Intel® Remote Management Module 2 User Guide

Order Number: E27084-001

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Intel server boards contain a number of high-density VLSI and power delivery components that need adequate airflow for cooling. Intel's own chassis are designed and tested to meet the intended thermal requirements of these components when the fully integrated system is used together. It is the responsibility of the system integrator that chooses not to use Intel developed server building blocks to consult vendor datasheets and operating parameters to determine the amount of airflow required for their specific application and environmental conditions. Intel Corporation can not be held responsible if components fail or the server board does not operate correctly when used outside any of their published operating or non-operating limits.

Preface

About this Manual

Thank you for purchasing and using the Intel® Remote Management Module 2.

This manual is written for system technicians who are responsible for installing, troubleshooting, upgrading, and repairing this management module. This document provides a brief overview of the features of the module, and instructions on how to use and operate the Intel® Remote Management Module 2.

Manual Organization

Chapter 1 provides a brief overview of the Intel® Remote Management Module 2. In this chapter, you will find a list of the module features and photos of the product.

Chapter 2 provides instructions on installing the module. Use this chapter for step-by-step instructions.

Chapter 3 provides instructions on using the utility – Psetup, which can be used to identify the IP address of the Intel® RMM2.

Chapter 4 provides instructions on using the utility KiraTool, which is a command line application used to probe, manage, and configure the Intel® RMM2.

Chapter 5 provides an introduction to the Intel® RMM2 and the Web interface used for connections.

Chapter 6 outlines the steps to use the Remote Console (KVM) connection.

Chapter 7 covers all the menu options available on the Web interface.

Safety Information

WARNING

Before working with your Intel® RMM2 product, whether you are using this guide or any other resource as a reference, pay close attention to the safety instructions. You must adhere to the assembly instructions in this guide to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL listing and other regulatory approvals of the product and will most likely result in noncompliance with product regulations in the region(s) in which the product is sold.

WARNINGS

System power on/off: The server power button DOES NOT turn off the system power or Intel® RMM2 power. To remove power from the Intel® RMM2 you must unplug the server AC power cord from the wall outlet. Make sure the AC power cord is unplugged before you open the chassis to add or remove the Intel® RMM2.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

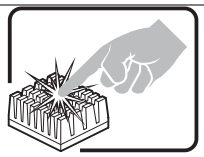
Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine needle nosed pliers. If your jumpers do not have such a tab, take care when using needle nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool you use to remove a jumper, or you may bend or break the pins on the board.

Safety Cautions

Read all caution and safety statements in this document before performing any of the instructions. See also *Intel Server Boards and Server Chassis Safety Information* at http://support.intel.com/support/motherboards/server/sb/cs-010770.htm.

SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps:

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by pressing the power button.
3. Unplug all AC power cords from the system or from wall outlets.
4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system.
5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.
6. Do not operate the system with the chassis covers removed.



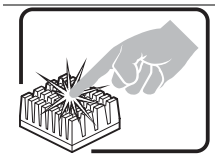
A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.

Wichtige Sicherheitshinweise

Lesen Sie zunächst sämtliche Warn- und Sicherheitshinweise in diesem Dokument, bevor Sie eine der Anweisungen ausführen. Beachten Sie hierzu auch die Sicherheitshinweise zu Intel-Serverplatinen und -Servergehäusen auf der Ressourcen-CD oder unter http://support.intel.com/support/motherboards/server/sb/cs-010770.htm.

SICHERHEISMASSNAHMEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten:

1. Schalten Sie alle an Ihr System angeschlossenen Peripheriegeräte aus.
2. Schalten Sie das System mit dem Hauptschalter aus.
3. Ziehen Sie den Stromanschlußstecker Ihres Systems aus der Steckdose.
4. Auf der Rückseite des Systems beschriften und ziehen Sie alle Anschlußkabel von den I/O Anschlüssen oder Ports ab.
5. Tragen Sie ein geerdetes Antistatik Gelenkband, um elektrostatische Ladungen (ESD) über blanke Metallstellen bei der Handhabung der Komponenten zu vermeiden.
6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.



Der Mikroprozessor und der Kühler sind möglicherweise erhitzt, wenn das System in Betrieb ist. Außerdem können einige Platinen und Gehäuseteile scharfe Spitzen und Kanten aufweisen. Arbeiten an Platinen und Gehäuse sollten vorsichtig ausgeführt werden. Sie sollten Schutzhandschuhe tragen.

重要安全指导

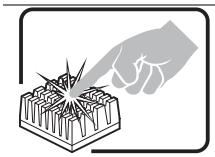
在执行任何指令之前，请阅读本文档中的所有注意事项及安全声明。参见 Resource CD（资源光盘） 和/或http://support.intel.com/support/motherboards/server/sb/cs-010770.htm 上的 *Intel Server Boards and Server Chassis Safety Information*（《Intel 服务器主板与服务器机箱安全信息》）。

Consignes de sécurité

Lisez attention toutes les consignes de sécurité et les mises en garde indiquées dans ce document avant de suivre toute instruction. Consultez *Intel Server Boards and Server Chassis Safety Information* sur le CD Resource CD ou bien rendez-vous sur le site http://support.intel.com/support/motherboards/server/sb/cs-010770.htm.

CONSIGNES DE SÉCURITÉ -Lorsque vous ouvrez le boîtier pour accéder à l'intérieur du système, suivez les consignes suivantes:

1. Mettez hors tension tous les périphériques connectés au système.
2. Mettez le système hors tension en mettant l'interrupteur général en position OFF (bouton-poussoir).
3. Débranchez tous les cordons d'alimentation c.a. du système et des prises murales.
4. Identifiez et débranchez tous les câbles reliés aux connecteurs d'E-S ou aux accès derrière le système.
5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier).
6. Ne faites pas fonctionner le système tandis que le boîtier est ouvert.



Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Nous vous recommandons l'usage de gants de protection.

Instrucciones de seguridad importantes

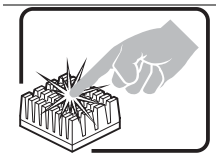
Lea todas las declaraciones de seguridad y precaución de este documento antes de realizar cualquiera de las instrucciones. Vea *Intel Server Boards and Server Chassis Safety Information* en el CD Resource y/o en http://support.intel.com/support/motherboards/server/sb/cs-010770.htm.

INSTRUCCIONES DE SEGURIDAD: Cuando extraiga la tapa del chasis para acceder al interior del sistema, siga las siguientes instrucciones:

1. Apague todos los dispositivos periféricos conectados al sistema.
2. Apague el sistema presionando el interruptor encendido/apagado.
3. Desconecte todos los cables de alimentación CA del sistema o de las tomas de corriente alterna.
4. Identifique y desconecte todos los cables enchufados a los conectores E/S o a los puertos situados en la parte posterior del sistema.
5. Cuando manipule los componentes, es importante protegerse contra la descarga

electrostática (ESD). Puede hacerlo si utiliza una muñequera antiestática sujetada a la toma de tierra del chasis — o a cualquier tipo de superficie de metal sin pintar.

6. No ponga en marcha el sistema si se han extraído las tapas del chasis.



Si el sistema ha estado en funcionamiento, el microprocesador y el disipador de calor pueden estar aún calientes. También conviene tener en cuenta que en el chasis o en el tablero puede haber piezas cortantes o punzantes. Por ello, se recomienda precaución y el uso de guantes protectores.

AVVERTENZA: Italiano

PASSI DI SICUREZZA: Qualora si rimuovano le coperture del telaio per accedere all'interno del sistema, seguire i seguenti passi:

1 Spegnere tutti i dispositivi periferici collegati al sistema.

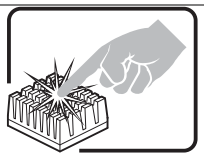
2 Spegnere il sistema, usando il pulsante spento/acceso dell'interruttore del sistema.

3 Togliere tutte le spine dei cavi del sistema dalle prese elettriche.

4 Identificare e sconnettere tutti i cavi attaccati ai collegamenti I/O od alle prese installate sul retro del sistema.

5 Qualora si tocchino i componenti, proteggersi dallo scarico elettrostatico (SES), portando un cinghia anti-statica da polso che è attaccata alla presa a terra del telaio del sistema – qualsiasi superficie non dipinta – .

6 Non far operare il sistema quando il telaio è senza le coperture.



Se il sistema è stato a lungo in funzione, il microprocessore e il dissipatore di calore potrebbero essere surriscaldati. Fare attenzione alla presenza di piedini appuntiti e parti taglienti sulle schede e sul telaio. È consigliabile l'uso di guanti di protezione.

Contents

Figures

1. Intel® Remote Management Module 2 Features

This chapter briefly describes the main features of Intel® Remote Management Module 2 (Intel® RMM2). This chapter provides a photograph of the product and a list of module features.

The Intel® Remote Management Module 2 is shown in the following photo.

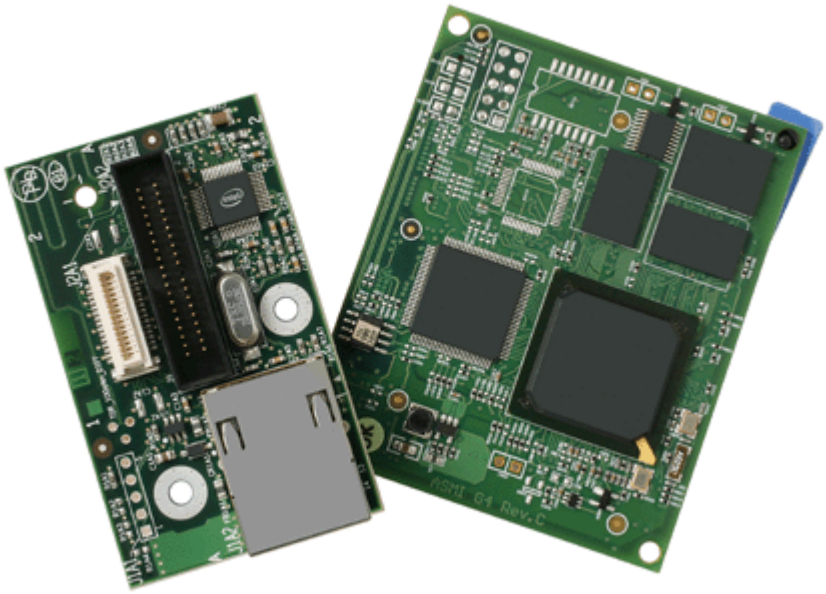


Figure 1: Intel® Remote Management Module 2 and Network Interface Card

1.1 Feature Summary

The Intel® RMM2 works as an integrated solution on your server system. Based on an embedded operating system, the Intel® RMM2 add-on card provides both exceptional stability and permanent availability independent of the present state of the server's operating system. As a system administrator, you can use the Intel® RMM2 to gain location-independent remote access to respond to critical incidents and to undertake necessary maintenance.

1.1.1 Feature Details

The Intel® RMM2 add-on card defines a new class of remote access devices. It offers convenient, remote KVM access and control via LAN or Internet. It captures, digitizes, and compresses video and transmits it with keyboard and mouse signals to and from a remote computer. Remote access and control software runs on Intel® RMM2 embedded processors so there is no impact to the server operation or network performance. In addition, the Intel® RMM2 add-on card offers integrated remote power management using IPMI. Key features of the Intel® RMM2 add-on card are:

- Embedded Web UI - Remote Power on\off, system health, system info, Intel® RMM2 Firmware Update, Event log includes Intel® RMM2 events
- KVM redirection via Dedicated NIC– high performance, multiple concurrent sessions
- USB 2.0 media redirection - boot over remote media
- Security – SSL, LDAP, SSH, RADIUS support
- OEM Customization
- Email Alerting for Intel® RMM2 events
- SMASH CLI/CLP, WS- MAN , SNMP traps for Intel® RMM2 events
- Soft Keyboard via KVM (multiple language support)
- IPMI V2.0 Compliance
- Intel® RMM2 dedicated NIC can works as BMC channel 3 (IPMI forwarding)
- Automatically senses video resolution for best possible screen capture
- High-performance mouse tracking and synchronization
- Allows remote viewing and configuration in pre-boot POST and BIOS setup

1.2 Supported Operating Systems

The Intel® RMM2 runs independently of the host operating system on the server where it is installed except during remote console (KVM) connections. During remote console connections the keyboard, mouse, and video of the console system operate just as if you were at the server where the Intel® RMM2 is connected. During remote console connections the interaction with the host operating system limits the support to operating systems that have been validated. Those operating systems are listed below:

1.2.1 Server System

The following operating systems are supported on the managed server:

- Microsoft Windows 2003 Server* with Service Pack 1 or later, and all recent updates
- Red Hat* Enterprise Linux Advanced Server 4

1.2.2 Client System

The following client operating system and Internet browser combinations have been tested:

- Red Hat* Linux 4 / Red Hat* Linux 4 ES with Firefox
- SuSE* 9 Pro 9.1 with Mozilla
- Microsoft Windows XP Pro* with Service Pack 2, with Internet Explorer
- Microsoft Windows 2003 ES* with Service Pack 1, with Internet Explorer

2. Hardware Installations and Initial Configuration

2.1 Before You Begin

Before working with your server product, pay close attention to the Safety Information at the beginning of this manual.

2.2 Tools and Supplies Needed

- Phillips* (cross head) screwdriver (#1 bit and #2 bit)
- Needle nosed pliers
- Antistatic wrist strap and conductive foam pad (recommended)

2.3 Installation

The Intel® Remote Management Module is currently supported on the following Intel® server boards:

- All SKUs of Intel® Server Board S5000XAL / S5000PAL
- All SKUs of Intel® Server Board S5000XSL / S5000PSL
- Intel® Server System SC5400RA
- Intel® Server System S7000FC4UR

The Intel® RMM2 box contains the following components:

- Intel® Remote Management Module
- Network Interface Card (NIC) module
- Plastic bag containing screws, slot bracket, three plastic standoffs and cabling

The installation will vary between these server boards and their chassis configurations. The following sections detail installation instructions.

Note: Remove AC power from the server before installing the Intel® RMM2.

2.3.1 Installation on Intel® Server Board S5000XAL / S5000PAL

The Intel® Server Board S5000XAL / S5000PAL installs in rack mount 1U or 2U chassis. The same installation steps apply to both chassis types.

- The Intel® RMM2 module ships with one plastic standoff pre-installed as shown in Figure 2. The standoff will align with a hole in the server baseboard when mounted to the baseboard.
- Attach the Intel® RMM2 to the connector on the server baseboard labeled “RMM”. Snap the standoff into the corresponding hole in the baseboard.
- Next, insert three plastic standoffs into the holes of the Intel® RMM2 NIC module. See Figure 3.
- Push out and remove the metal cover on the chassis where the NIC RJ-45 receptacle will align.
- Mount the NIC module to the header on the baseboard and snap the three standoffs into the corresponding holes in the baseboard. This will align the RJ-45 with the opening in the chassis.
- Make a note of the MAC address of the Intel® RMM2. It is written on a label attached to the module (not the NIC). Keeping a record now may eliminate the need to reopen the cover later.
- Replace the chassis cover, attach AC power and connect a network cable to the Intel® RMM2 NIC.

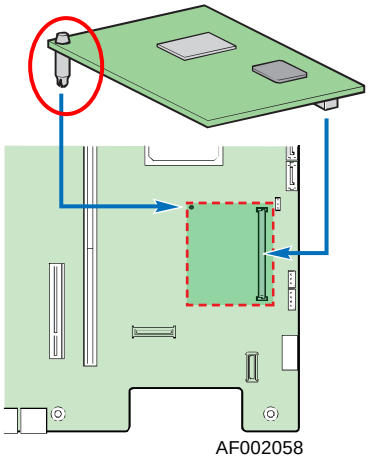


Figure 2: Installing the Intel® RMM2

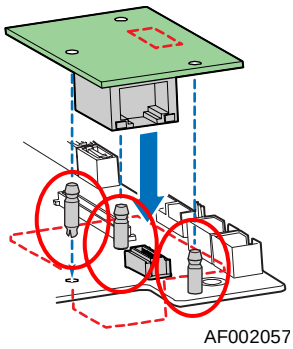


Figure 3: Installing the Intel® RMM2 Dedicated NIC Module

2.3.2 Installation on the Intel® Server Board S5000PSL

The Intel® Server Board S5000PSL installs in pedestal style chassis. The following steps detail the installation for this type of chassis.

- The Intel® RMM2 module ships with one plastic standoff pre-installed as shown in Figure 4. The standoff will align with a hole in the server baseboard when mounted to the baseboard.
- Attach the Intel® RMM2 to the connector on the server baseboard labeled “RMM”. Snap the standoff into the corresponding hole in the baseboard.
- Attached the NIC module to the add-in card slot bracket as shown in Figure 5. Use the screws provided.
- Mount the bracket with the NIC module in a chassis slot near the baseboard connector for the cable.
- Attach the cable from the baseboard to the NIC module as shown.
- Make a note of the MAC address of the Intel® RMM2. It is written on a label attached to the module (not the NIC). Keeping a record now may eliminate the need to reopen the cover later.
- Replace the chassis cover, attach AC power and connect a network cable to the Intel® RMM2 NIC.

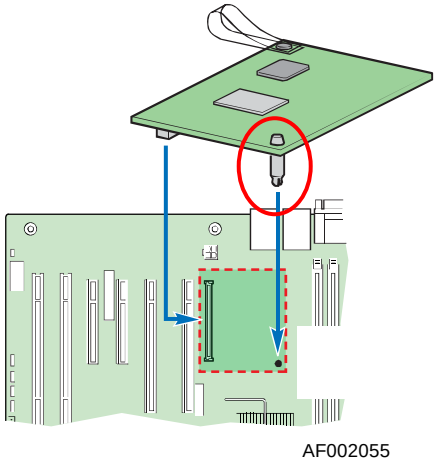


Figure 4: Installing the Intel® RMM2

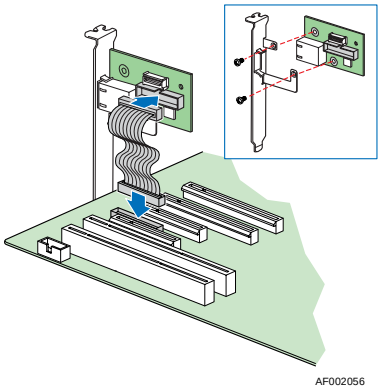


Figure 5: Installing the Intel® RMM2 Dedicated NIC Module

2.3.3 Installation on Intel® Server System S7000FC4UR

The following steps detail the installation of Intel® RMM2 on the Intel® Server System S700FC4UR.

- Remove the top cover of the Intel® Server System S7000FC4UR. For instructions, see the Intel® Server System S7000FC4UR product guide.
- Remove the I/O riser card. For instructions, see the Intel® Server System S7000FC4UR product guide.
- Set the I/O riser card on a static-controlled surface with the components facing up.
- Write down the MAC address on the Intel® RMM2. It is on a label attached to the Intel® RMM2. If you do not write down the MAC address before installing the Intel® RMM2, you will need to open the system later to record this information before you can configure the Intel® RMM2.

The I/O gasket is required to meet EMI requirements.

- Peel the backing from the EMI gasket that is included with your Intel® Remote Management Module 2 kit. See letter “A” in the following figure.
- Adhere the EMI gasket to the I/O riser board where the NIC will contact the I/O riser. See letter “B” in the figure.

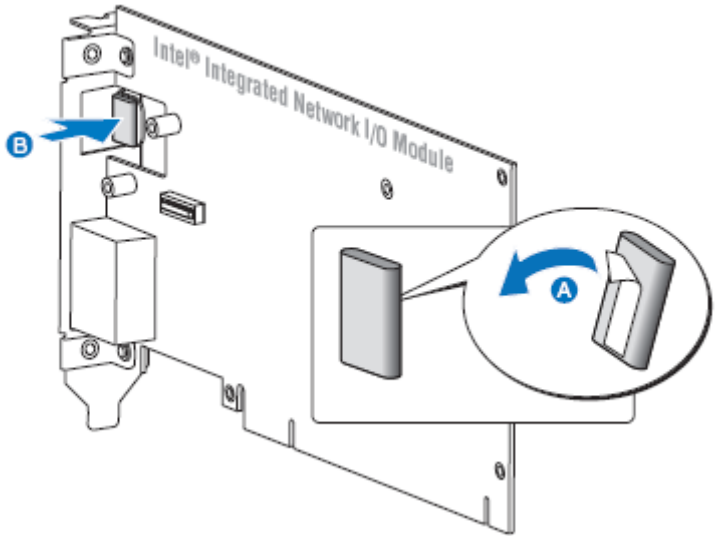


Figure 6: Attaching the EMI Gasket on the Intel® Server System S7000FC4UR I/O Riser Board

- Screw the NIC module to the J2B1 header on the I/O riser board, using the provided screws. This aligns the RJ-45 port with the opening on the back cover of the I/O riser board. See the following figure.

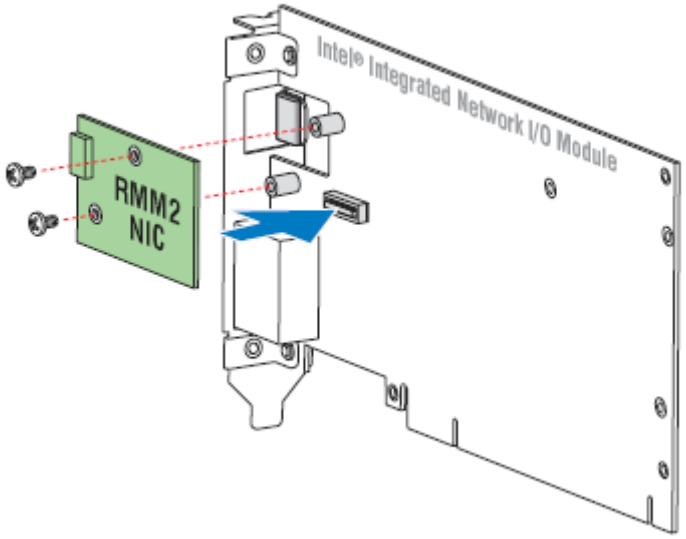


Figure 7: Installing the Intel® RMM2 Dedicated NIC Module

- Align the connector on the Intel® RMM2 to the J6C1 connector on the I/O riser board and align the plastic standoff to the Intel® RMM2 corresponding hole in the I/O riser board.
- Push down on the Intel® RMM2 to attach it to the I/O riser board.

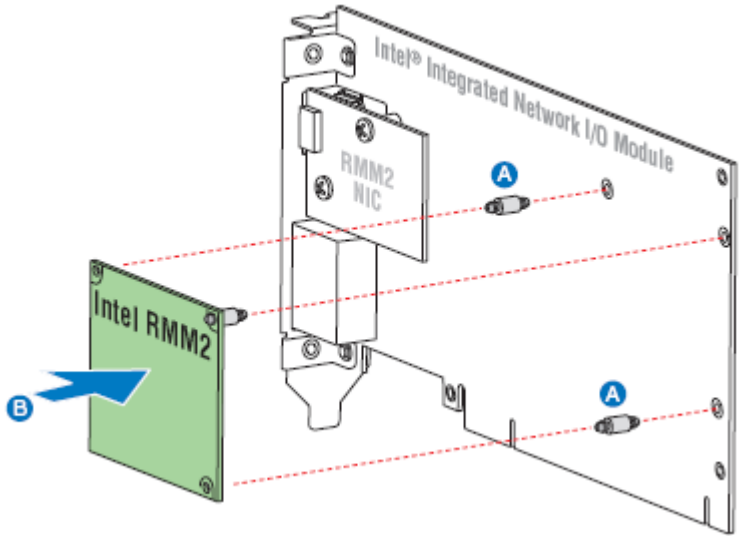


Figure 8: Installing the Intel® RMM2

2.4 Initial Network Configuration

When first powered on, the Intel® RMM2 will use a DHCP server acquire an assigned network IP address. If no DHCP server is available, the Intel® RMM2 will need to be configured to use a static IP address. A utility named *psetup* is provided to assist with discovery and IP address configuration, and also to view the IP address that was assigned by a DHCP server. *Psetup* is available in Linux and Windows* versions. See Section 3 for additional details on *psetup*.

3. Intel® RMM2 Configuration Utility - Psetup

3.1 Psetup Outline

The *psetup* utility is a graphical user interface application, which is used to determine the IP address assigned to the Intel® RMM2 by the DHCP server, or to change the device's initial network configuration. It allows access to the Intel® RMM2 even if it has no IP address configured.

Psetup can access the Intel® RMM2 by two ways:

- Locally:
  Psetup can be started directly on the host containing the Intel® RMM2. The tool uses SCSI/USB driver to access the module.
- Remotely:
  Psetup can be started on any host connected to the same subnet (broadcast domain) as the Intel® RMM2. *Psetup* uses UDP broadcasts to access the module.

3.2 Using the Psetup Tool via Graphical User Interface

A typical Windows* version of the psetup screen is shown in Figure 9.

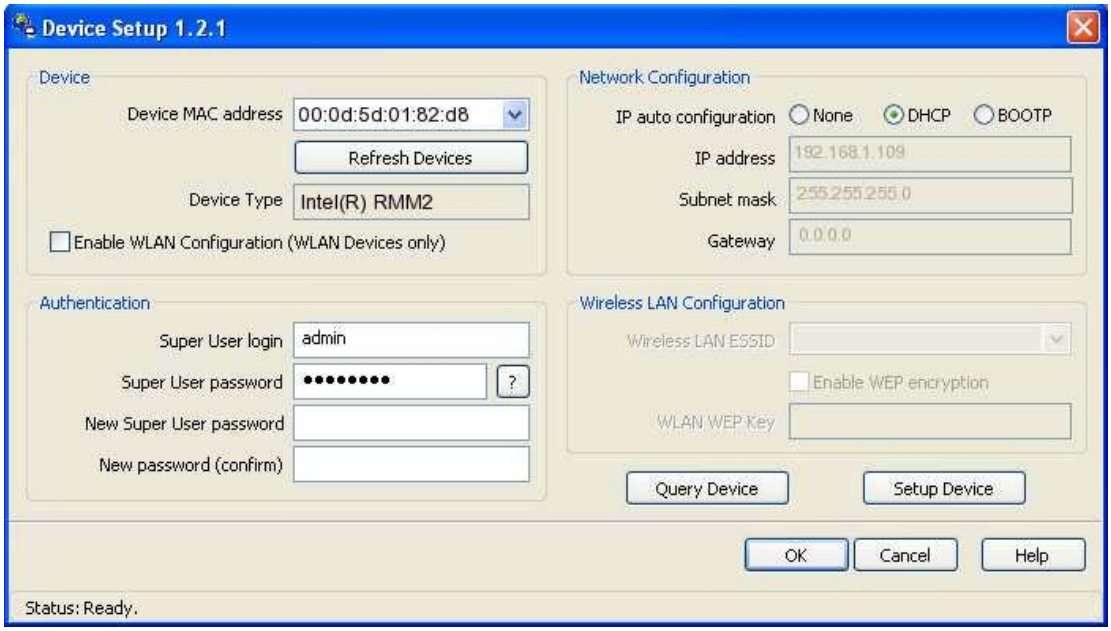


Figure 9: Psetup Utility (Windows* Version)

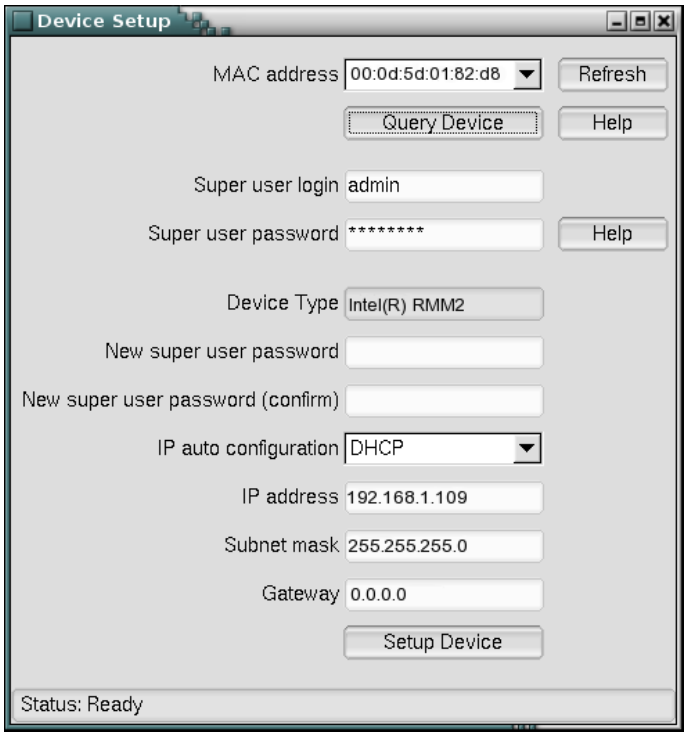


Figure 10: Psetup Tool (Linux Version)

When first launched, *psetup* automatically scans and auto-detects all Intel® RMM2 modules on the local host and on the subnet. The MAC addresses of all detected modules are available as a drop down list. This list allows you to connect and configure individual Intel® RMM2 modules. You can restart the auto-detection by clicking on "Refresh Devices". After selecting a device by MAC address, the "Device Type" will show "Intel(R) RMM2". You are now able to query the current network settings of that device by "Query Device". To change the network settings or assign a new administrator password, you will need to authenticate as an administrator. See the section called “Authentication”.

Note: The Linux version of psetup needs module “**sg**” running on the system to detect a local Intel® RMM2; execute command “ **modprobe sg** ” to load this module.

3.3 Mac Address Detection

3.3.1 Using the Psetup Utility for Windows*

On the upper left corner, the MAC address of the Intel® RMM2 is displayed. To detect the MAC address manually, click the Refresh Devices button. The displayed MAC address is the same MAC address printed on the sticker placed on the Intel® RMM2. On the lower right corner of the window, there are two buttons: Query Device and Setup Device. Click the Query Device button to display the preconfigured values of the network configuration. The values are displayed in the text

fields located above. If necessary, adjust the network settings. To save the changes, enter a user name and a password, then click the Setup Device button.

