



TRENDNET®



User's Guide

TK-IP101

About this manual

This *User Guide* is the complete reference to the TK-IP101, its functional features and usage. The Complete User Guide could be found only on the TK-IP101 Support CD-ROM disc.

TK-IP101 documentation List

Quick Installation Guide	Print-out / TK-IP101 support CD-ROM disc
User Guide	TK-IP101 Support CD-ROM disc
How to generate your own set of Certificates	TK-IP101 Support CD-ROM disc

FCC Statement

This equipment has been tested and found to comply with the regulations for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this User Guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case, the user will be required to correct the interference at his/her own expense.

CE Statement

This is a Class B product in a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.



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1 INTRODUCTION

The name of **TK-IP101** is derived from an acronymic combination from its full name, **1-Port KVM Switch over IP**, which well explains the functionality of this powerful machine in itself. Though lightweight in size and compact in form factor, **TK-IP101** is nevertheless a heavy-weight in its functional versatility, rock-solid robustness and formidable security. It supports full 1024-bit PKI authentication, 256-bit SSL data encryption, LDAP, RADIUS as well Active Directory authentication and RADIUS accounting.

Dominant yet cost-effective solution for remote server management scenarios

With the ubiquity of the DSL/Cable technology and the bandwidth availability therewith, the IP-based KVM technology has emerged as a dominant player in the new landscape of remote servers management. Today, the IP-based KVM Extender has been regarded as a better and more cost-effective solution to address the critical issue of remote servers management, which could only be partially tackled in the past by expensive yet redundant software solutions or Enterprise Management System. And **TK-IP101** is a robust and versatile solution to address the needs of modern remote server management scenarios.

Total server control from BIOS level up anytime anywhere

TK-IP101 gives users total control from *preboot stage* such as the BIOS-level CMOS setting up to the *GUI applications* and *daily maintenance routines* such as power cycling (power control unit required). And all these could be nicely done on your admin desk using an ordinary web-browser management interface and a thin-client software viewer. All you need for accessing your computer is to login the **TK-IP101** and download the viewer program and get yourself connected to a whole bunch of servers in seconds. A truly anytime anywhere access for the server administrator!

Versatile backup connection featuring a PPP Server or PPP Client

To provide the necessary redundancy of a second backup system while your network might no longer work in critical situation, **TK-IP101** also allows an easy and convenient PPP connection over the dial-in modem phone line. It could serve as a PPP server to accept a peer computer to make PPP connection request over either a direct cable connection or a dial-in modem phone line. On the other hand, **TK-IP101** could also serve as a PPP client to dial-in to your ISP or enterprise PPP server to connect to internet, making a truly anytime access for remote client anywhere on the Internet. Thus, the PPP server/client features in **TK-IP101** allow users a second backup system, which offers a direct cable/modem dial-in access to your connected servers via PSTN while your network is down.



TK-IP101

Edge of critical Advantage over other remote server management solution

The advantages of using **TK-IP101**, as compared to the conventional software remote control solution is that: The hardware-based remote control solution such as **TK-IP101** is able to access the server regardless of the server states while software remote control solution is non-functional while the server is still in the POST or preboot stage or in a "blue screen of death". **TK-IP101** also offers power on/off alternatives if used with a remote power control unit.

Rock-solid stability and ultra-security yet with flexibility and convenience to use

The **TK-IP101** distinguishes itself among its peer products not only in its rock-solid stability in durable performance, but also in its industry-standard security features such as full 1024-bit PKI Authentication and 256-bit SSL data encryption. Together with 3 levels of viewer connection security levels in combination with 3 types of password policies and three categories of user privileges, all these make **TK-IP101** a ultra-powerful IP Extender machine with ultra-flexibility for a customized balance between data safety and user convenience. On the other hand, the robustness and the ease of maintenance of the embedded systems involve zero costs for the unit management and maintenance.

Global Time Zone and Timer Servers Support

To make **TK-IP101** really comfortable with all the global time zones it will be deployed in, it is vital to provide a convenient Global Time Zone support since it will give a correct time stamp to all logging events, alert e-mail notifications and won't leave server administrators in troubles with calculating the time differences he will inevitably encounter with servers in different time zones. Additionally, **TK-IP101** also supports NTP time servers and keep its time always sync with the timer servers you specify. The TK-IP101 is even sophisticated enough to take care of the daylight saving time in each and every Time Zone/Region, thus saving troubles for updating time frame with daylight saving specifics every six months.

