

REALTEK

RTL8326

RTL8324P

RTL8318P

RTL8316BP

RTL8310P

DEMO BOARD RMT USER GUIDE **Preliminary for RMT 2.1 Build 08**

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USING THIS DOCUMENT

This document is intended for using by the software engineer when programming for Realtek RTL8326, RTL8324P, RTL8318P, RTL8316BP and RTL8310P controller chips. Information pertaining to the hardware design of products using these chips is contained in a separate document.

Though every effort has been made to assure that this document is current and accurate, more information may have become available subsequent to the production of this guide. In that event, please contact your Realtek representative for additional information that may help in the development process.

REVISION HISTORY

Revision	Release Date	Summary
Pre-0.1	2005/04/13	First release.
Pre-0.2	2005/10/25	For RMT Release 2.0 Build 06 version. The user interface is different from the RMT Release Build 0.1 version in order to let the switch manager to use more easily.
Pre-0.3	2005/11/14	For RMT Release 2.0 Build 07 version.
Pre-0.4	2005/12/06	For RMT Release 2.0 Build 08 version.
Pre-0.5	2006/01/09	For RMT Release 2.1 Build 01 version. The RMT supports RTL8326 controller chip.
Pre-0.6	2006/02/24	For RMT Release 2.1 Build 02 version.
Pre-0.7	2006/03/31	For RMT Release 2.1 Build 03 version.
Pre-0.8	2006/06/07	For RMT Release 2.1 Build 04 version.
Pre-0.9	2006/07/18	For RMT Release 2.1 Build 05 version.
Pre-0.10	2006/10/13	For RMT Release 2.1 Build 06 version.
Pre-0.11	2006/12/27	For RMT Release 2.1 Build 07 version.
Pre-0.12	2007/05/15	For RMT Release 2.1 Build 08 version.

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1. General Description

The Realtek Remote Control Protocol (RRCP) is a Realtek proprietary simple and easy device management program that is implemented for in-band remote control purposes. Based on RRCP, Realtek develop a software program, RMT, to manage Realtek Switch.

RTL8324P, RTL8318P, RTL8316BP and RTL8310P provide I2C interface to connect with EEPROM and save configuration in it. The ICs provide the feature for users to control the switch without any external MPU. However, RTL8326 still needs a MPU (For example: SyncMOS89516) to support the RMT tool.

2. Switch Hardware Needed and Install Software

2.1. Using RMT Program to make the management

- (1) RTL8326 + 8051 + EEPROM → Switch system need a 24C04 EEPROM at least.
- (2) RTL8324P/8318P/8316BP/8310P + EEPROM → Switch system need a 24C08 EEPROM at least.

※ Discontinue Products:

- (a) RTL8324/8318/8316B/8310 + 8051 + EEPROM → Switch system need a 24C04 EEPROM at least.
- (b) RTL8324/8318/8316B/8310 + EEPROM → Switch system need a 24C08 EEPROM at least.
- (c) RTL8324P/8318P/8316BP/8310P+8051+EEPROM → Switch system need a 24C08 EEPROM at least.

2.2. How to install software

- (1) Make sure your switch's RRCP function is enabled.
- (2) Install **WinPcap_3_1.exe** or **WinPcap_3_0.exe**: the Free Packet Capture Library for Windows.
- (3) Double click "**RMT_x_x_Bxx.exe** to run RMT software.

3. RMT software user guide

3.1. Discover switch in network

After you install the RMT program, you can execute the program. As you implement it, the RMT will send “Hello Packet”, and it can find the switch, which supports the RRCP feature. Furthermore, you can set vendor id in rmt_config.ini file. RMT will filter the switch whose vendor id doesn’t conform to it. All the found switches will be shown on the window as Figure 1. Then, double click to select a switch you want to manage.

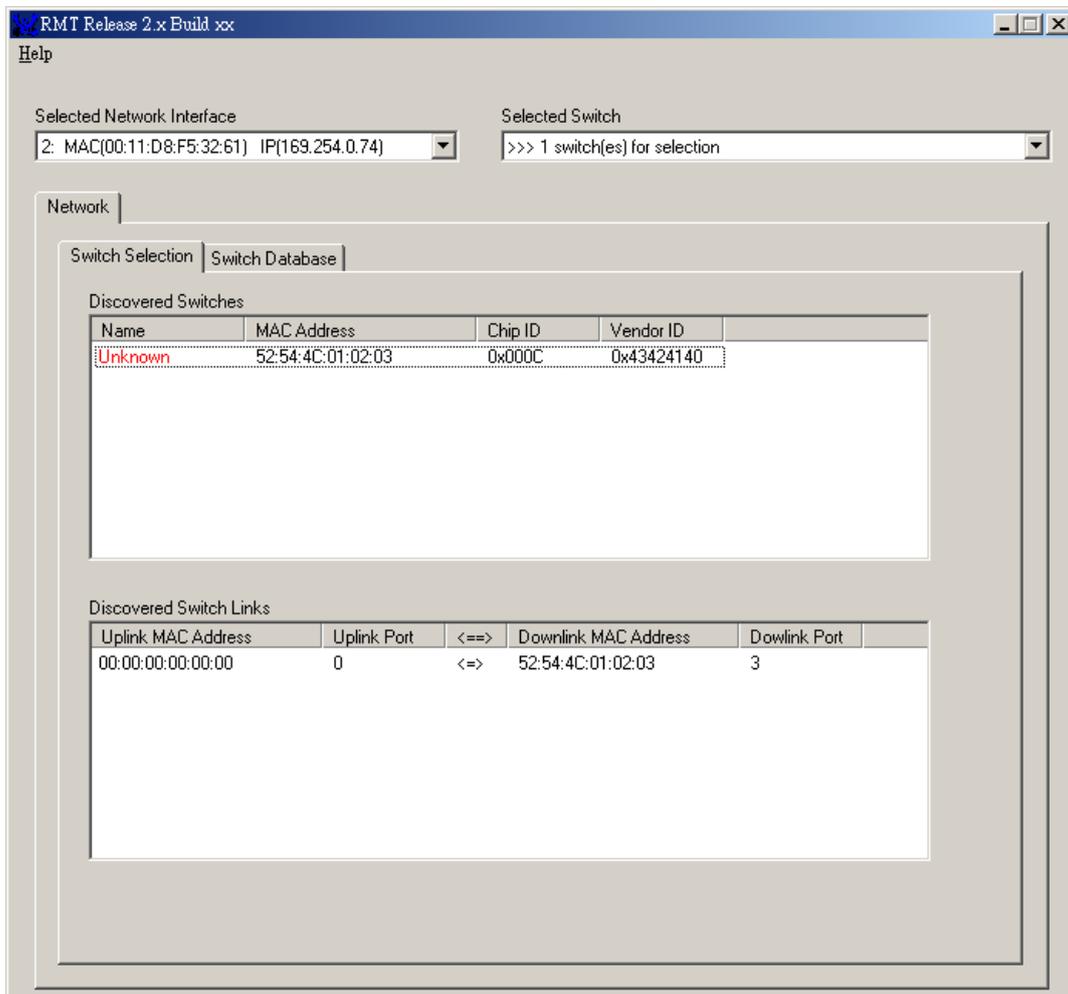


Figure 1. RMT: Discover Switch in the Network

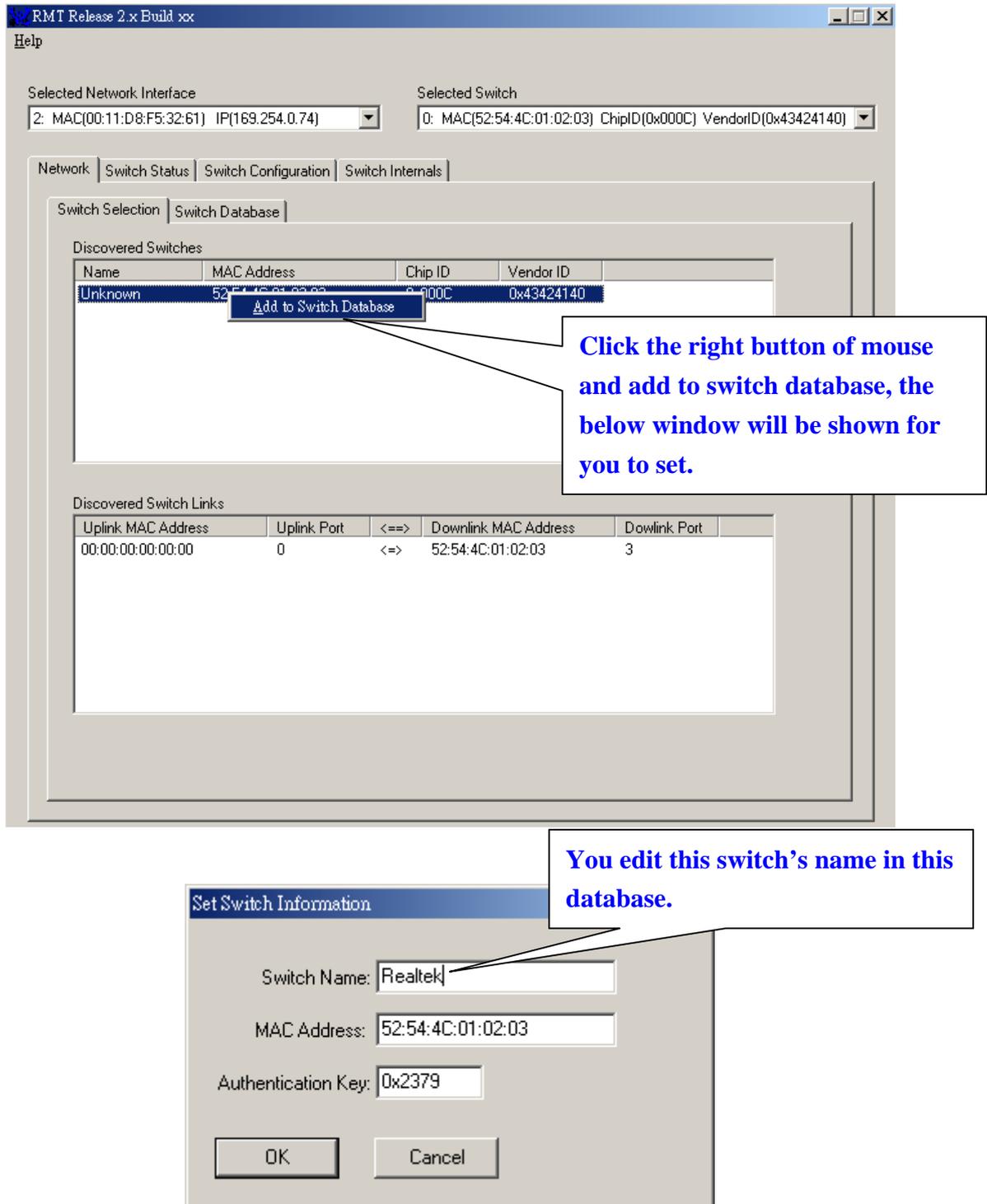


Figure 2. RMT: Add switch information to database

3.2. Network

3.2.1. Switch Selection

Switch Selection: The all switch that support RRCF function will be shown on this window, and you have to select one that you want to control before you start to manage it.