3.3.2 Using the Psetup Utility for Linux

On the top of the window, the MAC address of the device is displayed. To detect the MAC address manually, click the button Refresh. The displayed MAC address is the same MAC address printed on the white sticker placed on the back of the Intel® RMM2. Furthermore, there are two buttons on the window: Query Device and Setup Device. Press the Query Device button to display the preconfigured values of the network configuration. The values are displayed in the text fields located nearby. If necessary, adjust the network settings. To save the changes, enter a user name and a password, then click the Setup Device button.

3.4 Authentication

The “Authentication” portion of *psetup* allows you to change the super user/administrator password. To modify the current authentication settings, enter your login as super user/administrator and change your password.

- Super user login:
  Enter the login name of the super user. The initial value is "admin".
- Super user password:
  Enter the current password for the super user. This initial value is "password".
- New super user password:
  Enter the new password for the super user.
- New password (confirm):
  Re-type the new password for the super user.

To close the window and accept the changes, click the OK button; otherwise click the Cancel button (on Windows*). On a Linux system close the window by clicking the appropriate window button.

3.5 Operating the Psetup Utility from a Linux Command Line

It is also possible to operate *psetup* from a Linux command line. The following list shows the command syntax and their usage. Example commands are shown at the end of the section.

```
--mac <MAC address of the device>
```
Shows the current network configuration.

```
--ip <new IP address>
```
Set a new IP address.

```
--ipacp <dhcp|bootp|none>
```
Set the auto configuration.

```
--netmask <net mask>
```
Set a new netmask.

```
--gateway <gateway address>
```
Set a new gateway address.

`--login <username>`

A valid user name with administration rights is required in order to change the network configuration.

`--pw <password>`

Password of the specified user.

`--pw-new <password>`

The specified user gets a new password.

The following examples show commands and their results:

- Displaying the current network settings:

```
test@teststation:~# /home/test/psetup --mac 00:0D:5D:00:65:78
IP auto configuration: dhcp
IP address: 192.168.5.135
Subnet mask: 255.255.255.0
Gateway: 192.168.5.1
```

- Changing the network settings:

```
test@teststation:~# /home/test/psetup
--mac 00:0D:5D:00:65:78 --ipacp none --ip 192.168.5.55
--gateway 192.168.5.1 --netmask 255.255.255.0
--login super --pw pass
Device configured successfully.
```

4. Intel® RMM2 Configuration Utility - KiraTool

4.1 KiraTool Outline

4.1.1 About the KiraTool Software

The KiraTool utility is a command line application which allows the user to manage the Intel® Remote Management Module 2 (Intel® RMM2). KiraTool can be easily invoked by scripts and batch files. This allows the user to design script files to configure the Intel® RMM2 quickly and automatically. KiraTool is available for Windows* and DOS*, EFI and RedHat* Linux.

KiraTool can access the Intel® RMM2 via several ways dependent upon the OS that KiraTool is running. Table1 shows different versions of KiraTool and supported access methods.

Table 1: Accessing the Intel® RMM2

KiraTool Version	Windows*	Linux	EFI	DOS*
Network	✓	✓	×	×
SCSI/USB driver	✓	✓	✓	×
System Management Interface	×	×	×	✓

4.1.2 KiraTool Syntax

KiraTool command syntax contains [option] and [command]. The general syntax is as follows:

```
kiratool [option] [command]
```

Single-letter options are preceded with a dash or hyphen such as -s, commands are several characters long and do not have a preceding hyphen, for example: reset.
For example,

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 -a -u admin -
p password ip show
IP address: 192.168.2.6
```

-l, -a, -u and -p are [options], ip show is [command] in this example

4.1.3 KiraTool Options for the Connection Type

Options for connection type are a set of switches which can control how KiraTool accesses the Intel® RMM2. KiraTool supports following connection options:

- `-l <IP Address>`, use the specified IP address to talk to the Intel® RMM2 over LAN.
- `-s,` use IPMI over SCSI/USB; this can be augmented with the following -d device option.
- `-d,` device option: here you can specify the drive identification for SCSI access of the Intel® RMM2. For the Windows* version use the drive letter, (e.g. F:) and for Linux use /dev/sg1. If you omit this option, KiraTool will attempt to auto-detect the Intel® RMM2 by probing the SCSI drive identification.

Note: If you do not specify a option for connection type, the default type for the DOS* version is SMI; the default type for EFI, Linux, and Windows* versions is USB/SCSI.

4.1.4 KiraTool Options for the Authentication Type

In order to execute administrative functions on the Intel® RMM2, KiraTool needs to authenticate the user; options for authentication are designed for this purpose. All Intel® RMM2 modules come with a pre-configured administrator login with a factory default password.

Note: The default login is “admin” for the administrator user name and “password” for the administrator password.

For most KiraTool commands you must specify the administrative login and password to the Intel® RMM2 using the following options:

`-u` – the admin user
`-p` – the admin password

For example:

```
linux# kiratool -u admin -p password ip show
```

Note: If you use KiraTool from a batch or script file, you will almost certainly enter these passwords in clear text in the file. This is a potential security problem: anyone who can read your command file can attain administrative access to your Intel® RMM2 modules and is able to reconfigure or disable them; this can have a serious impact on your servers or your network.

MAKE SURE YOU ADEQUATELY PROTECT THESE FILES FROM UNAUTHORIZED ACCESS!

In order to reduce the risk of the clear text passwords in such files, KiraTool offers an option:

`-P` prompt for admin password

You would then execute the KiraTool command as follows:

```
linux# kiratool –u admin –P lan
Password:
```

Note: When you type the password, your characters will not be echoed: they do not appear as you type.

4.1.5 KiraTool Options for Other Purposes

KiraTool also supports the options below.

- `-f,` force. This will cause a command to the Intel® RMM2 to be executed without any user confirmation.
- `-a,` use ASMI mode – needed if you want to access an Intel® RMM2.
- `-v,` verbose. This causes KiraTool to be more informative about the actions taken. The output (like all outputs of KiraTool) will go the stdout. You can use this option more than once, and each use increases the level of verbosity.
- `-c,` calm. This option is the same as the –q (quiet) option of other programs: KiraTool will not generate any output.
- `-h/-?,` KiraTool will print out online help.

4.1.6 KiraTool Commands

The command is a parameter of KiraTool which will request KiraTool to perform different actions based on the specific command. For example:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 -a -u admin
-p password ip show
IP address: 192.168.2.6
```

Table 2 KiraTool Commands

ver	Show program version and information.
info	Show information about the BMC.
serial	Serial number operations.
reset	Reset the device.
defaults	Reset device to factory settings.
cfg	Backup or restore device configuration.
raw	Execute raw commands.
admin	Show or set admin name and password.
mac	Read or set MAC address.
ip	Read or set IP address.
netmask	Read or set subnet mask.
gw	Read or set default gateway address.
ipsrc	Get or specify configuration for the IP address.
fw	Firmware operations.
fni	IPMI over FML forwarding commands.
test	Execute self tests.

4.2 KiraTool Commands in Detail

4.2.1 General Commands

ver(sion)
The ver command shows the version of the KiraTool itself:

```
C:\Program Files\KiraTool>kiratool ver
        KiraTool 1.5.11 (Intel)
```

info(rmation)
The info command shows basic information (manufacturer identification and product ID) of the Intel® RMM2. The example given also shows the use of the -l, -u and -p options:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 -a -u admin -p
password info
Manufacturer ID: 10437 (0x28c5)
Product ID:      0 (0x0)
```

serial [show]
The serial command displays the serial number of the Intel® RMM2. Serial numbers can be strictly numbers and alpha-numeric strings.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.5 –a -u admin
-p password serial
Serial number: 007-BOND
```

reset
The reset command resets the device.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password reset
The device might not respond for about one minute.
Successfully reset the device.
```

defaults
The defaults command will reset the device to factory defaults.

Note: This operation will also reset the administrative password, so the following KiraTool command needs to use the default password.

```
C:\Program Files\KiraTool>kiratool –l 192.168.2.6 –a -u admin
–p password defaults
Successfully reset device to factory settings.
```

cfg backup <filename>
The cfg backup command will backup the device's configuration to a file.

cfg restore <filename>
The cfg restore command will restore the device's configuration from a file.

raw
The raw command allows you to execute very basic commands on the Intel® RMM2.
These command codes are specific to your Intel® RMM2 and depend heavily on the version. The example shown here is only an academic example. Normal users of the KiraTool will not need raw commands.
Important: They are intended for advanced development and debugging use only.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password raw 06 01
Executed raw command.
    Return code:     0x00
    Returned bytes:  0x20 0x01 0x04 0x02 0x02 0x8f 0xc5 0x28
                              0x00 0x02 0x00 0x00 0x00 0x53 0x59
```

4.2.2 User Administration

The following commands allow you to manage the administrator account for the Intel® RMM2.

admin [show]
The admin command shows the current setting of the admin account. The show verb is optional. This is kind of redundant, as you have to know the admin login in order to enquire it.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u super
-p password admin
Administrator username: super
```

admin name
Set the admin users name:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u super
-p password admin name admin
Successfully set administrator username to admin
```

admin password
Set the password for the admin password:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p pass admin passwd password
Successfully set administrator password.
```

4.2.3 Network Interface Commands

The following commands allow you to set the parameters for the Intel® RMM2 LAN interface, including IP address, netmask, gateway, and MAC.

Note: When you change these parameters you can very easily make the Intel® RMM2 unavailable on the network. Changing the MAC or IP address will cause problems with your ARP caching and the DHCP server accessing information. Normally you should not encounter a need to change these addresses.

mac [show [-c]]
This command shows the Intel® RMM2's Ethernet or MAC address:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password mac
MAC address: fe:00:00:51:00:38
```

The optional –c option to this command displays the MAC address in a compact format.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password mac show -c
MAC address: FE0000510038
```

mac set <mac addres>
This command allows you to set the MAC address of the Intel® RMM2. You can also use the below expanded ":" notation for the MAC address.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password mac set FE0000510200
Successfully set MAC address to FE0000510200
or
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password mac set fe:00:00:51:02:00
Successfully set MAC address to fe:00:00:51:02:00
```

ip [show]
Shows currently configured IP address:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password ip
IP address: 192.168.2.6
```

ip set <ip address>
This command can assign an IP address for the Intel® RMM2, and set "ipsrc" to "static" as default. The Intel® RMM2 can get an IP address from the DHCP server or the BIOS of the host. See the "ipsrc" command for more details.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password ip set 192.168.2.5
Successfully set IP address to 192.168.2.5
```

netmask [show]
Display the netmask currently used by the Intel® RMM2:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password netmask
Subnet mask: 255.255.255.0
```

netmask set <netmask>
You can set the netmask using the normal IP dot notation. Note that changing the netmask can change the behavior of the Intel® RMM2 with regards to broadcasting. If you "widen" the netmask then broadcasts by the Intel® RMM2 can use more network bandwidth.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password netmask set 255.255.0.0
Successfully set Subnet mask to 255.255.0.0
```

gw [show]
This shows the currently used default routing gateway for the Intel® RMM2:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password gw
Default gateway: 192.168.2.1
```

gw set <ip address>
This will set a new default routing gateway:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password gw set 192.168.2.3
Successfully set Default gateway to 192.168.2.3
```

ipsrc [show]
This command allows you to view which method the Intel® RMM2 uses in order to get its IP address:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password ipsrc
IP source: DHCP Address
```

ipsrc set [static|dhcp|bios|none]
The three methods available work as follows:

- **dhcp** allows the Intel® RMM2 to get the IP configuration from the locally resident DHCP server. This should be in the same broadcast domain as the Intel® RMM2, otherwise the DHCP lookup will not work. The DHCP also sets other basic information like the netmask, IP address, and the gateway address.
- **static** allows only static setting of the Intel® RMM2's IP address.
- **none** means unspecified.
- **bios** is the method where the Intel® RMM2 will look into the BIOS of the host in order to find the IP address.

Example:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password ipsrc set static
Successfully set IP source to static
```

4.2.4 Firmware Commands

The KiraTool also allows you to manage the Intel® RMM2's firmware.

fw [ver]
Shows the version of the firmware.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.5 –a -u admin
-p password fw
Firmware version: 4.2.2
Build number:     123
Hardware ID:      0x20
Firmware tag:     Devel
OEM:              intel
```

fw validate
This command allows you to check if the firmware binary file is compatible with your Intel® RMM2. It is recommended to check this before you attempt to upgrade the Intel® RMM2's firmware!
In order to perform the check, you need to know the exact name and location on your hard drive of the firmware binary.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password fw validate
F:\fw-kira-kimasmig4-asmidc-intel_040200-5359.bin
Starting Firmware Validation
Uploading Firmware File
0% ------------------- 50% ------------------ 100%
**************************************************
Upload complete.
Validating Firmware
Firmware file is valid.
```

fw upgrade
This is the upgrade command corresponding to the above validation. Note that it is quite possible to “upgrade” the firmware with one of the same version. This is often useful to re-install the firmware.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.6 –a -u admin
-p password fw upgrade
F:\fw-kira- kimasmig4-asmidc-intel_040200-5359.bin
Starting Firmware Upgrade
Uploading Firmware File
0% ------------------- 50% ------------------ 100%
**************************************************
Upload complete.
Flashing Firmware (takes about 1min)
Successfully upgraded firmware.
```

4.2.5 Test Commands

You can use the test command to perform several self-tests on the Intel® RMM2. You can specify to test all items or you may skip certain tests.

test <test>
Execute the test labeled “test” on the Intel® RMM2. For example the most basic test is the device test; it checks to see if the Intel® RMM2 device is responding.

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.5 –a -u admin
-p password test device
device: ok (firmware 4.2.0, Build 5359)
```

test all [-s test_to_skip]
This executes all of the tests. It includes the following subtests provided they are available on your Intel® RMM2, in the following order:

1. device – is the device available
2. ddc info – the DDC interface
3. video status – the status of the video inputs and outputs. May fail if there is no remote video connected.
4. ipmb bmc – the Board Management Controller (if available)
5. fml esb2 – tests FML interface and the ESB2
6. usb status – the status of the USB interface (for SCSI over USB)
7. nic status – the status of the network interface (LAN)

The example below shows you the output of the test all command on an Intel® RMM2 module with no remote connections:

```
C:\Program Files\KiraTool>kiratool -l 192.168.2.5 –a -u admin -p
password test all
device: ok (firmware 4.2.0, Build 5359)
Could not query DDC from device: Self test not supported
ddc info: error
video status: failed
IPMB BMC status test failed: Self test not supported
ipmb bmc: error
FML ESB2 status test failed: Self test not supported
fml esb2: error
usb status: failed
nic status: ok (link: up, duplex: full, speed: 100 MBit)
```

4.2.6 Test Types

Here is a more detailed listing of the available tests.

Note: the tests are organized in a hierarchical fashion. If you exclude a top-level test like –s nic from the testing then ALL of the nic tests will be skipped! Conversely if you specify a top-level test to be done, then all of the available sub-tests will be executed.

- **video <subtest>** - tests video interface (digital video input and output)
  status – checks detected video signal and resolution
  crc – calculate CRC sum over the captured screen
- **ddc <subtest>** – test DDC interface
  info – queries EDID information from the device and compares it to the EDID information known by the OS (only available under Windows)
- **ipmb <subtest>** – test IPMB interface
  bmc – test whether a BMC responds over IPMB
  evalboard – test whether the IPMB connection between two evaluation boards work
- **fml <subtest>** – test FML interface
  esb2 – test whether an ESB2 is responding on FML when TPT (TCP PassThrough) is active
  evalboard – test whether the FML connection between two evaluation boards work
- **usb <subtest>** – test USB interface
  status – test whether the device's USB module is enumerated
- **nic <subtest>** – tests network interface
  status – test NIC status and parameters
  loopback – test NIC loopback functionality
- **ping <host>** – Test whether pinging a host works

4.2.7 Test Return Codes

All of the above tests return an error code if they fail and a zero (0) code when they succeed:

- 0 (zero) is returned if ALL of the specified tests executed successfully.
- -1 (minus one) is returned when an error occurs (except for the test command itself). Be careful: in some operating systems this is converted to 127 or another value. Be sure to check carefully!
- Other values are returned when a specific test produces an error. See table below.

Note: If the test all command fails, then the returned error code is that of the first failed test. Testing will continue even if errors are encountered in previous tests.

Table 3: Test Return Codes

Test	Return Code
device	1
video status	2
video crc	3
ddc info	4
ipmb ddc	5
fml esb2	6
usb status	7
nic status	8
nic loopback	9
nic ping	10
nic broadcast	11
fml evalboard	12
ipmb evalboard	13

4.3 KiraTool Commands in Detail

4.3.1 Windows* Version

The Windows* version of KiraTool can run on Microsoft Windows 2000*, Microsoft Windows XP*, and Microsoft Windows 2003 Server*.

Execute a self-extracting executable file: “KiraTool 1.5.xx Intel.EXE”, in the KiraTool package to install the Windows* version of KiraTool. (xx is revision number)

The welcome page appears; click **NEXT** to continue.

Figure 11: KiraTool Setup Welcome Screen

The “Choose Components” page allows you to select the components to install. Generally you should accept the defaults.

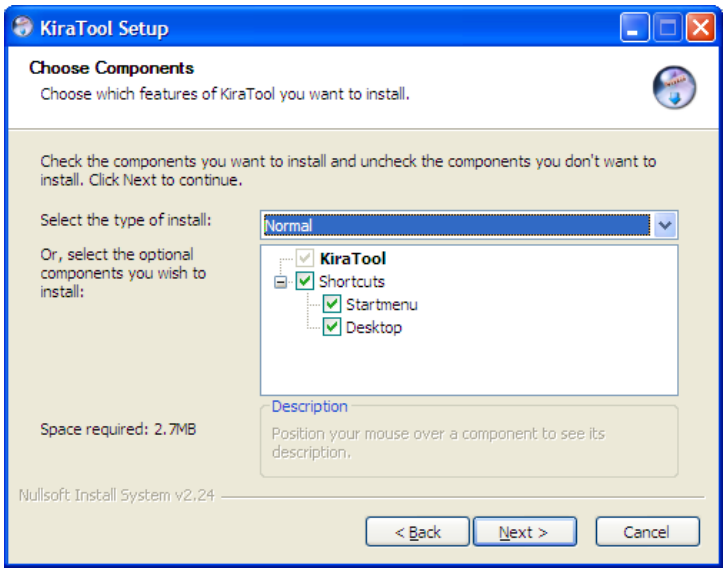


Figure 12: KiraTool Setup “Choose Components” Screen

Once you have selected **NEXT**, the installer will ask you for the location to install the KiraTool. Generally this will be in the suggested default location of C:\Program Files:

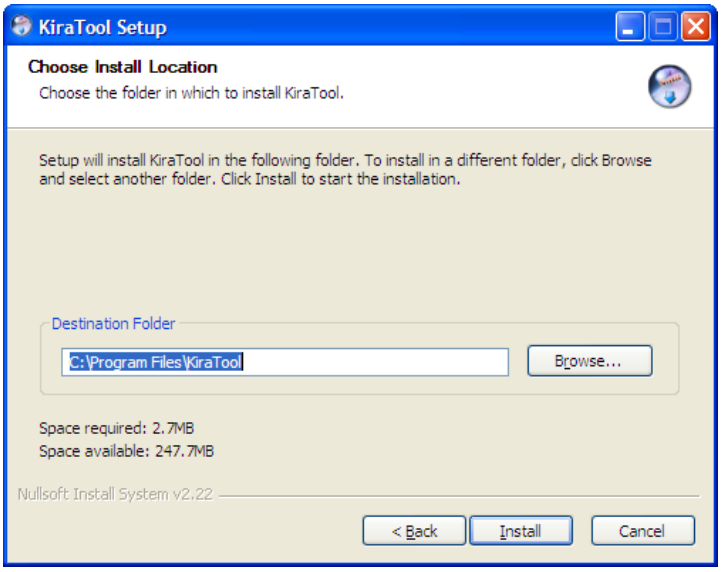


Figure 13: KiraTool Setup Install Location Screen

When you accept the suggestion, the installer will proceed to extract and copy the files.

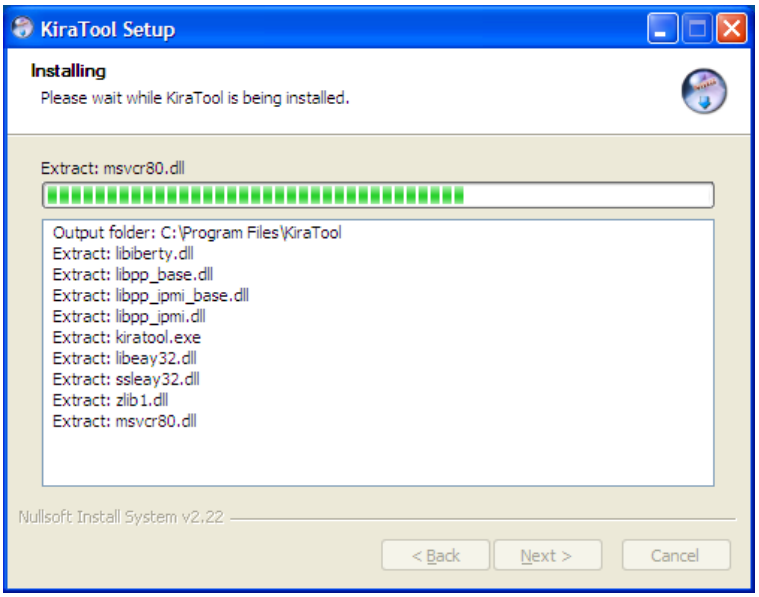


Figure 14: KiraTool Setup Installing Screen

The final installer screen confirms successful installation:

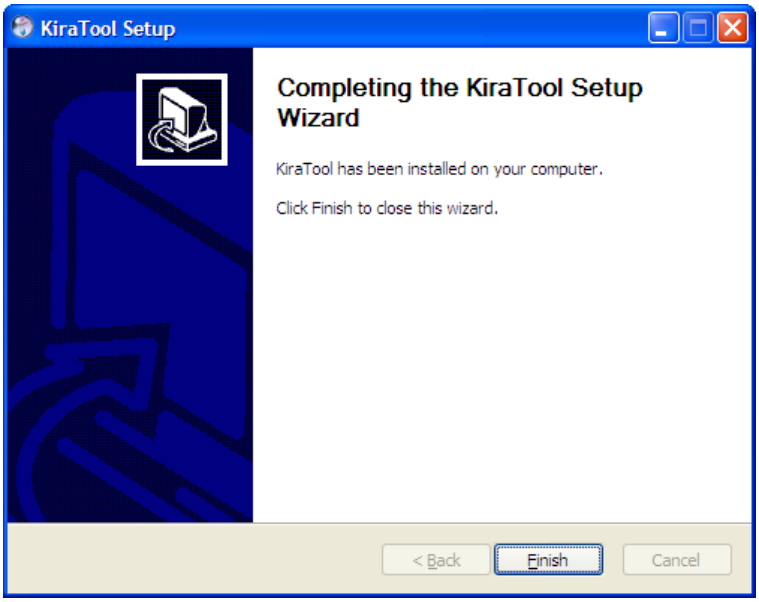


Figure 15: KiraTool Setup Finished Screen

Once you have selected **FINISH** you will find a “KiraTool Environment” shortcut on your desktop. The picture below shows the shortcut (in the background). You can also invoke KiraTool from the Microsoft Windows XP* Start Menu.

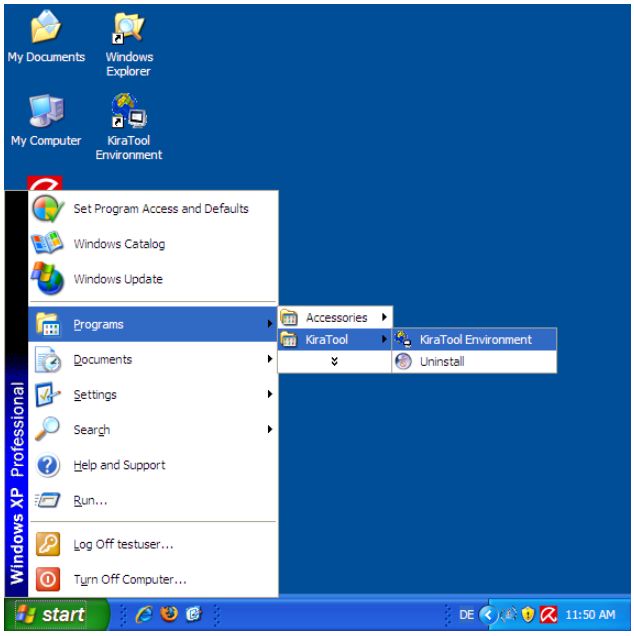


Figure 16: Start the KiraTool under Microsoft Windows XP*

When you start the “KiraTool Environment”, the system will open a Windows* Command Line window. You can execute the KiraTool command at this window. For example, execute “kiratool” to view its online help page.

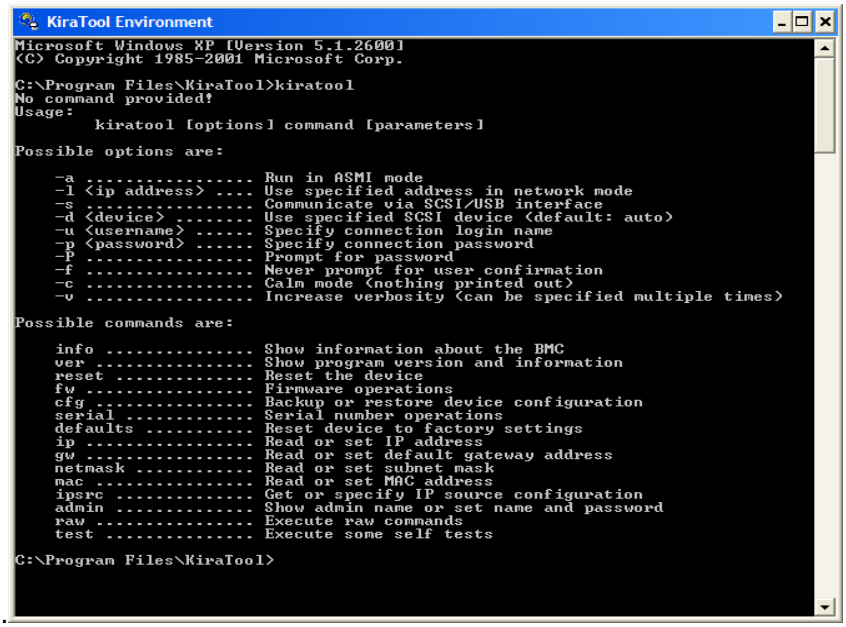


Figure 17: Starting the KiraTool under Microsoft Windows XP*

4.3.2 EFI Version

Follow below steps to execute the KiraTool on the EFI shell.

1. Boot the server to the EFI shell.
2. Copy “KiraTool.efi” from the KiraTool package to a USB key, and plug to the USB port of the server.
3. Execute “map –r” at the EFI shell to map the USB key; usually it will be mapped with device “fs0”.
4. Execute “ fs0:” to change current folder to “fs0:\>”.
5. Execute the KiraTool command.

Or you also can copy “KiraTool.efi” to local hard disk to execute it with the same way.

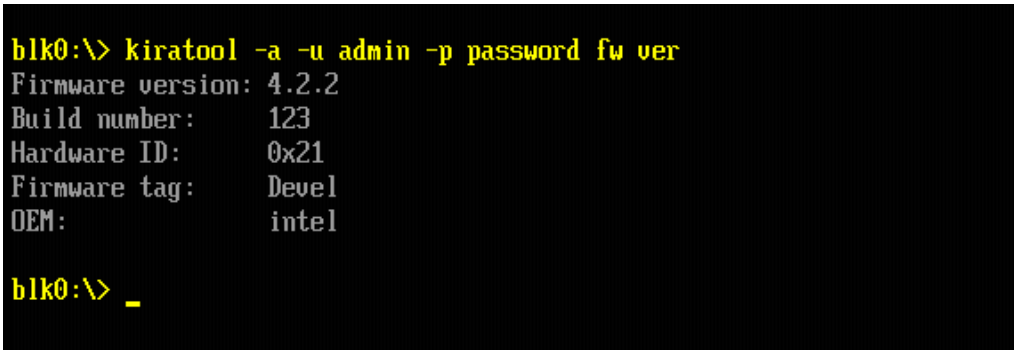


Figure 18: Working with KiraTool under EFI

4.3.3 DOS* Version

To execute the DOS* version of the KiraTool, you need to boot the server to DOS* and directly execute the KiraTool command as shown below.

