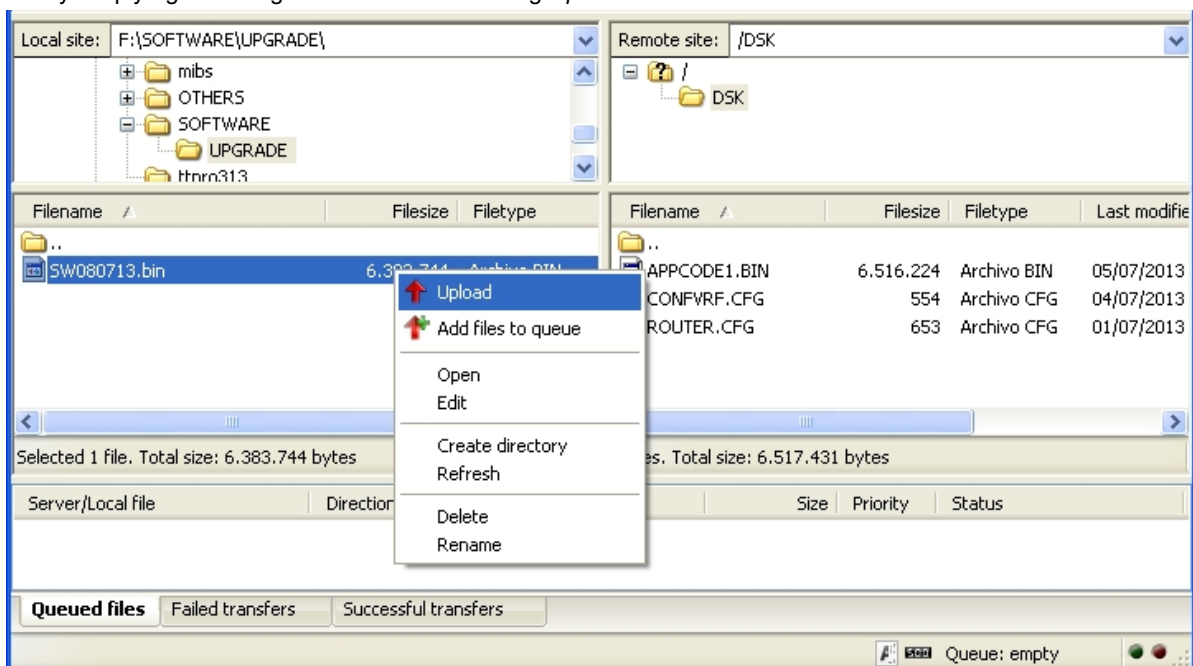
Subsequently, click on *Quickconnect*.

Host: 192.168.1.1	Username: USER	Password: ●●●●●●	Port:	Quickconnect
-------------------	----------------	------------------	-------	--------------

(2) *Transferring the file*

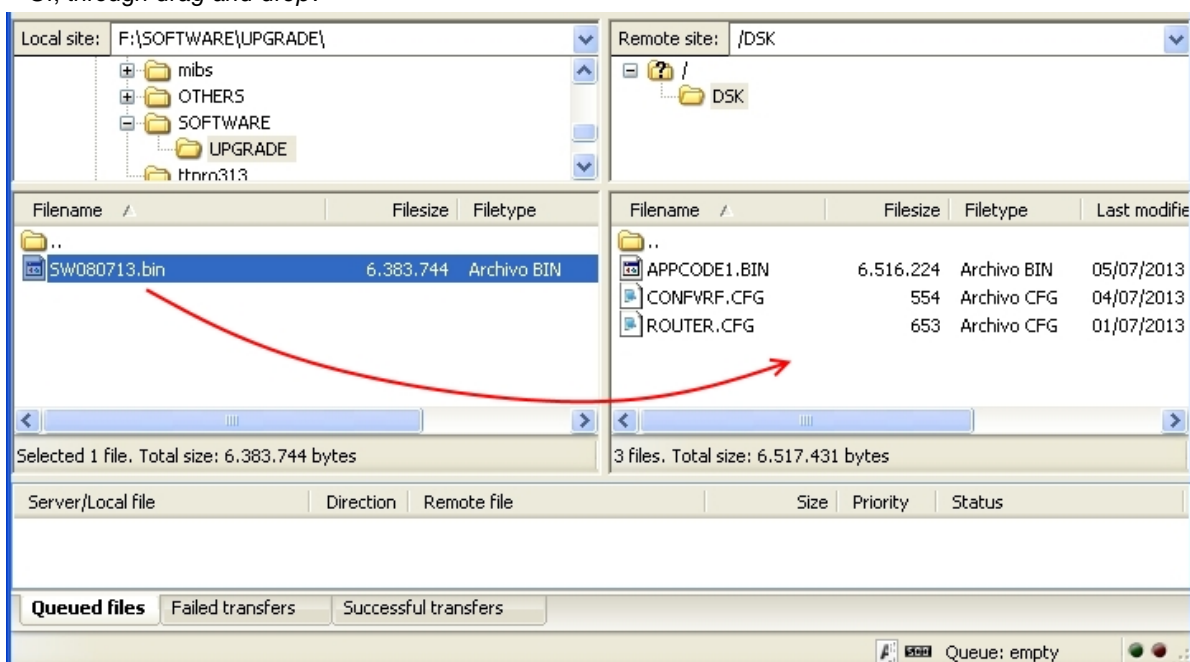
There are various ways of doing this:

- By simply right clicking on the file and selecting *Upload*.

