

Application Note

101

bsmUpdate firmware update utility for PCoIP devices

This application note describes how to use the [bsmUpdate.exe](#) utility to run bulk BSM firmware updates on Amulet Hotkey PCoIP devices.

Note: [bsmUpdate.exe](#) 1.0.0 can only be used to update DXZ4 zero clients. Later versions will support updates to PCoIP host cards (ie, DXP4, DXH4 and DXM13 mezzanine cards).

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1. About BSM firmware updates

Each Amulet Hotkey T2 PCoIP host and zero client includes a Board Support Microcontroller (BSM). The BSM monitors and controls internal product operations.

To update the BSM firmware, you transfer a firmware update package over your network to the target BSM, identified by its IP address. In normal operation, however, the BSM is disconnected from the network to avoid the need for the Amulet Hotkey product to have a second DHCP address and to minimise potential attack surfaces. Therefore, to allow the BSM firmware to be updated remotely, the BSM network interface must be activated to allow the BSM to share the Ethernet link normally reserved for PCoIP traffic.

2. Update procedure summary

To update the BSM firmware on your PCoIP devices, the following steps are required:

1. Install the [bsmUpdate.exe](#) utility. See [section 3](#).
2. Create a device file, containing the IP address of the Teradici PCoIP devices. See [section 8](#).
3. Run [bsmUpdate.exe](#) to activate the BSM network interfaces on your PCoIP devices. See [section 5](#).
4. Determine the DHCP IP address assigned to the BSM and add these to the device file.
5. Run a second [bsmUpdate.exe](#) command to push and apply the BSM firmware update. See [section 6](#).

3. Introducing the bsmUpdate utility

[bsmUpdate](#) is simple command line utility created by Amulet Hotkey which allows you to gather information about your estate of PCoIP devices, activate the BSM network interface and update the BSM firmware.

3.1 Updating single or multiple devices

[bsmUpdate.exe](#) can be used to update single or multiple PCoIP devices.

To update a single device, you can use the `-t` and `-b` parameters to specify a target device by its IP addresses.

Alternatively, to update multiple devices you use the `-f` parameter to specify a device file that contains address details for all target devices.

For full syntax details, see [section 7](#).

3.2 Compatibility

[bsmUpdate.exe](#) has been developed for and tested with Windows 7 SP1 and Windows 8.1.

As a prerequisite it requires either Chrome or Firefox web browsers to be installed on the host PC.

The utility has been tested with Chrome version 47.0.2526.106 and Firefox version 43.0.4, these being the latest available versions at Jan 2016.

4. Installing bsmUpdate

The [bsmUpdate](#) utility is supplied as a Windows zip file along with a number of supporting files. To install the utility, unzip the file to your preferred network location.

The zip file also contains the BSM binary files.

5. Activate the BSM network interfaces

Before you can update the BSM firmware on your PCoIP devices, you must activate the BSM network interfaces on these devices. This enables the BSM on each device to acquire IP addresses.

Note: Remember to allow sufficient time for your DHCP server to allocate an IP address to the BSM after the network interface has been activated.

Run one of the following commands:

```
bsmUpdate -f <file> -eb
```

```
bsmUpdate -t <ip> -eb
```

Where:

- f <file> Specifies a *device file* i.e. a text file containing address details for the target devices.
<file> specifies the path and name of the device file. You can specify a fully qualified UNC path or a path relative to the [bsmUpdate.exe](#) installation folder.
The device file lists, as a minimum, the IP addresses of the Teradici processors on each target PCoIP device. For device file formats, see [section 8](#).
`--file <file>` is an alternative supported format.
- t <ip> Identifies a specific device where <ip> is the IP address of the device's Teradici processor.
For example
`-t 192.168.1.2`
`--teraIP <ip>` is an alternative supported format.
- eb Activates the BSM network interface on the specified devices in preparation for transferring a BSM firmware update package, add this parameter:
`--enableBSM` is an alternative supported format.

For full syntax details, see [section 7](#).

This command will generate a macAddr.txt file containing details of the BSM MAC addresses to assist with finding their IP addresses; see [section 10.2](#).

6. Update the BSM firmware

Now that the BSM on each target device has acquired an IP address, you can transfer the firmware update package to these devices.

For details about BSM behaviour after a firmware update has been transferred, see [section 6.2](#).