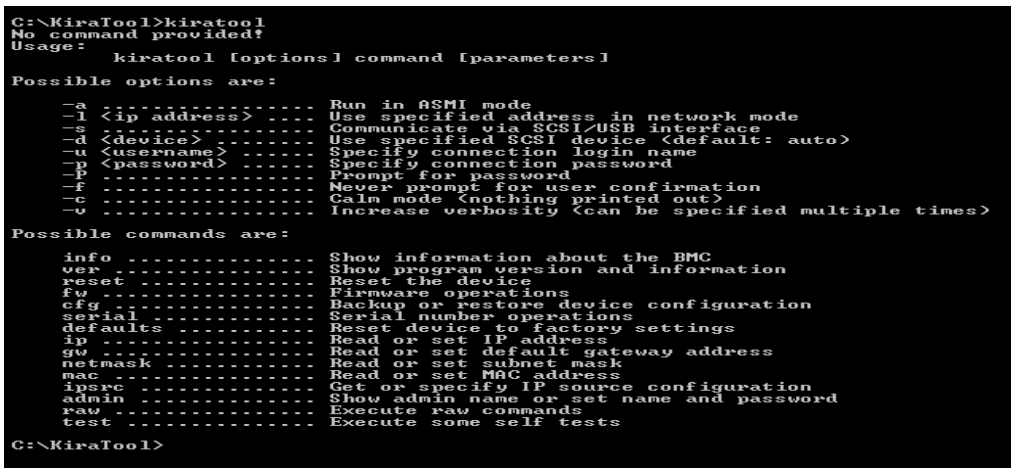


Figure 19: Working with KiraTool under DOS*

4.3.4 Linux Version

To execute the Linux version of the KiraTool, you need to copy " KiraTool-1.5.xx-intel" from the KiraTool package to a Linux server folder, such as " */usr/local/bin* ". (xx is KiraTool revision number). Follow the process below:

```
linux# cp kiratool-1.5.11-intel /usr/local/bin
linux# chmod 755 /usr/local/bin/kiratool-1.5.11-intel
```

KiraTool needs the **sg** kernel module to detect a locally installed Intel® RMM2. Load this kernel module before running KiraTool with the command below:

```
modprobe sg
```

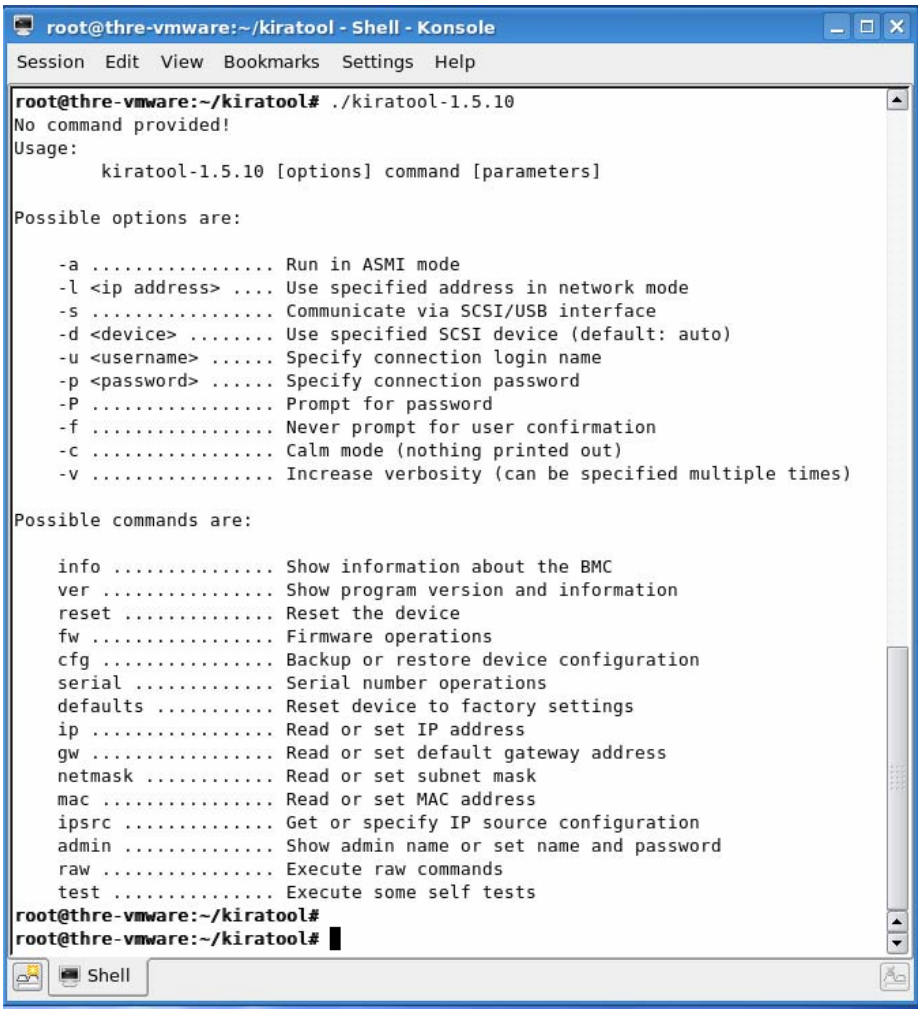


Figure 20: Working with KiraTool under Linux

4.4 Uninstalling KiraTool

4.4.1 Windows Version Uninstallation

The Windows* version of KiraTool contains an uninstall wizard. Refer to Figure 21 to start the uninstall wizard.

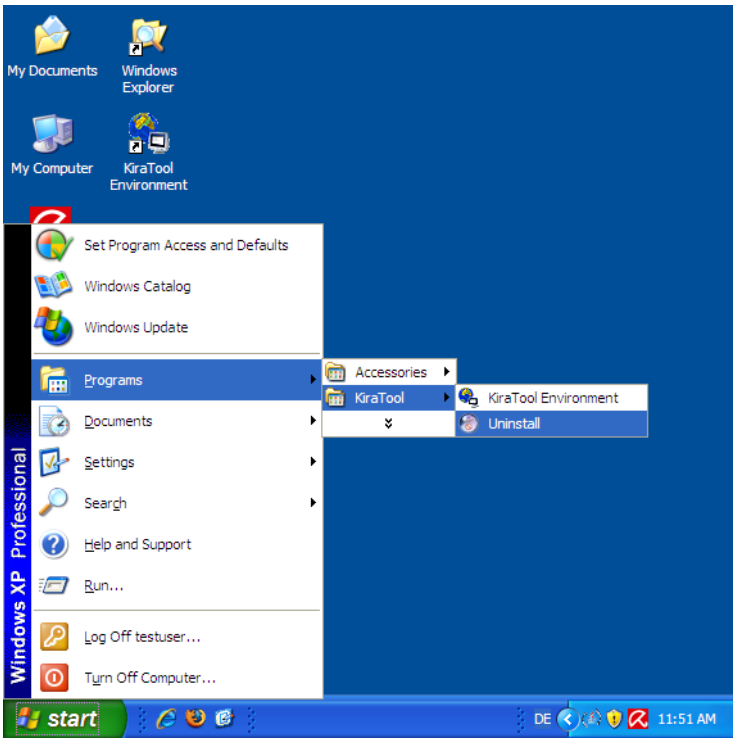


Figure 21: Uninstall the KiraTool under Windows*

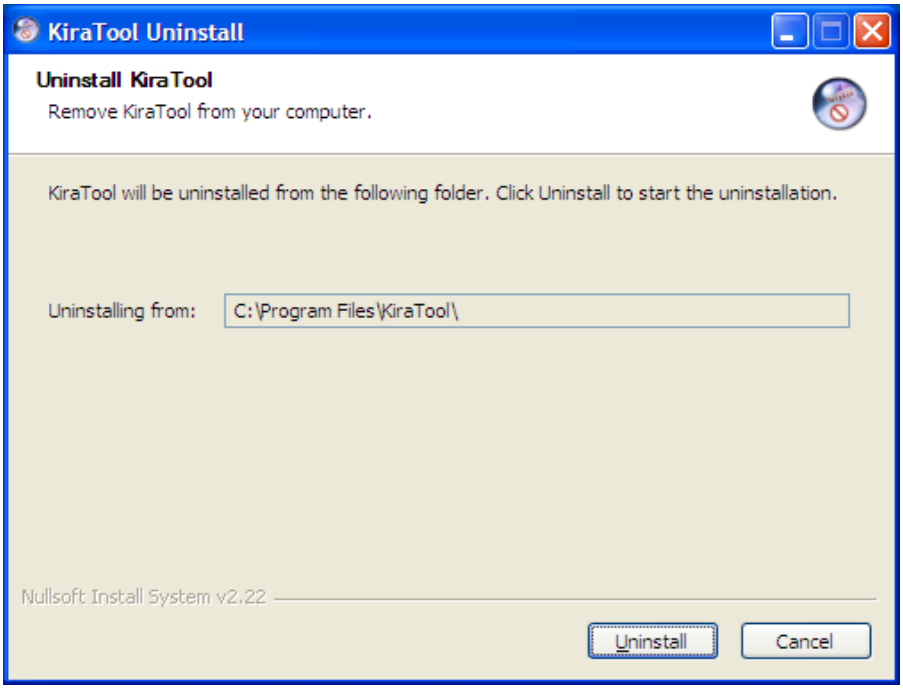


Figure 22: KiraTool Uninstall Wizard

After you click the **UNISTALL** button, the wizard will start the uninstallation process. At the end of the process, you will see a confirmation screen.

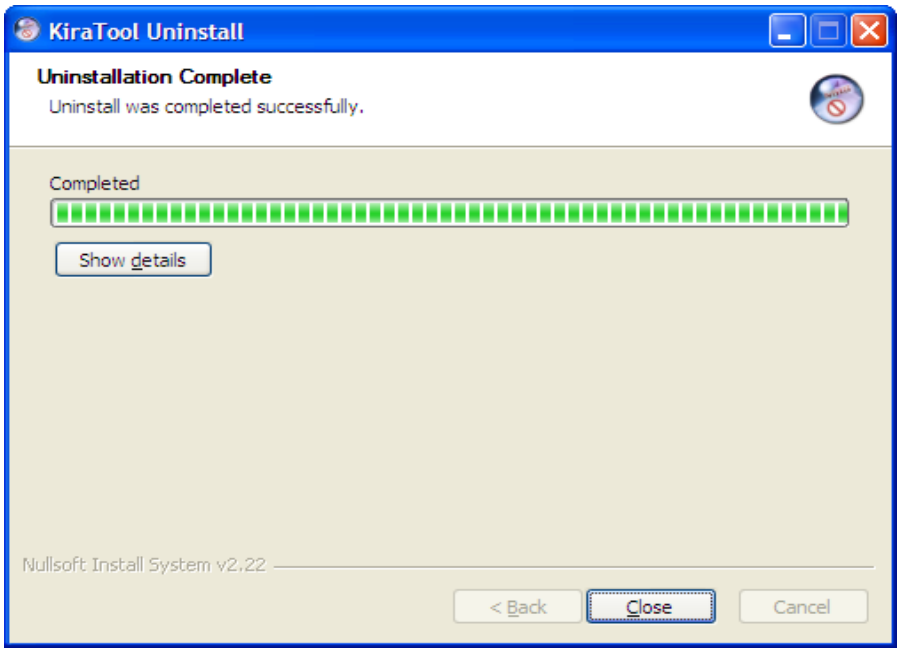


Figure 23: Finished KiraTool Uninstall Wizard

4.4.2 Linux Version Uninstallation

To uninstall the Linux version of KiraTool, you need to remove the files you placed in the system with command below.

```
linux# rm /usr/local/bin/kiratool-1.5.11-intel
```

4.4.3 DOS and EFI Version Uninstallation

Directly remove KiraTool binary file from your disk.

5. Getting Started with Intel® RMM2 Operation

This section describes the operation of the Intel® RMM2. It will cover the initial login to the advanced features of the module.

5.1 Logging in for the First Time

The Intel® RMM2 add-in card may be accessed using a standard Java enabled web browser. You may use the HTTP protocol or a secure encrypted connection via HTTPS. Just enter the configured IP address of the Intel® RMM2 add-in card into your web browser.

```
http://192.168.1.22/
```

In order to use a secure connection type in:

```
https://192.168.1.22/
```

This will take you to the Intel® RMM2 login page as shown in Figure 24.

Figure 24: Login screen

The initial login settings for the web interface are as follows:

```
User = admin
Password = password
```

After the initial login, system administrators and IT professionals may change passwords, create new users, and have full control over access to the Intel® RMM2. Note that the password is case sensitive.

5.2 Prerequisites

The Intel® RMM2 features an embedded operating system and applications offering a variety of standardized interfaces. This section describes the interfaces and how to use them. The interfaces are accessed using TCP/IP protocol. The following interfaces are supported.

- **HTTP/HTTPS**
  Full access is provided by the embedded web server. You can access the Intel® RMM2 using the insecure HTTP protocol or using the encrypted HTTPS protocol. Whenever possible use HTTPS.

- **Telnet**
  A standard Telnet client can be used to access most of the Intel® RMM2's functionality, including a text-mode console redirection. When connected using Telnet, the following commands are supported: help, quit, version, terminal, and clp.
- **SSH**
  A Secure Shell (SSH) client can also be used to access the Intel® RMM2.

5.3 Browsers

In order to access the remote host system using a securely encrypted connection, you will need a browser that supports the HTTPS protocol. Strong security is only assured by using a key length of 128 Bit. Some older browsers may not have a strong 128 Bit encryption algorithm.

If you are using Windows Internet Explorer*, you can verify strong encryption by opening the "Help / About" menu to read about the key length that is currently activated. The figure below shows the dialog box presented by Internet Explorer 6.0.

Figure 25: Encryption Key Length Displayed by Internet Explorer

In order to use the Remote Console (KVM) window of your managed server, Java Runtime Environment (JRE) version 1.4 or higher must be installed. If the browser has no Java support (such as on a small handheld device), you are still able to maintain your remote host system using the administration forms displayed by the browser itself.

5.4 Navigation

After the successful login to the Intel® RMM2, the main page of the Intel® RMM2 appears (see Figure 26). This web page consists of three parts; each of them contains specific information. The buttons on the top allow you to navigate within the home web page, KVM, and logout screens. See the figure below for details. The lower left frame contains a navigation bar and allows you to switch between the different sections of the Intel® RMM2. Within the right frame, task-specific information is displayed that depends on the section you have chosen before.

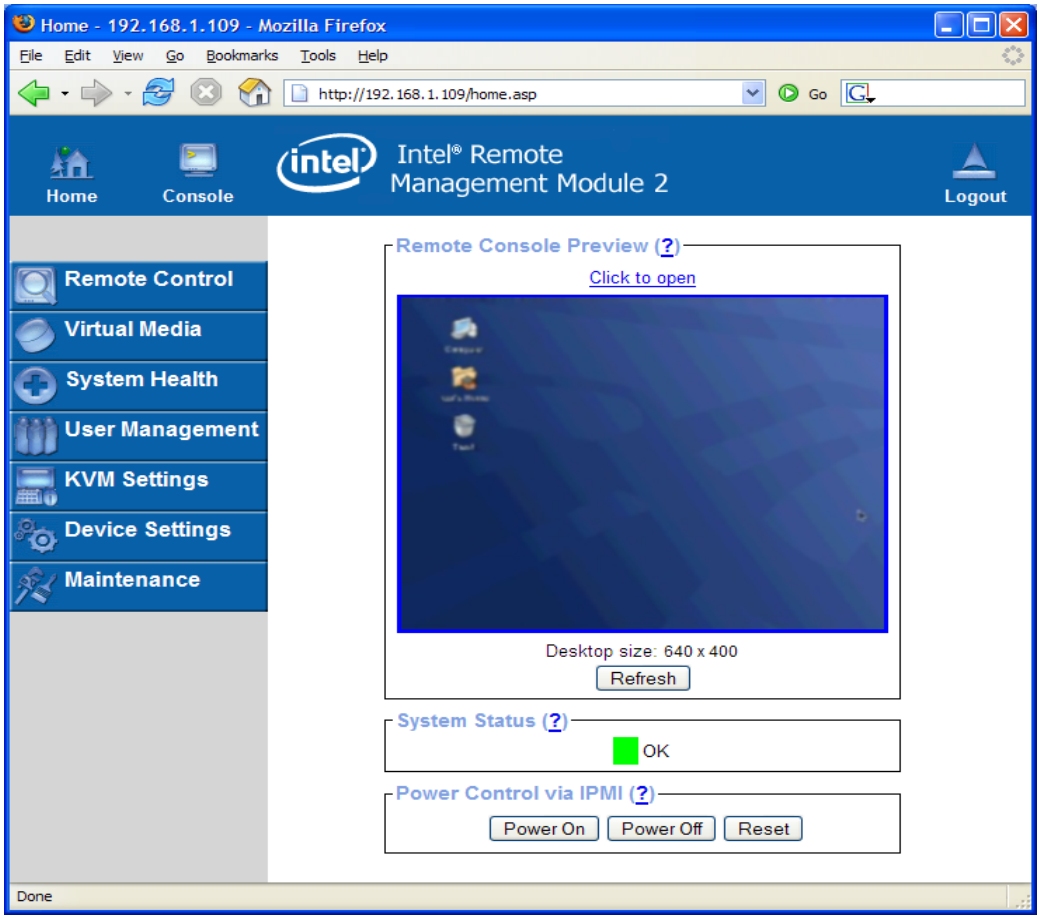


Figure 26: Home Page when Accessing the Intel® RMM2

Return to the main page of the Intel® RMM2.

Open the Intel® RMM2 Remote Console (KVM).

Exit from the Intel® RMM2 front-end.

Figure 27: Web Interface – Top Screen Buttons

5.5 Online Help

The Web front-end comes with online help. To get further information on a certain topic or group of options, just click the question mark (?) near the group title displayed in the right page and a new browser with the online help will be opened.

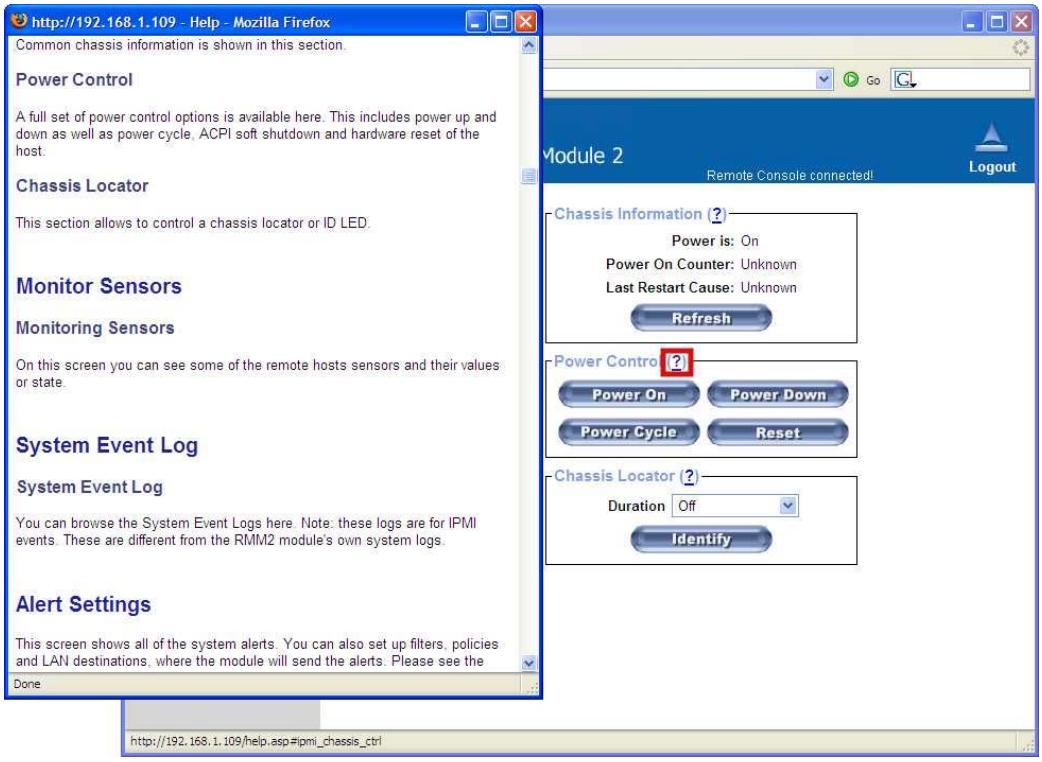


Figure 28: Launching the Online Help

5.6 Logging out of the Intel® RMM2

This link logs out the current user and presents a new login screen. Please note that an automatic logout will be performed if there is no activity on the web page for half an hour. There is no timeout associated with the Remote Console (KVM) connection; it will not timeout until closed by the user.

6. Remote Console (KVM) Operation

6.1 General Description

The Remote Console is the redirected keyboard, video, and mouse of the remote host system where the Intel® RMM2 is installed.

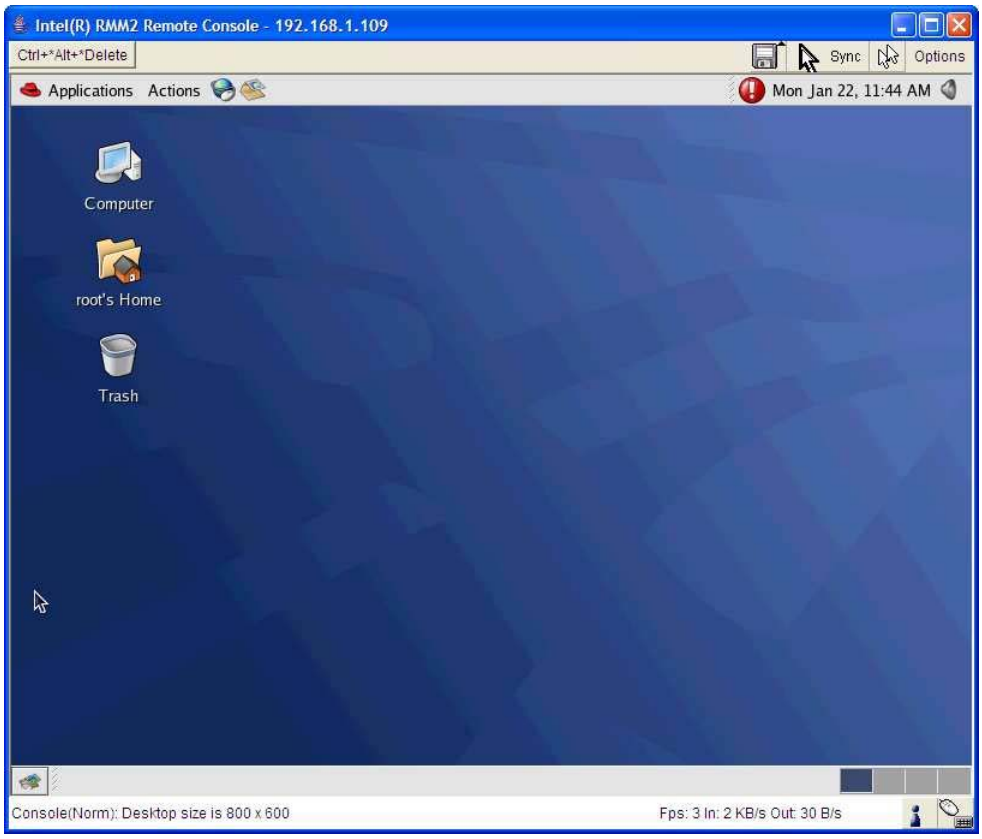


Figure 29: Remote Console

The Remote Console window is a Java applet that establishes a TCP connection to the Intel® RMM2. The protocol that is run over this connection is a unique KVM protocol and not HTTP or HTTPS. This protocol uses port #443. Your local network environment must permit this connection to be made, i.e. your firewall and, in case you have a private internal network, your NAT (Network Address Translation) settings have to be configured accordingly.

6.2 Main Window

Starting the Remote Console opens an additional window. It displays the screen content of your remote server. The Remote Console will behave exactly as if you were located at the remote server. The responsiveness of the keyboard and mouse may be slightly delayed depending on the bandwidth and latency of the network between the Intel® RMM2 and Remote Console.

The Remote Console window always tries to show the remote screen with its optimal size. That means it will adapt its size to the size of the remote screen initially and after the screen resolution of the remote screen has been changed. However, you can always resize the Remote Console window in your local system window as usual.

6.3 Remote Console Control Bar

The upper part of the Remote Console window contains a control bar. Using its elements you can see the status of the Remote Console and influence the local Remote Console settings. A description for each control follows.

Note: Some of the following control options are visible only when the operating system type, "Other Operating Systems" has been selected. For details on selecting "Other Operating Systems" see the section for Keyboard/Mouse under the KVM Settings menu.

Figure 30: Remote Console Control Bar

- Drive Redirection

  Opens the virtual media Drive Redirection menu for the Remote Console.

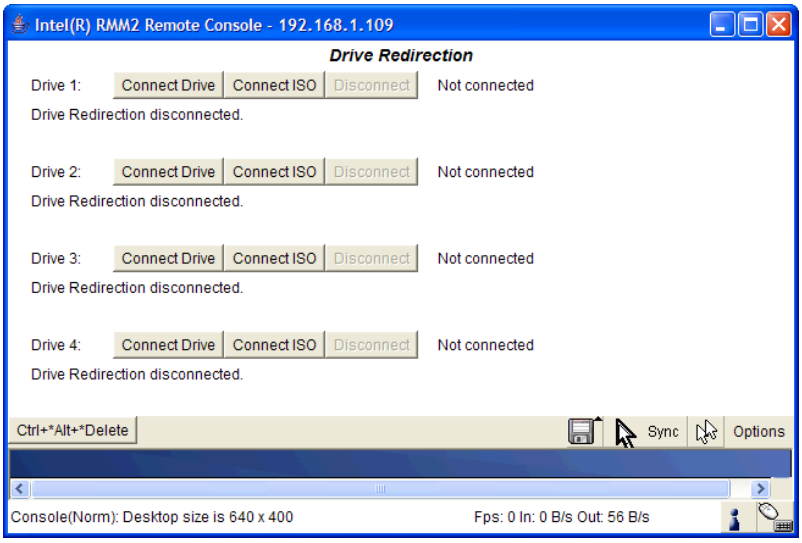


Figure 31: Remote Console Applet Drive Redirection Menu

Using this menu, you can either redirect a local drive (only available under Windows*):

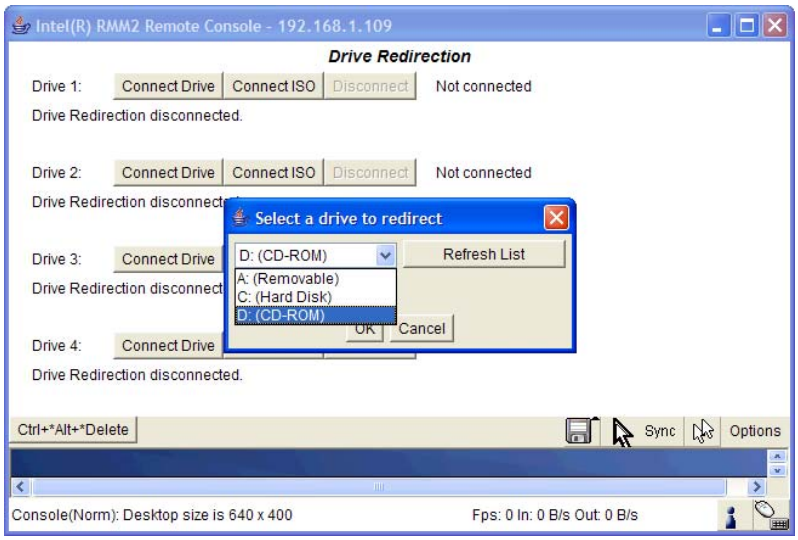


Figure 32: Redirecting a Local Drive

or redirect an ISO CD/DVD image:

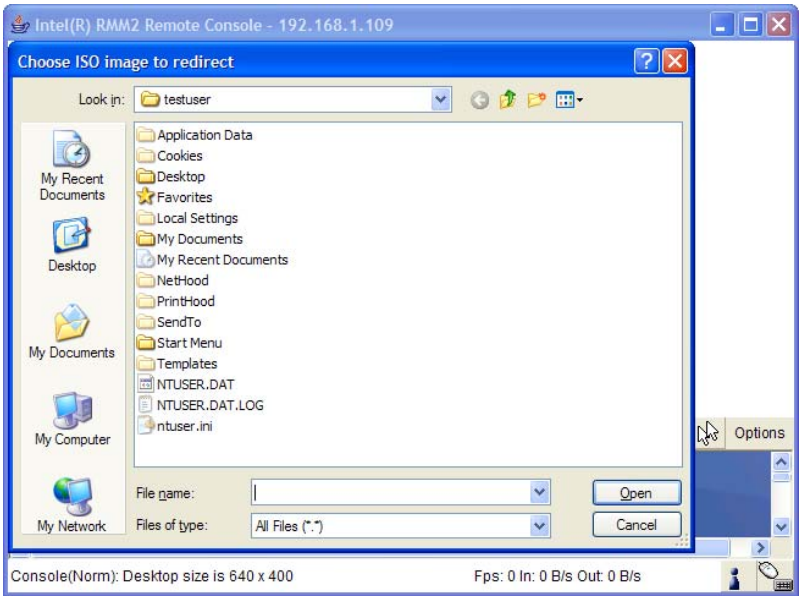
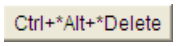


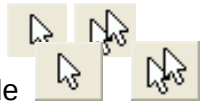
Figure 33: Redirecting an ISO Image

- Sync Mouse 

  Choose this option in order to synchronize the local mouse with the remote mouse cursor. This is necessary when using accelerated mouse settings on the host system. In general, there is no need to change mouse settings there. This option is available when “Other Operating Systems” is selected.

- Ctrl+Alt+Delete 

  Special button key to send the "Control Alt Delete" key combination to the remote system (see also the section called “KVM Settings” for defining a new button). This option is available when “Other Operating Systems” is selected.

- Single/Double Mouse Mode 

  Switches between the Single Mouse Mode (where only the remote mouse pointer is visible) and the Double Mouse Mode (where the remote and local mouse pointers are visible and need to be synchronized). Single Mouse Mode is only available if using SUN JVM 1.4 or higher.

  To leave the Single Mouse Mode and get your local mouse pointer back, press Alt-F12.

6.4 Remote Console Options Menu

To open the Options menu click on the "Options" button.

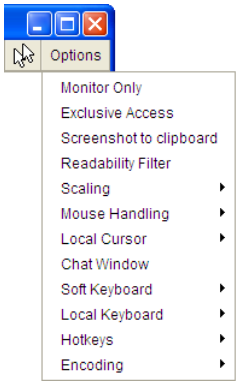


Figure 34: Remote Console Options Menu

6.4.1 Monitor Only

Toggles the Monitor Only filter on or off. If the filter is switched on, no Remote Console interaction is possible; the remote screen can be viewed only.

6.4.2 Exclusive Access

If a user has the appropriate permission, all other Remote Console’s connections are forced to close. No other user can open a Remote Console connection until this user disables the exclusive access or logs off.

6.4.3 Screenshot to Clipboard

This button allows you to capture a screenshot of the Remote Console. The Intel® RMM2 will automatically place it onto the "clipboard". This allows you to easily import the screenshot into your documents or other programs.