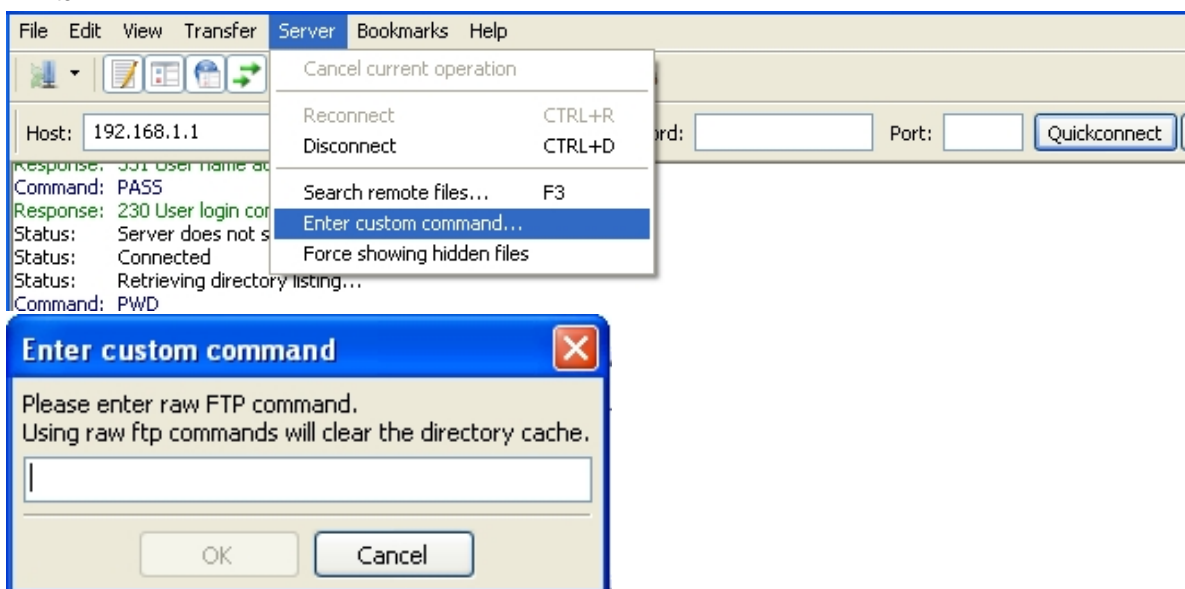




- By double clicking on the file.
- Or, through *drag and drop*.



- (3) *Execute the recording command for the file in the disk and close the FTP connection*  
 To do this, and for each FTP command going to be executed, select the *Enter custom command...* from the *Server* menu and enter the command to be executed in the new window. Once entered, click on *OK* or press *Enter*.



Execute the following commands in the given order:

- *site savebuffer*
- *site reload on* (optional command)
- *quit*



#### Note

While executing *site savebuffer*, you may receive a response reporting a device disconnection. If this happens, do not do anything. After a certain amount of time you'll receive an OK message associated to this command.

```
Command: LIST
Response: 150 Data connection open, list transfer in process...
Response: 226 List transfer completed, data connection is closed.
Status: Directory listing successful
Command: site savebuffer
Status: Disconnected from server
Response: 200 SAVEBUFFER completed O.K.
```

## 1.6.2 WinSCP Client

WinSCP is a Windows FTP client with free software that supports FTP, SFTP and SCP. This application lets you choose between two types of interfaces. We'll be using *Commander Interface* in this section.