6.1 Firmware update commands

Run one of the following commands:

```
bsmUpdate -f <file> -ub [<ver>]
```

```
bsmUpdate -t <ip> -b <ip> -ub [<ver>]
```

Where:

- f <file>** Specifies a *device file* i.e. a text file containing address details for the target devices.
<file> specifies the path and name of the device file. You can specify a fully qualified UNC path or a path relative to the [bsmUpdate.exe](#) installation folder.
The device file lists, as a minimum, the IP addresses of the Teradici processors *and* BSM on each target PCoIP device. For device file formats, see [section 8](#).
--file <file> is an alternative supported format.
Alternatively, if updating a specific individual device, the required parameters comprise **-t** and **-b**.
- t <ip>** Identifies a specific device where <ip> is the IP address of the device's Teradici processor.
For example
-t 192.168.1.2
--teraIP <ip> is an alternative supported format.
- b <ip>** Identifies a specific device where <ip> is the IP address of the device's BSM. For example
-b 192.168.203.15
--bsmIP <ip> is an alternative supported format.
- ub [<ver>]** Specifies the version of BSM firmware to transfer.
If <ver> is omitted the script will update to the latest version, 0.4.8 at time of writing.
Alternatively, you can upgrade to a previous firmware version by including <ver>, where <ver> specifies the firmware in *n.n.n* format. For example, to update devices to BSM firmware 0.4.7, add this parameter:
-ub 0.4.7
--updateBSM [<ver>] is an alternative supported format.
Note: [bsmUpdate.exe](#) uses a built-in TFTP server to transfer the BSM firmware update package to the specified devices.

For full syntax details, see [section 7](#).

6.2 After the BSM firmware update has been transferred

Following a successful firmware update, note the following:

- **Zero clients wait for current PCoIP session to end:** By default, if a PCoIP session is in progress when the BSM firmware is updated, the zero client waits until the session closes before rebooting and switching to the new firmware image.

To force a PCoIP session to be terminated, use the `-fd` parameter; see [page 9](#).

- **The BSM disconnects from the network:** By default, the BSM network interface is deactivated after transferring a firmware update to a device.

To keep the BSM network interface activated, use the `-kb` parameter; see [page 9](#).

7. Command syntax

The command line syntax for running BSM firmware update operations is:

```
bsmUpdate <required_parameters> <update_parameter> [optional_parameters]
```

Where:

<required_parameters> are mandatory and identify the devices to be updated.

The required parameter is either:

-f <file> Specifies a *device file* ie a text file containing address details for the target devices.
<file> specifies the path and name of the device file. You can specify a fully qualified UNC path or a path relative to the `bsmUpdate.exe` installation folder. The **-f** parameter is suitable for bulk firmware updates on multiple devices.

For device file formats, see [section 8](#).

--file <file> is an alternative supported format.

Or, if updating a specific individual device, the required parameters comprise **-t** and **-b** plus, optionally, **-p**.

-t <ip> Identifies a specific device where <ip> is the IP address of the device's Teradici processor.
For example

```
-t 192.168.1.2
```

--teraIP <ip> is an alternative supported format.

-b <ip> Identifies a specific device where <ip> is the IP address of the device's BSM. For example

```
-b 192.168.203.15
```

--bsmIP <ip> is an alternative supported format.

-p <password> *Optional*. This parameter specifies the administrative password needed to change the configuration of a PCoIP device. If **-p** is omitted, the command uses the default password. (The factory pre-set password for all Amulet Hotkey zero clients is **ahkdante**.)

--password <password> is an alternative supported format.

<update_parameters> is one of the following:

-eb Activates the BSM network interface on the specified devices in preparation for transferring a BSM firmware update package.

Remember to allow sufficient time for your DHCP server to allocate an IP address to the BSM after the network interface has been activated.

--enableBSM is an alternative supported format.

-db Deactivates the BSM network interface after applying a firmware update.

--disableBSM is an alternative supported format.

-ub [**<ver>**] Updates the BSM firmware update package on the specified devices, where **<ver>** optionally specifies the firmware in **n.n.n** format. For example, to update devices to BSM firmware 0.4.8, add this parameter:

-ub 0.4.8

If **<ver>** is omitted, the latest available firmware version is used.

For example output generated by this parameter, see [section 7.1.2](#).

--updateBSM is an alternative supported format.

Note: **bsmUpdate.exe** uses a built-in TFTP server to transfer the BSM firmware update package to the specified devices.