Upgrade and Configuration Backup is just a breeze

TK-IP-101 is fully Web-enabled to allow software upgrade and configuration upload/backup over the Web Management Interface. All you need to do is to upload the files to **TK-IP-101** over Web interface and voila it's freshly restarted and begins

working with those latest update functionalities and features-all within minutes and can be performed across oceans-by a remote SUPERADMIN!

Advantages Galore

With **TK-IP101**, the server administrator can access enterprise server room or data center on his own seat without toils and troubles of going anywhere from across the street to oversea. And organizations can enjoy a uniquely centralized and very cost-effective control over its dispersed servers in different branch offices, even around the world, thus saving money for outsourcing costs.

1.1 Primary features

General features

- Full-featured IP-based Remote Control Solution for server management
- Provides remote control for several servers when connected to a conventional KVM Switch
- Simultaneous access from multiple users
- No user limitation
- Facilitate centralized control
- Total control over the remote server from BIOS level up to GUI applications
- Remote Power On/Off support
- Total transparency of control
- Ultra-security using full 1024-bit PKI Authentication / 256-bit SSL encryption
- Work with LDAP / RADIUS / Active Directory Servers
- Ethernet 10/100 and serial PPP connections

TCP/IP remote connection

- Web Management Interface for all settings and upgrade/backup features
- Support Telnet session and FTP service (disabled by default for more security)

Thin-client Viewer Program

- Win-32 viewer and Java viewer for cross-platform compatibility
- Connection options configurable for optimized performance
- *Shared, Non-Shared* and *View Only* sessions
- Easy download and installation
- Multiple viewer instances can be run on a same client computer
- Automatic video optimization

Hi-Speed PPP Connection

- PPP Connection support over serial RS-232 interface up to 1 Mbps
- PPP server enabling for PPP connection across a pair of modems for secure or backup direct access
- PPP client enabling for PPP connection to the internet with a modem

Video server

- Support up to 1280 x 1024 @ 60 Hz resolution
- 8/16-bit color
- 3 Video Quality settings
- 3 Video Compression schemes
- 8-bit color reduction
- JPEG Compression option for low bandwidth internet connections
- Configurable database to set up new or unknown VGA modes
- Virtually compatible to any KVM Switch through simple configuration

Power ON-OFF Control Support

- Remote power ON-OFF control over serial interface
- Serial commands configurable to fit all serial power control devices
- Power ON-OFF privilege only for the SUPERADMIN users

Security

- 1024-bit Public key Authentication using certificates generated by an external CA
- 256-bit SSL Encryption for keyboard, mouse and video signal transmissions
- Remote authentication support for LDAP or RADIUS servers
- RADIUS accounting support
- 3 SSL security levels :
 - No authentication – No encryption
 - Server Authentication – SSL encryption
 - Server & Client authentication – SSL encryption
- 3 password policies :
 - No Password
 - One global password for all users
 - One different password for each user
- Linux operating system offers robust virus resistance

Alarms and Notifications

- Alert e-mail notification and SNMP trap messages for critical server events such as No Video, Blue Screen and NumLock Test Failure

User Management

- User login either by querying the local user database or by connection to remote LDAP or RADIUS server
- 3 user privileges :
 - SUPERADMIN – to access complete set of management features and user features, including Power ON-OFF remote servers
 - ADMIN – partial set of management and all user features
 - USER – only user features