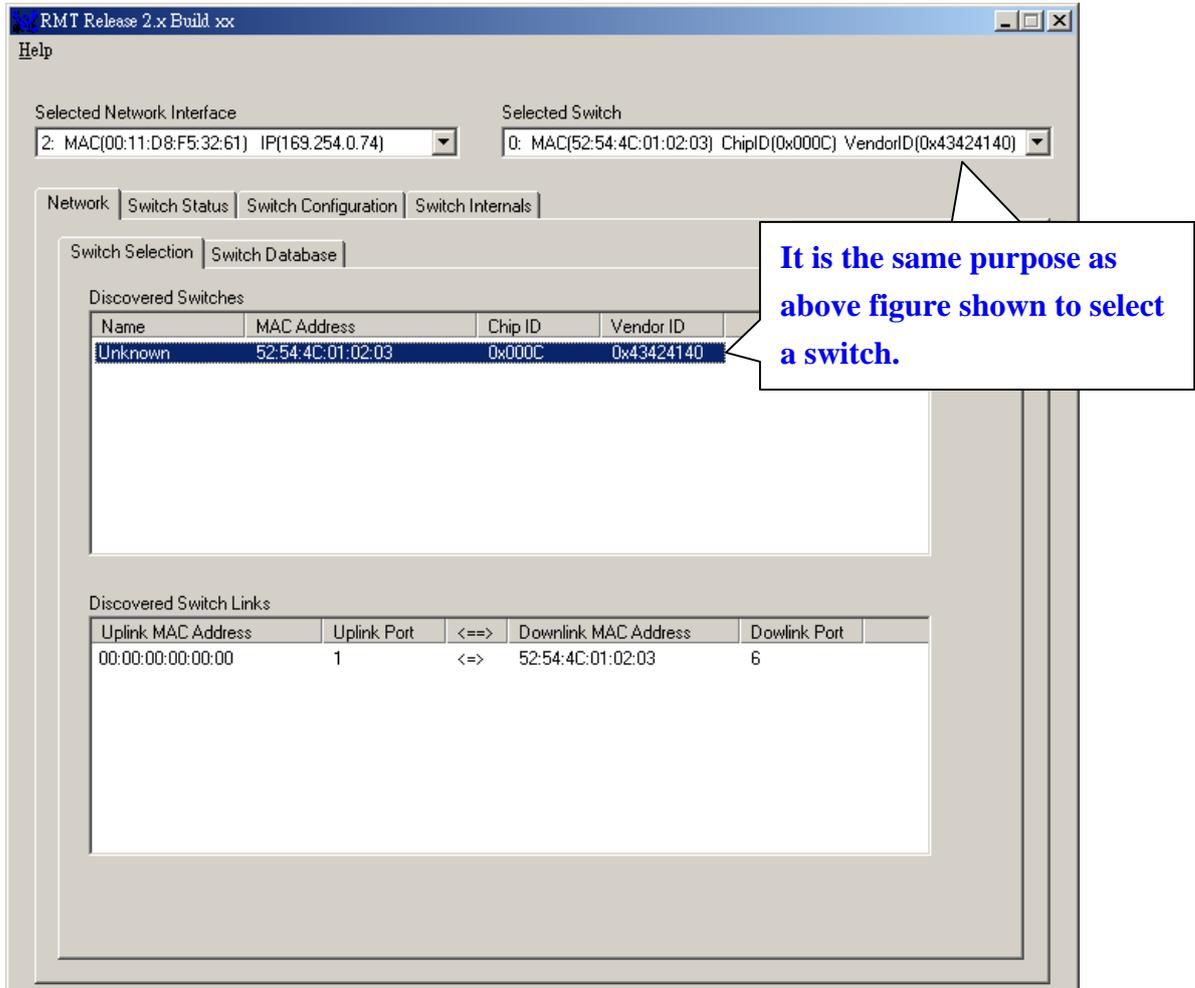


Figure 3. RMT: Main Menu to Select one switch

3.2.2. Switch Database

Switch Database: Click the right button to add or edit the switch name

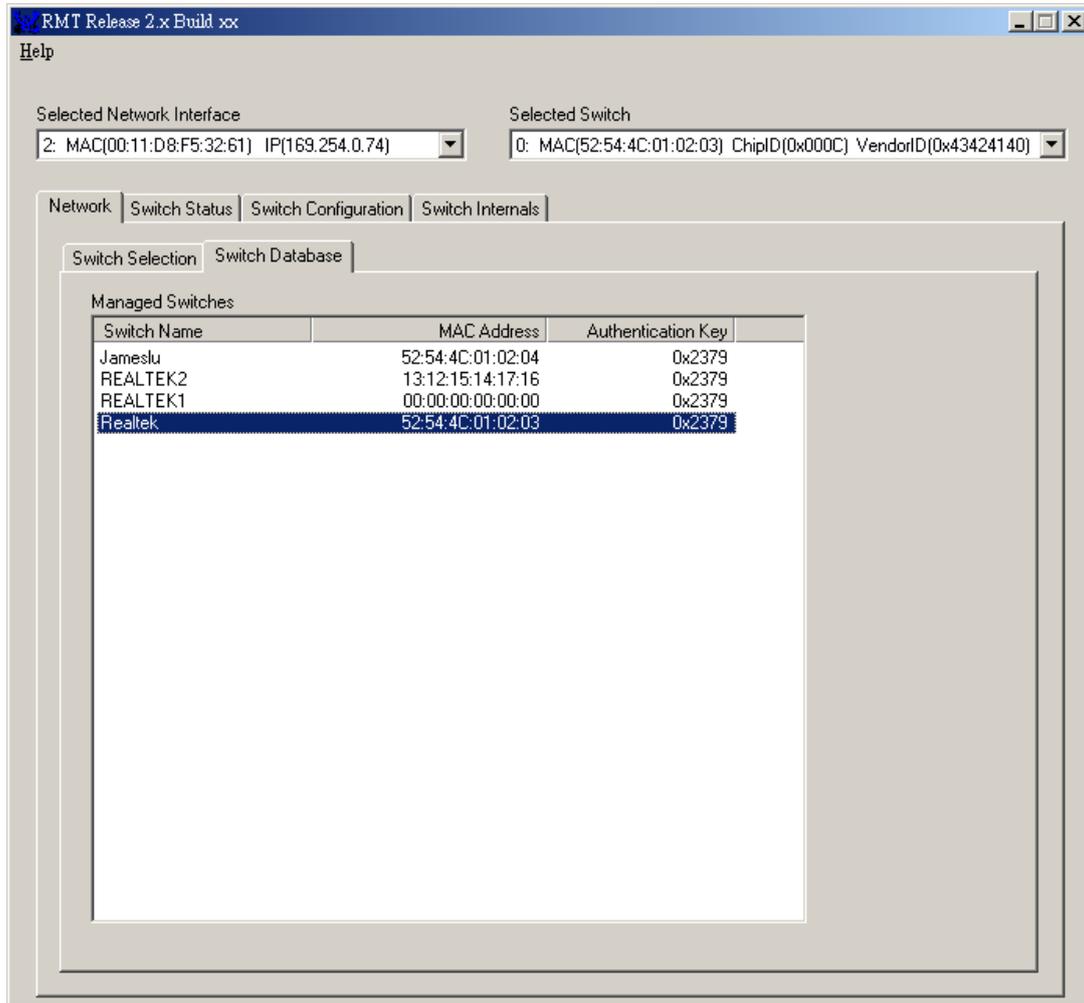


Figure 4. RMT: Add or Edit switch name.

3.3. Switch Status

3.3.1. Port Status

The column shows every port status on the switch, and includes link, speed, flow control, auto negotiation, loop detect, trunk fault and router port.

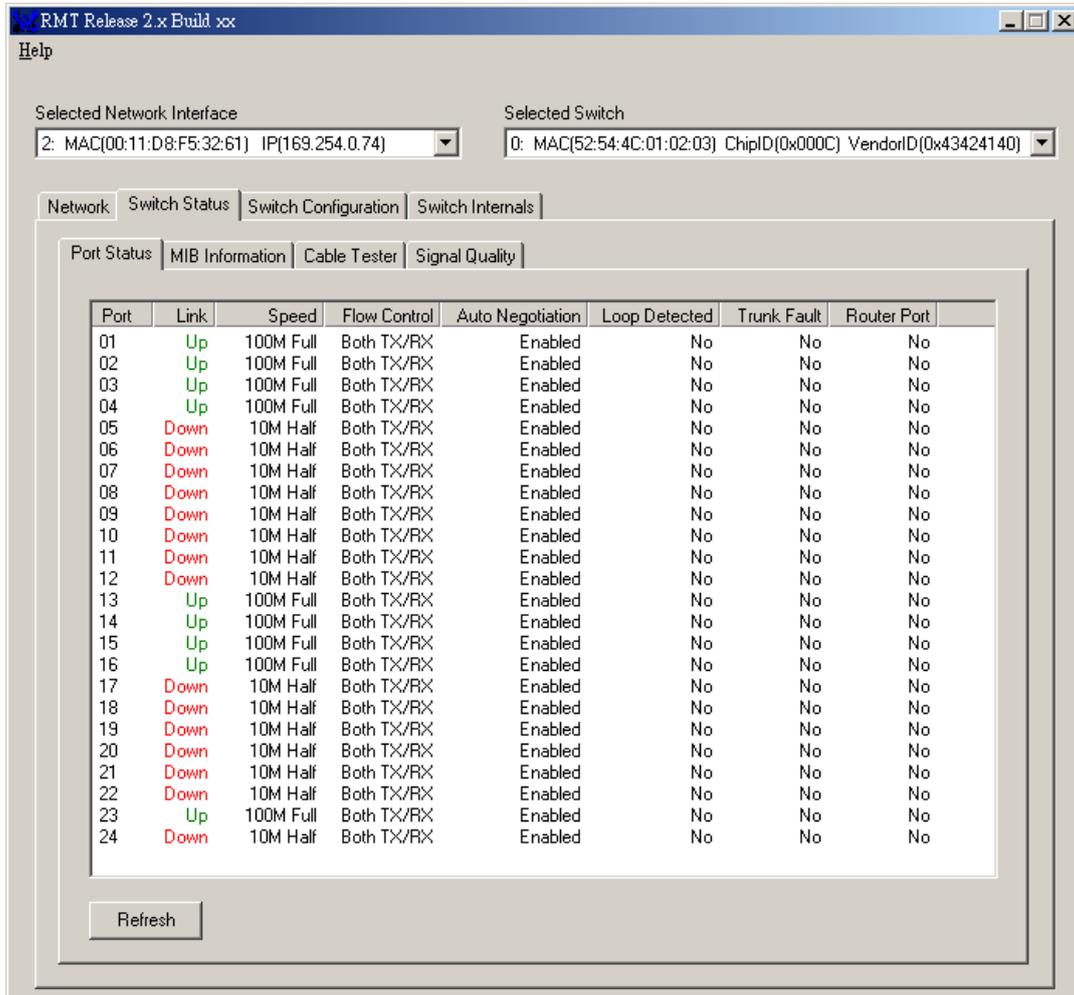


Figure 5. RMT: Show you the Port Status

3.3.2. MIB Information

We can use the MIB Counter function, which the MAC supports to count the packet number receive in or transmit out the MAC IC. Click the “Start” button, and the RMT will show the packet number that the MAC receive or transmit immediately. Click the “Stop” button, and we can stop the action of counting the packet number. Click the “Clear” button, and we can clear the number shown on the window. Click the “Pause” button, and we can stop showing the packet number, but this function is not the same as the “Stop” button. It will still count but doesn’t show on the window, when you click “Continue”, the window will show the accumulating packet number in the past time.

