



Metal Tower

**Remote Telemetry Unit (RTU)**  
**Upgrading RTU Firmware Over IP**

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## Quick Summary

**Note:** This section is a summary of the steps required to load firmware into an RTU over an IP connection. If you are not familiar with these steps, skip to the more detailed sections that follow.

To load firmware into an RTU over an IP connection:

- Ensure the RTU is correctly connected to your computer. Use the `ping` command to confirm this.
- Start the `UDPDownload.exe` program.
- The program will search for RTUs connected on your network. The names of the RTUs are listed in the white box to the middle of the program window.
- Ensure the correct path and name of the `PDL-Generic.bin` file is displayed in the RAM Loader box at the top of the window. If it is not, click the "3 dots" button to its right and select the file.
- Ensure the correct path and name of the new firmware `.bin` file is displayed in the User Program box at the top of the window. If it is not, click the "3 dots" button to its right and select the file.
- In the box with the names of discovered RTUs, click on the name of the RTU you wish to upgrade.
- Click `Download` in the menu bar at the top of the window.
- Wait for the program to upgrade the RTU.

## What You Will Need

RMS / Metal Tower makes available a program known as the Network Download Utility program, named `UDPDownload.exe`, that is licensed from SHDesigns. The program is located in the `UDP Download` folder of the CD supplied by RMS / Metal Tower and is also available from the downloads area of the RMS / Metal Tower web site

[www.rmsystems.com](http://www.rmsystems.com). The other files that you will need are:

- `PDL-Generic.bin` is a binary file that manages the loading of the new firmware into the RTU;
- `UDPDownload.ini` is a configuration file used by the download program;
- `UDPDownload.pdf` is the generic set of instructions prepared by SHDesigns and is supplied for your information.
- This document that you are currently reading has the information you need to upgrade the RTU.

The RTU you wish to upgrade must be configured with an IP connection. You will also require a binary (`.bin`) file supplied by RMS / Metal Tower that contains the new RTU firmware.

## Overview

The firmware version released by RMS / Metal Tower in October 2005 has the ability to remotely upgrade the RTU's Network firmware over an IP network. RMS / Metal Tower licensed a third party utility from SHDesigns. The utility is known as the Network Download Utility. It uses UDP to transmit new firmware into the RTU.

In most cases the RTU will retain all its settings after the new firmware has been installed. However, where the internal storage of settings has been altered, it may be necessary to carry out the upgrade in two stages:

- The first stage reorganises the internal storage of settings to meet the requirements of the new version;
- The second stage loads the new firmware into the RTU and uses the new settings.

It is always a good idea to back up your settings before making any changes to your hardware or firmware. RMS / Metal Tower provides a separate utility known as the RTU Device Manager that enables you to do this.

## Where to Find the Files

The CD supplied by RMS / Metal Tower contains all files in the \RMS folder. The files you require for the firmware upload are located in

- \RMS\UDP Download

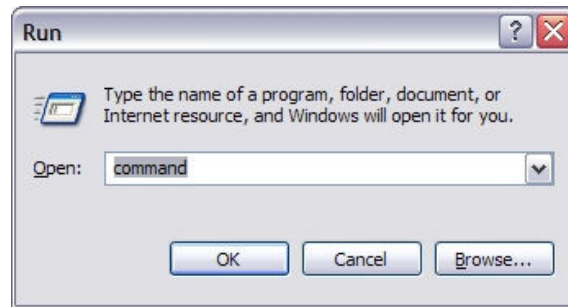
Firmware binaries are located in

- \RMS\Binaries

## Loading the Firmware

Ensure the RTU is correctly connected to your network.

Use the Windows `ping` command to do this.