6.4.4 Readability Filter

Toggles the Readability Filter on or off. If the filter is switched on in scaling mode, it will preserve most of the screen details even if the image is substantially scaled down. This option is only available with a JVM 1.4 or higher.

6.4.5 Scaling

Allows you to scale down the Remote Console. You can still use both mouse and keyboard, however the scaling algorithm will not preserve all display details.

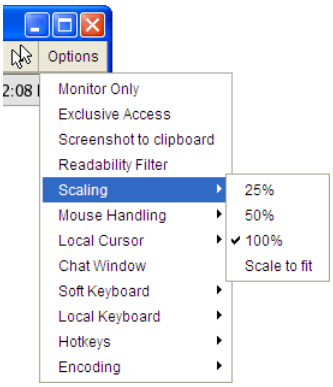


Figure 35: Remote Console Options Menu: Scaling

6.4.6 Mouse Handling

The submenu for Mouse Handling offers two options for synchronizing the local and the remote mouse pointer when using Soft Mouse Mode as explained in the section called “Mouse and Keyboard Configuration”. This option is available when “Other Operating Systems” is selected as the operating system type.

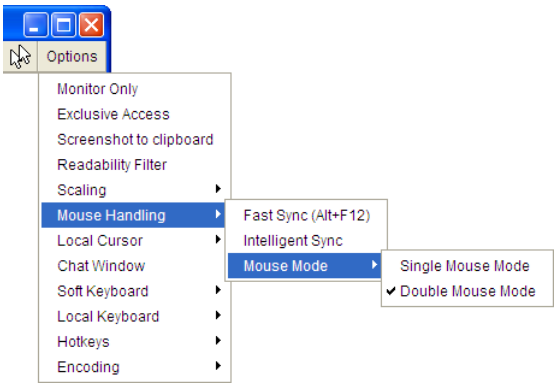


Figure 36: Remote Console Options Menu: Mouse Handling

- **Fast Sync**
  The fast synchronization is used to correct a temporary but fixed skew.

- **Intelligent Sync**
  Use this option if the fast sync does not work or the mouse settings have been changed on the host system.

6.4.7 Single/Double Mouse Mode

Single Mouse Mode will show only the remote mouse pointer. The local mouse pointer will be hidden and the remote one can be controlled directly. To leave this mode it is necessary to define a mouse hotkey in the Remote Console Settings Panel. Press this key to free the captured local mouse pointer. This feature is available when “Other Operating System” is selected.

6.4.8 Local Cursor

There is a list of different cursor shapes to choose from for the local mouse pointer. The selected shape will be saved for the current user and activated the next time this user opens the Remote Console. The number of available shapes depends on the Java Virtual Machine.

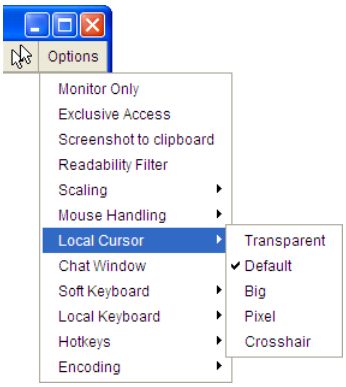


Figure 37: Remote Console Options Menu: Cursor

6.4.9 Chat Window

This opens a chat window allowing you to interactively "chat" with other users logged into the Intel® RMM2.

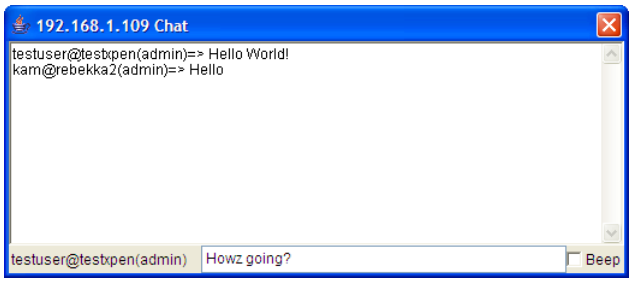


Figure 38: Chat Window

6.4.10 Soft Keyboard

The Soft Keyboard simulates an entire keyboard that is connected to the remote system. It is necessary when your remote system runs with a completely different language and country mapping to your administration machine. By selecting the appropriate key(s) you can send key codes and key sequences to the remote system; it acts as if you are working with a keyboard that is directly connected to the remote system.

In order to open the Soft Keyboard, select the entry "Soft Keyboard" from the Options menu. You can send single key strokes like “F” as well as combinations of keys such as “Ctrl+C” or “Alt+Shift+F4”.

For a single key stroke you can click on the key with the wanted character. Single keys such as regular characters and numbers are sent immediately. Special keys like “Ctrl” and “Shift”, as well as the function keys F1 through F12 have to be selected twice. The first press sends the signal "key is pressed"; the second press indicates the signal "key is released" to the remote system. After the first press, the key will change its color to signal that the according key is pressed. After the second press, the key will appear as usual and signal that the key was sent.

To send the key combination “Ctrl+C” select the “Ctrl” key first; the key will change its color. Press the “C” key. The following key (“C” in our example) will be combined with the previously selected key. Both the “Ctrl” and “C” keys are released and the key combination will be sent to the remote system. The “Ctrl” key will appear normal (color change).

In order to send the key combination “Ctrl+F5” three steps are required. Select the “Ctrl” key once and the “F5” key twice. The last press will release both keys and send the key combination to the remote system.

In order to send the key combination “Alt+Shift+F4” four steps are required. First, select the “Alt” key once. Second, select the “Shift” key. Finally, choose the “F4” key twice. The last press will release all the keys and send the key combination to the remote system.

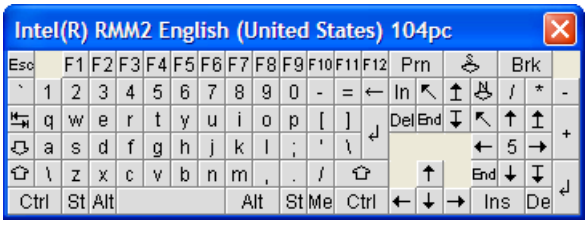


Figure 39: Soft Keyboard

- **Show**
  Displays the Soft Keyboard.
- **Mapping**
  Used for choosing the desired language and country mapping of the Soft Keyboard.

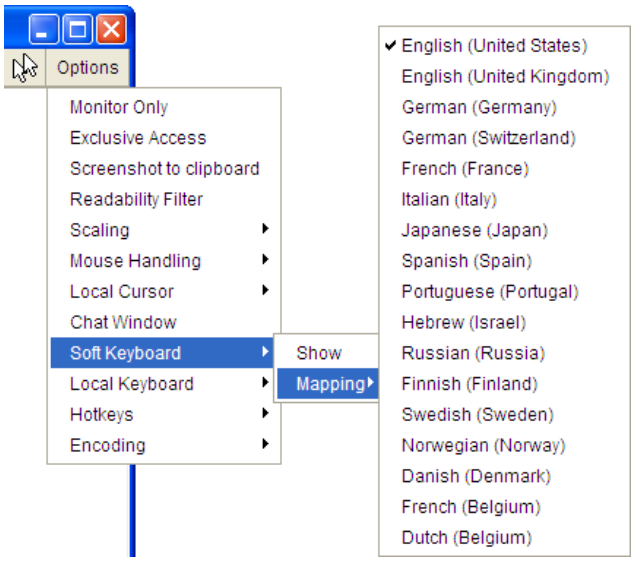


Figure 40: Soft Keyboard Mapping

6.4.11 Local Keyboard

This is used to change the language mapping of your browser machine running the Remote Console Applet. Normally the applet determines the correct value automatically. However, depending on your particular JVM and your browser settings, this is not always possible. A typical example is a German localized system that uses a US-English keyboard mapping. In this case you have to manually change the Local Keyboard setting to the right language.

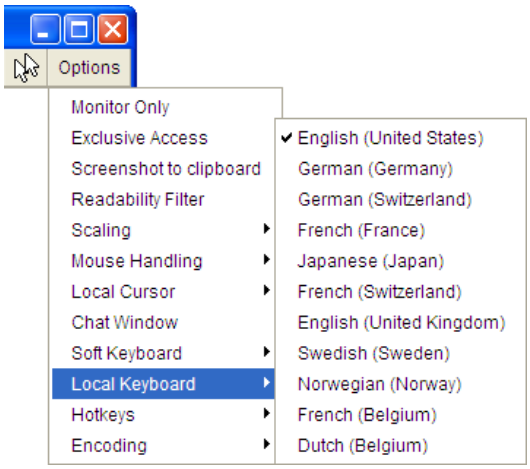


Figure 41: Local Keyboard Language Menu

6.4.12 Hotkeys

This opens a list of previously defined hotkeys. In order to send a registered command to the host system, choose the appropriate entry. A confirmation dialog will be displayed before sending the selected command to the remote host. Choose "OK" to perform the command on the remote host.

Figure 42: Remote Console Confirmation Dialog

6.4.13 Encoding

These options are used to adjust the encoding level in terms of compression and color depth. They are available unless "Transmission Encoding" is determined automatically.

Compression Level: You may select a value between 1 and 9 for the desired compression level, with level 1 enabling the fastest compression and level 9 the best compression. The most suitable compression level should always be seen as a compromise between the network bandwidth that is available, on your video picture to be transferred, and on the number of changes between two single video pictures. We recommend using a higher compression level if the network bandwidth is low. The higher the compression level, the more time is necessary to pack or unpack the video data on either side of the connection. The compression quality depends on the video picture itself, e.g. the number of the colors or the diversity of pixels. The lower the compression quality, the more data has to be sent and the longer it may take to transfer the whole video picture. If level 0 is chosen, the video compression is disabled completely.

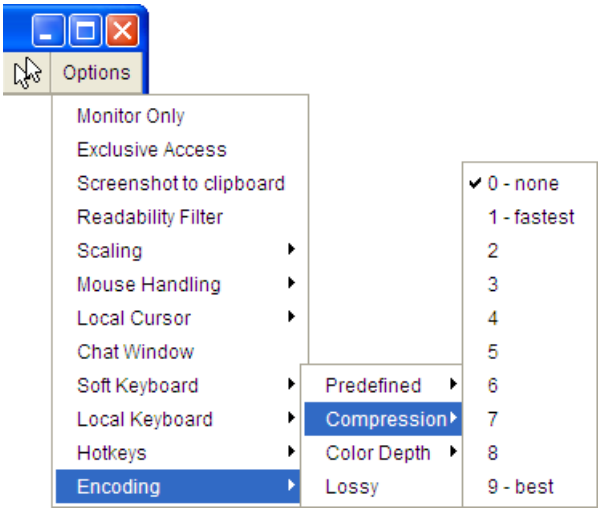


Figure 43: Remote Console Options: Encoding Compression

Predefined & Lossy Compression: The Predefined menu displays preset compression options as show in the figure below. Lossy compression can be used but may lead to degradation in image quality.

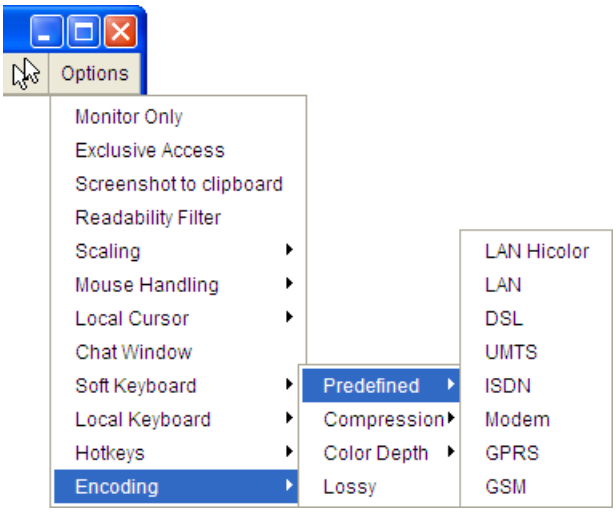


Figure 44: Remote Console Options: Predefined Encoding Compression

Color Depth: Sets the desired color depth. You may select between 8 bit and 16 bit for compression level 0, or between 1 bit and 8 bit for compression level 1 through 9. The higher the color depth, the more video information has to be captured and transferred.

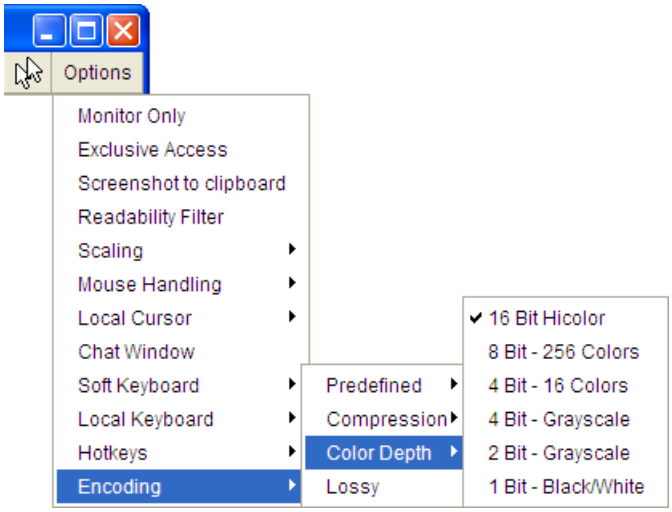


Figure 45: Remote Console Options: Color Depth

6.5 Remote Console Status Line

The status line at the bottom of the Remote Console screen shows both console and the connection state. The value in parenthesis describes the connection to the Remote Console. "Norm" means a standard connection without encryption; "SSL" indicates a secure connection using Secure Socket Layer (SSL).

The status line also displays the number of frame buffer updates ("Fps") as well as the incoming ("In:") and the outgoing ("Out:") network traffic in KB per second. A low value of network traffic is recommended and can be achieved as described in the section called “Optimizing the Video Picture”. If compressed encoding is enabled, a value in brackets displays the compressed transfer rate.

Figure 46: Status Line

6.5.1 Visual Display of Access Setting

The icons in the lower right corner of the Remote Console screen display current access settings.

One single user is connected to the Remote Console of the Intel® RMM2.

One or more users are connected to the Remote Console of the Intel® RMM2.

Exclusive access is set for you. Any other user may not access the remote host via Remote Console unless you disable this option.

A remote user has exclusive access. You may not access the remote host via Remote Console unless the other user disables this option. The outer right button displays the state of the “Monitor Only” settings.

Indicates that the “Monitor Only” option is disabled and that keyboard and mouse actions are possible.

Indicates that “Monitor Only” is enabled.

6.6 Recommended Mouse Settings

The following are recommended mouse control settings for various operating systems when using Remote Console connections.

6.6.1 Microsoft Windows* 2000, 2003, XP (All Versions)

Choose the auto mouse speed radio button under the left menu for KVM settings, keyboard / mouse. For Microsoft Windows XP*, disable the option "enhance pointer precision" in the control panel. The remote mouse should always be synchronized with the local mouse if selecting the option “Windows >= 2000.." under the USB Mouse Type option.

6.6.2 Linux

Choose "Other Operating Systems" from the USB Mouse Type selection box. Second, choose the auto mouse speed radio button. This applies for both USB and PS/2 mice.

7. Menu Options of the Intel® RMM2 Embedded Web

This section details the Intel® RMM2 menu options as seen on the left pane of the home page and the corresponding pages on the right pane.

7.1 Remote Control

This menu has two sub-menu listings: KVM and Remote Power.

7.1.1 KVM Console

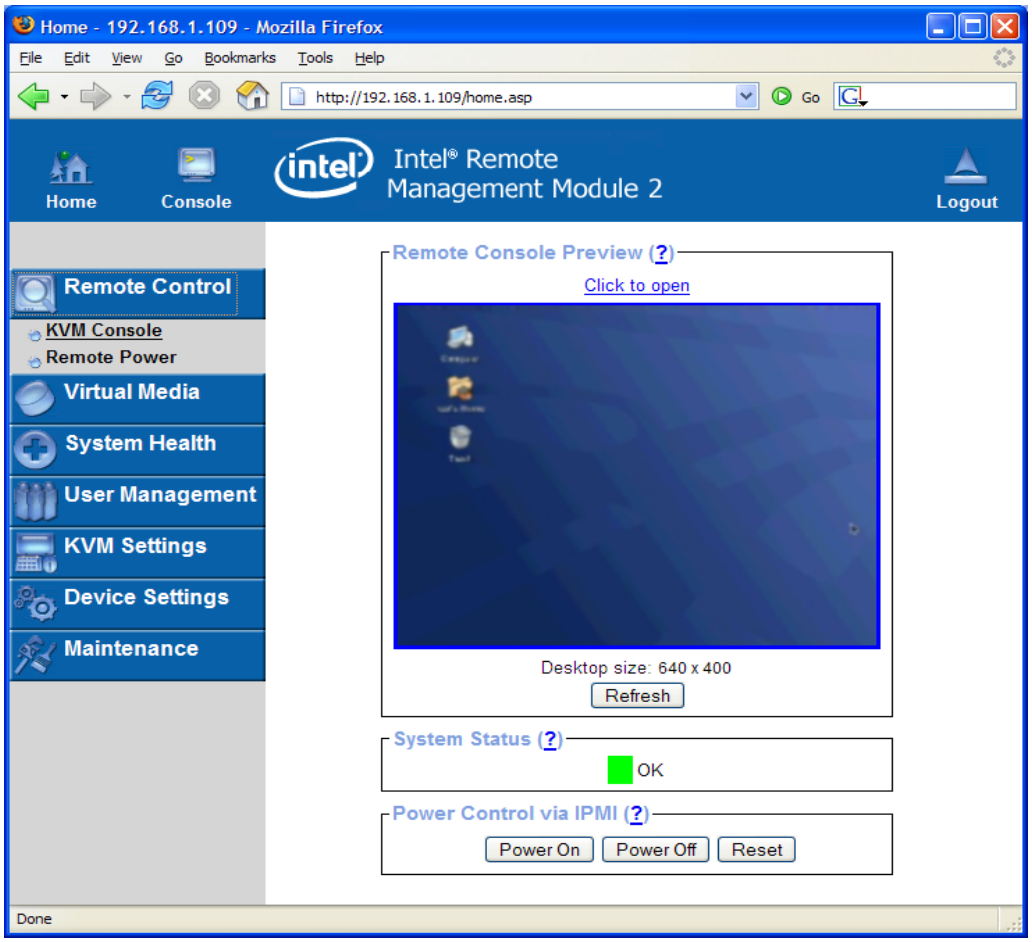


Figure 47: Remote Console Menu

Remote Console Preview
To open the KVM console either click on the menu entry on the left or on the console picture on the right. To refresh the picture click on the button that is named "Refresh".

7.1.2 Remote Power

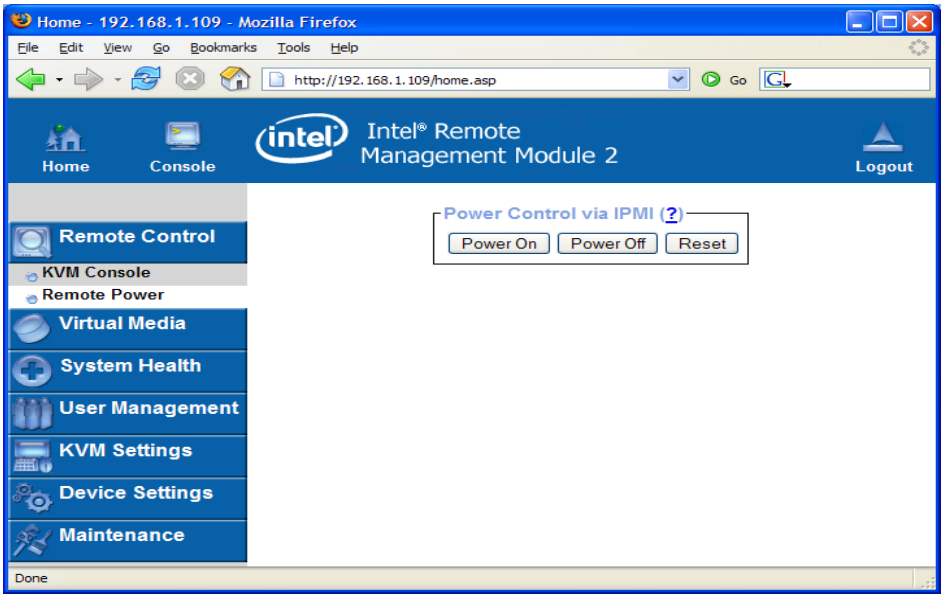


Figure 48: Remote Power Display

On this screen are buttons which allow you to power cycle or reset the remote server. This does not affect the operation of the Intel® RMM2.

7.2 Virtual Media

This menu has two sub-menu listings: Floppy Disk Image and Drive Redirection.

7.2.1 Floppy Disk Image

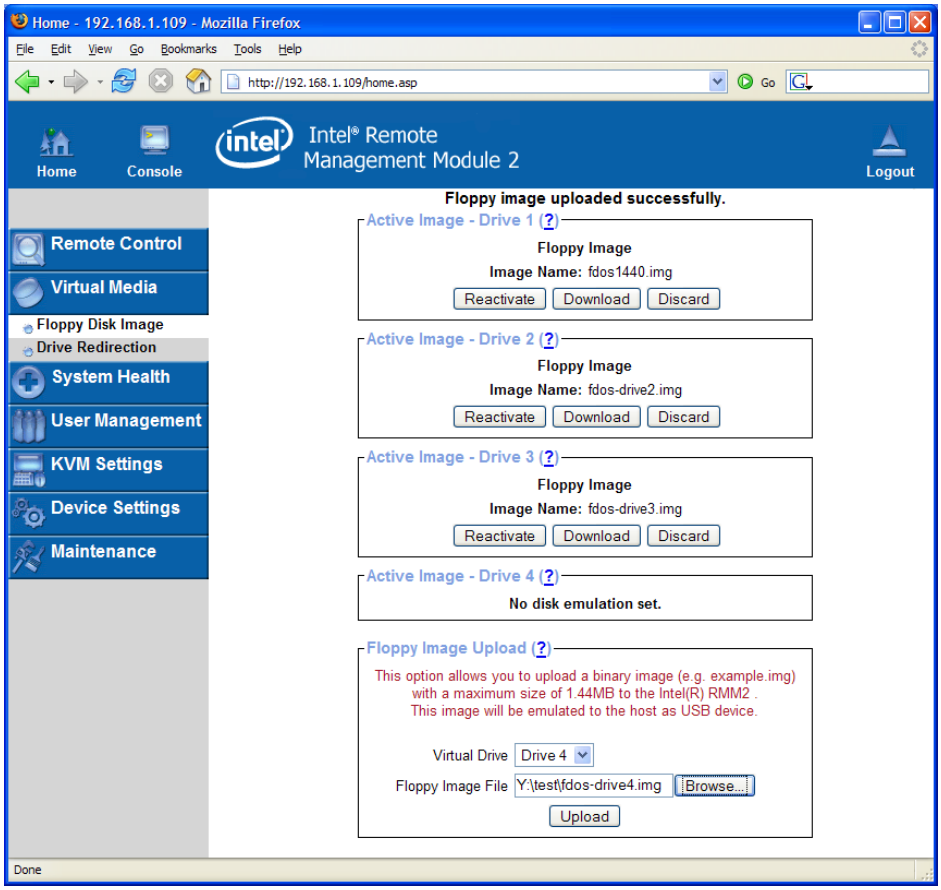


Figure 49: Floppy Disk Image

Two virtual floppies are possible using the Intel® RMM2. Use this screen to configure the path to the floppy images. You can specify up to two images. To open the file selection dialog click on the button "Browse" and select the desired image file.

The maximum image size is limited to 1.44MB. To use a larger image mount this image via Windows Share (or SAMBA).

Click on the "Upload" button to initiate the transfer of the chosen image file into the onboard memory of the Intel® RMM2. This image file is kept in the onboard memory of the Intel® RMM2 until the end of the current session, until you log out, or until a reboot of the Intel® RMM2 is initiated.

7.2.2 Drive Redirection

The Drive Redirection is another possibility to use a virtual disc drive on the remote computer. With Drive Redirection you do not have to use an image file but may work with a drive from your local computer on the remote machine. The drive is shared over a TCP network connection. Devices such as floppy drives, hard disks, CD-ROM drives, and other removable devices such

as USB drives can be redirected. It is possible to enable a write support so the remote machine can write data to your local disk.

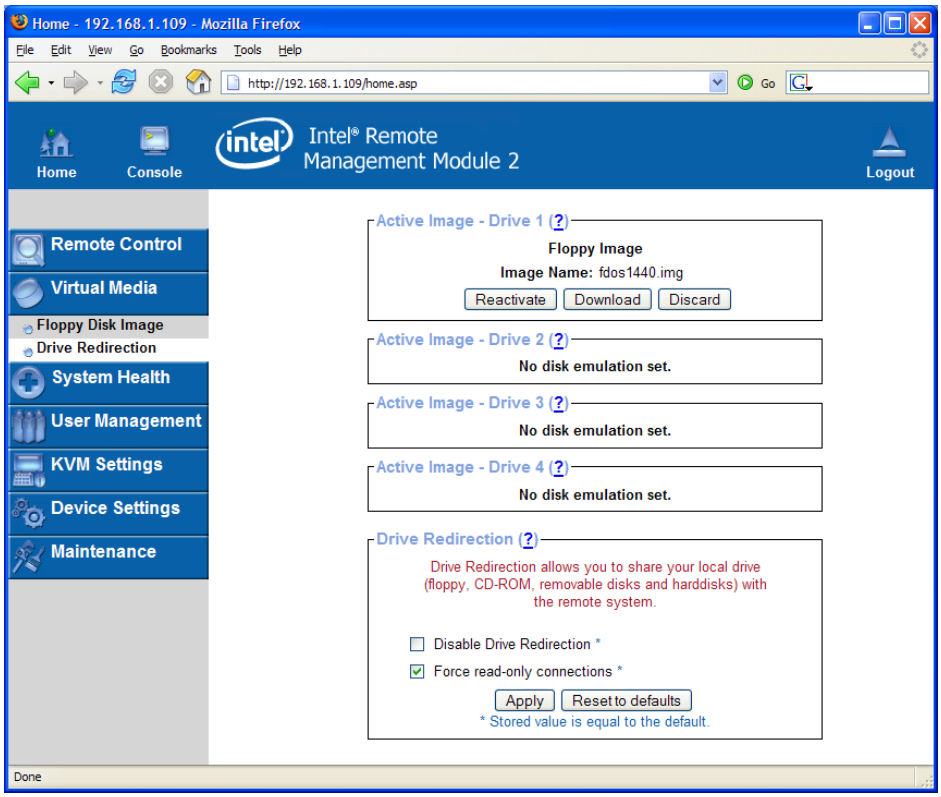


Figure 50: Drive Redirection

Note: The screen shown above displays status only. It cannot be used to establish virtual media or drive redirection. To use virtual media or drive redirection you must be in the Remote Console window.

Drive Redirection works on a level below the operating system. Neither the local nor the remote operating system is aware that the drive is currently redirected. This may lead to inconsistent data as soon as either the local or remote operating systems write data to the device. If “write” support is enabled, the remote computer might damage the data and the file system on the redirected device. Alternatively, if the local operating system writes data to the redirected device, the drive cache of the operating system of the remote host might contain older data. This may confuse the remote host’s operating system. Care in using Drive Redirection is needed, especially when using the “write” support.

Disable Drive Redirection: If enabled, the Drive Redirection is switched off.

Force read-only connections: If enabled, the Write Support for the Drive Redirection is switched off. It is not possible to write on a redirected device.

7.3 System Health

The Intelligent Platform Management Interface (IPMI) support on the Intel® RMM2 allows you to power cycle the remote host system or to perform a hard reset. Additionally you can see the remote hardware event log and interrogate the state of some system sensors, i.e., temperature.

7.3.1 System Information

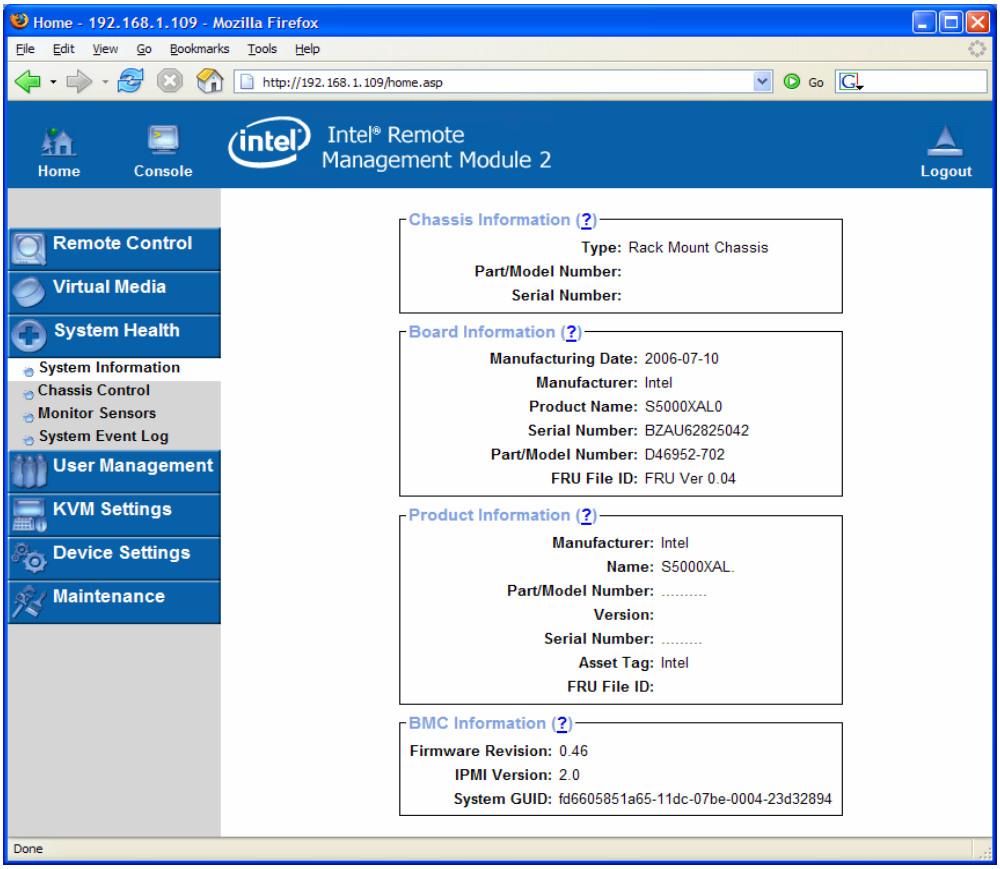


Figure 51: System Information

This page displays information coming from the FRU (Field Replaceable Unit) repository of the host system.