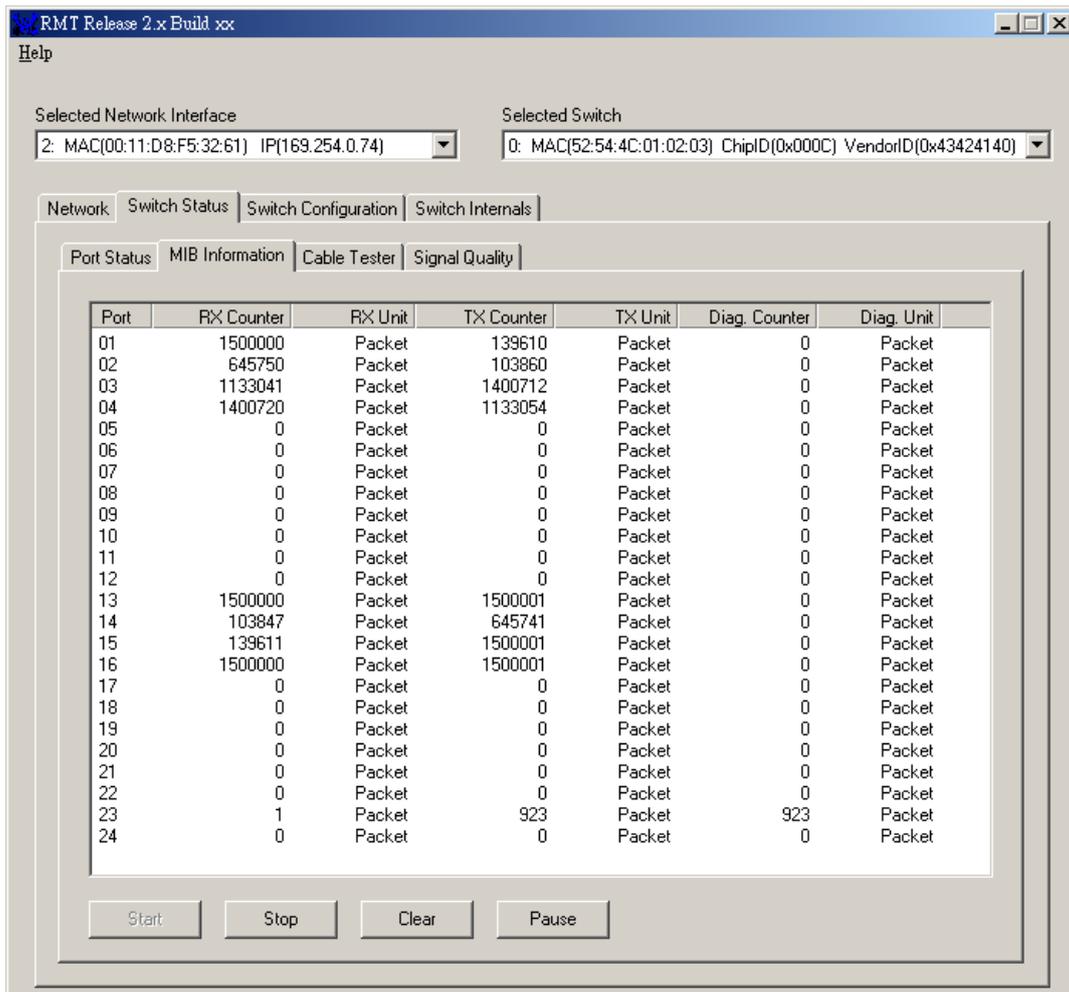


Figure 6. RMT: Show you the MIB Counter

3.3.3. Cable Tester

Cable tester can detect the Cable's status, short, link on, and open of UTP ports. Please note that the feature does not support fiber ports. User can easily use cable tester function to diagnose cable problem.

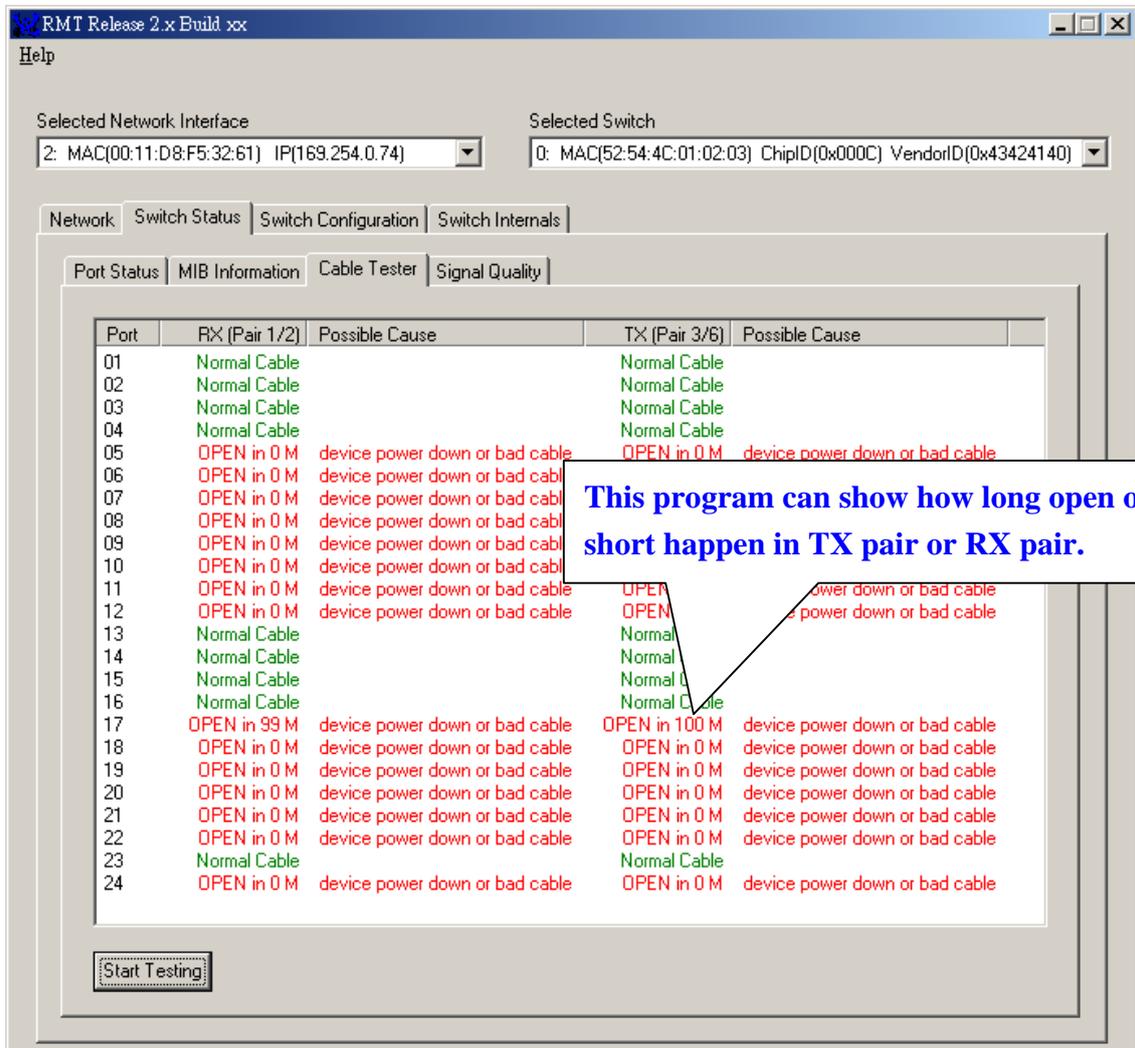


Figure 7. RMT: Show you the Cable Tester Result

You can check whether each port on the switch is connecting on the normal station or not. The Realtek proprietary function can check the TX or RX pair either short or open in what distance away from the switch. From RMT_2_0_B05 version, RMT used the “Start Testing” button instead of the “refresh” button in the RMT_2_0_B01. In B06 version, you have to click the “Start Testing” button and the cable tester function will start whereas in B01 version you will implement it automatically when you change to this column.

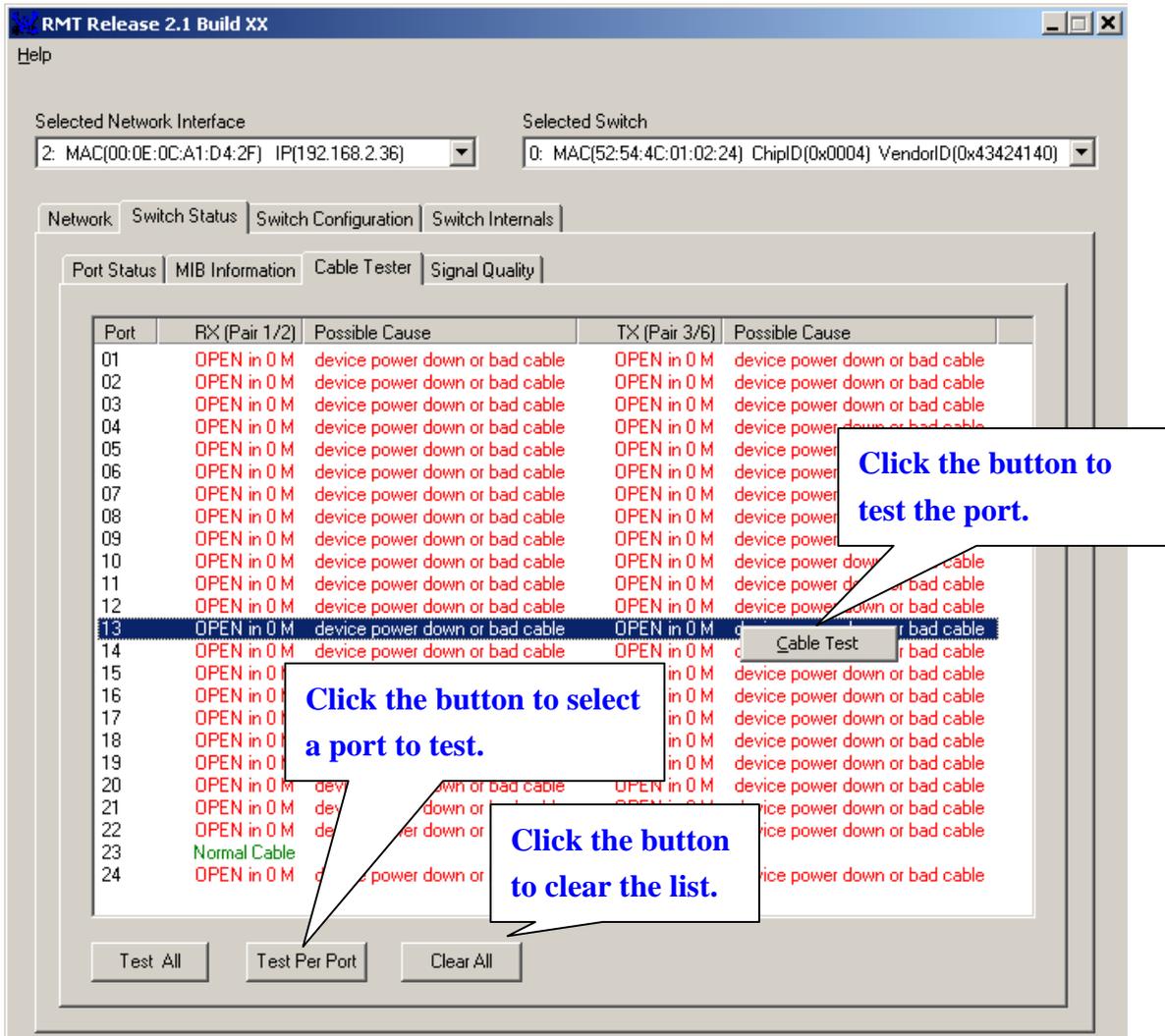


Figure 8. RMT: Per Port Cable Test.

You can do Cable Test every port separately.

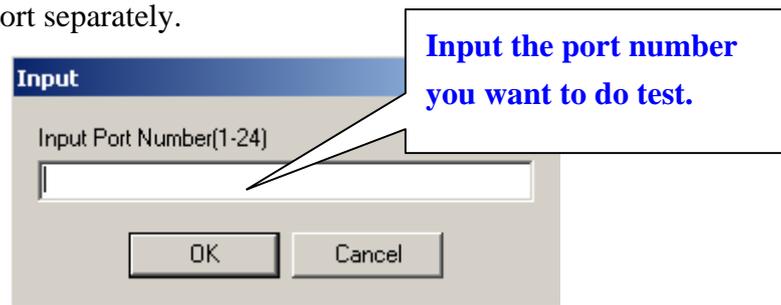


Figure 9. RMT: Select a Port to do Cable Test.