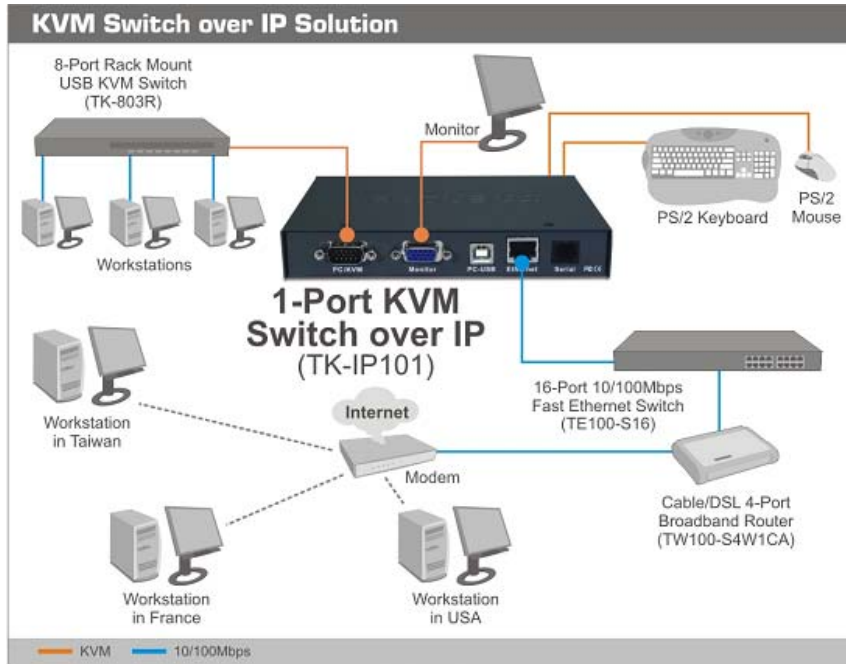
Global Time Zone Support

- Time support for all continents and major cities
- Time synchronization by connection to any NTP time servers
- Automatic Daylight Saving management

1.2 System Architecture

The **TK-IP101** is based on an embedded Linux platform for computing power and rugged stability. The **TK-IP101** employs a High speed Processor to ensure excellent video quality and fast keyboard / mouse response across the Internet, even when bandwidth availability is limited.

LAN/WAN Configurations



TK-IP101 connected to a single server

1.3 TK-IP101 External Views

TK-IP101 Front View



TK-IP101 Front-panel

PS/2 Keyboard port

This is where you connect the PS/2 keyboard for local console.

PS/2 Mouse port

This is where you connect the PS/2 mouse for local console.

Console Management Port (RJ-12)

This is where you connect the serial console cable for advanced console management of **TK-IP101** unit via a serial terminal emulation utility such as Windows HyperTerminal.

Status LEDs

The *10/100Mbps* LED is lit as solid orange when the current digital link is running on 100Mbps speed.

The *Link/Act* LED gives off solid green light when a network link is established and flashes whenever network transmission are perceived on the digital port.

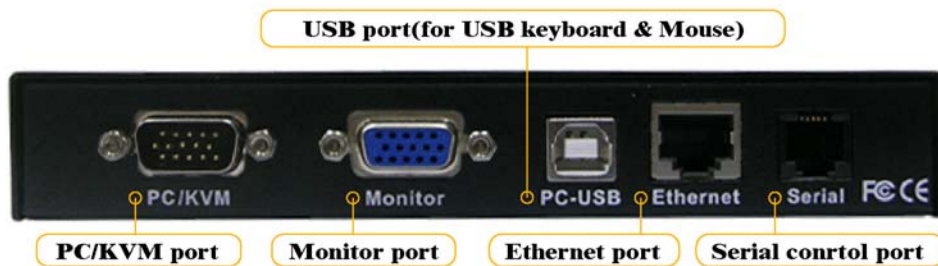
The *Power* LED indicates the Power On status when it is lit as solid green.

The *Video* LED indicates the normal functioning of video server when it is blinking.

Restore-to-Default Button

The *Restore-to-Default button* is a tiny recessed button located to the right of the LED indicators, and can only be accessed by prying down with a pointed needle tip. To depress the recessed button for over 4 seconds, and upon release, it will restore TK-IP101 to factory default – the default IP settings and user account settings that come with factory default settings.

TK-IP101 Rear View



TK-IP101 Rear Panel

PC/KVM port (HDB-15, integrated with PS/2 Keyboard and mouse signals)

The PC port connector is where you should connect to either a single PS/2 computer or a single PS/2 KVM Switch, using the 3-in-1 slim KVM cables w/ an integrated HDB15 connector. However, if you are using USB-enabled computer or USB KVM Switch, you should additionally use a USB cable to connect to a USB port on your computer for keyboard/mouse connection.

Monitor Port (HDB-15)

This is where you should plug in the Monitor for your local console on **TK-IP101**.