<optional_parameters> can include the following:

-i Displays full details for the specified devices. For example output, see [section 7.1.3](#).

--info is an alternative supported format.

-bi Displays summary details for the BSM on each specified device. For example output, see [section 7.1.4](#).

--bsmInfo is an alternative supported format.

-w **<browser>** Specifies which web browser is used to open the Administrative Web Interface (AWI) in order to configure each specified zero client. **<browser>** can be:

Chrome or **chrome**

Firefox or **firefox**

If omitted, **bsmUpdate.exe** defaults to Chrome.

--webBrowser **<browser>** is an alternative supported format.

Note: **bsmUpdate.exe** launches the AWI in order to activate or deactivate the BSM's network interface; see the **-eb** and **-db** parameters above.

-l **<logfile>** specifies an alternative path and file name for the log file. For example, this parameter specifies the **\mylogs** subfolder below the **bsmUpdate.exe** installation folder:

-l mylogs\mylogfile.txt

Enclose the path and name in double quotes if they include spaces.

If **-l** is omitted, log entries are written to a default log file; see [section 10.1](#).

--logFile **logfile>** is an alternative supported format.

- fd** Disconnects the current PCoIP session on the specified devices. Note that firmware updates cannot be applied to a device if they are in a PCoIP session; this parameter ensures any open PCoIP sessions are ended before rolling out a firmware update.

`--forceSessionDisconnect` is an alternative supported format.

Note: If a device *is* in a PCoIP session when a firmware update is applied, the update is cached on the device and applied after the session ends.
- kb** Keeps BSM network interface activated after running transferring a firmware update to a device (see the `-ub` parameter above).

`--keepBsmOnNetwork` is an alternative supported format.

Note: If you apply the `-kb` parameter, you will subsequently need to re-run `bsmUpdate.exe` with the `-db` parameter to manually deactivate the BSM network interface.
- h** Displays help information for the `bsmUpdate.exe` parameters.

`--help` is an alternative supported format.

7.1 Example commands

7.1.1 Activating the network interface

- To active BSM network interfaces on devices listed in the device file `MyDevices.txt`:
`bsmUpdate -f MyDevices.txt -eb`
Where `MyDevices.txt` lists the Teradici IP addresses for the target devices.
- To active BSM network interfaces on a specific device:
`bsmUpdate -t 192.168.203.1 -p my_password -eb`
Where `192.168.203.1` is the Teradici IP address for the target device and `my_password` is the password required to reconfigure PCoIP settings on the target device.

7.1.2 Updating the BSM firmware

- To update the BSM firmware to version 0.4.8 on devices listed in MyDevices.txt:
`bsmUpdate -f MyDevices.txt -ub 0.4.8`

Where `MyDevices.txt` lists the Teradici IP addresses *and BSM IP address* for the target devices.

- To update the BSM firmware to version 0.4.8 on a specific device:
`bsmUpdate -t 192.168.203.1 -b 192.168.203.15 -ub 0.4.8`

Where `192.168.203.1` is the Teradici IP address and `192.168.203.15` is the BSM IP address for the target device. No password is specified, so `bsmUpdate.exe` uses the factory default password **ahkdante**.

Example output

```
>bsmUpdate.py -ub 0.4.7 -t 192.168.203.32 -b 192.168.203.80
Creating log file [logs/20160114-16.13.12_bsmUpdate.log]

Amulet Hotkey BSM update script
=====
AHK part no   : SW-SCRT-0080
Version      : 1.0.0-RC4
Released     : 11-Jan-2015
svn         : 92:94
Browser      : chrome
Command      : bsmUpdate.py -ub 0.4.7 -t 192.168.203.32 -b 192.168.203.80
Selenium     : 2.48.0
Platform     : Windows-7-6.1.7601-SP1
Device file  : Single device specified [192.168.203.32]
Running from : Q:\T2\PCSoftware\SW-SCRT-0080-1.0.0-RC4
ChromeDriver : 2.16
              Opening Chrome web browser, please wait...
Chrome ver   : 47.0.2526.106
-----
[1.1] Finished opening browser
Attempting to log into dev 0 [192.168.203.32]...
[3.1] Reached home page
192.168.203.32 is a Zero Client
[3.1] Logged in
-----
[3.1] Scraping details for dev 0 [192.168.203.32]...
Browsed to Version page
Found 4045 lines in the log file
found #15 BSM version lines in log
-----
First live device 0 [192.168.203.32] is a DXZ4
Updating all DXZ4 BSM's to 0.4.7 using file [Q:\T2\PCSoftware\SW-SCRT-0080-1.0.0-RC4\firmware\FW-DXZ4-0010_0.4.7-GA.bsm]
-----
[9.1] Checking if dev 0 [192.168.203.32] BSM [192.168.203.80] is reachable from here...
[12.1] dev 0 [192.168.203.32] BSM [192.168.203.80] seen on the network, about to push update 0.4.7
[12.1] Logged out of Zero Client
[17.1] tftp upload complete
-----
BSM Update Summary
-----
ID  Ter  Firmware   Tera IP addr   BSM Firmware  BSM IP addr   Update
-----
  0  [Tera 5.0.0] 192.168.203.32 [BSM 0.4.7]   192.168.203.80 ok
-----
dev 0 bsm update occurred 0 s ago, waiting for 45 seconds to allow reboot to occur
Still waiting...
still waiting...
```