3.3.4. Signal Quality

From RMT_2_0_B04 version, a new function called “Signal Quality” of RTL8208B was added. This function can determine whether the cable connect on the switch is good or not. As Cable Tester feature, the Signal Quality does not support fiber ports, and it only take effect on UTP ports. The RTL8208B check the “Signal and Noise Ratio” (SNR) and can determine the cable is “very good”, “good”, or “bad”. Like Cable Tester, you can select a port to do Signal Quality Test.

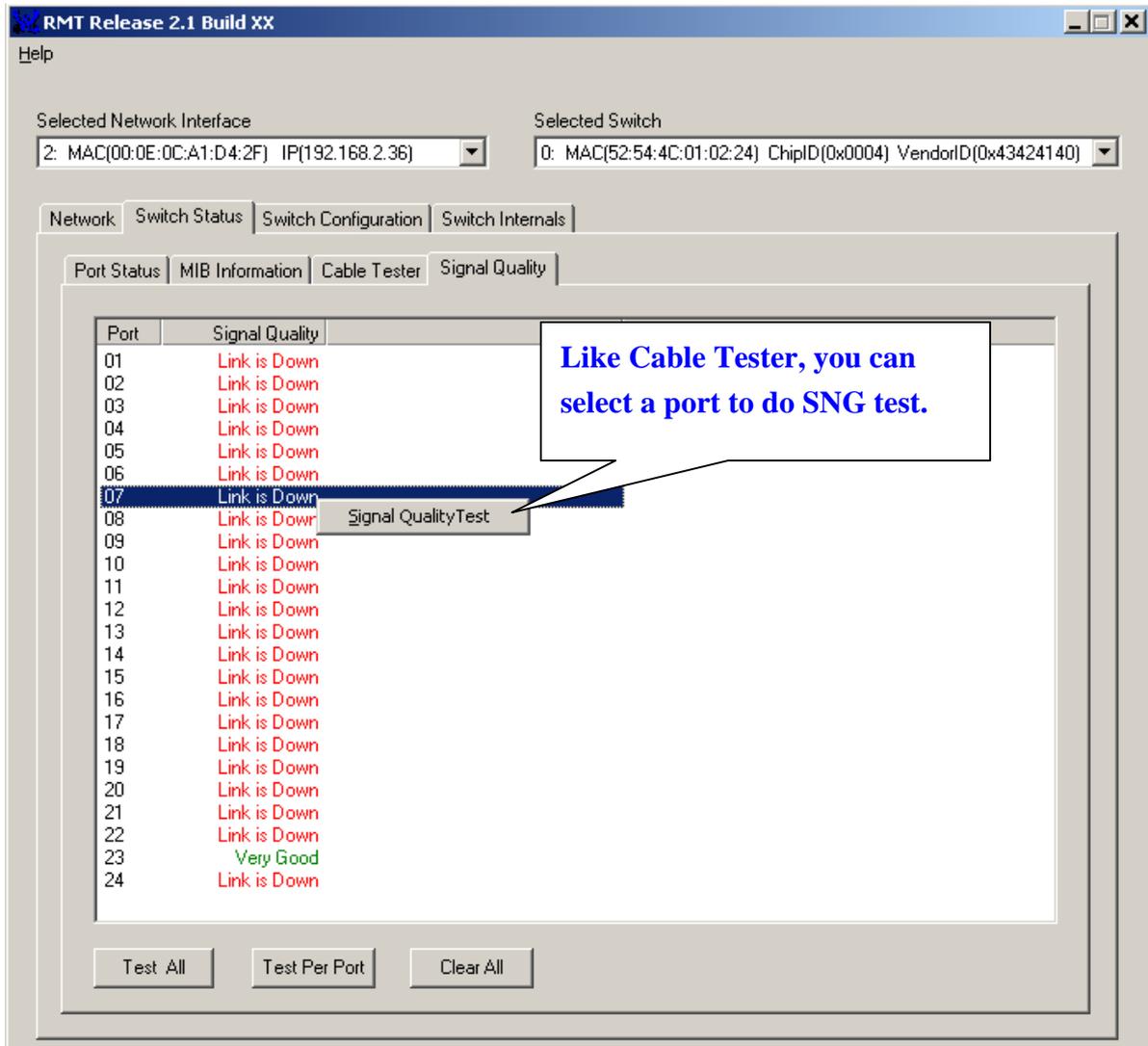


Figure 10. RMT: Show you the Cable Quality.

3.4. Switch Configuration

In “Switch Configuration” items including “Global configuration”, “Port Configuration”, “QoS Configuration”, “VLAN Configuration”, “Port Mirror Configuration” and “Security Configuration”, user can press “Apply” button to execute. If user don’t click the “Apply”, the function will not change in order to avoid an unintentionally click.

3.4.1. Global Configuration

Disable/Enable Some Global Configuration:

- (1) Broadcast Flow Control.
- (2) Multicast Flow Control.
- (3) Broadcast Storm Filtering.
- (4) Loop Port Detection.
- (5) IGMP Snooping.

The “Broadcast Flow Control” and “Multicast Flow Control” are the function for user to transmit more smoothly when you meet a congested port. The “Broadcast Storm Filtering” can drop broadcast packets to avoid continuously receive broadcast packets. The “Loop Port Detection” can detect whether a loop is exist. However, this feature just enables the IC to provide a warning message through parallel or serial LED. Any loop happened on switch will cause a crash for that the RRCP packets can’t receive by IC normally. In other words, RMT can’t work at a network error condition like loop error. The “IGMP Snooping” can execute the IGMP function. If you want to realize more information about above function, we suggest you to read the datasheet of RTL8324P.

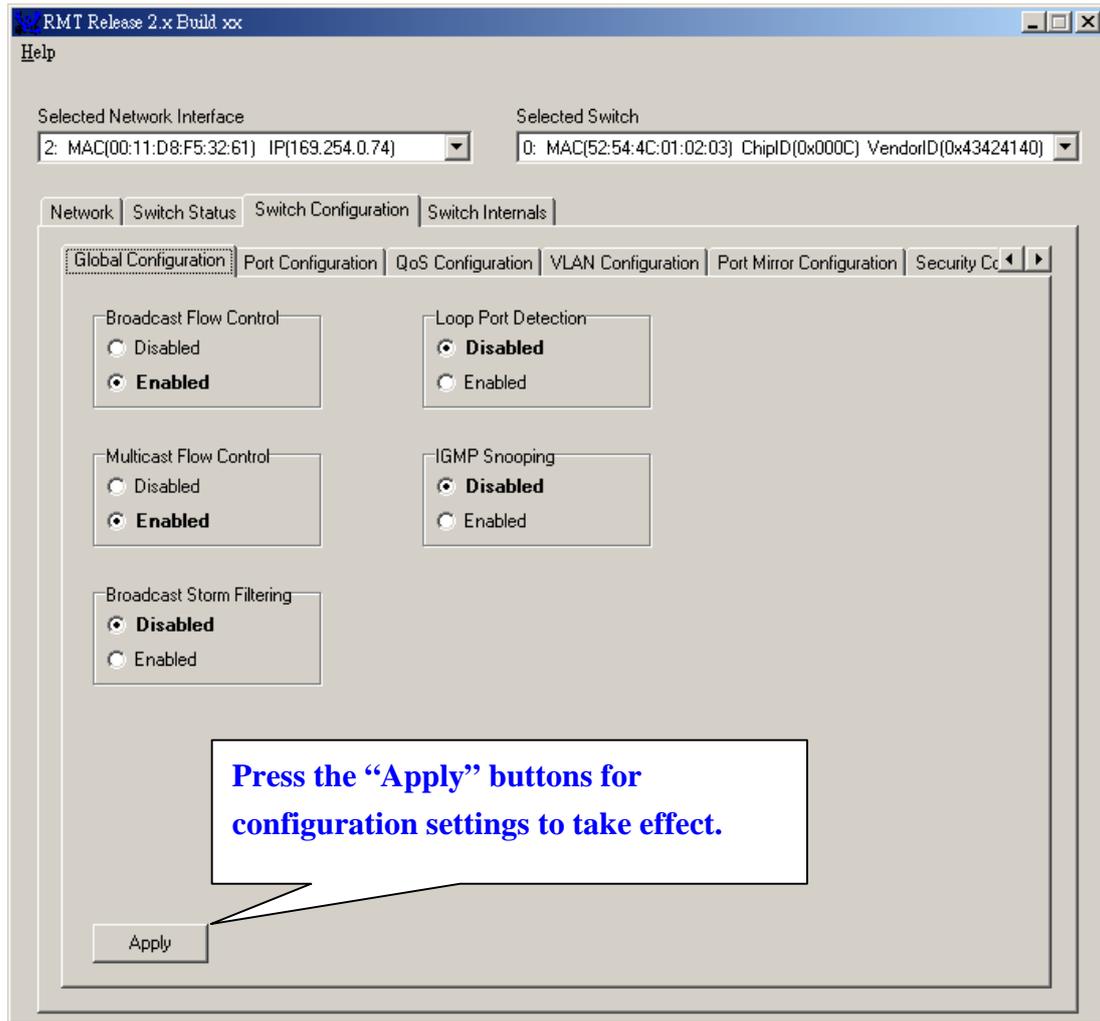


Figure 11. RMT: The Global Configuration

3.4.2. Port Configuration

The port configuration includes the configuration of each port.

- (1) Enable or Disable the port.
- (2) RX/TX Bandwidth: Control the port's RX/TX bandwidth, RTL8324P Provide many kinds of option to limit the bandwidth of each port: No limit, 128 Kbps, 256Kbps, 512Kbps, 1Mbps, 2Mbps, 4 Mbps, 8 Mbps.
- (3) Auto Negotiation: Enable or Disable Auto Negotiation.
- (4) Advertised Speed: 100 or 10 M Speed, Full or Half duplex.
- (5) Pause Flow Control: You can choose "No Flow Control" or "Both TX/RX Flow Control" two option.
- (6) Trunking: Enable the trunk port function. Each "Trunking Group" includes four ports as trunk.

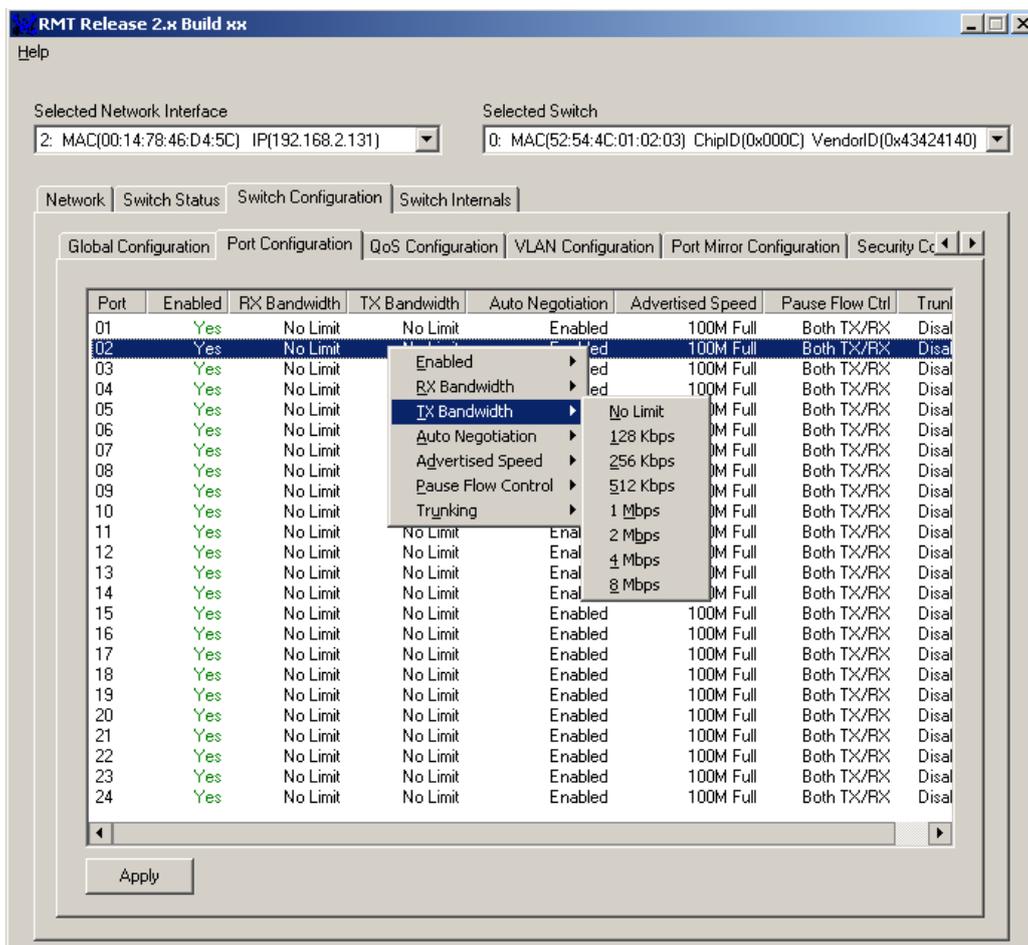


Figure 12. RMT: The Port Configuration

From RMT_2_0_B06 version, a new function, described as follows, was added to avoid user makes wrong settings. In IEEE 802.3ad standard, it is defined that switch's trunking must be full duplex and at the same speed, however, someone may be make mistakes that setting the trunk but in the wrong condition. Therefore, we add a choice window as Figure 13 while you want to enable a trunk. Whenever you enable the trunk, RMT will pop up a new window for switch manager to select speed and duplex. Of course, the network managers still have to take into account the other switch that the trunk ports connect with.