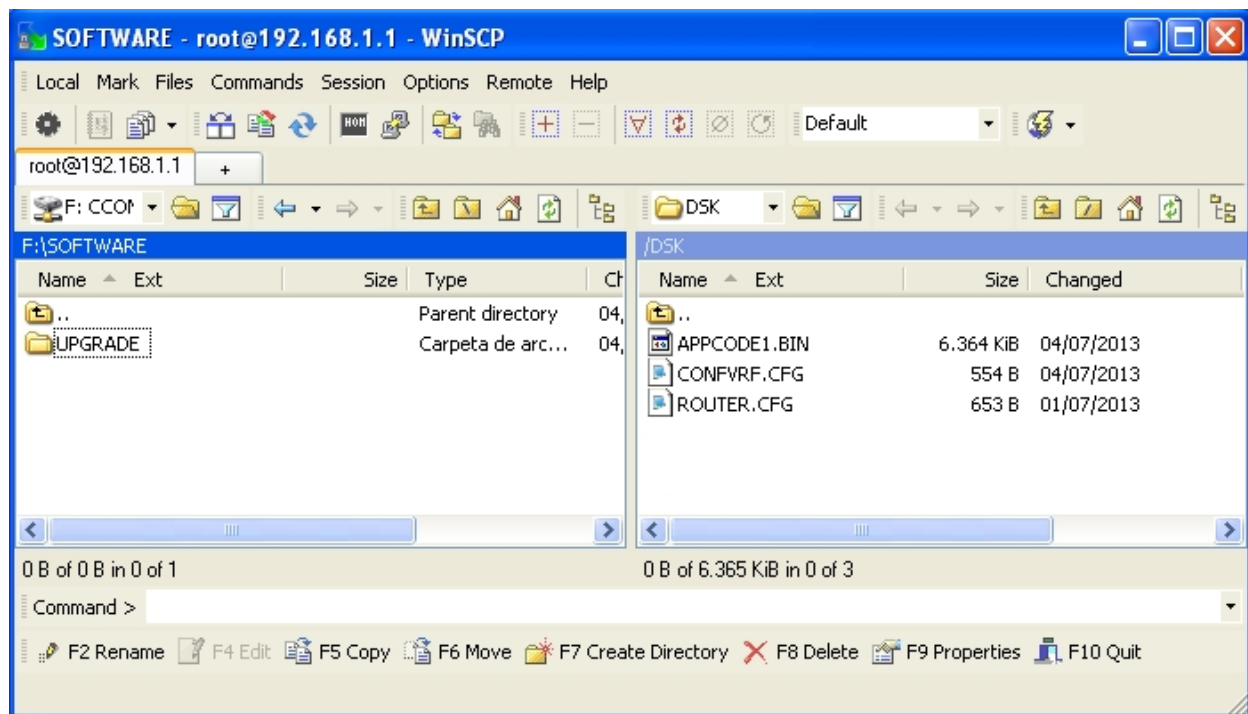
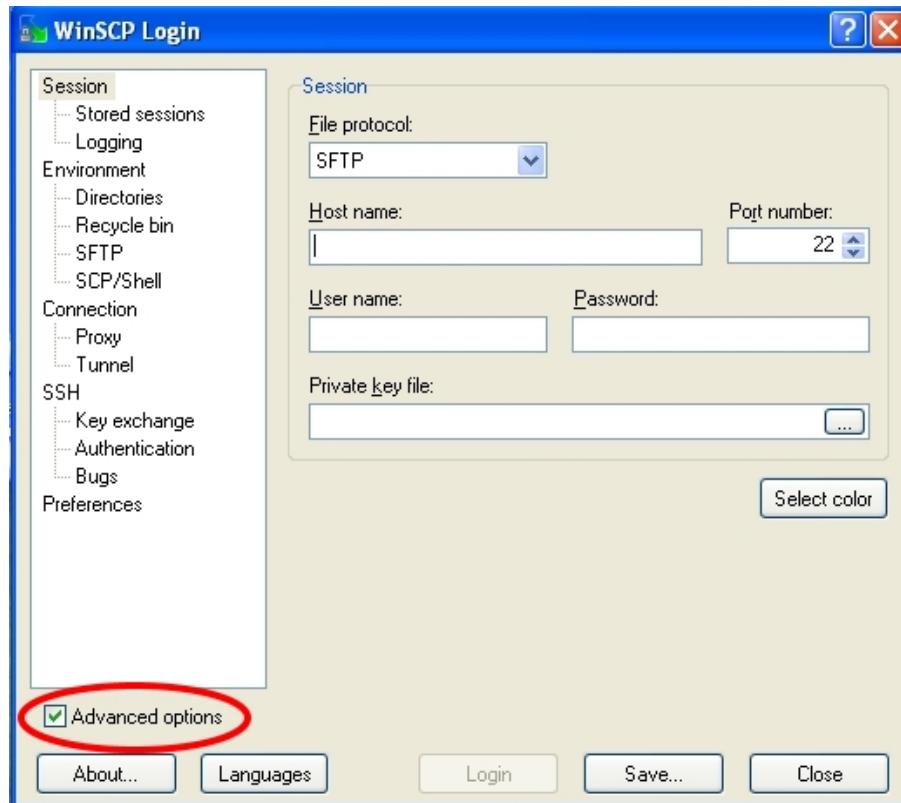


Fig. 2: "Commander Interface" Interface

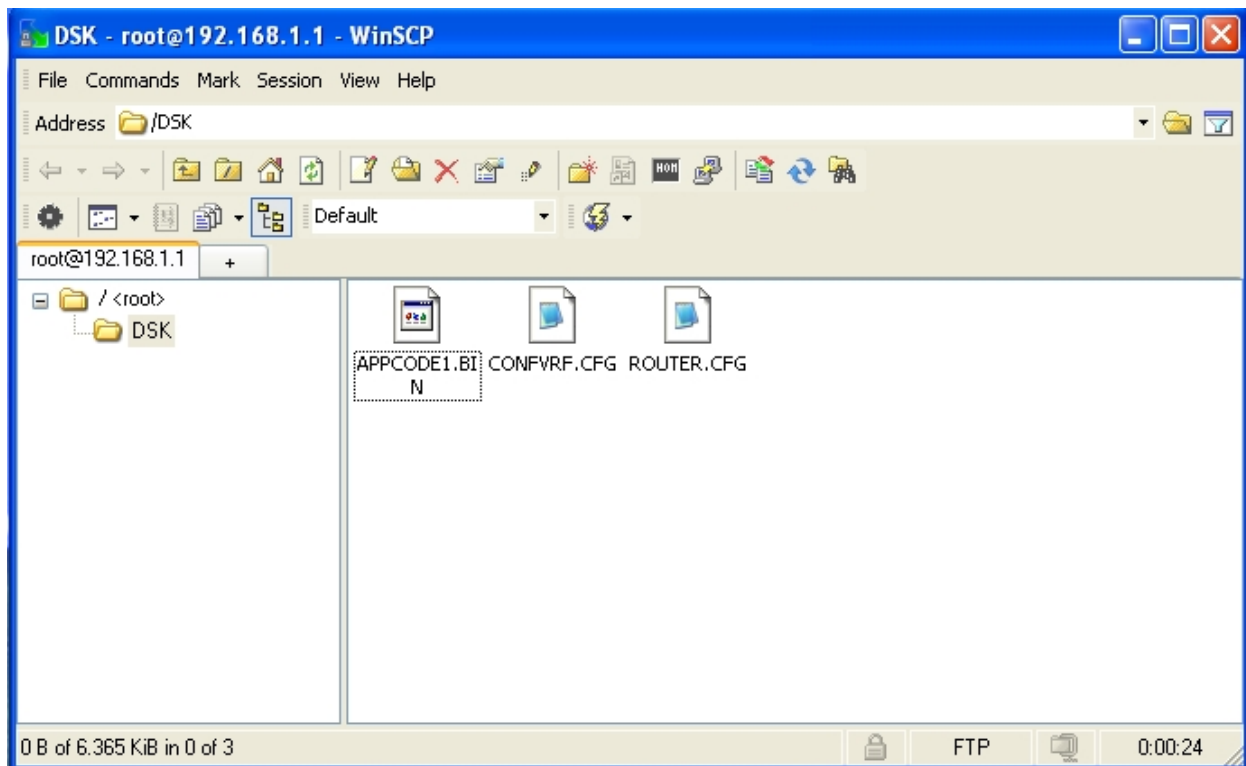
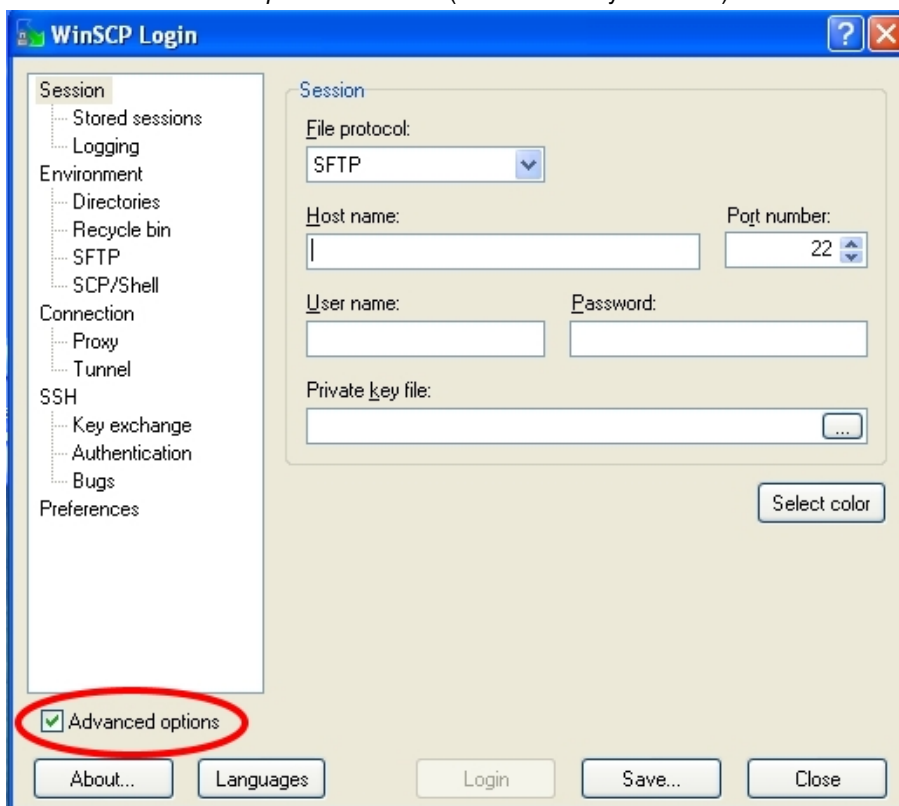