7.3.2 Chassis Control

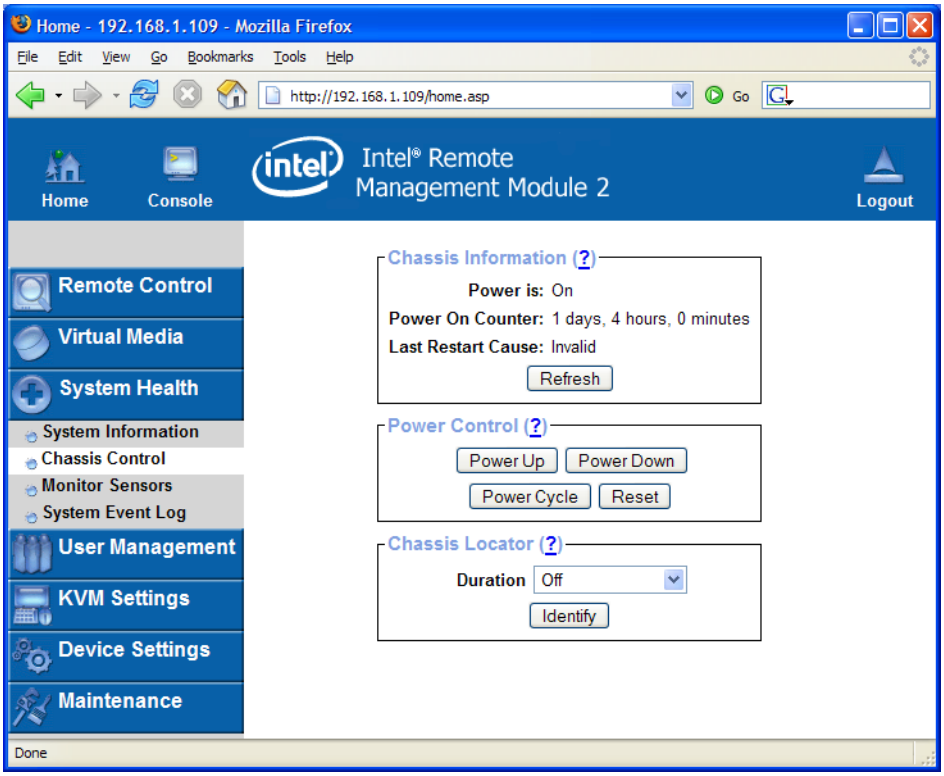


Figure 52: Chassis Control Page

Using Chassis Control you can obtain information about the selected chassis, switch the remote power on and off (power cycle), and locate the remote host chassis by turning on the blue System ID LED.

7.3.3 Monitor Sensors

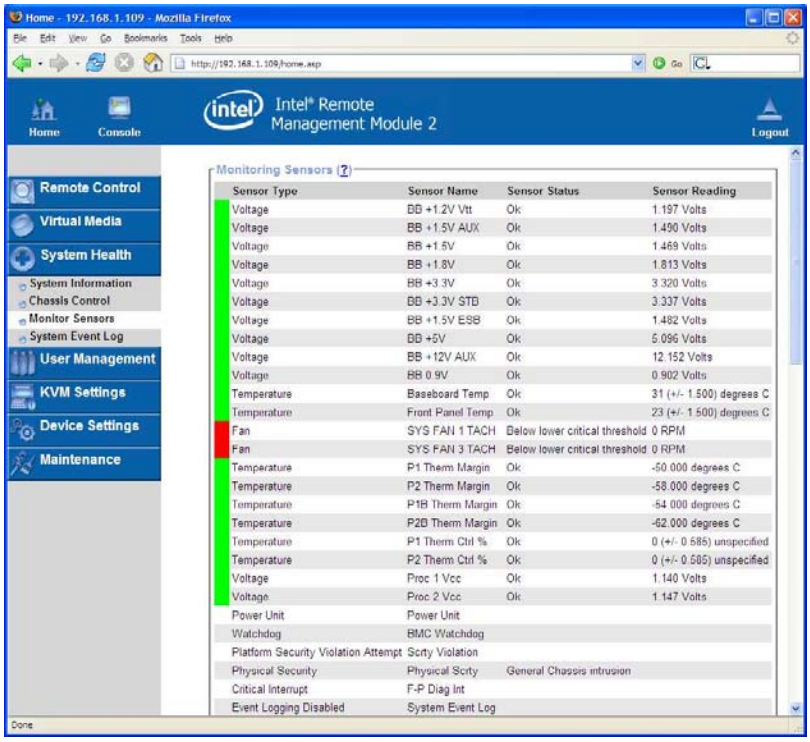


Figure 53: Sensor Status

This screen gives a visual and detailed report on individual sensor status. Threshold based sensors within a normal range of operation are displayed in green, and sensors in a critical state are shown in red.

7.3.4 System Hardware Event Log

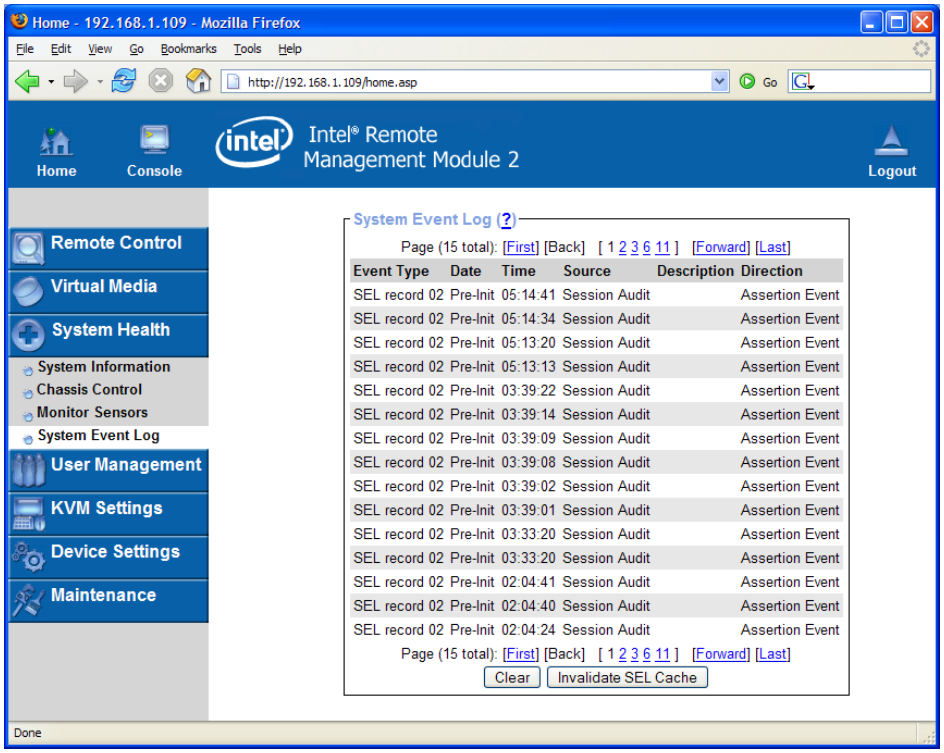


Figure 54: System Hardware Event Log

You can browse the System Event Logs here.

Note: These logs are for IPMI events. These are different from the system logs of the Intel® RMM2.

You may use the text buttons back, forward, first, and last to browse within the data. The back button displays the previous page with newer log information, whereas the forward button switches to the following page with older log information. The first button displays the page with the most recent entries, and the last button displays the page with the oldest entries. You can also directly switch to a certain page number.

The System Event Log entries are kept in an internal cache on the Intel® RMM2. If this cache is somehow messed up, you can trigger the Intel® RMM2 to pull the complete Event Log from the motherboard again. This can be done with the Invalidate SEL Cache button. However, this process may take several minutes.

7.4 User Management

The Intel® RMM2 comes with a pre-configured user account for the administrator, also referred to as the super user. The super user has the login name "admin" and a fixed set of permissions. This user has all possible rights needed to configure the device and to access all of the functions of the Intel® RMM2.

The Intel® RMM2 has several pre-defined user groups:

- Admin - User group for the administrative super user.
- Unknown - A restricted group for users without a specific group.
- None - Not really a group. This indicates that a user has no group and thus owns a private set of permissions.

A super user cannot delete any of the pre-defined groups. The super user may create and delete other groups.

7.4.1 Change Password

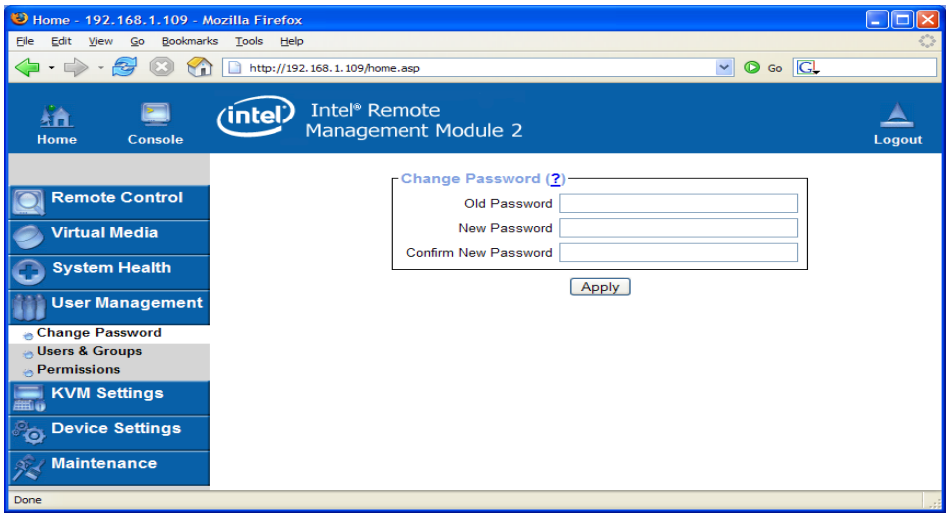


Figure 55: Changing Passwords

To change your password, enter your current password then enter the new password in the upper entry field. Retype the new password in the lower field. Click "Apply" to submit your changes.

7.4.2 User and Groups

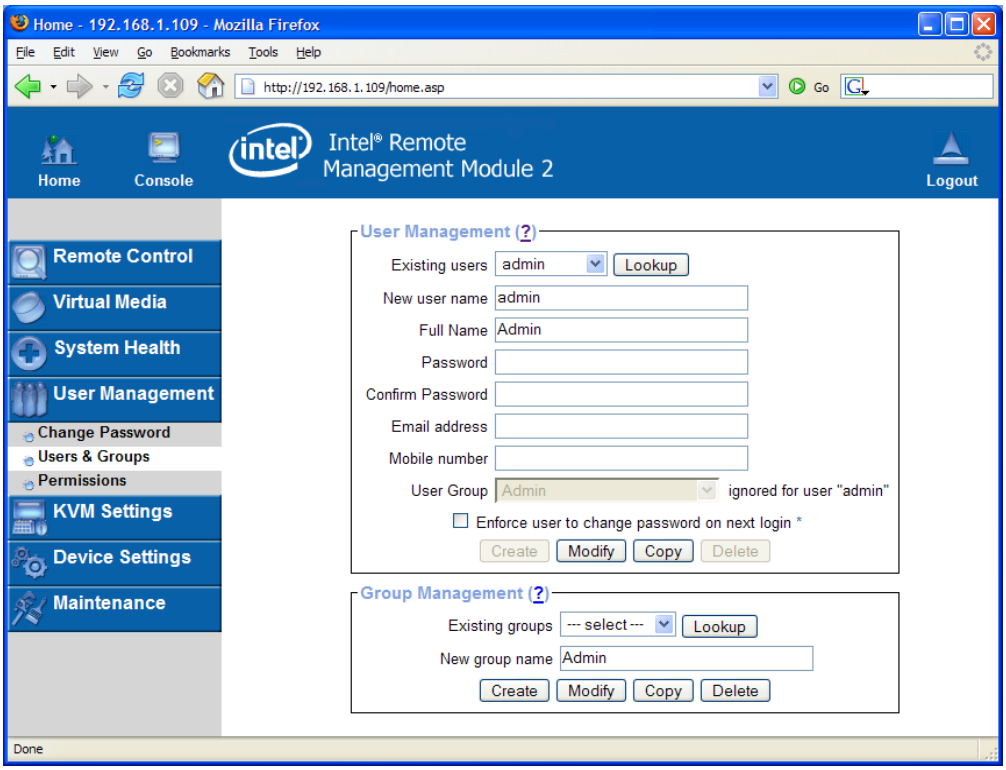


Figure 56: User Management Page

- Existing users: Select an existing user for modification. Once a user has been selected, click the lookup button to see the user information.
- New User name: The new user login name for the account currently selected or being created.
- Password: The password for the login name. It must be at least four characters long.
- Confirm password: Confirmation of the password above.
- Email address: This is optional.
- Mobile number: This is optional.
- User Group: Each user can be a member of one group. This can be one of the built-in groups or a newly created one. This group defines a set of privilege levels. If a user has no group, the individual privilege level set can be set for this user. To create a user, press the button "Create". The button "Modify" changes the displayed user settings. To delete a user, press the "Delete" button.

Note: The Intel® RMM2 is equipped with a host-independent processor and memory which both have a limitation in terms of the processing instructions and memory space. To guarantee an acceptable response time, we recommend that you not exceed 25 users connected to the Intel® RMM2 at the same time.

7.4.3 Permissions

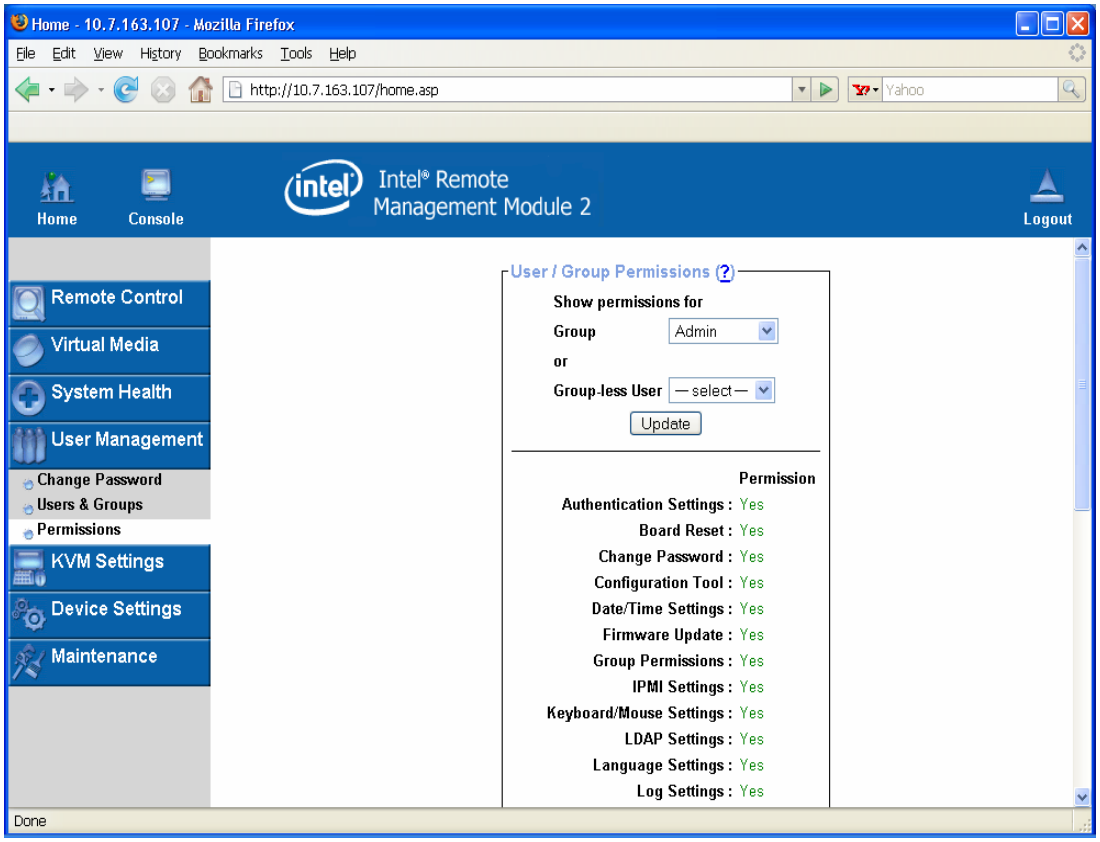


Figure 57: Permissions Page

Only one permission set per user is allowed. Either the user inherits permissions from his/her group, or for the user that does not belong to a group, the permissions can be set individually.

This page allows you to set these permissions for each group or group-less user. First, select the item (group or group-less user) from the drop-down lists. All changes you make will affect the permission set of the selected entity.

Each entry allows or denies the usage of certain functions. The fields labeled RC Settings pertain to the settings of the Remote Console.

7.5 KVM Settings

7.5.1 User Console

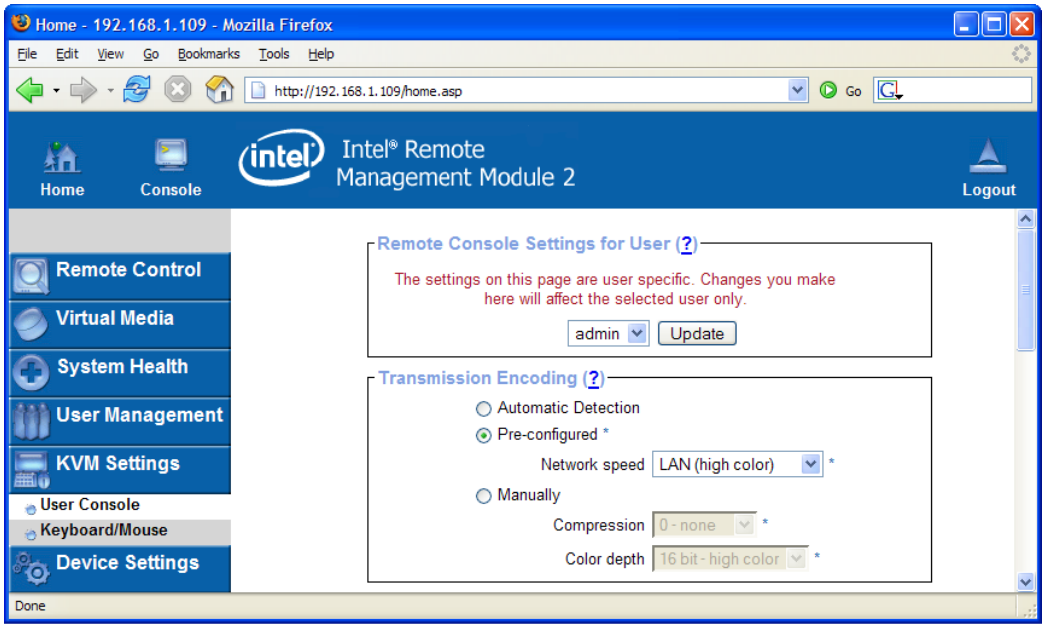


Figure 58: Remote Console Setting for Users

7.5.1.1 Remote Console Settings for Users

This selection box displays the user ID for which the values are shown and for which the changes will take effect. Select the desired user from the selection box and press the button "Update". This will result in displaying the according user settings below.

You are allowed to change the settings of other users only if you have the necessary access rights for this task. You must be a member of the admin super user group. For a user without the correct permissions it is not possible to change the settings for any other user and this configuration sub-section will not be displayed.

7.5.1.2 Transmission Encoding

The Transmission Encoding setting allows changing the image-encoding algorithm that is used to transmit the video data to the Remote Console window. It is possible to optimize the speed of the remote screen depending on the number of users working at the same time and the bandwidth of the connection line (Modem, ISDN, DSL, LAN, etc.).

- Automatic detection: The encoding and the compression level is determined automatically from the available bandwidth and the current content of the video image.
- Pre-configured: The pre-configured settings deliver the best results because of optimized adjustment of compression and color depth for the indicated network speed.

- Manually: Allows adjusting both the compression rate and the color depth individually. Depending on the selected compression rate the data stream between the Intel® RMM2 and the Remote Console will be compressed in order to save bandwidth. Since high compression rates are very time consuming, they should not be used while several users are accessing the Intel® RMM2 simultaneously.

The standard color depth is 16 Bit (65536 colors). The other color depths are intended for slower network connections in order to allow a faster transmission of data. Compression level 0 (no compression) uses only 16 Bit color depth. At lower bandwidths, only 4 Bit (16 colors) and 2 Bit (4 gray scales) are recommended for typical desktop interfaces. Photo-like pictures have best results with 4 Bit (16 colors). 1 Bit color depth (black/white) should only be used for extremely slow network connections.

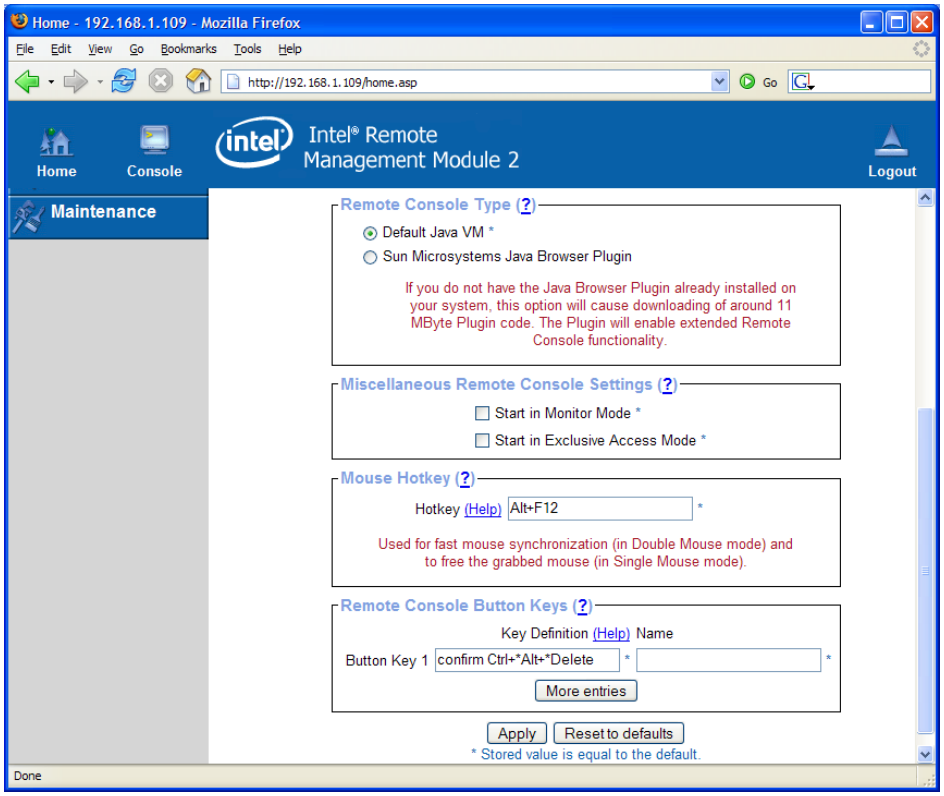


Figure 59: User Console Setting, Part 2

7.5.1.3 Remote Console Type

Specifies which Remote Console Viewer to use.

Default Java Virtual Machine (JVM)*
Uses the default JVM of your web browser. This may be the Microsoft* JVM for the Internet Explorer, or the Sun Microsystems* JVM if it is configured this way. Use of the Sun Microsystems* JVM may also be forced (see below). Java Virtual Machine and Java Runtime Engine (JRE) are sometimes used interchangeably in this User Guide.

Sun Microsystems* Java Browser Plug-in
Instructs the web browser of your system to use the JVM of Sun Microsystems*. The JVM in the browser is used to run the code for the Remote Console window, which is actually a Java Applet. If you check this box for the first time on your administration system and the appropriate Java plug-in is not yet installed on your system, it may be downloaded and installed

automatically. However, in order to make the installation possible, you still have to answer the according dialogs with "yes". The download volume is around 11 Mbytes. The advantage of downloading the Sun Microsystems* JVM is the usage of a stable and identical JVM across different platforms. The Remote Console software is optimized for the Sun Microsystems* JVM and offers a wider range of functionality.

7.5.1.4 Miscellaneous Remote Console Settings

Start in Monitor Mode
Sets the initial value for the monitor mode. By default the monitor mode is disabled. When switched on, the Remote Console window will start in a read only mode, i.e., only remote video is visible - remote keyboard and mouse are not working.

Start in Exclusive Access Mode
Enables the exclusive access mode immediately at Remote Console startup. This forces the Remote Consoles of all other users to close. Nobody else can open the Remote Console at the same time again until you disable this feature or log off.

7.5.1.5 Mouse Hotkey

Allows to specify a hotkey combination which starts either the mouse synchronization process if pressed in the Remote Console or is used to leave the single mouse mode. This is only available if you have selected the Mouse Mode "Other Operating System".

7.5.1.6 Remote Console Button Keys

Button Keys allow simulating keystrokes on the remote system that cannot be generated locally. The reason for this might be a missing key, or the fact that the local operating system of the Remote Console is unconditionally catching this keystroke already. Typical examples are `"Ctrl+Alt+Delete"` on Windows* and DOS*, that is always caught, or the key sequence "Ctrl+Backspace" on Linux that can be used for terminating the X-Server.

In order to define a new Button Key or to adjust an existing one, review the rules that describe the setting for a key. In general, the syntax for a key is as follows:

```
[confirm] <keycode>[+|-|>[*]<keycode>]
```

A term in brackets is optional. The star at the end means that you add further keys as often as required for your case. The term "confirm" adds a confirmation dialog that is displayed before the key strokes will be sent to the remote host.

The "keycode" is the key to be sent. Multiple key codes can be concatenated with either a plus, a minus, or a ">" sign. The plus sign builds key combinations - all the keys will be pressed until a minus sign or the end of the combination is encountered. In this case all pressed keys will be released in reversed sequence. So, the minus sign builds single, separate key presses and key releases. The ">" sign releases the last key only. The star inserts a pause with duration of 100 milliseconds.

As an example, the key combination of Ctrl, Alt, and F2 is represented by the sequence `“Ctrl+Alt+F2”.`

For a full list of key codes and aliases please refer to the Intel® RMM2 Technical Product Specification.

If you need more button keys than shown, use the button "More entries". This will open a list of additional entry fields.

7.5.2 Keyboard/Mouse

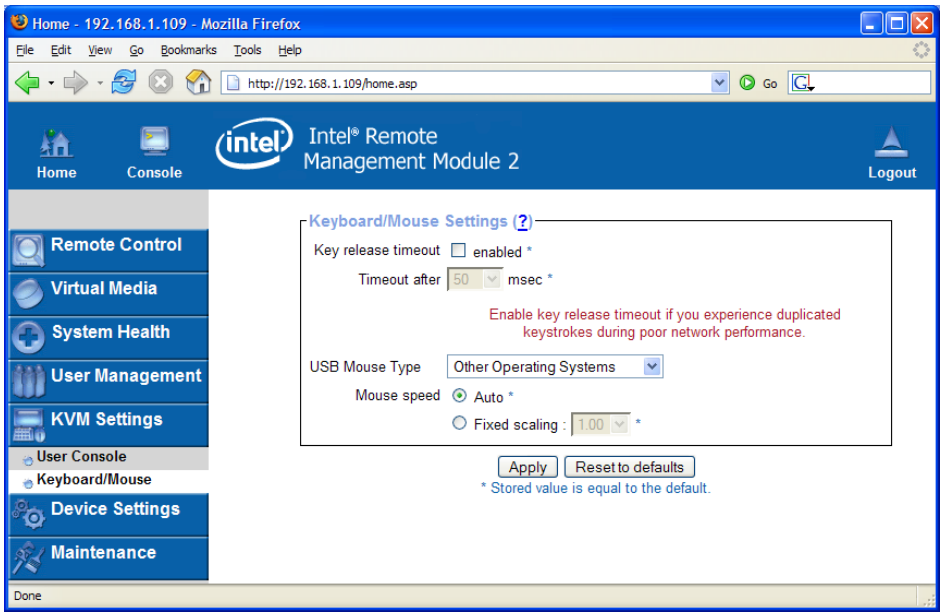


Figure 60: Keyboard / Mouse Configuration

7.5.2.1 Key Release Timeout

This is an important option if you are accessing the Intel® RMM2 over a slow or congested network. In this type of situation, you transmit a network packet containing the key PRESS to the Intel® RMM2. When you release the key, the Intel® RMM2 will receive a corresponding RELEASE packet. When the network is slow, it may take too long for the RELEASE packet to arrive. This might mislead the Intel® RMM2 to replicate the key press, as if you are holding down the desired key. The Key Release Timeout in Milliseconds tells the Intel® RMM2 to consider the key released, even if no RELEASE packet has arrived. This avoids keys being unintentionally repeated.

7.5.2.2 USB Mouse Type

This enables the USB mouse type. Choose an appropriate option from the selection box. Choose between "MS Windows 2000 or newer" for Microsoft Windows* 2000, 2003 Server, XP, or "Other Operating Systems" for Microsoft Windows NT*, Linux, or OS X. In "MS Windows 2000 or newer" mode the remote mouse is always synchronized with the local mouse.

7.5.2.3 Mouse Speed

Auto mouse speed
Use this option if the mouse settings on the host use an additional acceleration setting. The Intel® RMM2 tries to detect the acceleration and speed of the mouse during the mouse sync process.