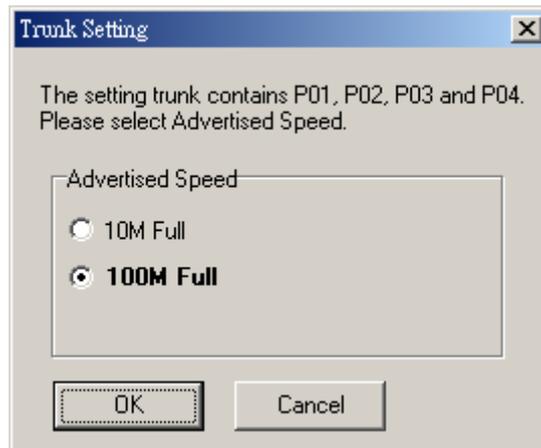


Figure 13. RMT: Selection of speed and duplex of turning port.

3.4.3. QoS function

- (1) **Diffserv Priority:** Enable the feature of the TCP/IP's TOS/Diffserv(DS) based priority. When the DS field of TOS octet [0:5] bits are "101110"(Expected Forwarding) ; or "001010"; "010010", "011010", "100010"(Assured Forwarding); or "11X000"(Network Control), the packet will be a high priority packet, otherwise the packet will belong to low priority packet.
- (2) **802.1p VLAN Priority:** Enable or Disable VLAN tag priority. If the packet's "User priority" is 0~3, it shall be low priority. The packet will be high priority when its "user priority" is 4~7.
- (3) **Adapted Flow Control:** Enable the auto turn off flow control function for 1~2 seconds, whenever the port receives a high priority packet.
- (4) **High/Low Priority Ratio:** The MAC will transmit the packet from the high priority port and the low priority port as the ratio of the ratio.
- (5) **Port Priority:** You can enable each port's priority. The packets received from high priority ports will be processed in output port's high priority queue.

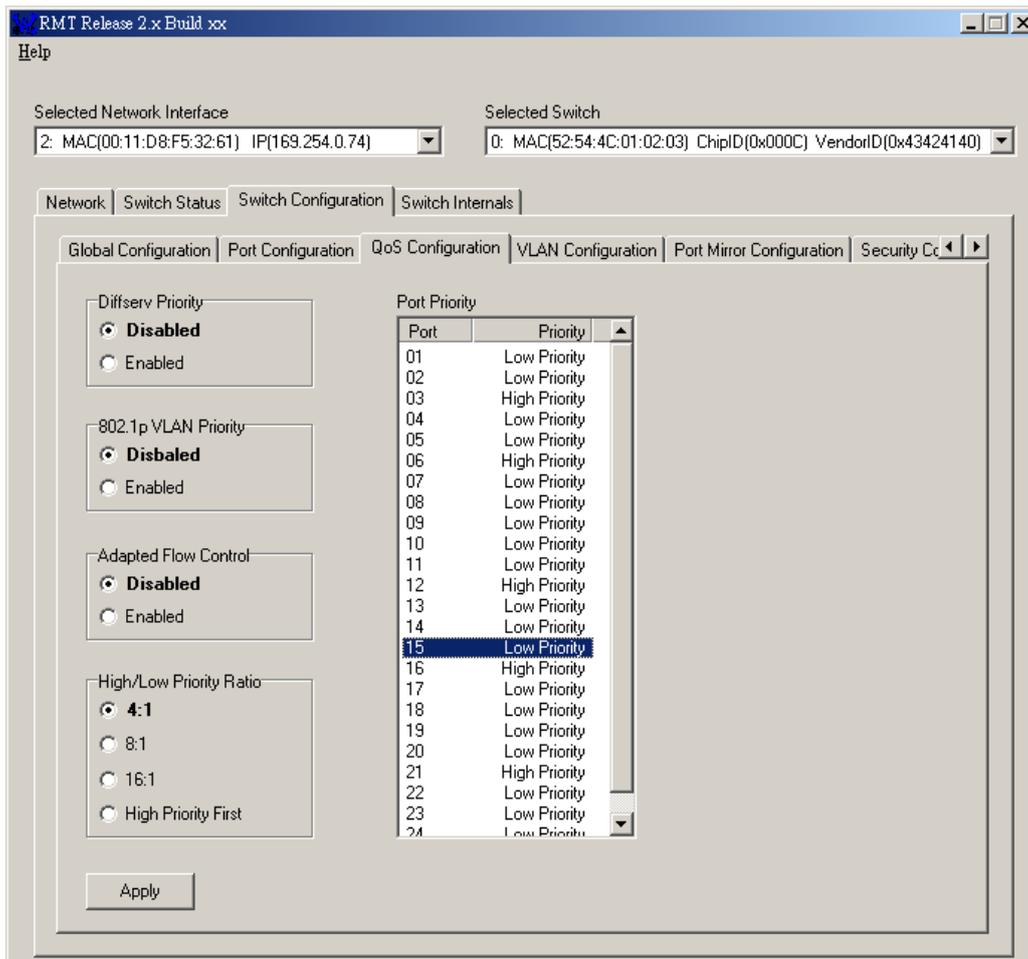


Figure 14. RMT: The QoS Setting

3.4.4. VLAN Configuration

- (1) **VLAN Ability:** There are three options: Disable VLAN, Port-based VLAN and 802.1Q VLAN. When you change the option, it will show a window to tell you that Change the VLAN option will reset the setting of VLAN. When you choose either Port-based VLAN or 802.1Q VLAN, the window will add one more button for you to set the configuration of VLAN.
- (2) **Unicast Packet Leaky:** When you enable this function, unicast packets can be transmitted to different VLAN group.
- (3) **ARP Packet Leaky:** If the function is enabled, ARP broadcast packets can be transmitted to different VLAN group.
- (4) **Multicast Packet Leaky:** When you enable this function, IP Multicast packets can be transmitted to different VLAN group.
- (5) **Ingress Filtering:** When you enable this function, the MAC IC will filter frames received from a port which is not in the port's VLAN group.

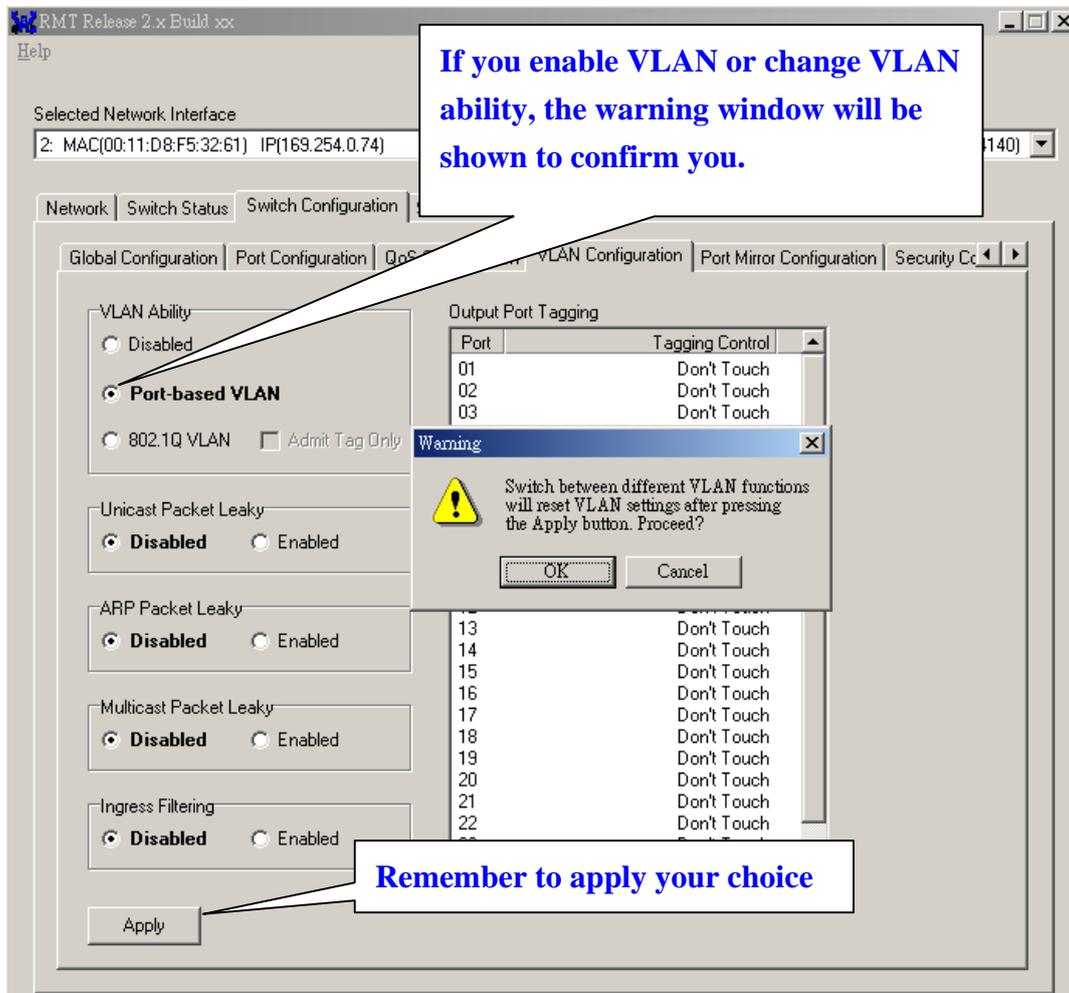


Figure 15. RMT: The VLAN Configuration Setting(1)

(6) Output Port tagging: MAC provides the function to handle the tag of output packet. “Don’t touch”, “Remove tag”, “Insert tag for high priority frame”, or “Insert tag for all frame”. Users have to notice that “Insert tag for high priority frame” and “Insert tag for all frame” only take effect when you enable either QoS function.