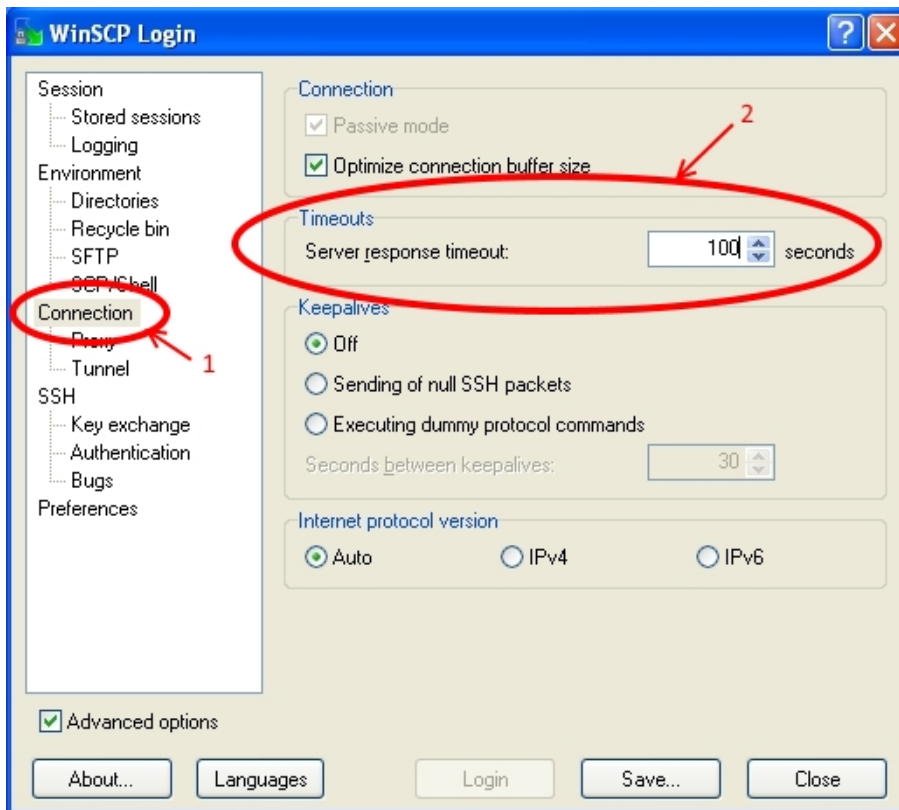
Fig. 3: Explorer Interface Interface

Before beginning the updating process, increase the response wait time to prevent the connection from being cut off while **site savebuffer** is executing. To do this, carry out the following:

- (1) Activate the *Advanced options* checkbox (if it isn't already activated).



- (2) Click on *Connection* and modify *Server response timeout*, assigning it a value of at least 100 seconds.