Fixed mouse speed
This option uses a direct translation of mouse movements between the local and the remote pointer. You may also set a fixed scaling which determines the amount the remote mouse pointer is moved when the local mouse pointer is moved by one pixel. This option only works when the mouse settings on the host are linear. This means that there is no mouse acceleration involved. To set the options click on the button "Apply".

7.6 Device Setting

7.6.1 Network

The Network Settings panel, as shown in the figure below, allows changing network related parameters. Each parameter is described below. Once applied, the new network settings will immediately come into effect.

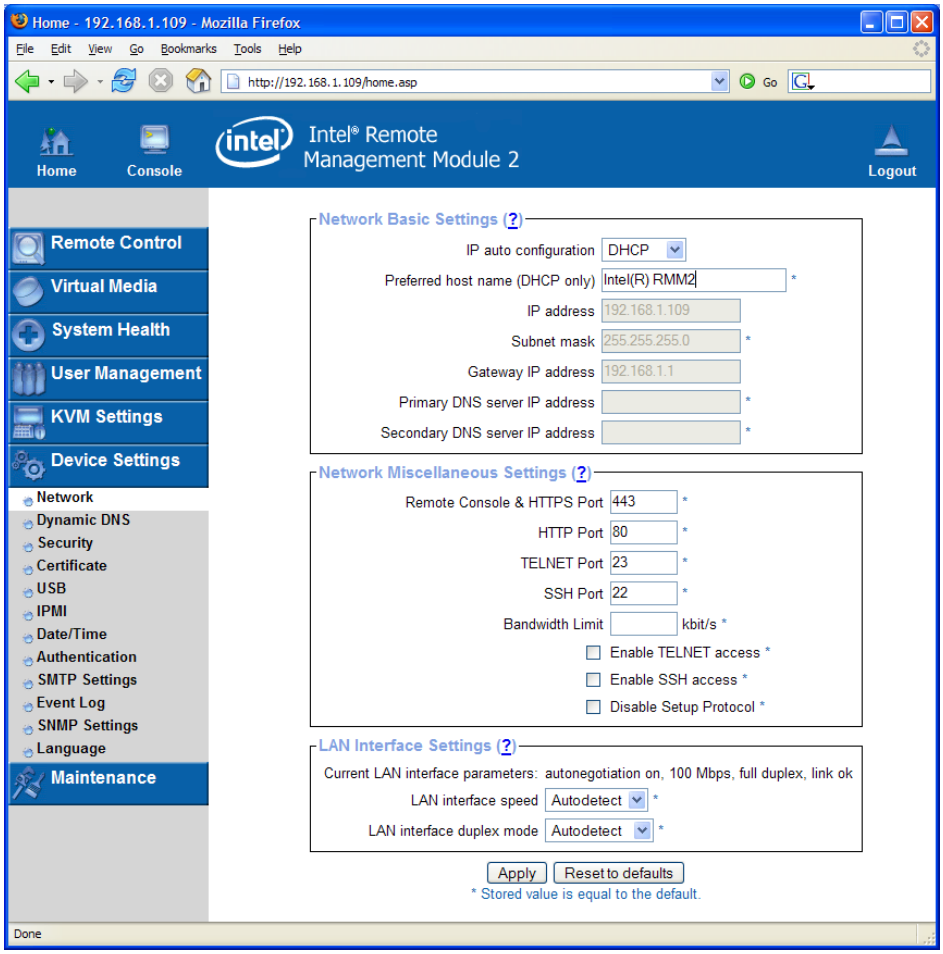


Figure 61: Network Menu

WARNING

Changing the network settings of the Intel® RMM2 may result in losing connection to it. If you change the settings remotely, make sure that all the values are correct and you are still able to access the Intel® RMM2.

7.6.1.1 Network Basic Settings

IP Auto Configuration
With this option you can define whether the Intel® RMM2 should fetch its network settings from a DHCP or BOOTP server. For DHCP select "dhcp" and for BOOTP select "bootp". If you choose "none", then IP auto configuration is disabled and the IP address and netmask have to be configured. If required, gateway and DNS server IP address have to be set as well.

Preferred Host Name
Preferred host name to request from the DHCP server. Whether the DHCP server takes the suggestion of the Intel® RMM2 into account or not depends on the server configuration.

IP Address
IP address in the usual dot notation.

Subnet Mask
The net mask of the local network.

Gateway IP Address
If the Intel® RMM2 needs to be accessible from networks other than the local one, this IP address must be set to the local network router's IP address.

Primary DNS Server IP Address
The IP address of the primary Domain Name Server in dot notation. This option may be left empty, however the Intel® RMM2 will not be able to perform name resolution.

Secondary DNS Server IP Address
The IP address of the secondary Domain Name Server in dot notation. It will be used if the Primary DNS Server cannot be contacted.

7.6.1.2 Miscellaneous Network Settings

Remote Console and HTTPS Port
Port number at which the Intel® RMM2's Remote Console server and the HTTPS server are listening. If left empty the default value (port 443) will be used.

HTTP Port
Port number at which the Intel® RMM2's HTTP server is listening. If left empty the default value (port 80) will be used.

Telnet Port
Port number at which the Intel® RMM2's Telnet server is listening. If left empty the default value (port 23) will be used.

SSH Port
Port number at which the Intel® RMM2's SSH (Secure Shell) server is listening. If left empty the default value (port 22) will be used.

Bandwidth Limit
The maximum network traffic generated through the Intel® RMM2 Ethernet device; value in Kbit/s.

Enable Telnet
This enables the Telnet client mode.

Enable SSH
This enables the SSH (Secure Shell) client mode.

Disable Setup Protocol
Enable this option to exclude the Intel® RMM2 from the setup protocol.

7.6.1.3 LAN Interface Settings

This entry field displays the current settings for the Ethernet/LAN interface of the Intel® RMM2. You may choose between auto negotiation and a fixed setting for the Ethernet transceiver settings "interface speed" and "duplex mode" in case auto negotiation does not work correctly.

LAN Interface Speed
Depending on your network connection you may select a speed value for this interface.
To adjust the interface automatically, choose "auto-detect" (default value). If this selection results in erratic behavior of the interface, choose one of other speed options to work with. The interface will transmit and receive data with that fixed speed.

LAN Interface Duplex Mode
If necessary you may also select a specific duplex mode. The default value is set to "auto-detect", which leads to an automatic setting of the duplex mode depending on your network (recommended). As an alternative you may explicitly set the interface to either "half duplex" or "full duplex" mode.

7.6.2 Dynamic DNS

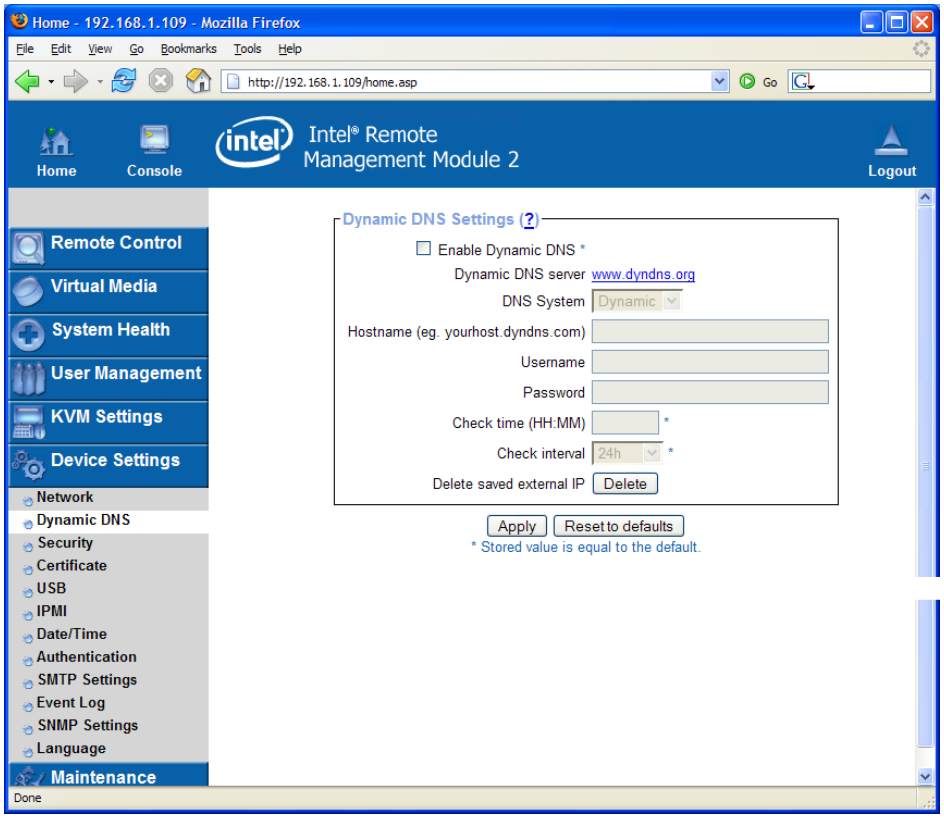


Figure 62: Dynamic DNS Menu

A freely available Dynamic DNS service (dyndns.org) can be used in the following scenario

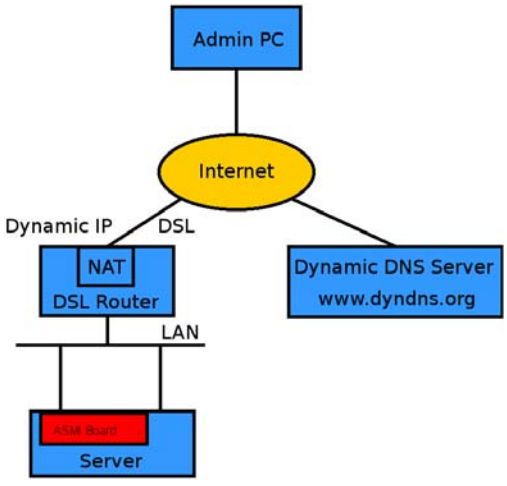


Figure 63: Dynamic DNS Scenario

The Intel® RMM2 is reachable via the IP address of the DSL router which is dynamically assigned by the provider. Since the administrator does not know the IP address assigned by the provider, the Intel® RMM2 connects to a special dynamic DNS server in regular intervals and registers its IP address there. The administrator may contact this server as well and pick up the same IP address belonging to the card.

The administrator has to register the Intel® RMM2 that is supposed to take part in the service with the Dynamic DNS Server and assign a certain hostname to it. He will get a nickname and a password in return through the registration process. This account information, together with the hostname, is needed in order to determine the IP address of the registered Intel® RMM2.

You have to perform the following steps in order to enable Dynamic DNS:

1. Make sure that the LAN interface of the Intel® RMM2 is properly configured.
2. Enter the Dynamic DNS Settings configuration dialog as shown in Figure 62.
3. Enable Dynamic DNS and change the settings according to your needs (see below).

Enable Dynamic DNS
This enables the Dynamic DNS service. This requires a configured DNS server IP address.

Dynamic DNS Server
This is the server name where the Intel® RMM2 registers itself in regular intervals. Currently this is a fixed setting since only dyndns.org is supported for now.

Hostname
This is the hostname of the Intel® RMM2 that is provided by the Dynamic DNS Server (use the whole name including the domain, e.g. testserver.dyndns.org, not just the actual hostname).

Username
You have registered this username during your manual registration with the Dynamic DNS Server. Spaces are not allowed in the Nickname.

Password
You have used this password during your manual registration with the Dynamic DNS Server.

Check Time
The Intel® RMM2 card registers itself in the Dynamic DNS server at this time.

Check Interval
This is the interval for reporting again to the Dynamic DNS server by the Intel® RMM2.

Note: The Intel® RMM2 has its own independent real time clock. Make sure the time setting of the Intel® RMM2 is correct.

The option "Delete saved external IP" is useful if you would like to update your IP address saved externally. To delete the saved address press the button "Delete".

7.6.3 Security

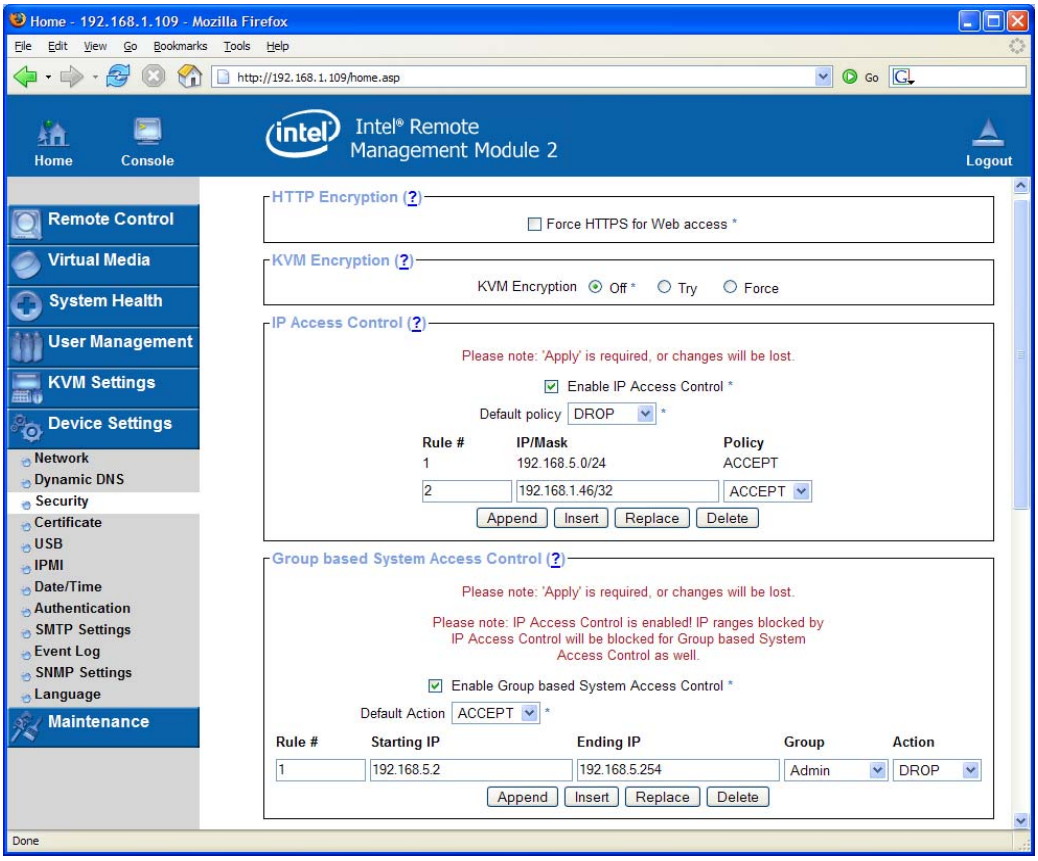


Figure 64: Security Menu

7.6.3.1 HTTP Encryption

If this option is enabled, access to the web front-end is only possible using an HTTPS connection. The Intel® RMM2 will not listen on the HTTP port for incoming connections. If you wish to create your own SSL certificate that is used to identify the Intel® RMM2, refer to the section called Certificate.

7.6.3.2 KVM Encryption

This option controls the encryption of the KVM protocol. This protocol is used by the Remote Console to transmit both the screen data to the administrator machine, and keyboard and mouse data back to the host.

If set to "Off", no encryption will be used. If set to "Try", the applet tries to make an encrypted connection. If the connection cannot be established, an unencrypted connection will be used instead. If set to "Force", the applet tries to make an encrypted connection. An error will be reported if the connection establishment fails.

7.6.3.3 IP Access Control

This section contains settings for the module built-in firewall. This firewall can be generally enabled or disabled. If enabled, the firewall allows for explicitly blocking or allowing connections from certain client IP addresses.

If the default policy is set to DROP, a list of IP addresses or address ranges can be configured to be exceptionally ACCEPTed. If the default policy is set to ACCEPT, a list of IP addresses or address ranges can be configured to be exceptionally DROPped.

The network or address range has to be configured in CIDR (Classless Inter-Domain Routing) notation, e.g. 192.168.1.0/24. It has to consist of an IP address followed by a slash and the number of relevant bits belonging to the network or address range (counting from left).

Enable IP Access Control
Enables access control based on IP source addresses.

Default Policy
This option controls what to do with arriving IP packets that do not match any of the configured rules. They can be accepted or dropped.

WARNING
If you set this to “DROP” and you have no “ACCEPT” rules configured, the access to the web interface over LAN is actually impossible! To enable access again you can change the security settings via modem or by temporarily disabling IP access control with the initial configuration procedure.

Rule Number
This should contain the number of a rule for which the following commands will apply. If appending a new rule, this field will be ignored.

IP/Mask
Specifies the IP address or IP address range for which the rule applies. Examples (the number concatenated to an IP address with a “/” is the number of valid bits that will be used of the given IP address):

Table 4: Example of IP Access Control

192.168.1.22/32	Matches the IP Address 192.168.1.22
192.168.1.0/24	Matches all IP packets with sources addresses from 192.168.1.0 to 192.168.1.255
0.0.0.0/0	Matches any IP packet

Policy
The policy determines what to do with matching packets. They can be either accepted or dropped.

Appending a Rule
Enter the IP/Mask and set the policy. Finally, press the Append button.

Inserting a Rule
Enter the rule number, the IP/Mask, and set the policy. Finally, press the Insert button.

Replacing a Rule
Enter the rule number, the IP/Mask, and set the policy. Finally, press the Replace button.

Deleting a Rule
Enter the rule number and press the Delete button.

Example of Use:
In the following example (Figure 65) the Intel® RMM2 is configured to be inaccessible for all IP addresses, except for the IP addresses which follow the two rules below:

Table 5: Example of IP Access Control

Rule #	IP/Mask	Policy	Effect
1	192.168.5.0/24	ACCEPT	All IP addresses of the Private Class C (16-bit block) subnet 5 can access the RMM2 module.
2	192.168.1.46/32	ACCEPT	Only the host with the IP address “192.168.1.46/32” of the Private Class C subnet 1 can access the RMM2 module.

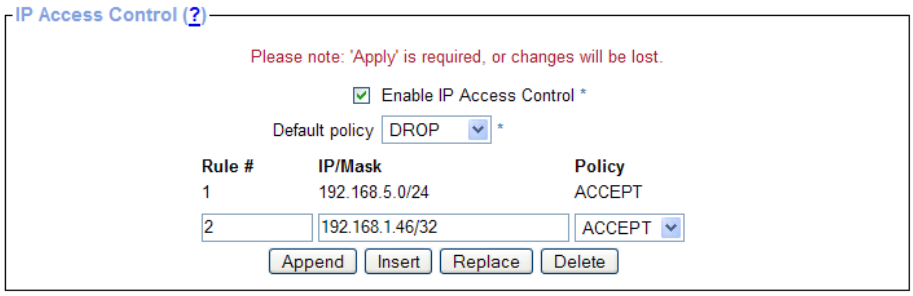


Figure 65: Example of IP Access Control

7.6.3.4 Group Based System Access Control

This is similar to the option above, except that you can specify a group of IP addresses and not a network with a network mask.

Example of Use:
In the following example (Figure 66) the Intel® RMM2 is configured to be accessible for all IP addresses which passed the IP Access Control rules, except for users with an IP address which follow the rule below:

Table 6: Example of Group Base Stystem Access Control

Rule #	Starting IP	Ending IP	Group	Action	Effect
1	192.168.5.2	192.168.5.254	Admin	Drop	All users of the group "Admin" with IP addresses of the Private Class C (16-bit block) subnet 5 can not access the Intel® RMM2 module. Only the "Admin" with the IP 192.168.5.1 can login on the Intel® RMM2. Additional to the one admin all other user groups which pass the IP Access Control rules can access the Intel® RMM2.

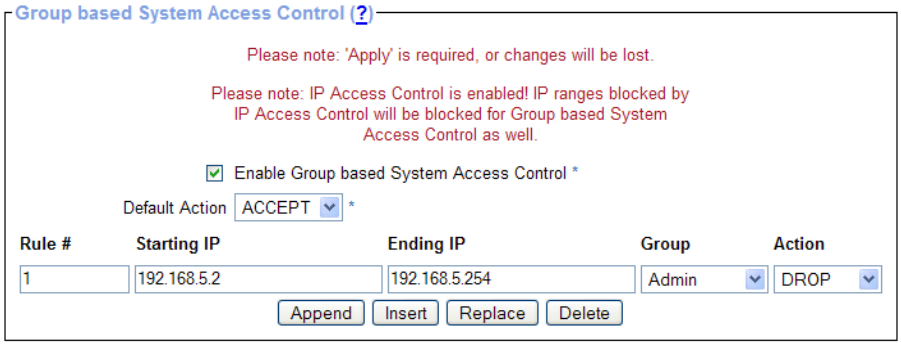


Figure 66: Example of Group Based System Access Control

7.6.3.5 User Blocking

When someone attempts to login to the Intel® RMM2 and fails, you can specify how many failed login attempts the Intel® RMM2 should tolerate before waiting the specified number of "Block Time" minutes before it allows further logins. This is useful for blocking automated hacking attempts. There are no default values for these settings.

- Maximum number of failed logins

Enter the maximum number of failed login attempts after which it should not be possible for this user to login anymore. Leave this field empty to disable the user blocking feature.

- Block time

The number of minutes the user is blocked after he exceeded his maximum number of failed login attempts. Leave this field empty to block him for an infinite amount of time until he is manually unblocked again.

7.6.3.6 Login Limitations

You can specify if only a single user is allowed to login to the Intel® RMM2 at one time. Note that if you do so, this greatly reduces the usefulness of some functions, for example the chat window. Additionally, if another administrator is logged in from a different location, you will be blocking access to the Intel® RMM2.

Password aging is the time interval at which users are required to change the password. Some systems refer to this as "Password Expiry".

7.6.4 Certificate

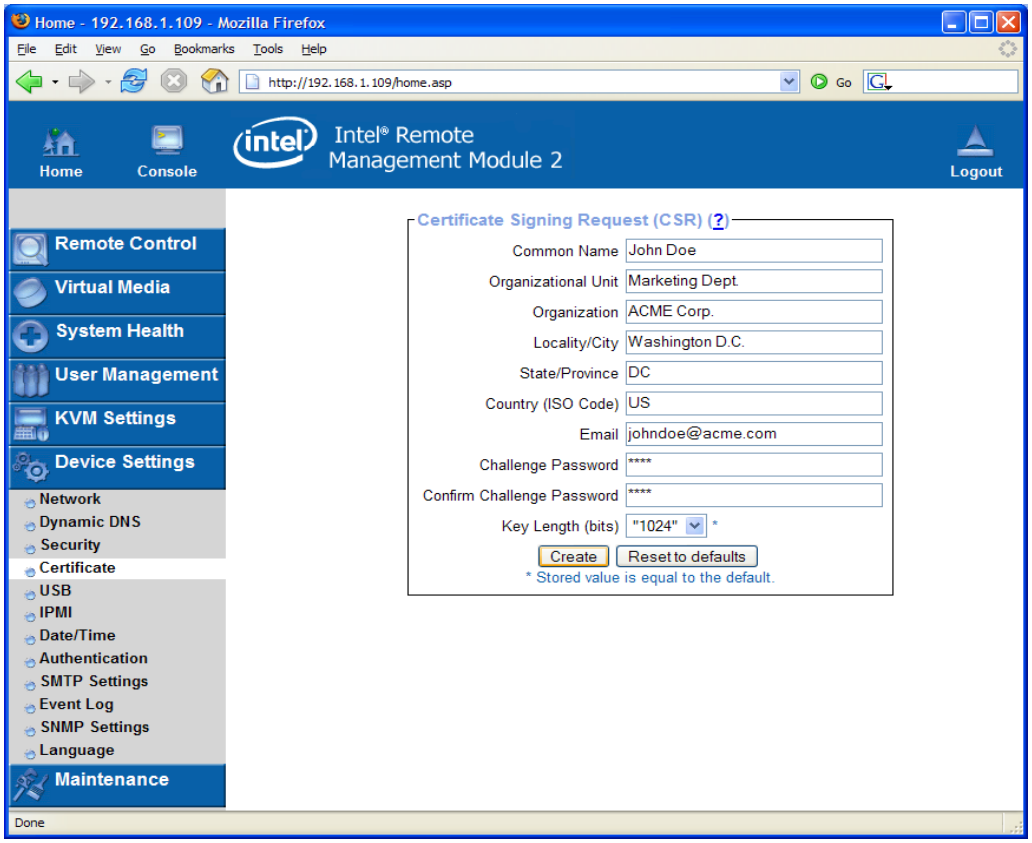


Figure 67: Certificate Menu

The Intel® RMM2 uses the Secure Socket Layer (SSL) protocol for any encrypted network traffic between itself and a connected client. During the connection establishment, the Intel® RMM2 has to expose its identity to a client using a cryptographic certificate. Upon delivery, this certificate and the underlying secret key is the same for all Intel® RMM2 cards ever produced, and certainly will not match the network configuration that will be applied to the Intel® RMM2 card by its user. The certificate's underlying secret key is also used for securing the SSL handshake, hence, this is a security risk (but far better than no encryption at all).

However, it is possible to generate and install a new base64 x.509 certificate that is unique for a particular Intel® RMM2. In order to do that, the Intel® RMM2 is able to generate a new cryptographic key and the associated Certificate Signing Request (CSR) that needs to be certified by a certification authority (CA). A certification authority verifies that you are the person who you claim you are, and signs and issues an SSL certificate to you.

To create and install an SSL certificate for the Intel® RMM2, the following steps are necessary:

1. Create an SSL Certificate Signing Request using the panel shown in Figure 6-31. You need to fill out a number of fields that are explained below. Once this is done, click on the button "Create" which will initiate the Certificate Signing Request generation. The CSR can be downloaded to your administration machine with the "Download CSR" button (see Figure 68).
2. Send the saved CSR to a CA for certification. You will get the new certificate from the CA after a traditional authentication process.
3. Upload the certificate to the Intel® RMM2 using the "Upload" button.

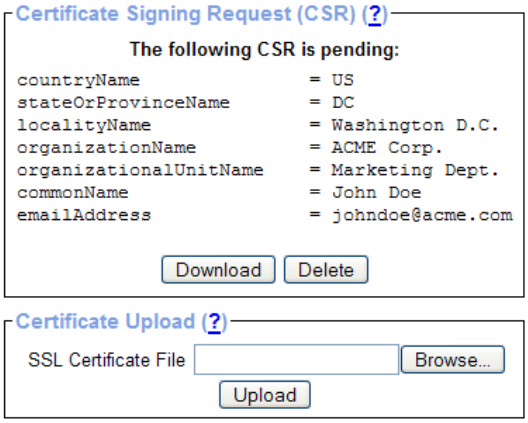


Figure 68: Certificate Upload

After completing these three steps, the Intel® RMM2 has its own certificate that is used for identifying the card to its clients.

If you destroy the CSR on the Intel® RMM2 there is no way to get it back! If you delete it by mistake, you will have to repeat the three steps as described above.

7.6.4.1 Common Name

This is the network name of the Intel® RMM2 once it is installed in the user's network (usually the fully qualified domain name). It is identical to the name that is used to access the Intel® RMM2 with a web browser, but without the prefix "http://". If the name given here and the actual network name differ, the browser will pop up a security warning when the Intel® RMM2 is accessed using HTTPS.

7.6.4.2 Organizational Unit

This field is used for specifying to which department within an organization the Intel® RMM2 belongs.

7.6.4.3 Organization

The name of the organization to which the Intel® RMM2 belongs.

7.6.4.4 Locality/City

The city where the organization is located.

7.6.4.5 State/Province

The state or province where the organization is located.

7.6.4.6 Country (ISO Code)

The country where the organization is located. This is the two-letter ISO code, e.g. DE for Germany, or US for the U.S.

7.6.4.7 Challenge Password

Some certification authorities require a challenge password to authorize later changes on the certificate (e.g. revocation of the certificate). The minimal length of this password is four characters.

7.6.4.8 Confirm Challenge Password

Confirmation of the Challenge Password.

7.6.4.9 Email

The email address of a contact person that is responsible for the Intel® RMM2 and its security.

7.6.5 USB

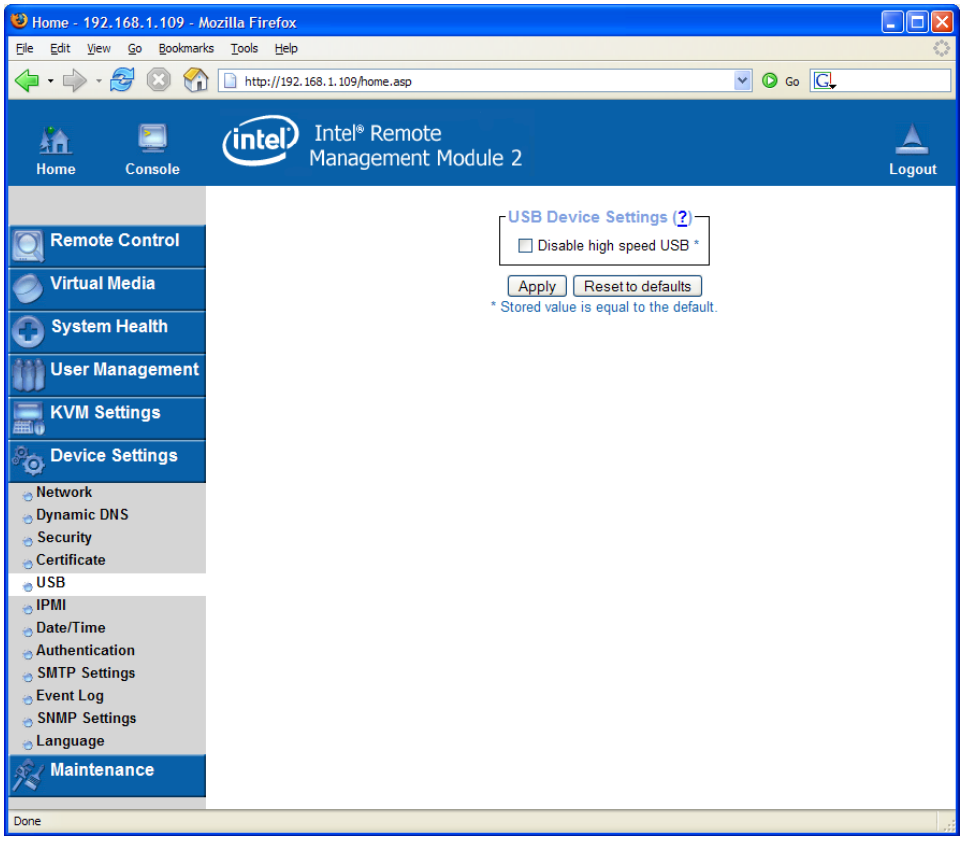


Figure 69: USB Settings

In this setting, you can disable the USB high speed mode. This helps resolve some compatibility issues with BIOS or very old Linux versions. However, this reduces the speed of the virtual media emulation.