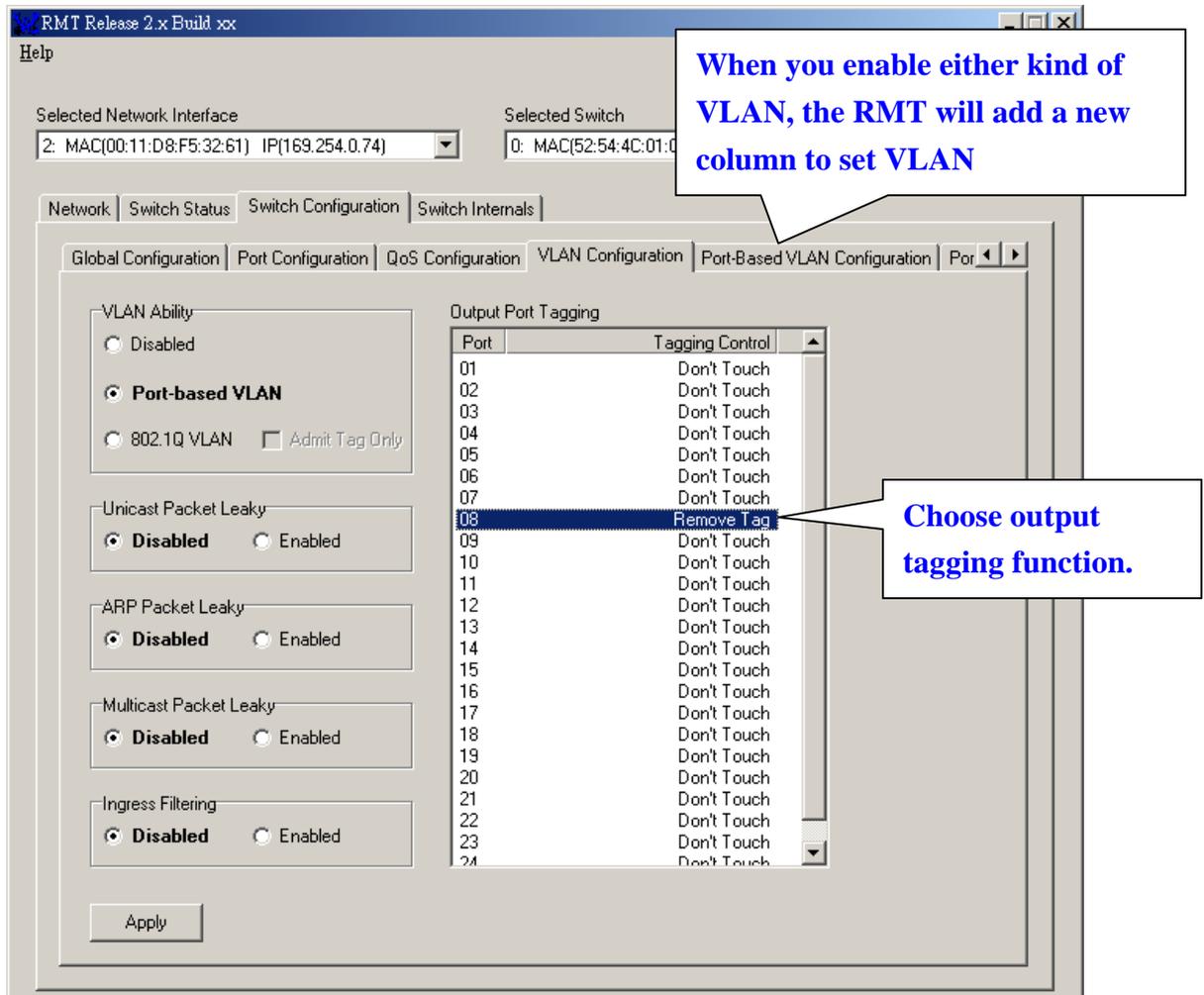


Figure 16. RMT: The VLAN Configuration Setting(2)

Let's take an example of VLAN setting. As the below figure, we set five new VLAN. Before setting any new VLAN, there is a default VLAN – VLAN 1, all port belong to it. While we add any ports to a new VLAN, it will be eliminated from the default VLAN. In this example, we have five new VLAN, and the default VLAN. Switch system has six port-based VLAN. If a packet receive by port 1 and manager don't enable the unicast leaky function. The packet will be send out only that its destination address which is port2~4, port7 and port10. Users have to notice that "Port-based VLAN" is not the standard VLAN, and it is just for network manager to configure the environment more conveniently. Therefore, RMT will add some internal VLAN if your "Port-based VLAN" setting has configured some overlapping ports in different VLAN. Under this situation, the maximum VLAN you can set is not 31 but depend on how many internal VLAN have been set.

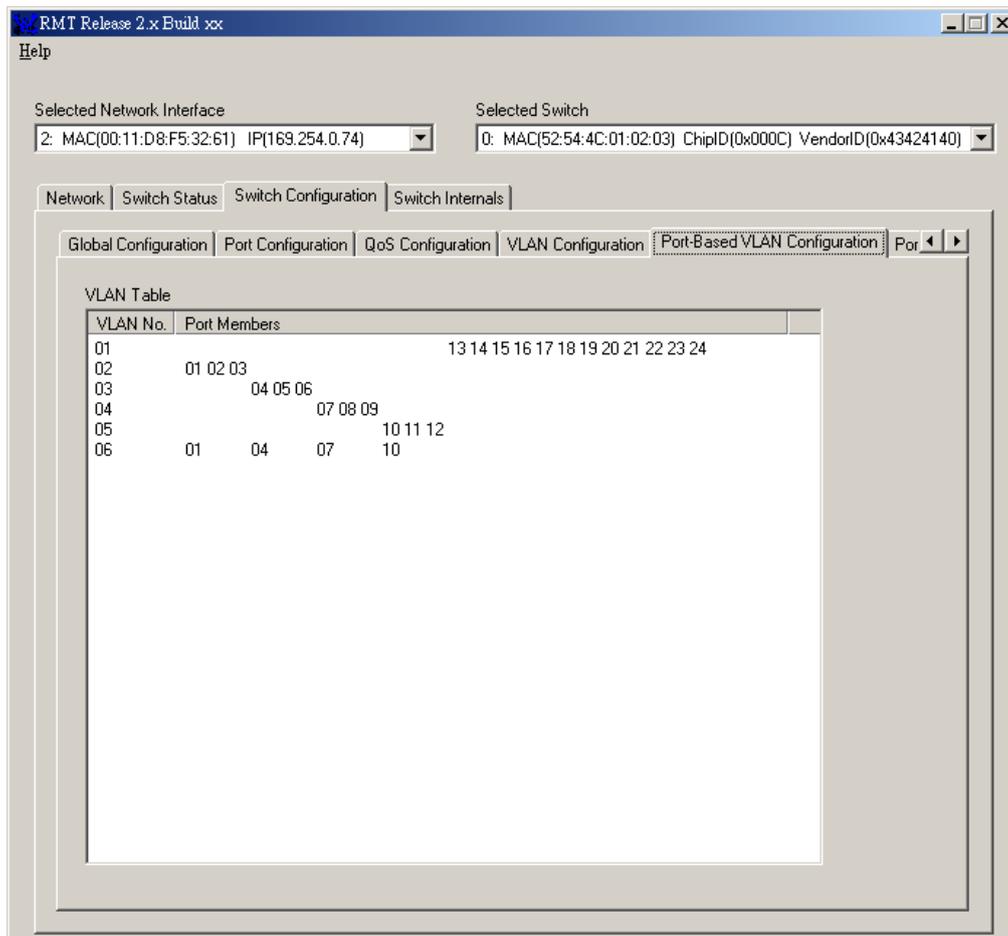


Figure 17. RMT: The VLAN Configuration Setting(3)—Port-Based VLAN

If the "802.1Q VLAN" is enabled, we can decide whether the switch receive untagged frame or not by enable the "Ingress Filtering" function. For an example, let us see Figure18. The RMT 802.1Q VLAN

follows the IEEE 802.1Q standard. If we enable this VLAN and configure as below, the switch can only transmit out the packet that its VID in the tag fit with the VID of destination port. If a packet with a VID=2 received by port 1, it can only transmitted out to port 2~port 4.

If a port receives an untagged packet, the MAC will refer to “Port VLAN Mapping” and decide whether the packet can forward to its destination port. For example, an untagged packet received by port1 will forward only to port9~port12 because the “Port VLAN mapping” is VID=4. In addition, “Port VLAN mapping” also map the “Output Port PVID Insertion”, as above example, an untagged packet with unknown DA received by port 2 and multicast to port13~port16. MAC will insert a VID=5 when forward to port14~port16, but packet forward to port13 is still an untagged packet.

Please note that RMT doesn’t allow “Output Port PVID Insertion” to be “Enabled” in ports connecting with RMT even series connection, because the event will make RMT can’t identify 8324P serial switches. If user does it, RMT will show a warning message as Figure 18 to avoid unknown errors. In addition, “Output Port PVID Insertion” will not show in RTL8326, because RTL8326 doesn’t support the function.

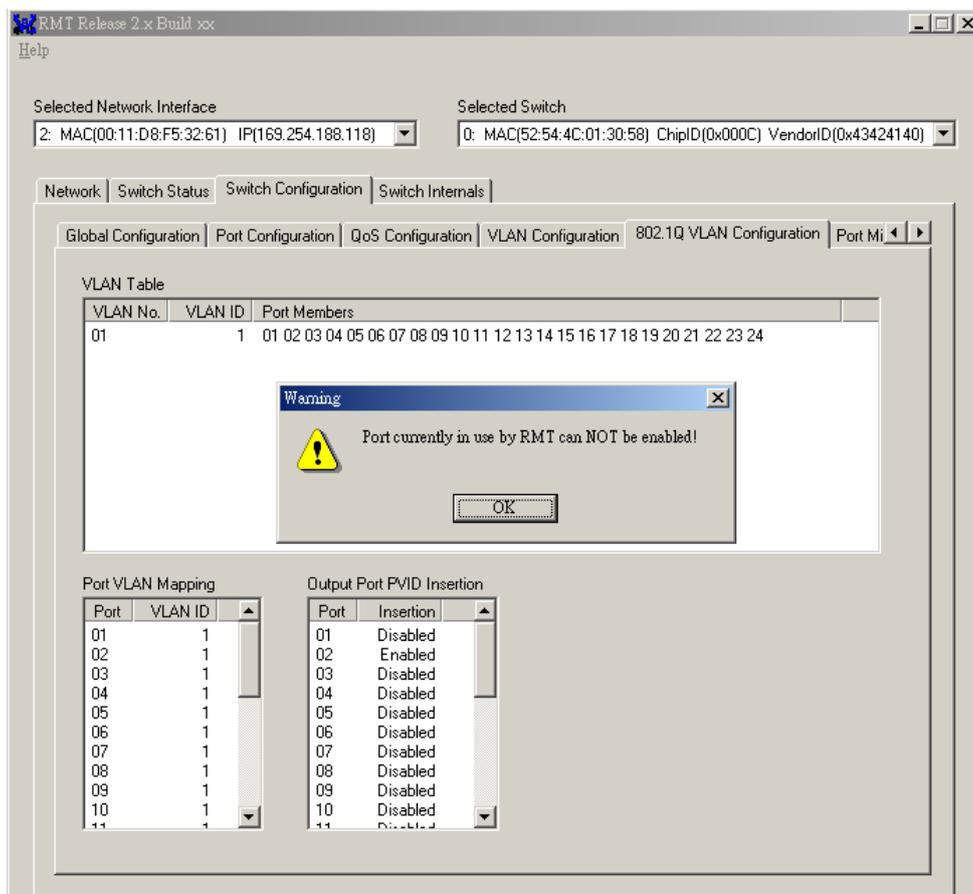


Figure 18. RMT: The VLAN Configuration Setting(4)—Insert tag constraint

Trunking and VLAN :

RMT added a new function to avoid the trunk and VLAN in the different member from RMT_2_0_B06 version. The function has two methods described as follows. In the first method, if you set a trunk that its members don't belong to the same VLAN, RMT will create a conform window to remind your choice have a fault. If you click the "Yes", RMT will change the window to the VLAN setting. You can't set the trunk successfully until your trunk settings don't have collision with VLAN setting. The other way is that when you configure the VLAN member where a port has been set in a trunk, RMT will automatically add the other ports in the same VLAN. For example, port1~4 are in a trunk. If user is setting a VLAN containing port4~6, RMT will add port1~3 into the setting VLAN.