USB port (USB Type B)

This USB port provides USB keyboard/mouse connections to a USB-enabled PC, or to a USB KVM Switch. Thus, if you are connecting any USB-enabled PC or USB KVM Switch, please use a USB cable to make the connection.

Ethernet Port (RJ-45)

The Ethernet port, or digital port, offers anytime anywhere access of **TK-IP101** and subsequently the conventional KVM Switch(es) and servers/computers connected behind it to the remote login clients over LAN/Internet.

Serial Control Port (RJ-12)

The serial control port allows you to connect to either an external modem or a power control unit or to a cascaded chain of power control units. When added with an external modem to its serial control port, **TK-IP101** could serve either as a PPP server to allow direct cable connection or dial-in connection from its peer computers, or as a PPP client to dial-in to the ISP or an enterprise PPP server. Furthermore, through serial commands sent over its serial control port, **TK-IP101** can perform remote power on/off and power cycling task via the (cascaded) power control module(s).

TK-IP101 Power Socket

You should use the DC9V 2A Adapter provided within the package. Use of any other adapter will nullify the warranty.

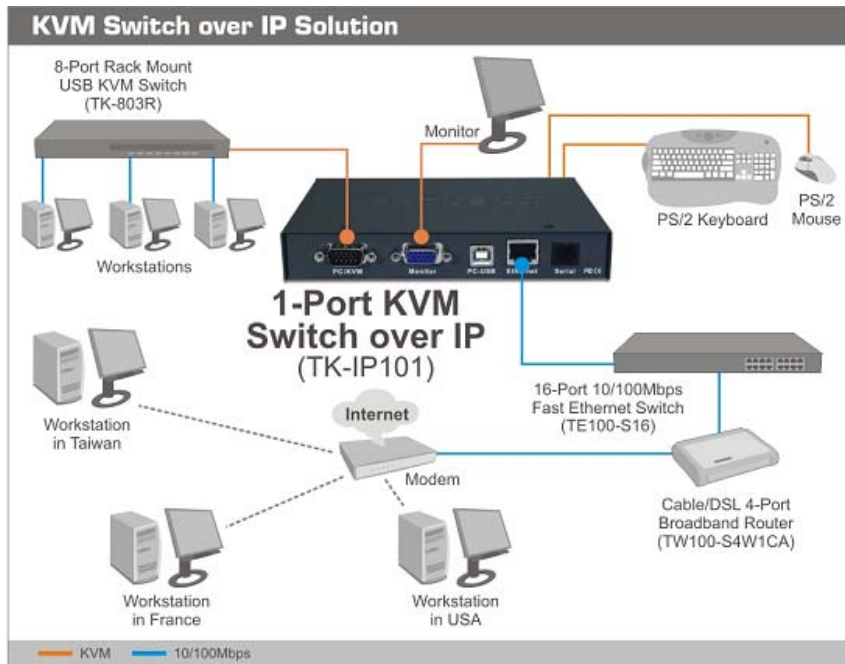
2 TK-IP101 INTALLATION

2.1 Physical Connections

Step 1. Power on the TK-IP101: Connect the TK-IP101 Power adapter and power on TK-IP101.

Step 2. Set up a local console on TK-IP101: If a local console (that is a physical keyboard, mouse and monitor connected to the TK-IP101) is required, connect the keyboard and mouse to the TK-IP101 local console ports (that is keyboard, mouse and monitor port specifically).

Step 3-a. Single Server Mode: If you need to connect to only one computer/server. Just connect to the PC/KVM port directly to the PC, using the 3-in-1 Slim KVM combo cable and/or the USB cable that come with the TK-IP101 packing box.



TK-IP101 configuration – Single server mode

Step 3-b. Multiple Server Mode: If you need to connect to multiple computers/servers, you should use a KVM switch in between the TK-IP101 and your connected computers/servers. Just connect to the PC/KVM port or the console port of your KVM switch using the 3-in-1 Slim KVM combo cable and/or the USB cable (if it is a USB KVM switch) that come with the TK-IP101 packing box. And the KVM switch will in turn be connected to the multiple computers/servers.

Now that you have set up your local console on **TK-IP101**, you can now configure your connected servers just by using the ready access provided by **TK-IP101**'s local console.