Continues on next page

```
Attempting to log into dev 0 [192.168.203.32]...
[63.1] Reached home page
192.168.203.32 is a Zero Client
[63.1] Logged in
Found 4188 lines in the log file
found #16 BSM version lines in log
-----
Disabling the BSM network
[65.1] disabling the BSM for dev 0 [192.168.203.32]...
Toggling the BSM network state...
BSM network now disabled
-----
```

BSM Update Summary

ID	Ter Firmware	Tera IP addr	BSM Firmware	BSM IP addr	Update
0	[Tera 5.0.0]	192.168.203.32	[BSM 0.4.7]	disabled	ok

[65.1] Shutting down...

7.1.3 Displaying information for a specific device

- To display full information for a specific device:
`bsmUpdate -t 192.168.203.1 -p my_password --info`

Where [192.168.203.1](#) is the Teradici IP address for the target device.

Example output...

```
> bsmUpdate.py -i -t 192.168.203.32

08:51:46.920000: -----
08:51:46.927000: Device[0]
08:51:46.928000: -----
08:51:46.929000: Tera IP address      : 192.168.203.1
08:51:46.930000: Tera password       : ahkdante
08:51:46.931000: teraIpAlive        : yes
08:51:46.932000: issueSummary       : ok
08:51:46.933000: -----
08:51:46.934000: Tera type           : Zero Client
08:51:46.935000: Tera FW version    : 5.0.0
08:51:46.936000: Tera MAC address   : 00-17-FD-50-26-16
08:51:46.936000: Tera FW part no    : FW020035
08:51:46.937000: Tera Processor     : TERA2140 revision 1.0 (512 MB)
08:51:46.938000: Tera up time       : 1 Days 1 Hours 5 Minutes 47 Seconds
08:51:46.939000: Line in log        : 4399
08:51:46.940000: -----
08:51:46.941000: AHK model          : DXZ4
08:51:46.942000: AHK build           : 2.1.A
08:51:46.943000: AHK serial no      : BW13333D3
08:51:46.944000: BSM initial firmware: 0.4.7
08:51:46.944000: BSM new firmware   : unknown
08:51:46.945000: BSM network status : disabled
08:51:46.946000: BSM IP address     : unknown
08:51:46.947000: BSM MAC address    : 00-17-FD-B0-26-16
08:51:46.948000: -----
08:51:46.949000: Session status     : Disconnected
08:51:46.950000: Session duration   : N/A
08:51:46.951000: Peer IP address    : N/A
08:51:46.952000: -----
08:51:46.953000: teraLoggedIn       : True
08:51:46.954000: bsmIpAlive         : unknown
08:51:46.955000: bsmUpdateRequired  : True
08:51:46.956000: bsmUpdateComplete  : False
08:51:46.957000: bsmUpdateSuccessful : unknown
08:51:46.957000: -----
```

7.1.4 Displaying information for all devices

- To display full information for all devices:

```
bsmUpdate -t MyDevices.txt --info
```

Where *MyDevices.txt* lists the Teradici IP addresses *and BSM IP address* for the target devices.