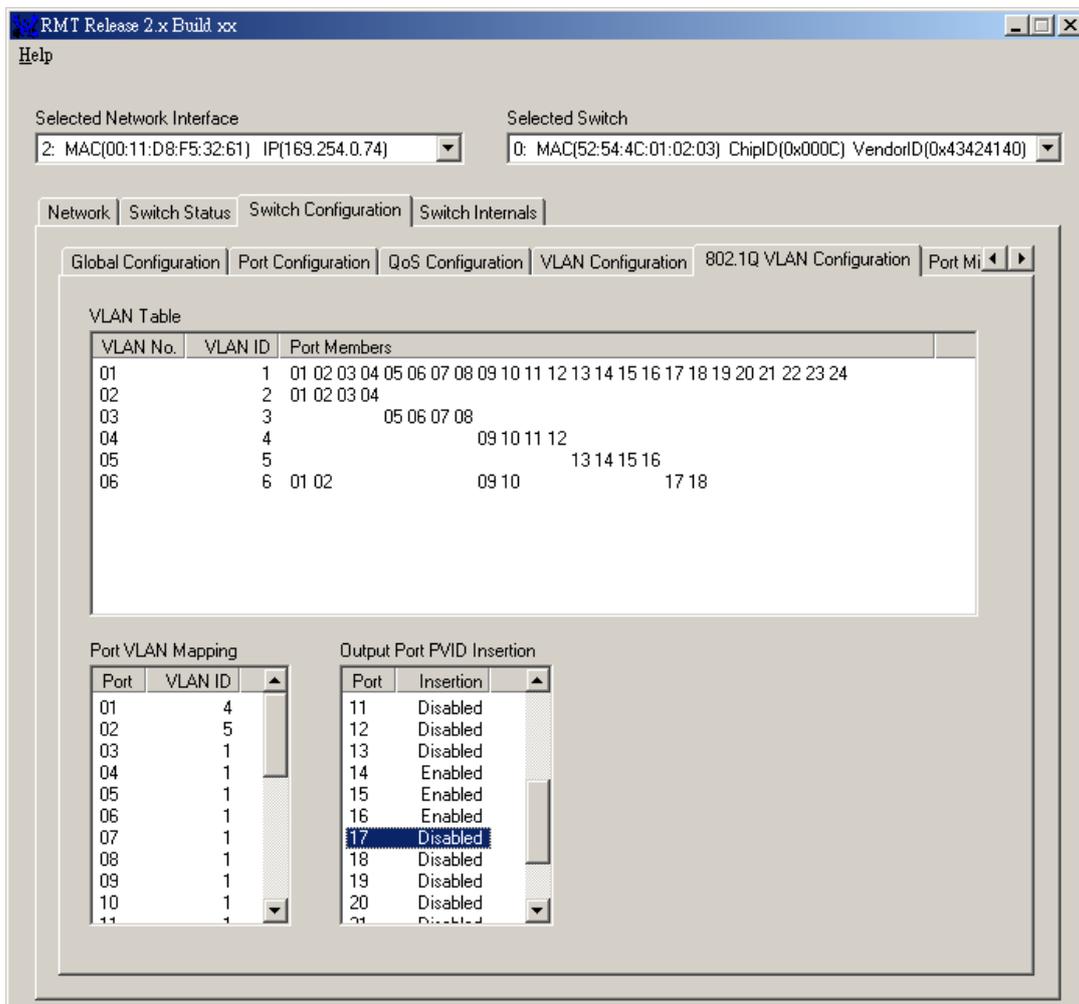


Figure 19. RMT: The VLAN Configuration Setting(5)—802.1Q VLAN Configuration

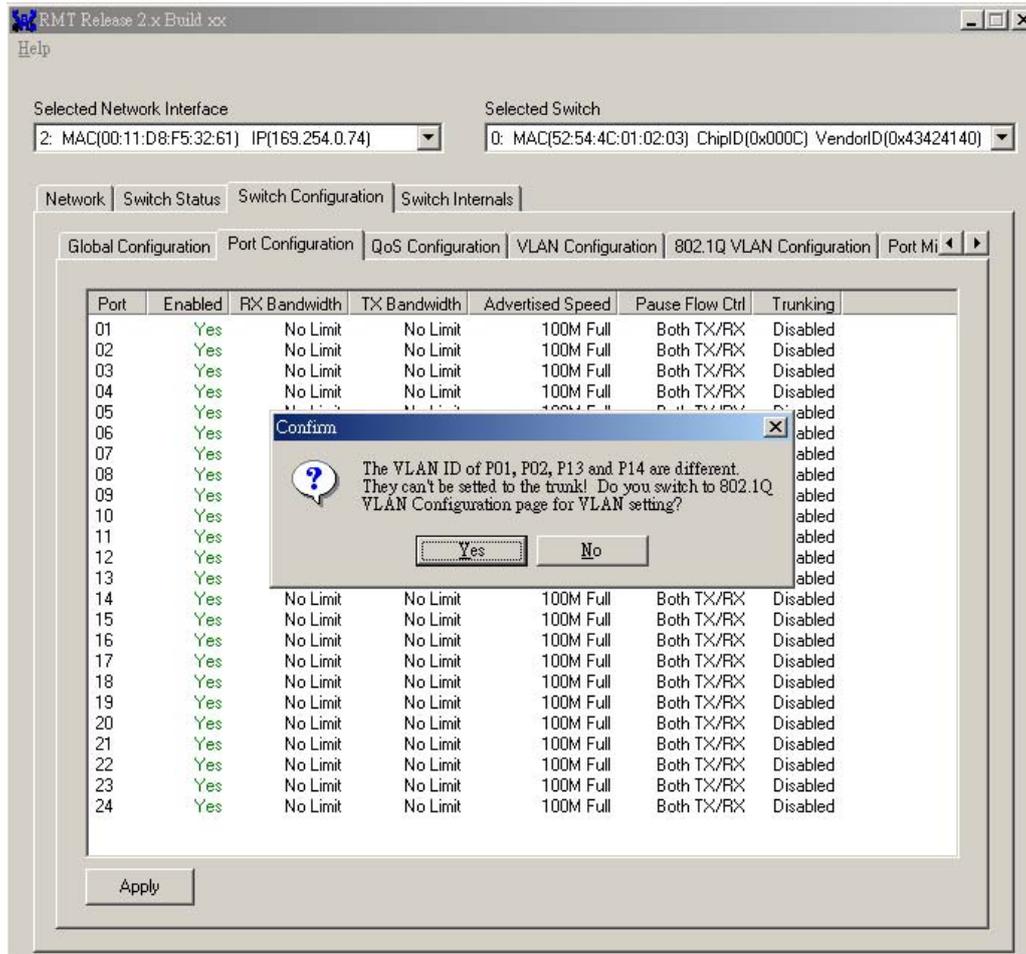


Figure 20. RMT: The VLAN and Trunk setting have collision

3.4.5. Port Mirror Configuration

In this section, we will introduce a function about port mirroring. In RTL8326, it doesn't support the mirror function. If you are using RTL8326, please ignore this section. First, please choose the mirroring port, for example, port 1, you just click the right button of mouse and enable the port's mirroring function. Then, choose the mirrored port, for example, port 2, you can follow the same action as you choose mirroring port, but at the place of Mirrored port to select which one you want.

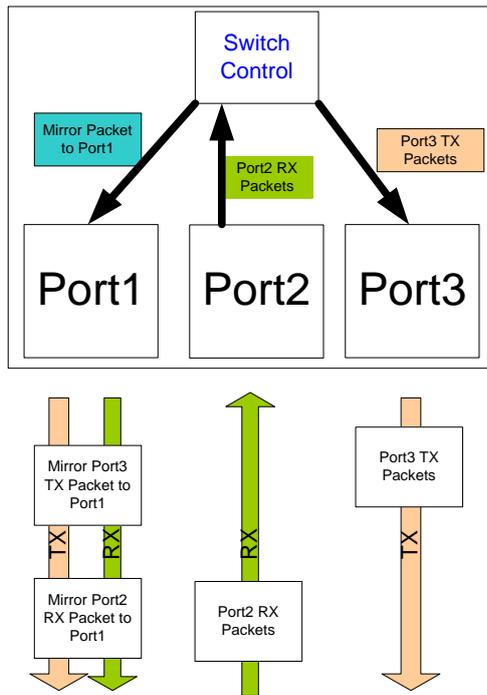


Figure 21. The Port Mirror Function Explanation

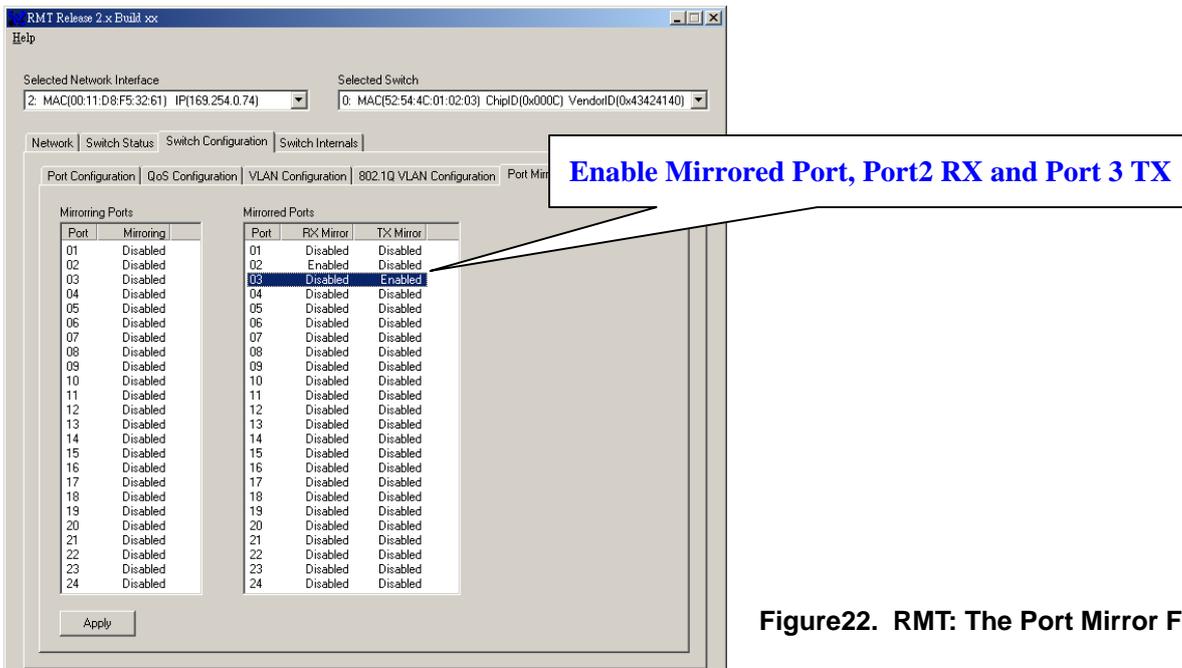


Figure22. RMT: The Port Mirror Function Setting

When you enable one port's mirror function, the port will concentrate on its mirroring ports; therefore, it will affect its receiving ability of RRCP packets. In order to avoid the user setting a wrong configuration, RMT will forbid your mirroring port setting when your setting influences the RMT controlling switch. As in Figure22, RMT shows a window to tell that enabling this port will affect the control of this switch or the other switches that connect directly or indirectly to this switch.