2.2 Configure Your Servers for Connections to TK-IP101

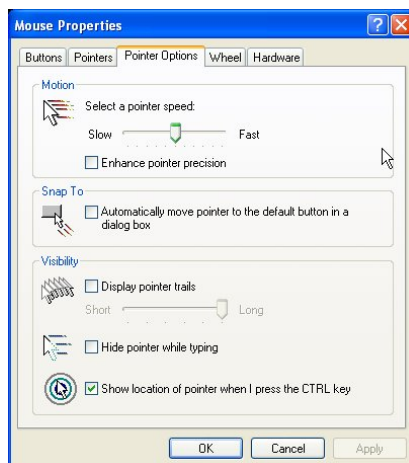
Mouse acceleration is not supported in TK-IP101. Therefore, you must turn off mouse acceleration on all your connected servers.

Turn off mouse acceleration & "Snap to" option

Windows XP Platform

Access *Control Panel/Mouse*. On the *Mouse Properties* tab, select the *Pointer Options* page :

1. Adjust the pointer speed slide bar to the exact middle.
2. Uncheck the *Enhance pointer precision* option.
3. Uncheck the *Automatically move pointer to the default button in a dialog box*



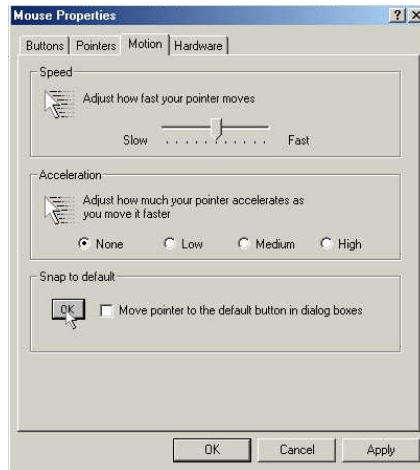
Click *OK*.

Windows 2000 Platform

Access *Control Panel/Mouse*. On the *Mouse Properties* tab, select the *Pointer Options* page :

1. Adjust the pointer speed slide bar to the exact middle
2. Select the Acceleration as *None*

3. Uncheck the *Move pointer to the default button in dialog box* in dialog box

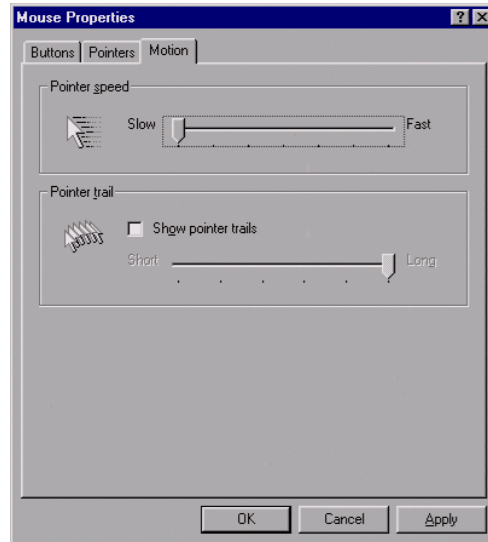


Click *OK*.


Windows 98

Access *Control Panel/Mouse*. On the *Mouse Properties* tab, select the *Motion* page. Under the *Pointer Speed* category:

1. Adjust the pointer speed slide bar to the slowest (leftmost) position.



Click *OK*.

 The mouse setting page on different Windows platforms might be quite different, some gives mouse acceleration option and some don't. If you see any mouse acceleration option, please uncheck it. If there is no mouse acceleration available on the setting page, you can adjust the mouse speed slide bar to either x1 or the slowest position (such as on Linux platforms). But sometimes, it requires a middle position on the speed slide bar to make mouse synchronization on the viewer side, for example, Windows XP requires a middle position on mouse speed. Anyway, the worst case is that you have to make some trial and error to make your mouse acceleration off and the speed as x 1 (could be at the slowest position or the middle position).