7.6.6 IPMI

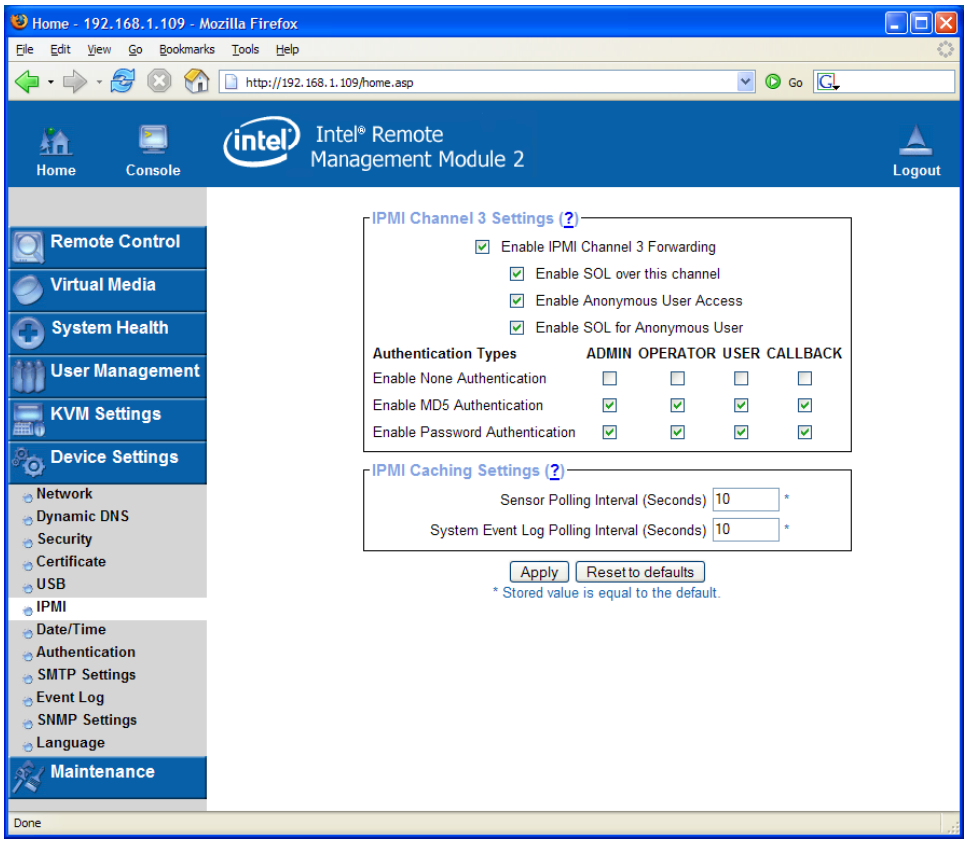


Figure 70: IPMI Settings

This link refers to the page that can be used to set up the IPMI settings of the Intel® RMM2 module. This is used to configure how the Intel® RMM2 communicates with the motherboard's BMC, and how you can access the BMC with the help of the Intel® RMM2.

IPMI Channel 3 Settings

The Intel® RMM2 can act as LAN channel 3 for the onboard BMC. You can specify here whether this functionality is enabled or not. Also, you can configure whether the anonymous IPMI user shall be enabled by default over this channel. You can also configure which authentication types are allowed over this channel. Note that the channel is not accessible if all authentication types are disabled.

Note: When you establish IPMI communication with channel 3, the BMC handles the authentication, so the BMC account needs to be enabled first. The Intel® Deployment Assistant (IDA) and SYSCFG utility can help setup the BMC. If you want to enable other BMC accounts (except an anonymous account) on channel 3, Intel® Deployment Assistant and the SYSCFG utility are needed to configure the BMC.

IPMI Caching Settings

The Intel® RMM2 caches the sensor values and system event log entries from the BMC to ensure faster display of these values in the web interface. However, updating the cache takes some time, so other IPMI operations will take longer during these operations. You can specify the update interval here.

7.6.7 Date and Time

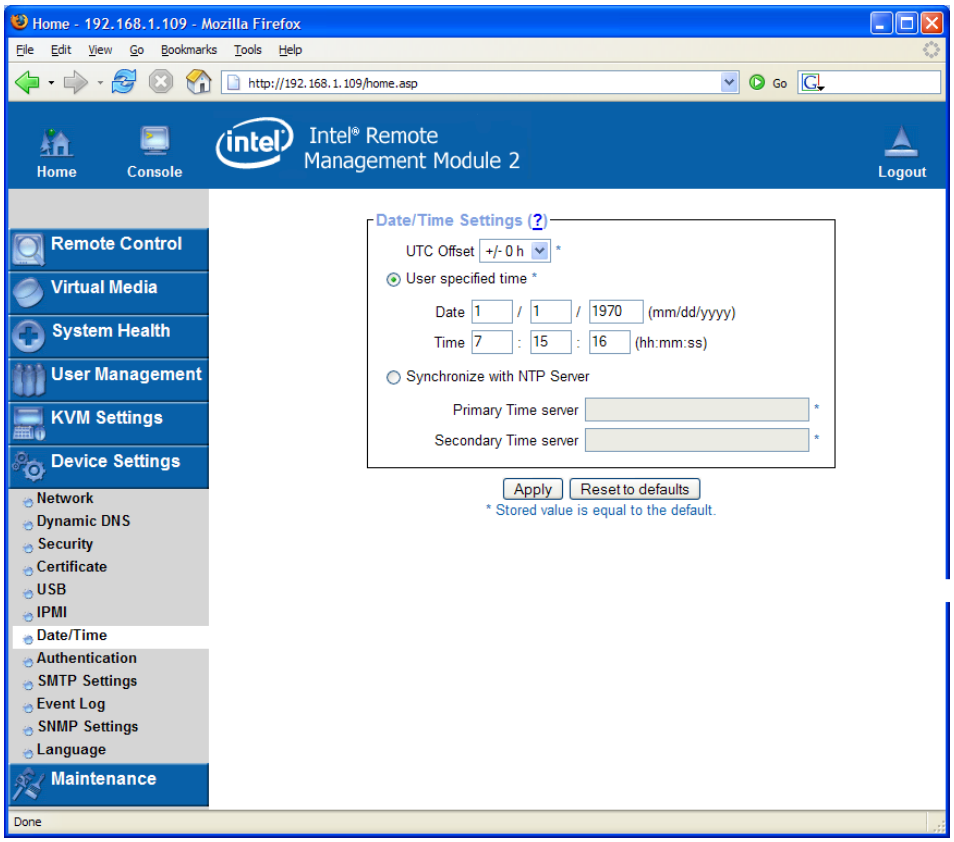


Figure 71: Date and Time Menu

This link refers to a page where the internal real-time clock of the Intel® RMM2 can be set. You have the option to adjust the clock manually or to use a NTP time server. Without a time server your time setting will not be persistent, so you will have to adjust it again after the Intel® RMM2 loses power for more than a few minutes. To avoid this you can use a NTP time server which sets the internal clock automatically to the current UTC time. Because NTP server time is always UTC, there is a setting that allows you to set up a static offset to get your local time.

Note: Daylight saving time is not automatically changed.

7.6.8 Authentication Settings

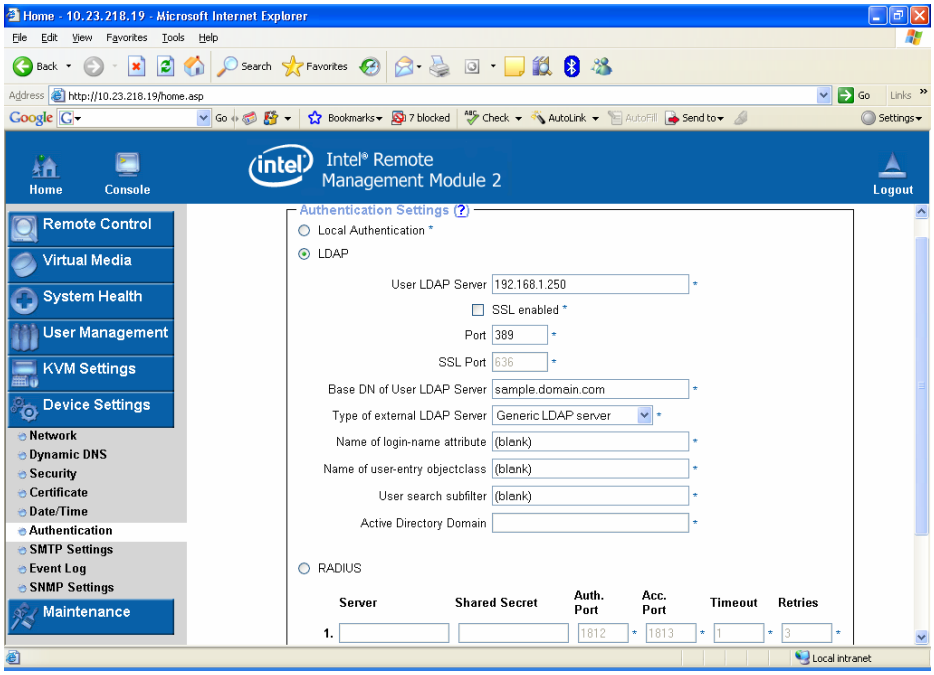


Figure 72: LDAP and Other Authentication Settings

On this screen you can specify where the Intel® RMM2 will look to authenticate users. You can use "Local Authentication" which requires you to have created the user account on the Intel® RMM2; the user/group information residing on the Intel® RMM2 will be used for authentication. Alternatively, you can specify an LDAP or a RADIUS Server to use for the login authentication.

Note: Whatever you configure, you can always login over the network as the super user "admin". The super user is always authenticated and authorized locally, so you always have a "back door" to the Intel® RMM2.

7.6.8.1 LDAP Access

The Intel® RMM2 uses LDAP only for authentication (password verification). User privileges and private settings are still stored locally at the Intel® RMM2. A user account has to be created on the Intel® RMM2 before a user can login via LDAP. Additionally, all privilege configurations have to be done within the Intel® RMM2 user management.

In order to configure the LDAP access, you can set the following options:

- User LDAP Server: Enter the name or IP address of the LDAP server containing all the user entries. If you choose a name instead of an IP address you need to configure a DNS server in the network settings, e.g.: 192.168.1.250
- Base DN of User LDAP Server: Specify the distinguished name (DN) where the directory tree starts in the user LDAP server. E.g.: dc=test, dc=domain, dc=com
- Type of external LDAP Server: Set the type of the external LDAP server. This is necessary since some server types require special handling. Additionally, the default

values for the LDAP scheme are set appropriately. You can choose between a Generic LDAP Server, a Novell* Directory Service, and a Microsoft* Active Directory. If you have neither a Novell* Directory Service nor a Microsoft* Active Directory then choose a Generic LDAP Server and edit the LDAP scheme used (see below).

- Name of login-name attribute: This is the name of the attribute containing the unique login name of a user. To use the default leave this field empty. The default depends on the selected LDAP server type.
- Name of user-entry object class: This is the object class that identifies a user in the LDAP directory. To use the default leave this field empty. The default depends on the selected LDAP server type. You can refine the search for users that should be known to the Intel® RMM2.
- Active Directory Domain: This option represents the active directory domain that is configured in the Microsoft* Active Directory server. This option is only valid if you have chosen a Microsoft* Active Directory as the LDAP server type, e.g.: test.domain.com.

7.6.8.2 Using the RADIUS Server

The Intel® RMM2 uses RADIUS only for authentication (password verification). User privileges and private settings are still stored locally at the Intel® RMM2. A user account has to be created on the Intel® RMM2 before this user can login via LDAP. Also, all privilege configurations have to be done within the Intel® RMM2 user management.

RADIUS (Remote Authentication Dial In User Service) is a protocol specified by the Internet Engineering Task Force (IETF) working group. There are two specifications that make up the RADIUS protocol suite: Authentication and Accounting. These specifications aim to centralize authentication, configuration, and accounting for dial-in services to an independent server. The RADIUS protocol exists in several implementations such as freeRADIUS, openRADIUS, or RADIUS on UNIX systems. The RADIUS protocol itself is well specified and tested. Recommendations for all products listed above are available. For detailed information on how to setup the RADIUS server, refer to Appendix C.

Note: Currently the Intel® RMM2 does not support challenge/response. An Access Challenge response is seen and evaluated as an Access Reject.

To access a remote device using the RADIUS protocol you must login first. You are asked to specify your user name and password. The RADIUS server reads your input data (Authentication) and the Intel® RMM2 looks for your profile (Authorization). The profile defines (or limits) your actions and may differ depending on your specific situation. If there is no such profile your access via RADIUS will be refused.

In terms of the remote activity mechanism the login via RADIUS works similar to the Remote Console. If there is no activity for half an hour your connection to the Intel® RMM2 will be aborted and closed.

- Server: Enter either the IP address or the hostname of the RADIUS Server to connect to. If entering the hostname, DNS has to be configured and enabled.
- Shared Secret: A shared secret is a text string that serves as a password between the RADIUS client and RADIUS server. In this case the Intel® RMM2 serves as a RADIUS client. A shared secret is used to verify that RADIUS messages are sent by a RADIUS-enabled device that is configured with the same shared secret, and to verify that the RADIUS message has not been modified in transit (message integrity). For the shared secret you can use any standard alphanumeric and special

characters. A shared secret may consist of up to 128 characters in length and may contain both lowercase and uppercase letters (A-Z, a-z), numerals (0-9) and other symbols (all characters not defined as letters or numerals) such as an exclamation mark (!) or an asterisk (*).

- Authentication Port: The port the RADIUS server listens for authentication requests. The default value is #1812.
- Accounting Port The port the RADIUS server listens for accounting requests. The default value is #1813.
- Timeout: Sets the request time-to-live in seconds. The time-to-live is the time to wait for the completion of the request. If the request job is not completed within this interval of time, it is cancelled. The default value is 1 second.
- Retries: Sets the number of retries if a request cannot be completed. The default value is 3 times.
- Global Authentication Type: Sets the authentication protocol. This can be the unencrypted PAP (Password Authentication Protocol) or the encrypted CHAP (Challenge Handshake Authentication Protocol).

7.6.9 SMTP Settings

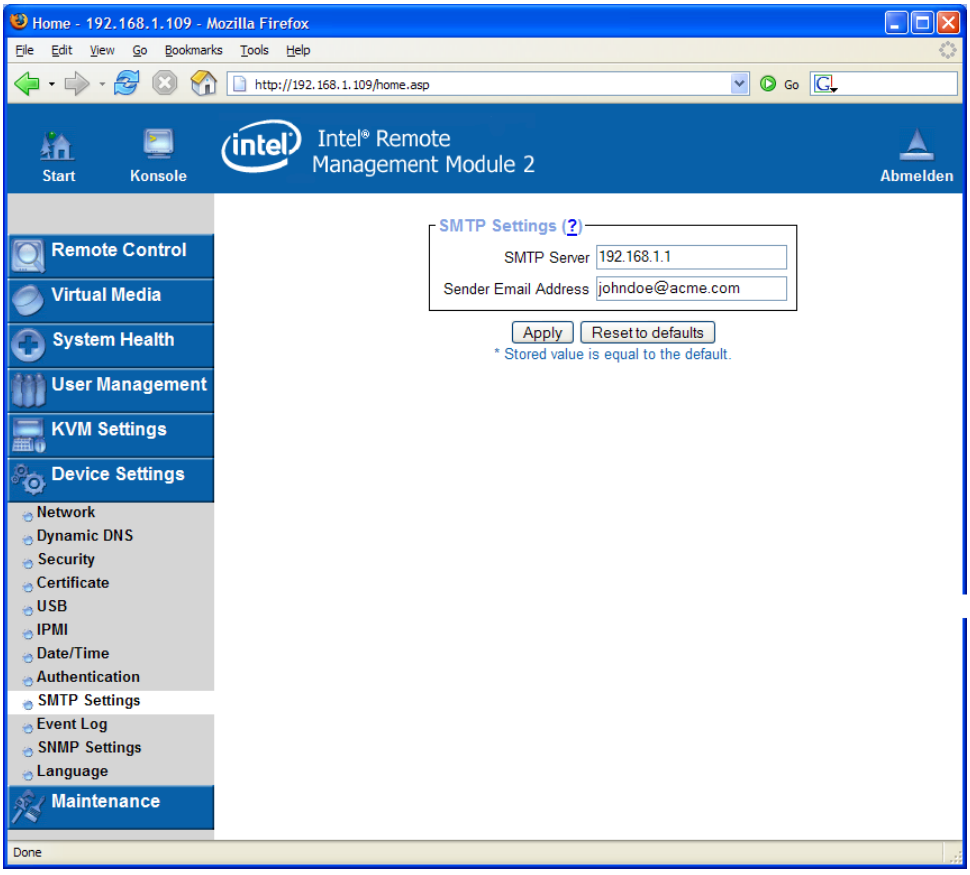


Figure 73: SMTP Settings Menu

Mail server and email source address for event logging is configured here. If you want to enable email notification for Intel® RMM2 internal events, you also have to enable SMTP on the page Event Log.

7.6.10 Event Log

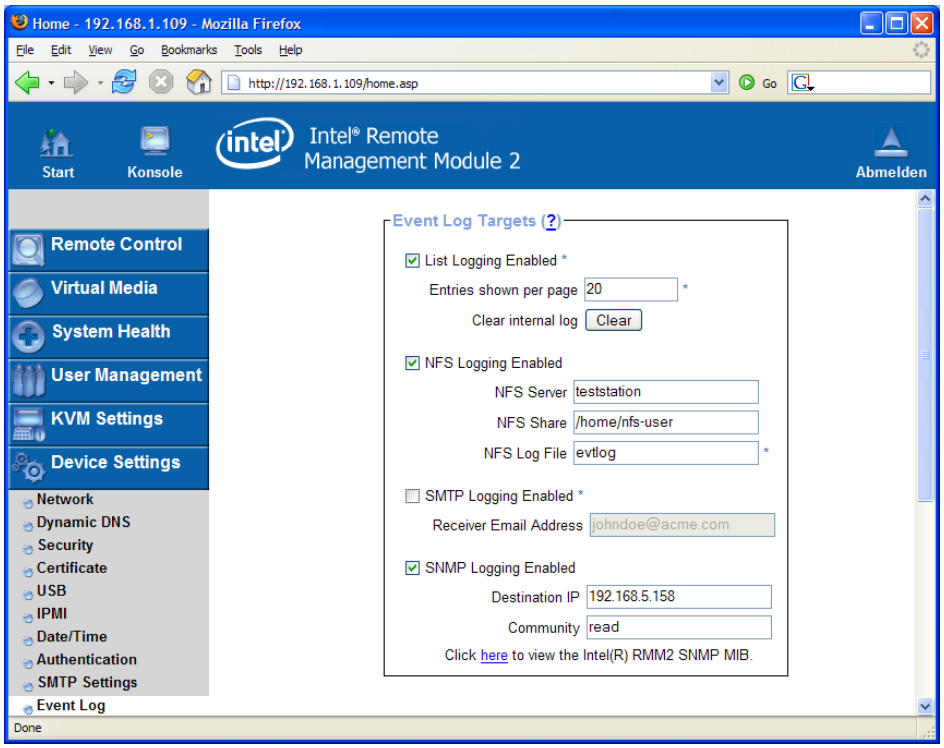


Figure 74: Event log Menu – Upper Screen Display

The Intel® RMM2 internal events (like a login failure or a firmware update) are logged to a selection of logging destinations. Each of those events belongs to an event group which can be activated separately. For a detailed specification of the existing event groups and the log events belonging to them, use the "help" link in the HTML front-end.

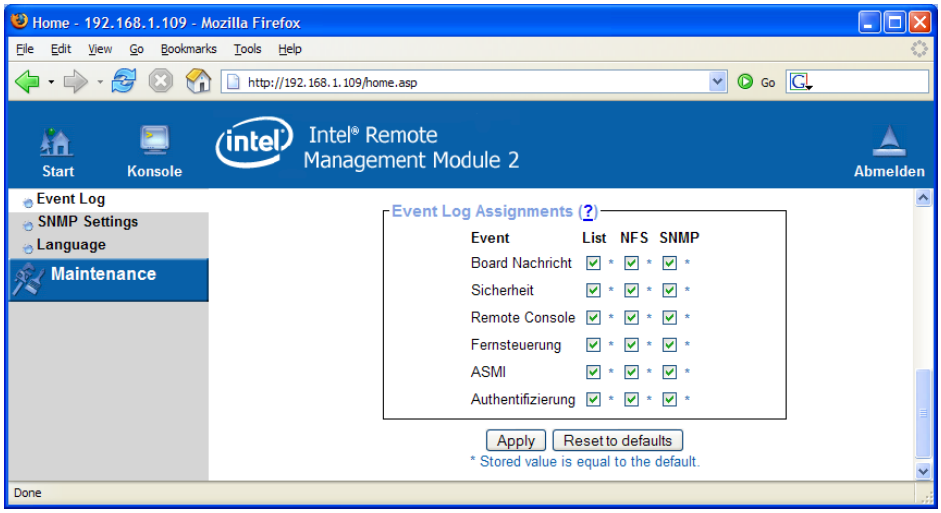


Figure 75: Event Log Menu – Lower Display Screen

The common way to log events is to use the internal log list of the Intel® RMM2. To show the log list, click on the item "Event Log" from the section "Maintenance". In the Event Log Settings you can choose how many log entries are shown on each page. You can also clear the log file here.

7.6.10.1 Event Log Targets

List Logging Enabled
To log events you may use the internal log list of the Intel® RMM2. To show the log list, click on "Event Log" on the "Maintenance" page.

Since the system memory of the Intel® RMM2 is used to save all the information, the maximum number of possible log list entries is restricted to 1,000 events. Every entry that exceeds this limit overrides the oldest one automatically.

NFS Logging Enabled
Define an NFS server where a directory or a static link has to be exported to, in order to write all logging data to a file that is located there. To write logging data from more than one Intel® RMM2 devices to only one NFS share, you must define a file name that is unique for each device. When you change the NFS settings and press the "Apply" button, the NFS share will be mounted immediately. This means the NFS share and the NFS server must be filled with valid sources or you will get an error message.

In contrast to the internal log file on the Intel® RMM2, the size of the NFS log file is not limited. Every log event will be appended to the end of the file and it grows continuously. If the file size gets too large, you may have to delete it or copy it to another location.

SMTP Logging Enabled
With this option the Intel® RMM2 is able to send emails to an address given by the email address text field in the Event Log Settings. These mails contain the same description strings as the internal log file and the mail subject is filled with the event group of the occurred log event. In order to use this log destination you must specify an SMTP server that is reachable from the Intel® RMM2 device and needs no authentication at all (<serverip>:<port>).

SNMP Logging Enabled
If this is activated, the Intel® RMM2 sends an SNMP trap to a specified destination IP address every time a log event occurs. If the receiver requires a community string, you can set it in the appropriate text field. Most of the event traps only contain one descriptive string with all information about the log event. Only authentication and host power events have their own trap class that consists of several fields with detailed information about the event that occurred. To receive the SNMP traps, any SNMP trap listener may be used.

7.6.10.2 Event Log Assignments

You may choose which actions of the Intel® RMM2 will be saved in the log file. Check the desired box(es) and click "Apply" to confirm your selection.

7.6.11 SNMP

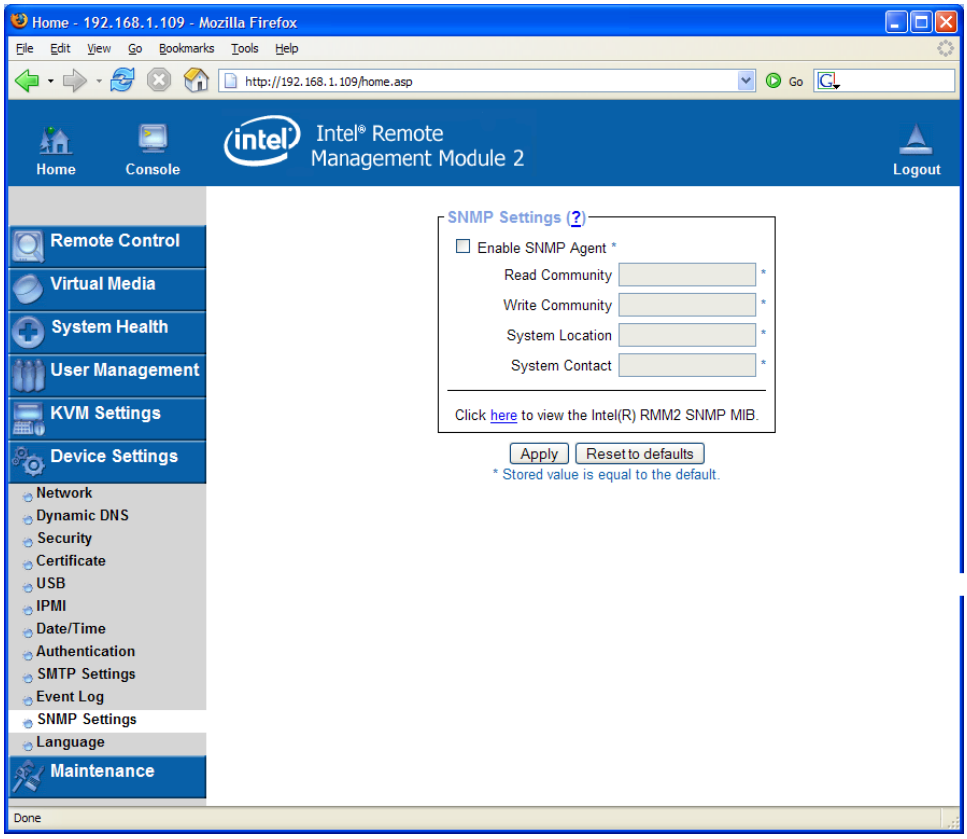


Figure 76: SMTP Menu

The following information is available via SNMP:

- Serial number
- Firmware version
- MAC address / IP address / Netmask / Gateway of LAN interface
- Server's power state
- Server's POST code

The following actions can be initiated via SNMP:

- Reset server
- Power on/off server
- Reset the Intel® RMM2

The following events are reported by the Intel® RMM2 via SNMP:

- Login trial at the Intel® RMM2 failed
- Login trial at the Intel® RMM2 succeeded
- Denying access to a particular action
- Server was reset
- Server was powered on/off

The SNMP settings panel, as shown in Figure 76, allows you to change SNMP related parameters.

7.6.11.1 Enable SNMP Agent

If this option is checked, the Intel® RMM2 will reply to SNMP requests.

Note: If a community is left blank, you cannot perform the corresponding request. For example, if you want to disable the option to reset the Intel® RMM2 via SNMP, do not set a write community.

7.6.11.2 Read Community

This is the SNMP community, which allows you to retrieve information via SNMP.

7.6.11.3 Write Community

This community allows you to set options and to reset the Intel® RMM2 or the host via SNMP, i.e., all that affects the host or the Intel® RMM2.

7.6.11.4 System Location

Enter a description of the physical location of the host. The description will be used in reply to the SNMP request "sysLocation.0".

7.6.11.5 System Contact

Enter a contact person for the host. The value will be used in reply to the SNMP request "sysContact.0".

7.6.11.6 “Click here to view the SNMP MIB”

This link allows you to view or save the Intel® RMM2 SNMP MIB file from your web browser. This file may be necessary for an SNMP client to communicate with the Intel® RMM2.

7.7 Maintenance

7.7.1 Device Information

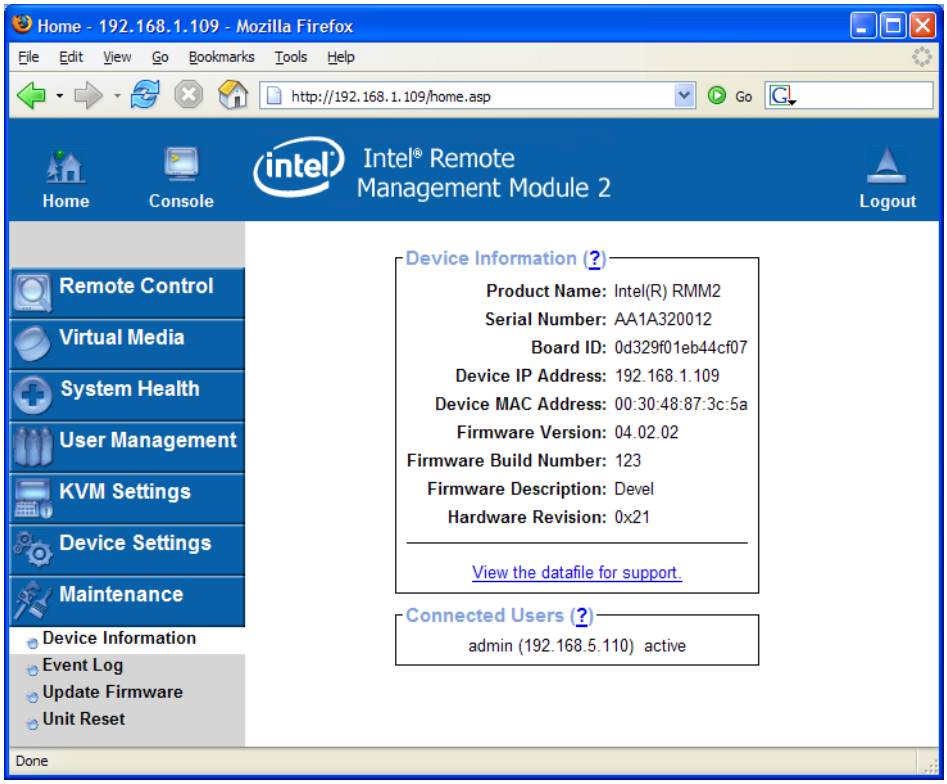


Figure 77: Device Information Page

This section contains a summary with various information about this Intel® RMM2 and its current firmware, and allows you to reset the card.