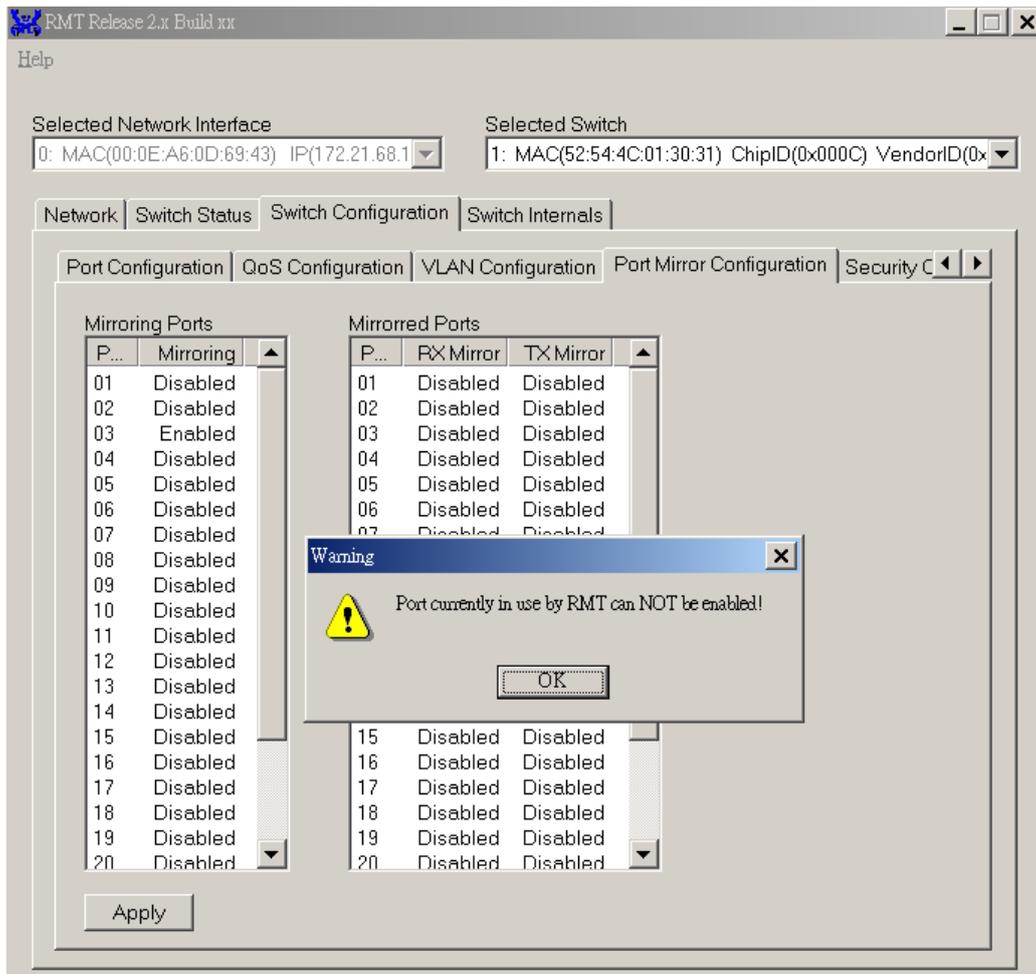


Figure 23. RMT: Rejection to your port mirroring setting if it influences RRCP-based Switch control

3.4.6. Security configuration

In the third “Security Configuration”, if the Authorized function of a port is disabled, it will not receive RRCP packets. Therefore, you can use the feature to limit only some users can control the switch by RMT.

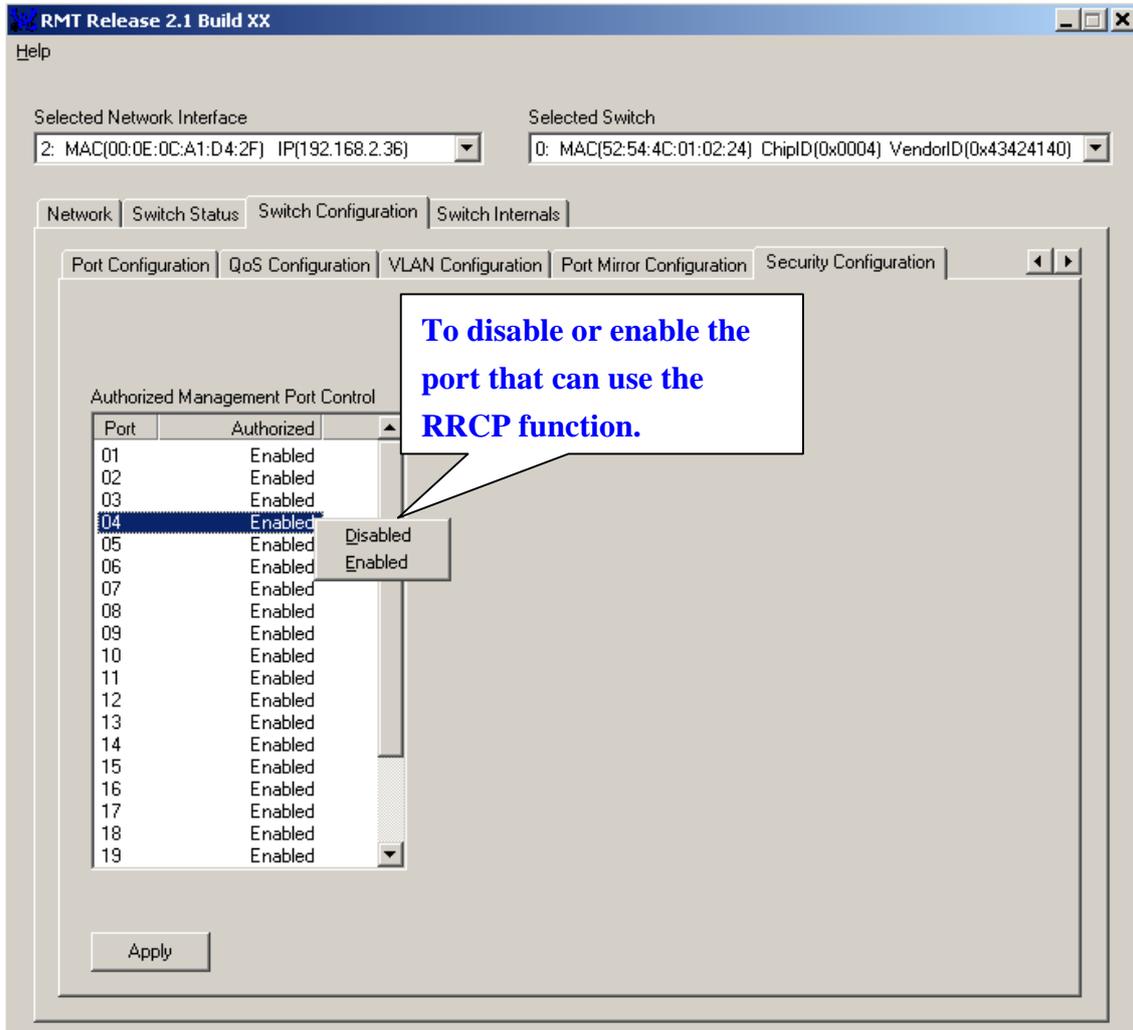


Figure 24. RMT: Security Configuration

3.5. Switch Internals

Device Management:

3.5.1. Load Factory Default Configuration

Click the “Load Factory Default Configuration” button, and you can load the default configuration, which is saved in the Switch hardware (EEPROM). The “Factory Default Configuration” means the configuration that saved in Switch hardware (EEPROM) when they produce by the factory, and will not be changed under normal operation.

Note: The Load Factory Default function will not save the “Factory Default” into hardware, therefore, we suggest that you save configuration after you load factory default.

3.5.2. Save Configuration to Hardware

Click the “Save Configuration to Hardware” button, and you can save the configuration that you now set in this program. When you click “Load Factory Default Configuration” and “Save Configuration to Hardware” button, it will show a message box as follows to tell you to wait a moment.

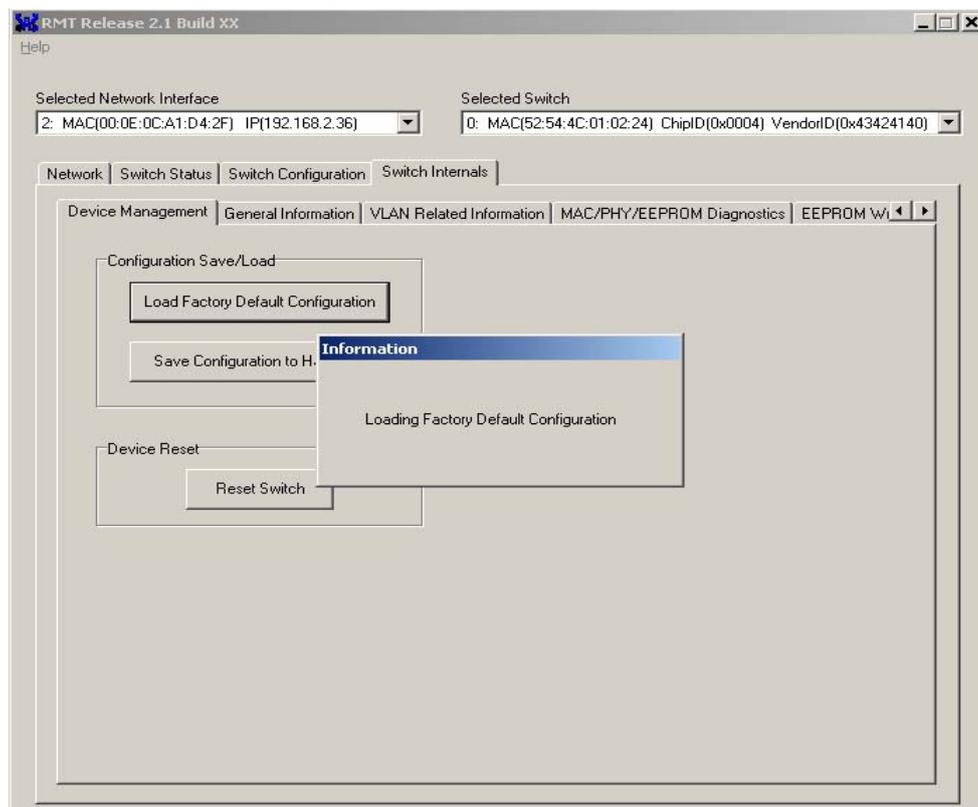


Figure 25. RMT: Load/Save Operation

3.5.3. Reset Switch

Click the “Reset Switch” button, and you can reset the switch as if you push the Reset button or switch device power off then on.

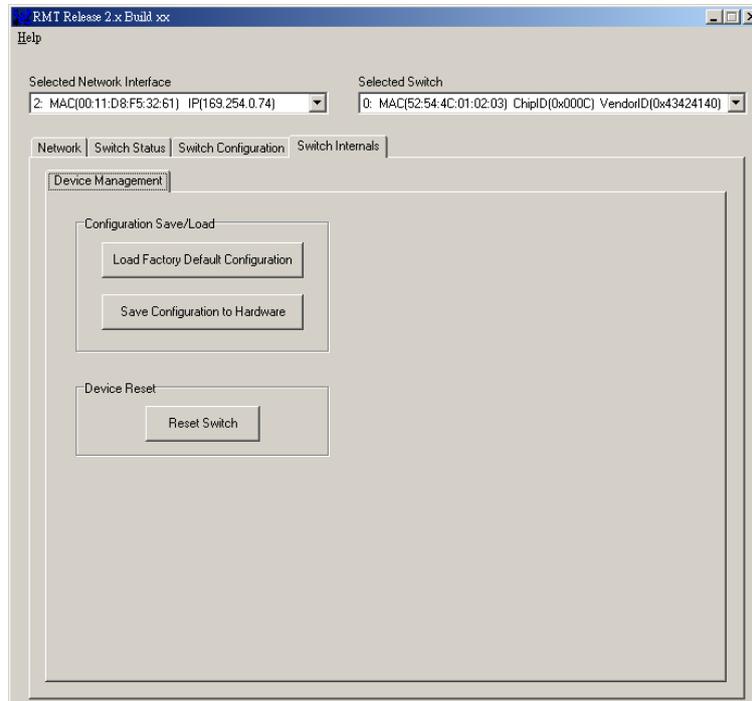


Figure 26. RMT: Device Management

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