2.3 More Tips for Server Desktop Configuration

There are several aspects that have to be taken into consideration and maybe configured on your computers or servers for best performance:

- (1) Resolution modes should refrain from too much peculiarity and better adopt ones that are within **TK-IP101**'s standard support.
- (2) Turn off the Menu special transition effects on your operating system (especially on Windows XP, if you are using any) such as *fade* for best video refreshing effect, especially when you are using Medium or Low Video Quality as your video filter setting on TK-IP101.
- (3) Adjust the server desktop backgrounds as containing preferably plain, solid colors with simple designs (only for improving video refreshing speed when bandwidth is critically limited. No need to do so when bandwidth is ample)

Configure Display Resolution on your Server



TK-IP101 supports most display modes up to 1280 x 1024. However, you might encounter some display problems when your display card is outputting an unusual display mode. These possible problems are either no video or abnormal display on viewer screen.

To simplify the display factor before connection to **TK-IP101**, we suggest you use more standard display modes such as: 800 x 600 @ 72Hz/75Hz, 1024 x 768 @ 72Hz/75Hz, etc. For the suggested display modes, please refer to the following table.

	640 x 400	640 x 480	800 x 600	1024 x 768	1152 x 864	1280 x 1024
56Hz						
60Hz		✓	✓	✓	✓	✓
61Hz						
64Hz						
70Hz	✓			✓	✓	
72Hz		✓	✓			
74Hz						
75Hz		✓	✓	✓		
76Hz				✓		
78Hz					✓	
84Hz						
85Hz	✓	✓	✓	✓		
100Hz		✓	✓	✓		

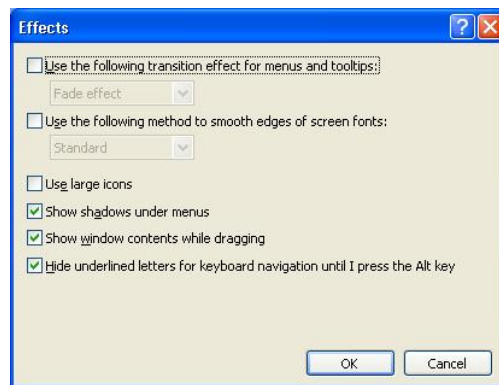
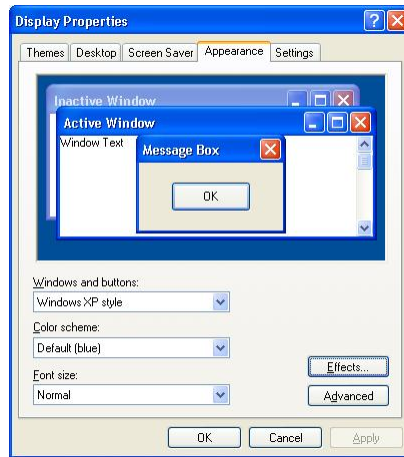
Note: These are suggested display modes for server desktop connected TK-IP101. However, the actual feasible display modes for as specific server desktop will be dependent on its display card. Some display modes listed here might not be feasible with some display card. Try to do some trials to determine the best display mode for your desktop on TK-IP101 viewer.

Disable special transition effects on the screen outputs of your connected servers

Go to *Control Panel/ Display / Appearance / Effects*. And then uncheck the option to disable transition effects such as *Fade* for the menus and tool tips. You should perform the same check on each of your connected servers.



On Windows platforms such as Windows 98, 2000, XP and 2003 Server, some transition effects might yield undesirable video refreshing artifacts, especially when you are using Medium or Low Video Quality as your video filter settings. To avoid undesirable artifacts from appearing on your screen, please turn off the special transition effects.



Choose plain and solid server desktop backgrounds for your connected servers.

To optimize the bandwidth efficiency and speed up video performance across bandwidth-limited environment, one should preferably adopt a server desktop which should be as plain as a color background with a solid and light-colored graphics. Complex patterns or color gradients should be avoided, if bandwidth is critical in your application, since they will create more bandwidth demands for their transmission across internet.

2.4 Configure TK-IP101 Network Settings

Step 1. Connect your **TK-IP101** to the Ethernet LAN.