Once this change is made, update the software by executing the following steps:



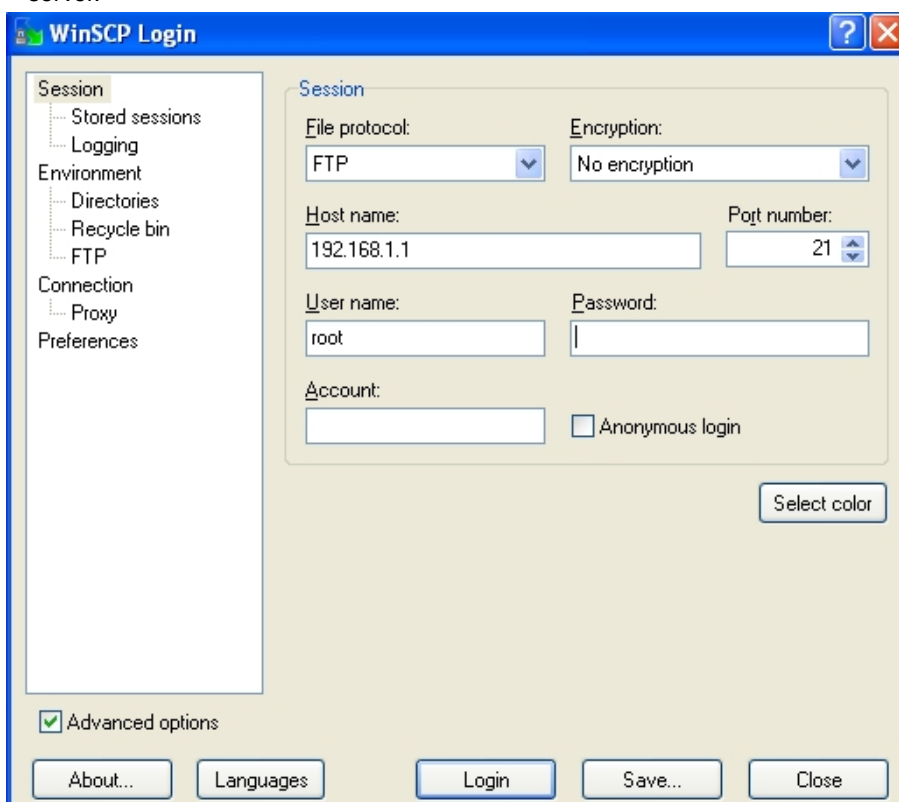
#### Note

Always use FTP protocol.

#### (1) Connecting to the router's FTP server

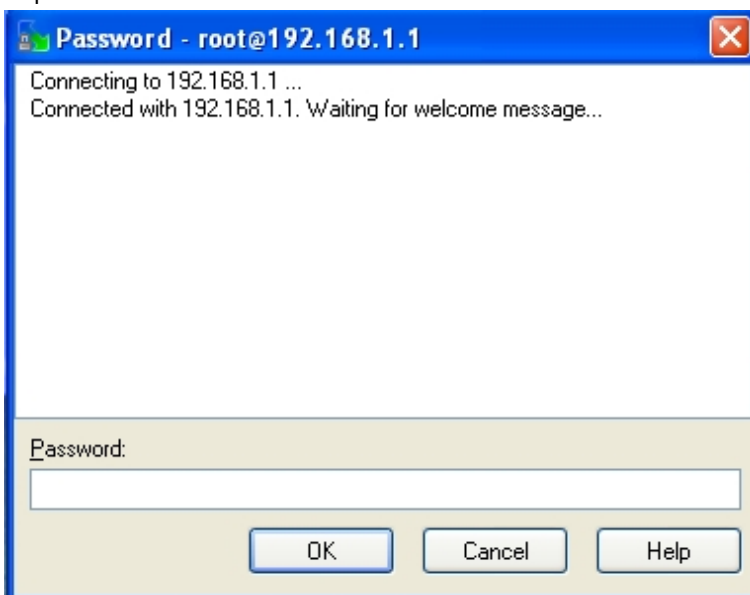
To do this, select FTP in the *File protocol* field and enter the router's IP address in *Host name*. Fill out the *User name* and *Password* fields with the username and the access password respectively. Where the router does not have any defined users, specify *root* as the user (no password is required).

The *Port* field should only be modified if a specific port, other than 21, has been configured in the router's FTP server.



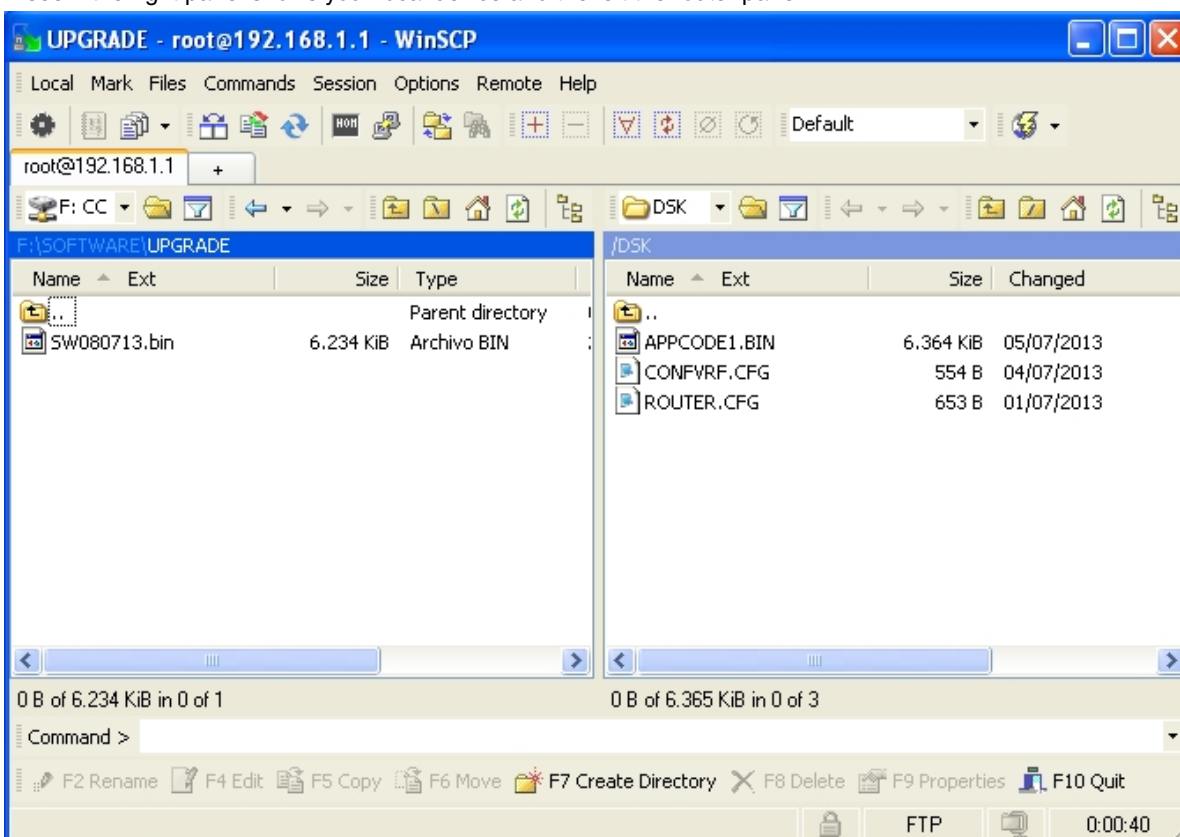
During the connection, you may be asked for the access credentials again. If this happens, reenter the re-