- To display a summary table of information for all devices:

```
bsmUpdate -t MyDevices.txt --bsmInfo
```

Where *MyDevices.txt* lists the Teradici IP addresses *and BSM IP address* for the target devices.

```
> bsmUpdate.py -bi -t 192.168.203.32
```

```
-----  
BSM Update Summary  
-----
```

ID	Ter Firmware	Tera IP addr	BSM Firmware	BSM IP addr	Update
0	[Tera 5.0.0]	192.168.203.32	[BSM 0.4.8]	None	ok
1	[Tera 5.0.0]	192.168.203.44	[BSM 0.4.7]	None	ok
2	[Tera 5.0.0]	192.168.203.65	[BSM 0.4.2]	None	ok

```
-----
```

8. Device file format

The device file identifies the target devices that require an update to their BSM firmware. For each device, the BSM is identified by its IP address.

Lines in the device file identify individual devices and must use this comma-separated format:
`<Teradici IP address>,[<BSM IP address>],[<Teradici password >]`

The device file can also include lines of comment (see the examples below) and blank lines.

An example device file named `devices.txt` is included in the zip file.

8.1 Layout and format notes

- Details for each product must be included on a single line
- Each line *must* include the IP address of the product's Teradici processor
- Each line can optionally include the IP address of the product's BSM
- Each line can optionally include a custom password for configuring the Teradici processor
- The Teradici IP address, BSM IP address and Teradici password must be separated by commas. If the BSM IP address is omitted, use two commands to separate the Teradici IP address and Teradici password
- Prefix lines of comment with a '#' symbol
- White spaces and blank lines can be included to make the content easier to read

8.2 Example lines in the device file

- Only the Teradici IP address
`192.168.0.1`
- Teradici IP address and BSM IP address
`192.168.0.3, 192.168.0.5`
- Teradici IP address, BSM IP address, and password
`192.168.0.6, 192.168.0.8, my_password`
- Teradici IP address and password but no BSM IP address
`192.168.0.3, , my_password`
- Teradici IP address, BSM IP address, and password. With additional spacing
`192.168.0.6 , 192.168.0.8 , my_password`
- Comments
`# Zero clients in London office`

9. BSM IP address

9.1 Determining BSM IP addresses

To perform a BSM firmware update, you will need to discover the IP address of each target BSM. You can then add these IP addresses to your device file.

1. A BSM can only be identified by its MAC address. Therefore, you first need to identify the target BSMs by their MAC addresses. You can easily retrieve BSM MAC addresses from macAddr.txt output file; see [section 10.2](#).

2. Having identified the target BSM MAC addresses, you can then discover their IP addresses.

Use your preferred network tools to compile the IP address details you want to include in the device file. For example, to determine the IP address of the BSM after its network interface has been activated, you can use the Fing network toolkit from www.overloadsoft.com.

Alternatively, you can manually compile the IP address details. The simplest method is to use the target BSM MAC addresses to look up the BSM IP addresses in the DHCP console. This process is described in section 6 of the *DXZ4 Manual*, available to registered users on the Amulet Hotkey website, <https://resources.amulethotkey.com/resources/pcoip-zero-client/dxz4-series>

9.2 DHCP address releasing

Applies only to DXZ4 BSM version 0.4.8 or earlier

BSM version 0.4.8 and earlier does not release the DHCP address when the BSM network is deactivated following a firmware update. On networks with limited spare DHCP addresses, you must either wait for the address to expire or a network administrator must manually release the address.

Note: This issue will be resolved in future BSM releases.

10. Output data

Each time `bsmUpdate.exe` runs, it generates a log file and a `macAddr.txt` file. In addition, key commands output important status information.

10.1 Log files

All output generated by `bsmUpdate.exe` is also written to a log file. By default, the log file name is:
`<timestamp>_bsmUpdate.log`

Where `<timestamp>` is in `yyyymmdd_hh.mm.ss` format. For example:
`20151216_09.45.23_bsmUpdate.log`

If a Chrome browser is used, an additional log is created with the following file name format:
`<timestamp>_chrome.log`

The default location for the log file is the `\logs` subfolder below the `bsmUpdate.exe` installation folder.

Alternatively, you can specify a custom log file name and location using the `-l` parameter; see [page 8](#).

10.2 macAddr.txt

This text file lists of the IP and MAC address for the Teradici processor and the MAC address for the BSM on each specified devices. This file can help you locate BSM MAC address for large deployments of PCoIP devices. Its content has the following format:

dev	product	tera IP	tera Mac	bsm Mac
0	DXZ4-M	192.168.203.10	00-17-FD-51-03-FE	00-17-FD-B1-03-FE
1	DXZ4-M	192.168.203.11	00-17-FD-51-04-10	00-17-FD-B1-04-10