The factory default network settings for TK-IP101 are as follows:

IP address: 192.168.1.200

Net mask: 255.255.255.0

Gateway: 192.168.1.254

DNS: 192.168.1.254

Step 2. Access **TK-IP101** Web Browser Management interface by typing the following in the address bar of your browser window on a remote client:

```
https://192.168.1.200:5908
```

Step 3. Then a login prompt will ask you for the account name the password. Use the default account and password:

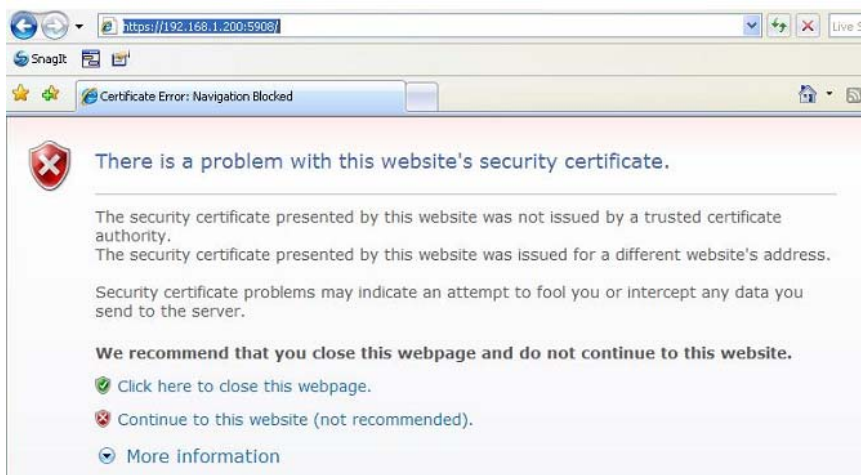
User Name: superuser

Password: superu

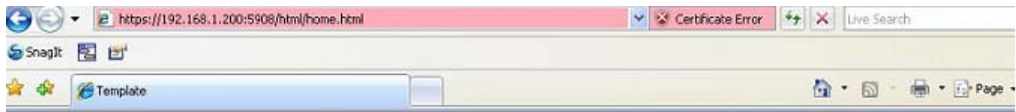
After logging in, you will see the **TK-IP101** Web Browser Management Interface.

Internet Explorer 7 users, click "Continue to the website (not recommended)".

Note: Due to added levels of browser security, Internet Explorers 7 users will see red in the address bar and a "Certificate Error" warning; this is not an issue with the TK-IP101. This product will continue to function properly. To avoid this event, please refer to this User's Guide for instruction on how to configure security setting and creating certificates



Internet Explorer 7.0 Certificate Error message.



Certificate Error in Internet Explorer 7.0 browser.



Step 4. Go to the LAN TCP/IP page on the **TK-IP101** Browser Management Interface and modify your IP settings. Refer to *Section 4.11, LAN TCP/IP – Port and IP Settings*.

Step 5. Apply the new setting by clicking *Apply Settings*.


Step 6. Verify **TK-IP101**'s network connection.

Connect to **TK-IP101** by Web Management Interface using the new IP address. Note that the IP address should be followed immediately by a colon and the port base +8 for port number,


https://<IP_address>:<PortBase+8>.

For example, if the IP address is 192.168.1.7 and the port base number is 5900, then you should enter

https://192.168.1.7:5908

 Remember that it's a secure SSL encrypted connection, so you should type "https" instead of the usual "http". Otherwise, the connection will not be established.

2.5 Configure port base setting for TK-IP101

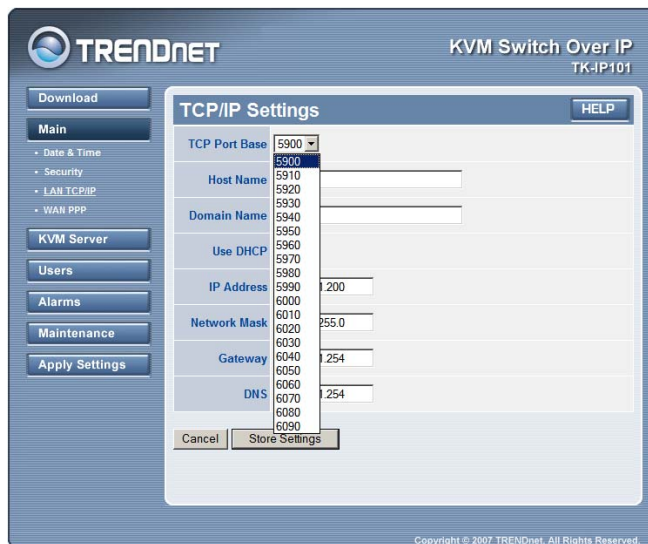
 If you are satisfied with the default port base setting as 5900, you can skip this section.