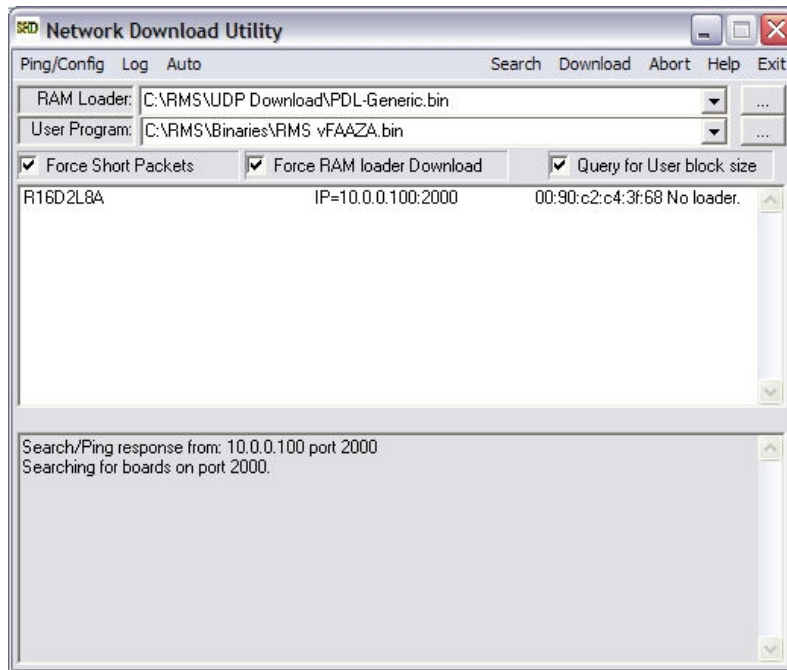


```
C:\WINDOWS\system32\command.com
Microsoft(R) Windows DOS
(C)Copyright Microsoft Corp 1990-2001.
C:\DOCUME~1\MAGIUS>ping 10.0.0.100
Pinging 10.0.0.100 with 32 bytes of data:
Reply from 10.0.0.100: bytes=32 time=4ms TTL=64
Reply from 10.0.0.100: bytes=32 time=3ms TTL=64
Reply from 10.0.0.100: bytes=32 time=1ms TTL=64
Reply from 10.0.0.100: bytes=32 time=1ms TTL=64
Ping statistics for 10.0.0.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 4ms, Average = 2ms
C:\DOCUME~1\MAGIUS>
C:\DOCUME~1\MAGIUS>_
```

To use the `ping` command:

- Click the Start button in your Windows task bar.
- Click the Run... item in the Start menu.
- Type `command` in the Open: box of the Run window that pops up.
- Click the OK button. The command (DOS) window will open.
- Type in `ping` followed by a space and the IP address of the RTU.
- The command will display "Reply from" messages if the RTU is accessible and responding.

When you know that the RTU is running and contactable, start up the Network Download Utility program, `UDPDownload.exe`. The program will display the following window:



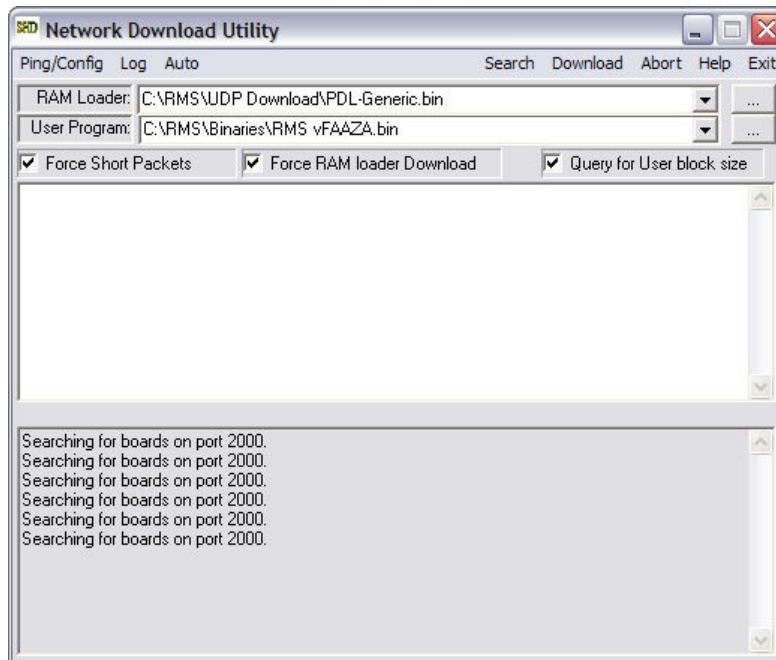
The program displays its actions in the grey box at the bottom of the window. The most recent actions are displayed at the top of the box, pushing older actions to the bottom.

When the program starts, it searches for connected RTUs. For each RTU it finds, the program displays:

- The configured RTU name
- The IP address
- The MAC address

This information is displayed in the white box in the middle of the window.