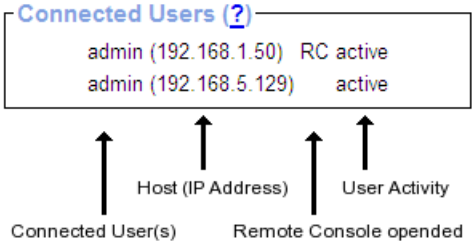


Figure 78: Connected Users

From left to right: the connected user(s), its IP address (from which host user is connecting), and its activity status is displayed. "RC" indicates that the Remote Console is open. If the Remote Console is opened in "exclusive mode" the term "(exclusive)" is added.

7.7.2 Event Log

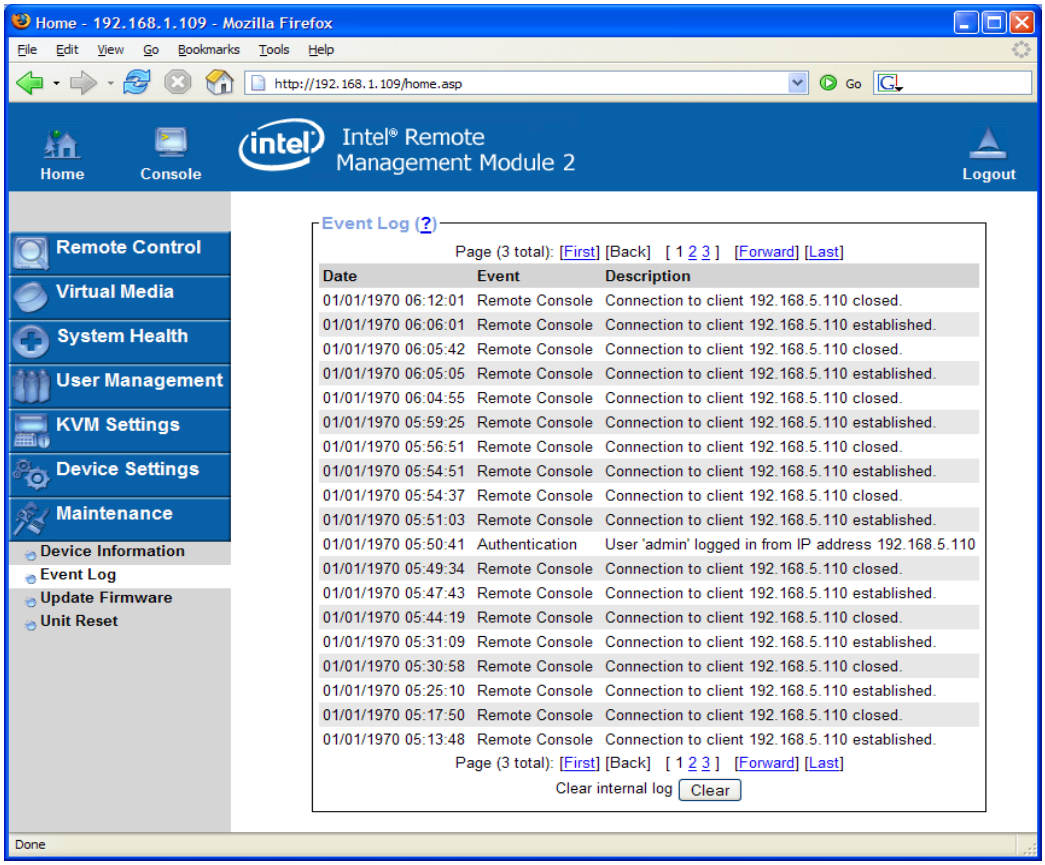


Figure 79: Event Log List

The Event Log lists the issues that the Intel® RMM2 has recognized. This is a different event log than the hardware System Event Log listed under the System Health menu. This log includes the events that are kept by the Intel® RMM2 and include the event date, a short event description, and an IP address the request was sent from.

You may use the text buttons "Prev" and "Next" to browse within the data. The button "Prev" displays the previous page with newer log information, and the button "Next" switches to the following page with older log information.

7.7.3 Update Firmware

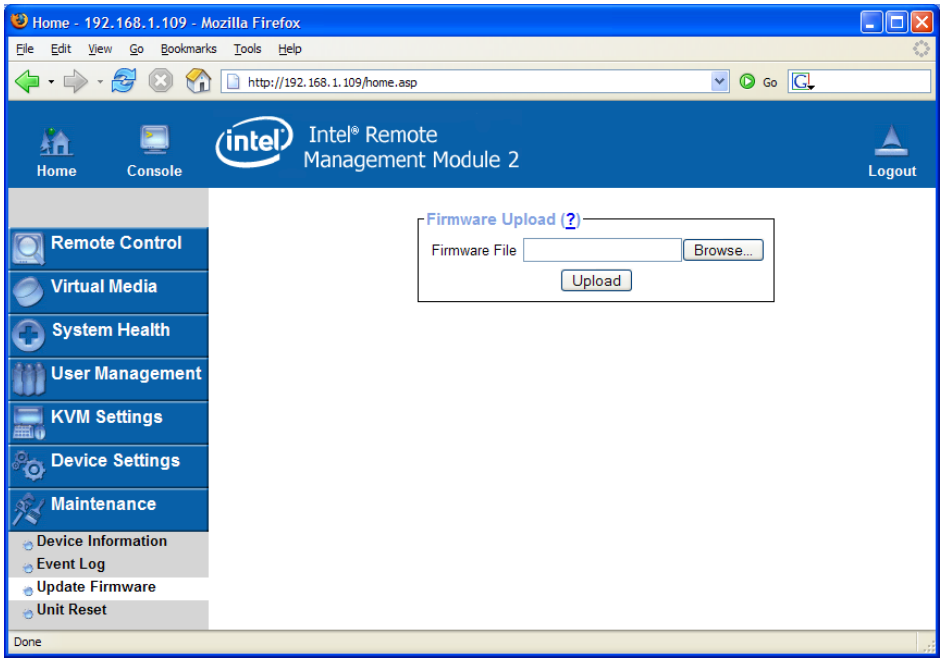


Figure 80: Firmware Update Page

The firmware of the Intel® RMM2 can be updated remotely in order to install new functionality or special features. If new releases of the Intel® RMM2 firmware are needed during the life of the module they will be posted and available from http://support.intel.com by searching on Intel® Remote Management Module 2 or Intel® RMM2.

Before you can start updating the firmware of your Intel® RMM2, the new firmware file must be accessible on the system that you use for connecting to the Intel® RMM2.

Updating the firmware is a three-stage process:
First, the new firmware file is uploaded onto the Intel® RMM2. Select the firmware file on your local system using the "Browse" button of the Upload Firmware panel. Then, click "Upload" to transfer the previously selected file from your local file system onto the Intel® RMM2. Once the firmware file has been uploaded, it will be checked to confirm it is a valid firmware file and that there were no transmission errors. If there are any errors, the Upload Firmware function will be aborted and the current firmware is kept as is.

In the second step you will see the Update Firmware panel. The panel shows you the version number of the currently running firmware and the version number of the firmware to be uploaded. Pressing the "Update" button will store the new version and remove the old one completely.

The third step, includes the Intel® RMM2 automatically resetting itself. After several minutes you will be redirected to the login page and requested to login once again.

WARNING

This process is not reversible and might take several minutes. Do not remove system power while the Intel® RMM2 is in the update process. This may place the Intel® RMM2 in an unusable state.

7.7.4 Unit Reset

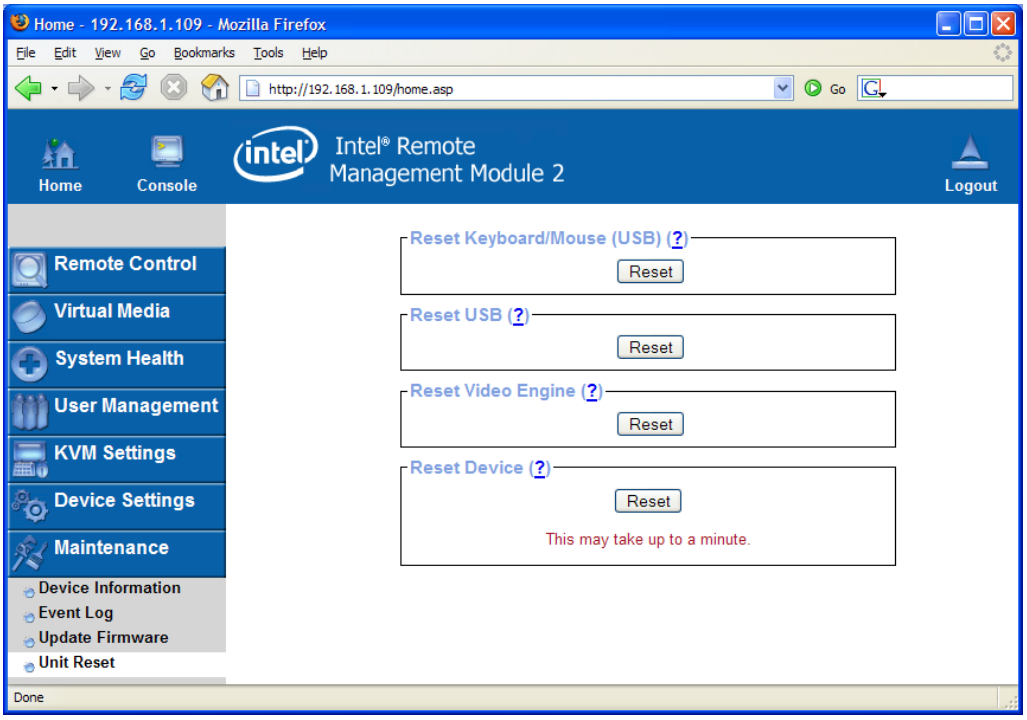


Figure 81: Unit Reset Page

This section allows you to reset specific parts of the device. This involves both the keyboard and mouse, the video engine, and the Intel® RMM2 itself. Resetting the card itself is mainly needed to activate a newly updated firmware. It will close all current connections to the administration console and to the Remote Console. The whole process will take about half a minute. Resetting sub-devices (e.g. video engine) will take several seconds only and does not result in closing connections.

To reset one of the Intel® RMM2 functions, click the appropriate button for the action you wish.

Note: Only the super user "admin" is allowed to reset the Intel® RMM2.

Getting Help

World Wide Web

http://support.intel.com/support/

Telephone

In U.S. and Canada	1-800-404-2284		
In Europe			
UK	0870 6072439	Finland	9 693 79297
France	01 41 918529	Denmark	38 487077
Germany	069 9509 6099	Norway	23 1620 50
Italy	02 696 33276	Sweden	08 445 1251
Spain	91 377 8166	Holland	020 487 4562
Belgium	02 714 3182		
In Asia-Pacific region			
Australia	1800 649931	Indonesia	803 65 7249
Hong Kong	852 2 844 4456	Malaysia	1 800 80 1390
Korea	822 767 2595	New Zealand	0800 444 365
China	800 820 1100 (toll-free) 8 621 33104691 (not toll-free)	Pakistan	632 63684 15 (IDD via Philippines)
		Philippines	1 800 1 651 0117
Singapore	65 6213-1311	Thailand	1 800 631 0003
India	0006517 2 68303634 (manual toll-free. From India, you need an IDD-equipped telephone)	Vietnam	632 6368416 (IDD via Philippines)
		Myanmar	63 2 636 9796 (via Philippines)
		Cambodia	63 2 636 9797 (via Philippines)
Taiwan	2 2545-1640		
In Japan			
0120 868686 (Domestic)		81 298 47 0800 (outside country)	
In Latin America			
Brazil	001-916 377 0180	Ecuador (Andimate)	Contact AT&T USA at 1 999 119. Once connected, dial 800 843 4481
Mexico	Contact AT&T USA at 001 800 462 628 4240. Once connected, dial 800 843 4481	Ecuador (Pacifictel)	Contact AT&T USA at 1 800 225 528. Once connected, dial 800 843 4481
Colombia	Contact AT&T USA at 01 800 911 0010. Once connected, dial 800 843 4481	Guatemala	Contact AT&T USA at 99 99 190. Once connected, dial 800 843 4481
		Venezuela	Contact AT&T USA at 0 800 2255 288. Once connected, dial 800 843 4481
Costa Rica	Contact AT&T USA at 0 800 0 114 114. Once connected, dial 800 843 4481	Argentina	Contact AT&T USA at 0-800 222 1288. Once connected, dial 800 843 4481
Panama	Contact AT&T USA at 00 800 001 0109. Once connected, dial 800 843 4481	Paraguay	001 916 377 0114
		Peru	001 916 377 0114
		Uruguay	001 916 377 0114
Chile (Easter Island)	Contact AT&T USA at 800 800 311. Once connected, dial 800 843 4481		
Chile (Mainland and Juan)	Contact AT&T USA at 800 225 288. Once connected, dial 800 843 4481		
Miami	1 800 621 8423		

For an updated support contact list, see *http://www.intel.com/support/9089.htm/*

Appendix A - Configuring the RADIUS Server

This appendix describes the necessary steps to configure a RADIUS server in order to be able to use remote authentication on the Intel® RMM2. This is shown for a Windows 2003 Server*, Standard Edition system with Active Directory enabled.

Prerequisites

1. Verify that Active Directory is enabled. If not, go to Start -> Run and type "dcpromo" to enable the Active Directory function. Follow the on-screen instructions to enable Active Directory.

2. Make sure the Internet Authentication Service is installed, enabled, and registered to the Active Directory. If it is not installed, follow these steps:

- To install the Internet Authentication Service (IAS), go to Start -> Control Panel -> Add or Remove Programs -> Add/Remove Windows Components. Select Networking Services by double click on it. Check Internet Authentication Service and then click OK. Click Next to install IAS.
- To register IAS to the Active Directory, go to Start -> Administrative Tools -> Internet Authentication Service. Then right click on the Internet Authentication Service (Local), select Register Server in the Active Directory.

3. Create a Windows* user group which will hold all users that are allowed to login on the Intel® RMM2. You can allow/deny login for a user just by adding/removing him/her to/from this group. For this group there will be a custom remote access policy configured later on. Groups can be maintained by the Active Directory Users and Groups tool: Start -> Administrative Tools -> Active Directory Users and Computers -> Users.

4. Create all users to be authenticated from Intel® RMM2. Make sure Remote Access Permission (Dial-in or VPN) access is set to Allow access where default is Deny access. To check, double click on user and select the Dial-in tabulator. Make all users member of the above group.

Add and Configure a RADIUS Client

This step is necessary to give the RADIUS server some information about the client (Intel® RMM2) and define a password phrase.

Go to Start -> Administrator Tools -> Internet Authentication Service. Right click on RADIUS Clients and select New RADIUS Client.

Type a name for this client. In this example, "Intel® RMM2 at Server3" is used. Type the IP address of the Intel® RMM2 that will be used as the RADIUS client. In this example "192.168.1.198" is used. Select Next after this is done.

Type the share secret that will be used between this RADIUS server and Intel® RMM2. (Note: remember this secret; you will be asked to key it in during the configuration of RADIUS function on the Intel® RMM2). Select Finish after this is done.

A new RADIUS client will now be shown on the display window.

Setup a Custom Remote Access Policy

This step explicitly allows the group configured above to login remotely.

Go to Start -> Administrator Tools -> Internet Authentication Service. Right click on Remote Access Policies and select New Remote Access Policy.

Select Next to get on the Policy Configuration Method page. Switch to set up custom policy and enter a policy name, e.g. "Intel® RMM2 Access".

Select Next to get on the Policy Conditions page. Press Add... to add a new policy. Select Windows-Groups and press Add to create this condition. Now add the previously created user group by pressing Add... and typing the group name in Enter object name to select. Leave the sub dialogs and return to the wizard by pressing OK two times.

Select Next to get to the Permissions page. Select Grant remote access permission.

Select Next to get to the Profile page. Select Edit Profile.... Make sure that both Encrypted authentication (CHAP) and Unencrypted authentication (PAP, SPAP) are enabled, and leave with OK.

Select Next and Finish to complete the wizard.

Appendix B – System Management Architecture for Server Hardware – Command Line Protocol

The Intel® RMM2 supports an interface to System Management Architecture for Server Hardware (SMASH) and the associated Command Line Protocol (CLP). The SMASH v1.0 suite of specifications was released by the Distributed Management Task Force, Inc in December 2006.

Command Line Protocol

The goal of the CLP specification is to reduce management complexity by delivering a human-oriented interface that provides a uniform command set for controlling hardware. The CLP allows users to execute common operations such as system power on and off, display hardware event logs, or view sensor information.

A Telnet or SSH connection to the Intel® RMM2 allows the use of CLP commands. Telnet and SSH are enabled under Device Settings > Network. You will be asked to enter your User Name and Password. Once connected you will be at a prompt: "eSH>" One of the commands available at the prompt is "clp". This will take you to a new command prompt: "clp:/->" From this prompt you are able to issue CLP commands.

CLP to CIM mapping

The CLP-to-CIM Mapping Specification is another specification from the SMASH suite. The specification describes the common requirements for the mapping of CLP commands to elements of CIM. The CLP target namespace needs to be mapped to appropriate CIM (Common Information Model) classes and objects and target properties that are to be read or manipulated by the SHOW or SET verbs. The CLP target namespace is organized in a tree structure, the root of which is called the *admin domain* and is labeled by a single slash character. All manageable devices are represented by targets subordinated somewhere in this tree structure. Instances of a class are indicated by an instance number appended to the class name:

```
/
|-- system1
|   |-- locator#
|   |-- nsensor#
|   `-- sensor#
`-- system2
    |-- account#
    |-- authorizedpriv#
    |-- group#
    |-- log#
    |   `-- record#
    `-- pwrmgtsvc#
        `-- record#
```

Global commands h

There are a number of CLP verbs that can be applied to any target:

- CD changes the default target and displays the new value.
- SHOW -display targets gives a list of targets subordinated to the specified target (or, if none specified, the default target).
- SHOW -display verbs displays a list of verbs applicable to the specified (or default) target.
- SHOW -display properties displays the required properties of a given instance.
- SHOW -display properties -all displays all properties of an instance.
- HELP displays useful information about a given target or CLP verb.

Admin domain /

The admin domain is not a valid target for any verbs apart from the global commands listed above.

/system#

The /system# targets map to the *CIM_ComputerSystem* class. There are two instances of this class, according to the IPMI CIM Mapping Specification: system1 represents the managed host system; system2 represents the BMC. The managed system's GUID value is included in the Name property of /system1. The system# instances are valid targets to the following CLP verbs, in addition to the default commands listed above:

- Performing the START and STOP commands on /system1 will change the host system's power state.
- RESET will reboot the host system or the BMC, depending on the target.

/system1/locator1

This instance represents the IPMI Chassis Identify feature. This is a Raritan extension which is not covered by any specification. It supports the following commands:

- SET can be used to modify the value of the Interval property, which specifies the Chassis Identify interval in seconds. The default value is 15.
- START will enable the Chassis Identify feature for the specified interval.

Sensors

The system's various sensors are subordinated to the /system1 instance. The instance's CIM class membership depends on the sensor type: Discrete sensors belong to the *CIM_Sensor* class; numeric sensors are instances of the *CIM_NumericSensor* class (which is derived from *CIM_Sensor*). The CLP class tag depends on the particular sensor's function.

Table 7: SMASH CIM Sensor

Sensor type	discrete	numeric
Voltage	voltsensor#	nvoltsensor#
Current	currsensor#	ncurrsensor#
Temperature	tempsensor#	ntempsensor#
Fan speed	tachsensor#	ntachsensor#
Other	sensor#	nsensor#

Properties:

Discrete and numeric sensors:

- Description shows the sensor name, IPMI device id, type, and associated target.
- SensorType and OtherSensorTypeDescription describe the sensor type.
- PossibleStates lists the possible states this sensor can be in.
- CurrentState shows the current sensor state.

Numeric sensors only:

- BaseUnit, UnitModifier, and RateUnits describe the sensor reading unit.
- CurrentReading shows the current sensor reading.
- NominalReading, NormalMin, and NormalMax represent the normal range for the sensor readings.
- MinReadable and MaxReadable describe the maximum possible range of sensor readings.
- LowerThresholdFatal, LowerThresholdCritical, LowerThresholdNonCritical, UpperThresholdNonCritical, UpperThresholdCritical, and UpperThresholdFatal represent the thresholds between the possible sensor states.

Supported commands:

- RESET invokes an IPMI Sensor Rearm Events command for the specified sensor.
- SET can be used to manipulate the various sensor thresholds (numeric sensors only).

/system2/account#

The account# instances belong to the *CIM_Account* class and represent the 63 available BMC user slots, including those that are currently empty.

Properties:

- Name is the key property used to select the instance that represents a given IPMI user slot. This is not the login name for that user.
- UserID displays the IPMI login name for that user, or NULL if none is set.
- UserPassword can be used to change the IPMI password for the given account. This property cannot be read back.

Supported commands:

SET can be used to change the UserID and UserPassword properties.

Associations:

Each account# is associated with one group# instance, using a *CIM_MemberOfCollection* association class. Modifying the Collection property of this association changes the group membership for the given account.

Example: Move the fifth IPMI user from group 3 (Operator) to group 4 (Administrator):
SET account5=>CIM_MemberOfCollection=>group3 Collection=group4

Examples of SMASH CLP Commands

- Locator LED: (Blue System ID LED)
  Change Interval: set /system1/locator1 interval=<nn>
  Example: set /system1/locator1 interval=60
  Turn on ID LED: start /system1/locator1
- Power control:
  System Reset: reset system1
  Power Off: stop /system1
  Power On: start /system1
- Display SEL:
  Display a list of records: show /system2/log1
  Display individual record: show /system2/log1/record<nnn>
  Example: show /system2/log1/record33
- Display just the GUID:
  show -display properties /system1
- Display Sensor info:
  Display a list of sensors: show /system1
  Display a sensor: show /system1/<sensor name from sensor list>
  Example: show /system1/sensor25
  show /system1/tempsensor1

Appendix C. KiraTool Commands

Supported Operating Systems

- Windows (2000 or newer)
- EFI Shell
- Linux
- DOS

Supported Interfaces

- Remote: LAN (only Windows* and Linux version)
- Local: - SCSI over USB
  - SMI (KCS)

Supported Functionality

- Network configuration (IP/mask/gw/MAC)
- Changing admin's name & password
- Showing serial number
- Resetting to factory defaults
- Firmware information and upgrade
- Device self-test

Usage

```
kiratool [options][cmd args]
```

Table 8: Options Overview

Options	Notes
`-a`	must be used for KIRA based Intel® RMM2
`-l <ip>`	use `<ip>` address to connect to the Intel® RMM2
`-s`	use IPMI-over-SCSI interface
`-d <device>`	use specified SCSI device; default: auto-detect
`-u <username>`	user name for login
`-p <password>`	password for login
`-P`	prompt for password
`-f`	force: never prompt for user confirmation

Options	Notes
`-v`	verbose: increase verbosity level by one step, may be mentioned more than once for extra output
`-c`	calm: does not print out anything (silent)
`-h / -?`	help: shows help and usage information

Table 9: Commands Overview

Commands	Notes
`ver`	Shows version of KiraTool.
`info`	Shows vendor and device ID of the connected device.
`ipsrc set static | dhcp | bios | none`	Sets IP address source.
`ipsrc [show]`	Shows current IP address source.
`ip set <ip addr>`	Sets IP address (e.g. 192.169.1.123).
`ip [show]`	Shows current IP address.
`netmask set <netmask>`	Sets netmask (e.g. 255.255.255.0).
`netmask [show]`	Shows current netmask.
`gw set <gw addr>`	Sets gateway address (e.g. 192.169.1.1).
`gw [show]`	Shows current gateway address.
`mac set <mac addr>`	Sets MAC address (e.g. "FE:00:00:12:34:56" or "FE0000123456").
`mac [show -c]`	Shows current MAC address (-c = compact mode, e.g. "87654321DCBA" instead of "87:65:43:21:DC:BA").
`fw upgrade [-h] [-o] <fw bin file>`	Upgrades firmware (-h = cross-hwid, -o = cross-oem).

Commands	Notes
`fw validate [-h] [-o] <fw bin file>`	Checks firmware compatibility (-h = cross-hwid, -o = cross-oem).
`fw [ver]`	Shows firmware version information.
`serial [show]`	Shows device's serial number.
`defaults`	Resets all settings to factory defaults.
`reset`	Hard-resets the module.
`cfg backup <filename>`	Backup the device's configuration to a file.
`cfg restore <filename>`	Restore the device's configuration from a file.
`cfg get <key>`	Read and show the given configuration key.
`cfg set <key> <value>`	Sets the given configuration key to the given value.
`admin name <name>`	Changes new admin name.
`admin passwd <passwd>`	Changes admin's password.
`admin [show]`	Shows admin's name.
`fni [show]`	Show status of IPMI over FML forwarding.
`fni set <on/off>`	Turn IPMI over FML forwarding on of off.
`raw <hex bytes>`	Send raw command and prints raw response (<netfn> <cmd> [<d1>] [<d2>] ... [<dN>]: e.g. 06 01).
`test <test>`	Performs module self test and shows results (return value is ==0 on success and =0 in failure).
`device`	Tests whether the device is available.
`video <subtest>`	Tests video interface (DVO/DVI).
`status`	Checks detected video signal and resolution.

Commands	Notes
`crc`	Calculate CRC sum over the captured screen.
`ddc <subtest>`	Tests DDC interface.
`info`	Queries EDID information from the device and compares it to the EDID information known by the OS (only available under Windows*).
`ipmb <subtest>`	Tests IPMB interface.
`bmc`	Test whether a BMC responds over IPMB.
`fml <subtest>`	Tests FML interface.
`esb2`	Test whether an ESB2 is responding on FML when TPT (TCP Pass-Through) is active.
`usb [-c <channel>] <subtest>`	Tests USB interface.
`status`	Test whether the device's USB module is enumerated.
`nic [-c <channel>] <subtest>`	Test NIC interface.
`status`	Test NIC status and parameters.
`loopback`	Test NIC loopback functionality.
`ping <host>`	Test whether pinging a host works.
`broadcast`	Broadcast ping (not yet implemented).
`all`	Performs all tests and subtests one after another.

Commands	Notes
`-s <test to skip>`	Single tests can be skipped using the -s parameter. You can both skip a whole component (e.g. -s ddc) and skip a single test (e.g. -s video crc). Included tests in sequence: 1. ddc info 2. video status 3. ipmb bmc 4. fml esb2 5. usb status 6. nic status

Return Codes

To let the caller know whether an error occurred and what went wrong, KiraTool delivers a return code back the caller:

- If everything went well (all tests passed) a value of 0 (zero) is returned.
- For all commands except the “test” command, a -1 (minus one) is returned if an error occurs.
- If a particular test fails, the return code indicates which test failed, according to the table below.

Table 10: Return Codes Overview

Test	Failure Return Code
Device	1
video status	2
video crc	3
ddc info	4
ipmb ddc	5
fml esb2	6
usb status	7
nic status	8
nic loopback	9

Test	Failure Return Code
nic ping	10
nic broadcast	11
fml evalboard	12
ipmb evalboard	13

Appendix D. Key Codes

Table 1111: shows the key codes used to define the key strokes or hotkeys for several functions. Please note that these key codes do not necessarily represent the key characters that are used on international keyboards. A key on a standard 104 key PC keyboard with a US English language mapping is named. The layout for this keyboard is shown in
Figure 8282.: . However, most modifier keys and other alphanumeric keys used for hotkey purposes in application programs are on a similar position, no matter what language mapping you are using. Some of the keys also have aliases. This means that a key can be named by two different key codes.

Figure 82. English (US) Keyboard Layout, Used for the Key Codes

Table 11: Key Names

Key	Alias Key(s)
0 – 9	
A - Z	
~	TILDE
_	MINUS
=	EQUALS
;	
´	
<	LESS

Key	Alias Key(s)
/	SLASH
Backspace	
TAB	
[	
]	
ENTER	
CAPS LOCK	
\	BACK SLASH
LSHIFT	SHIFT
RCTRL	CTRL, STRG
RSHIFT	SHIFT
LCTRL	CTRL, STRG
LALT	ALT
SPACE	
ALT Gr	
ESCAPE	ESC
F1	
F2	
F3	
F4	
F5	
F6	

Key	Alias Key(s)
F7	
F8	
F9	
F10	
F11	
F12	
PRINTSCREEN	
SCROLL LOCK	
BREAK	
INSERT	
HOME	POS 1
PAGE_UP	
PAGE_DOWN	
DELETE	DEL
END	
UP	
LEFT	
DOWN	
RIGHT	
NUM_LOCK	
NUMPAD0	

Key	Alias Key(s)
NUMPAD1	
NUMPAD2	
NUMPAD3	
NUMPAD4	
NUMPAD5	
NUMPAD6	
NUMPAD7	
NUMPAD8	
NUMPAD9	
NUMPADPLUS	NUMPAD_PLUS, +
NUMPAD /	/
NUMPADMUL	NUMPAD_MUL, *
NUMPADMINUS	NUMPAD_MINUS, -
NUMPADENTER	
WINDOWS	
MENU	