requested data and click on *OK*.

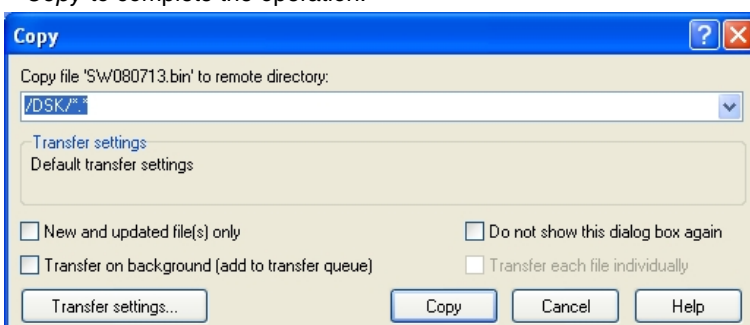


(2) *Transferring the required file*

Once the connection has established, the application displays the following window where two panels can be seen: the right panel shows your local device and the left the router panel.

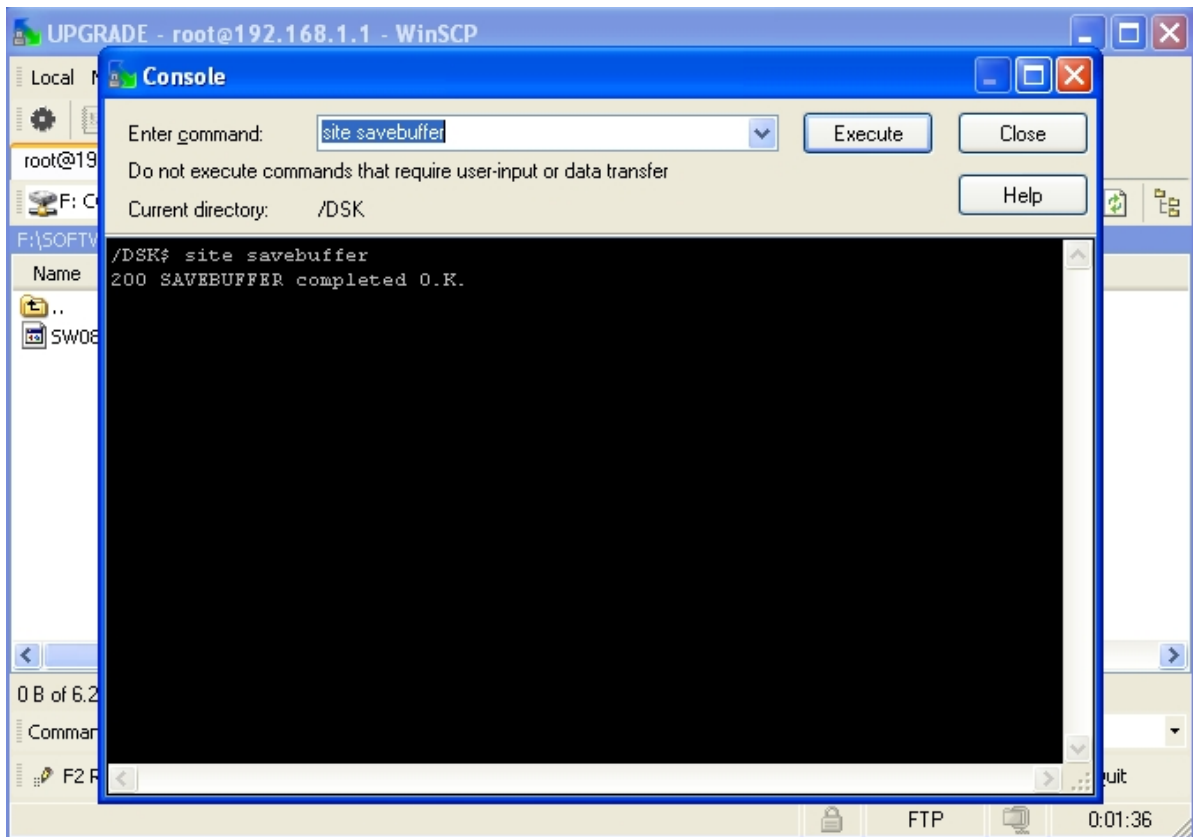


To transfer a file, use *drag and drop*. On releasing the mouse, the following dialog box appears. Just click on *Copy* to complete the operation.