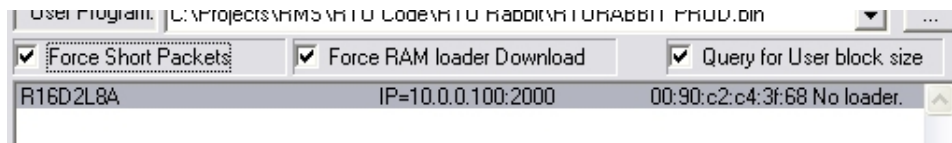
If the program does not find any RTUs it will keep searching until it finds at least one RTU, as shown below:



You will normally leave all settings at their default values as shown above. The settings you may need to adjust are:

- `RAM Loader` must be set to the location of the `PDL-Generic.bin` file. Use the button to the right of this entry (with a caption of 3 dots) to browse to the file if necessary.
- `User Program` must be set to the location of the new firmware binary (.bin) file supplied by RMS / Metal Tower. Use the button to the right of this entry (with a caption of 3 dots) to browse to the file if necessary.

Click on the entry for the RTU you wish to upgrade. The entry will be highlighted in the white box.



Click the `Download` entry in the menu bar. This will immediately commence the firmware update process.



Following is a typical upgrade sequence as reported by the UDP Download Utility program:

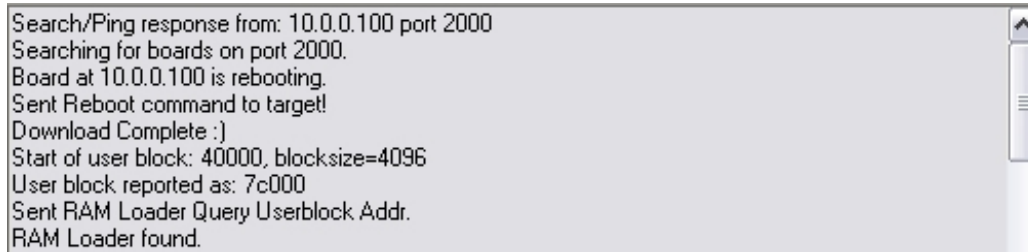
```
RAM Loader found.  
Search/Ping response from: 10.0.0.100 port 2000  
Sent ping to 10.0.0.100 port 2000  
Looking for RAM loader.  
Sent RAM Loader Run command to target!  
Download Complete :)  
Sent RAM Loader Size to target!  
Route to board ok  
Search/Ping response from: 10.0.0.100 port 2000  
Checking route to 10.0.0.100  
Downloading board 1 of 1 at IP=10.0.0.100.
```

Remember to read the actions from the bottom of the screen up. The Network Download Utility program checks that it can communicate with the RTU. The RTU contains enough code to allow a small UDP download manager (the RAM Loader) to be loaded into it. The Network Download Utility program downloads the RAM Loader code (this is the `PDL-Generic.bin` file) into the RTU. When the RTU has loaded this code, the Network Download Utility program sends a command to reboot the RTU.

The RTU will reboot at the same IP Address, now with the RAM Loader code present.

Note that when the RTU is running normally, it locks the IP connection down to 10Mbps. With the RAM Loader present, the RTU will negotiate the highest speed available with your network. When you install the RTU you need to be sure that the RTU negotiates and connects correctly, otherwise the firmware download will fail.

The following image shows the remainder of the download process:

A screenshot of a terminal window with a grey background and white text. The text shows the final steps of a firmware upgrade: a search/ping response from 10.0.0.100 on port 2000, searching for boards, a board at 10.0.0.100 rebooting, a reboot command being sent, the download being complete, the start of a user block at 40000 with a block size of 4096, the user block being reported as 7c000, a RAM loader query being sent, and the RAM loader being found. The terminal window has a scroll bar on the right side.

```
Search/Ping response from: 10.0.0.100 port 2000
Searching for boards on port 2000.
Board at 10.0.0.100 is rebooting.
Sent Reboot command to target!
Download Complete :)
Start of user block: 40000, blocksize=4096
User block reported as: 7c000
Sent RAM Loader Query Userblock Addr.
RAM Loader found.
```

The Network Download Utility program works with the RAM Loader to send the new firmware to the RTU. The new firmware is the file referred to as the `User Program`. When the new firmware has been successfully loaded, the Network Download Utility program sends a command to reboot the RTU.

The RTU will reboot and connect to the network at the same IP address. The RTU will again lock down to 10Mbps (unless this feature has been overridden in the firmware) and the RTU will operate normally using the new firmware.