(3) *Execute the recording command of the file in the disk and close the FTP connection*

To do this, select *Open Terminal* from the *Commands* menu. A new window will open.



On the upper right side, enter and execute the necessary commands one by one. To execute a command, click on *Execute* or press *Enter*. The application displays the results of each command on the lower part of the window.

Execute the following commands in the given order:

- *site savebuffer*
- *site reload on* (optional command)
- *quit*

### 1.6.3 FTP client through Linux console

An alternative way to update the software is to use the FTP client through the Linux console. Follow the same steps given in the corresponding subsection of *Chapter 2 "Updating Process"* according to the type of software you wish to update.

## Appendix A Backup Systems

### A.1 Distributing with BIOS, be.CLI and FWs files

These devices implement two backup systems, which lets you boot when the device detects problems.



#### Note

Some devices don't have enough space in Flash to store more than one be.CLI code. Ensure the total sum of the sizes does not exceed the available amount of Flash.

#### A.1.1 Two be.CLI codes loaded in the Flash disk.

On start up, the BIOS searches for the application established as active. If it doesn't find it (searching by name) or the CRC is incorrect, it searches for the next existing application file (\*.bin) in the disk: providing there are no problems, the BIOS starts up this second application.

```

Current production date: 13 35
Current software license: 34 26
S/N: 819/02723
BIOS MAC Add: 00-a0-26-ae-3d-7a
>>

*****
TRYING APP DUMP
  (CONFIGURED) NEWCODE.BIN ver.: 0,10,9,12 0,0,0,0
  *** ERROR ***
CRC error,
  (BY SEARCHING APP FILES ON FLASH)
  TRYING: NEWCODE.BIN ver.: 0,10,9,12 0,0,0,0
  *** ERROR ***
CRC error,
  TRYING: APPCODE1.BIN ver.: 0,10,9,8 10,8,0,0
APP CODE DUMP.....
.....
APP DATA DUMP.....
Running application at: 0x00200140
Default configuration used
Parsing text mode configuration ...
Configuration parsed
Initializing

Press any key to get started

```

You need to store both files with different names as, by default, the device ignores the file name and uses a specific name to record it. As a result, the device always replaces a file if it exists.

Execute the following steps:

- (1) Connect to the device FTP server.
- (2) Transfer and store the first be.CLI code if you want to update or replace the existing file:
  - Configure the binary mode through the **bin** command.
  - Transfer the application through the **put <application.bin>** command.
  - Once the transfer has completed, execute the recording command **quote site savebuffer**.



```
ftp> quote site savebuffer
200 SAVEBUFFER completed O.K.
ftp> ls
200 PORT is set to IP ADDR = 192.168.212.23  PORT = 39332
150 Data connection open, list transfer in process...
-rwxrwxrwx  1 ftp      ftp      7945344 Mar 27 2015 APPCODE1.BIN
226 List transfer completed, data connection is closed.
ftp>
```

- (3) Transfer and store the second be.CLI code with a different name:

- Execute **quote site check rename off**.

```
ftp> quote site check rename off
200 CHECK RENAME control is set to OFF.
```

- Configure the binary mode through **bin**.
- Transfer the application through **put <application.bin> <remote\_name>** where **<remote\_name>** is the name you want to assign to the file.

```
ftp> put rxxxxx.bin newcode.bin
```

- Once the transfer has completed, execute the recording command **quote site savebuffer**.

```
ftp> quote site savebuffer
200 SAVEBUFFER completed O.K.
ftp> ls
200 PORT is set to IP ADDR = 192.168.212.23  PORT = 58831
150 Data connection open, list transfer in process...
-rwxrwxrwx  1 ftp      ftp      8140160 Mar 27 2015 NEWCODE.BIN
-rwxrwxrwx  1 ftp      ftp      7945344 Mar 27 2015 APPCODE1.BIN
226 List transfer completed, data connection is closed.
```

- (4) Finally, indicate which of the two applications is to be established as active to boot the router. The other application is used as backup. There are two commands available for this:

- Console

```
Config>set application-active <code-file>
```

- FTP

```
ftp> rename <from-name> <to-name>
```

Command to let you establish the active application by renaming the files. So this works, remember the BIOS searches through the names on start up. You must assign same name to the new application (which you want to establish as active) that the current active application has.

## A.1.2 Flash Backup System

The Flash backup system allows automatic restoration of the last successfully installed distribution when the device detects problems in some of the software elements (BIOS FLASH, application and firmwares).

This system needs the Flash disk to be partitioned into two units, known as main and backup. Said partitioning means the available space for installation is less (half) and should only be activated when necessary. Ensure that the installation you want to execute can fit onto the main unit.

### Flash Disk Formatting

Formatting the Flash disk is destructive and only available in the local console to guarantee the user has local access to the device so it can be loaded correctly.

- (1) Pause device start up in BIOS by pressing CTRL-T keys together when a series of periods appear after two > symbols.



```
*****
*****
*****

BIOS CODE DUMP.....
BIOS DATA DUMP....
End of BIOS dump

FLASH BIOS CODE VERSION: 02.07 Mar 12 2014 11:41:18 L0

System Info:
PCB:0x13A GPPORCR:0x00000000 PVR:0x80212151 SVR:0x80F90110
CLKs: CCB=396000 CPU0/1=792000/0 DDR(clk)=330000 LBUS=99000 PCI0/1=0/0
Watchdog:Enabled
MMU Mode:Dynamic
ICache:ON DCache:ON Write-Back L2Cache:ON

Mem Info:
DRAM size: 128 Megabytes
  BANK 0: 128 Megabytes (detected)
FLASH: 32256 KB.
EEPROM: 16384 Bytes.

Devices:
SWITCH(4) 10/100/1000
GIGABIT ETHERNET 1
USB
NVRAM 128 KB
SECURITY ENGINE(0x0a140100)
PCI device: PowerPC processor, RC
  (Bus: 0, Device: 0, Function: 0)
  (Vendor: 0x1957, Device: 0x012A)
  (Subs. Vendor: 0x0000, Subs. Device: 0x0000)
Slot 1 - PCI device: network controller
  (Bus: 1, Device: 0, Function: 0)
  (Vendor: 0x168C, Device: 0x0030)
  (Subs. Vendor: 0x168C, Subs. Device: 0x3112)
PCI device: PowerPC processor, RC
  (Bus: 10, Device: 0, Function: 0)
  (Vendor: 0x1957, Device: 0x012A)
  (Subs. Vendor: 0x0000, Subs. Device: 0x0000)

Current production date: 13 35
Current software license: 34 26
S/N: 819/02723
BIOS MAC Add: 00-a0-26-ae-3d-7a
>>

***
```

- (2) Access the Flash disk menu:

```
=== INITIAL MENU ===

a) Change Time
b) Change Date
c) Change Code to Run
d) Change Licence
f) Disk menu
g) Set default name for file loaded from console
h) Change BIOS licence
l) Load from lan
sc) show configuration file name
s) Set temporary licence
u) Unset temporary licence
v) Change version control for loading
w) Change default ethernet device
x) Load from console (xmodem)
r) Reset
0) Exit
  >>f

=== DISK MENU ===

a) Change active drive,
c) Copy file,
d) Show files,
e) Erase file,
f) Format disk,
r) Rename archive,
0) Exit
  A:>>█
```

- (3) Format the main partition through the *AH: (Main disc - Half size)* option and subsequently the backup through *B: (BK disc - Half size)*.

```

=== DISK MENU ===

a) Change active drive.
c) Copy file.
d) Show files.
e) Erase file.
f) Format disk.
r) Rename archive.
0) Exit
A:;>>f

This operation can provoke important damages to equipment. Continue?(y/n): y
A: (only one disc - Full size);
AH: (Main disc - Half size);
B: (BK disc - Half size);
S: (Smart Card);
Drive: AH

Are you sure to format drive AH:?(y/n):y.....
*****
Drive formatted O.K.

=== DISK MENU ===

a) Change active drive.
c) Copy file.
d) Show files.
e) Erase file.
f) Format disk.
r) Rename archive.
0) Exit
A:;>>f

This operation can provoke important damages to equipment. Continue?(y/n): y
A: (only one disc - Full size);
AH: (Main disc - Half size);
B: (BK disc - Half size);
S: (Smart Card);
Drive: B

Are you sure to format drive B:?(y/n):y.....
*****
Drive formatted O.K.

```

After formatting and exiting menus, the device starts up and a be.CLI code must be loaded.

### Operating Flash Backup System

Once the Flash backup system has been enabled, the user must establish the restoration point, i.e. execute the copy of the main partition information to the backup partition. There are two commands available for this:

#### (1) Console

```

Config>backup-files
Backup in progress...
Backup successful.
Config>

```

#### (2) FTP

```

ftp> quote site backup
250 Backup successful.
ftp>

```

```

Config>file list
Config Media: Flash only
A:          APPCODE1.BIN    7945344    10/12/00    00:00    Flash
Flash Available Space : 6867 Kbytes

B:          APPCODE1.BIN    7945344    10/12/00    00:00    Flash Backup
Flash Backup Available Space : 6995 Kbytes

Config>

```

Once the restoration point has been established, the system is automatic:

- (1) On start up, the BIOS searches for the application established as active.
- (2) If it doesn't find it (searching by name) or the CRC is incorrect, it searches for the next existing application file (\*.bn) in the main partition.
- (3) If it doesn't find the next application file, or the CRC is incorrect, it makes a copy from the backup partition to the main partition: i.e. it executes a *backup restoring*.

```

Current production date: 13 35
Current software license: 34 26
S/N: 819/02723
BIOS MAC Add: 00-a0-26-ae-3d-7a
>>

*****
TRYING APP DUMP
  (CONFIGURED) APPCODE1.BIN ver.: 0,10,9,8 10,9,0,0
  *** ERROR ***
CRC error.
  (BY SEARCHING APP FILES ON FLASH)
  TRYING: APPCODE1.BIN ver.: 0,10,9,8 10,9,0,0
  *** ERROR ***
CRC error.
Restoring backup for application fault.....
Reading B:APPCODE1.BIN
Writing A:APPCODE1.BIN.....
..... OK.
Backup restored for application fault.
Restoring BIOS backup for application fault.....
BIOS Backup restored for application fault. Resetting...

```

- (4) Once the application has started up, when a determined firmware has been requested (\*.bfw files), the application checks the file is in the main partition and if it has a valid CRC. If the **firmware-checking** command is configured, and some of the requested firmwares fail (or do not exist or the CRC is invalid), the application requests a *backup restoring* and forces a router reset.
- (5) Once the BIOS (or the application) has provoked a *backup restoring*, the flag (that indicates this has started up from backup and can only be deactivated when you successfully re-execute *backup-files* or the **quote site backup** command) activates.

## A.2 Distributing with the be.CLI image file (IMG)

### A.2.1 Introduction

Devices with be.CLI image file distribution do not implement the backup flash although it does allow you to save two be.CLI images. It's the BOOT that automatically maintains the last two loaded images, provided the total sum of the image sizes does not exceed the available amount of Flash.

### A.2.2 Operating a system with double image in flash

- (1) On start up, the BOOT searches for the application established as active.
- (2) If it finds it, the device boots. If it doesn't (or the CRC is wrong), it looks for the second image.
- (3) If it finds it, the device boots. If it doesn't (or the CRC is wrong), the router will reboot.