The default port base for **TK-IP101** connection is set at 5900. This means it will use port 5900 (port base) for viewer connection and port 5908 (port base + 8) for https web browser connection.

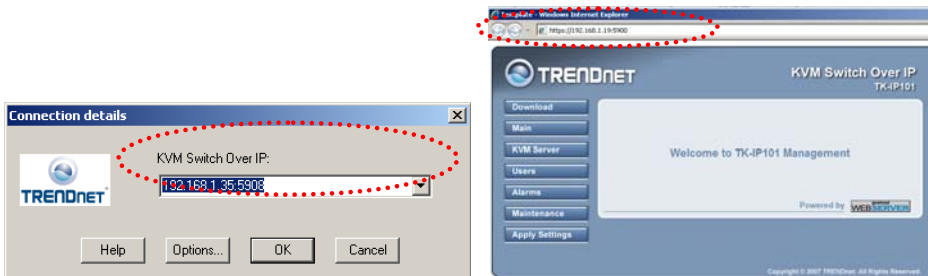
<Port base> – used for viewer connection

<Port base + 8> – used for secure browser connection

However, if you intend to use your own port base setting, just access the Web Management interface and configure the port base as follows:



For example, if you choose 5970 as your port base, then you have:
5970 – used for viewer connection
5978 – used for secure browser connection



Click *Submit button* and *Apply Settings* button to validate your new setting.

*Now you have installed **TK-IP101** within your Local Area Network environment, and can try to establish a remote viewer connection...*

2.6 Configure your firewall/router for accessing TK-IP101 across internet

To allow access to the TK-IP101 behind corporate firewall/router, please configure the following settings on your firewall/router (not on your TK-IP101):

Step 1. Configure a virtual server on your router: you should configure (or ask your net admin to configure for you!) a virtual server as mapped to the TK-IP101 local IP address.

Step 2. Open a port range: (<port_base> ~ <port_base+_9>) both inbound and outbound for the virtual server: you should open a port range according to what you have configured as port base for TK-IP101 previously. Taking previous example, if we configure TK-IP101 as having a port base of 5970, then we should open port range 5970~5979 (that is, <port_base> ~ <port_base +9>) both for inbound and outbound, in which,

<port_base> = 5970 is the TK-IP101 viewer connection port

.....
<port_base + 8> = 5978 is the browser SSL connection port

<port_base + 9> = 5979 is for viewer internal communication, etc.

For example:

Router internet IP ↔ virtual server (port range open) ↔ TK-IP101 local IP

61.232.134.120 ↔ virtual server (port 5970~5979 open) ↔ 192.168.1.7

Once you have configured a virtual server with appropriate port range open (<port_base> ~ <port_base+_9>), you can then try to access your TK-IP101 across internet by using in the public IP address and designated port number. For example, in this case, we have

Browser access: [https:// 61.232.134.120:5978](https://61.232.134.120:5978)

Viewer access: 61.232.134.120:5970

If you have domain name mapping to the public IP address, you can also use the domain name, for example:

Browser access: [https:// www.mycompany.com:5978](https://www.mycompany.com:5978)

Viewer access: www.mycompany.com:5970

 Once you have changed the port base of your TK-IP101, you should also modify the open port range on your router accordingly, if you want internet access to come across.

2.7 Install Certificates on TK-IP101



You could use the default set of certificates (could be found on CD-ROM) to practice making some PKI-authenticated connections as long as your network safety is not jeopardized. We advise that it is better to do the practices within your Local Area Network, which is supposed to be well secured with adequate firewall and other due precautions against network intrusions. Or if you have already obtained a set of certificates with the file names and formats required by TK-IP101, you can then use them for TK-IP101 viewer authentication. However, if you simply use the default set of certificates that comes with TK-IP101, anybody who has a copy of the default certificates may establish a connection to your servers. . So we strongly recommend that you obtain your own certificates for TK-IP101 or go forth to generate them using software like XCA..... **For certificate generation using XCA, please refer to *How to Generate TK-IP101 Certificates using XCA* (could be found on the TK-IP101 support CD-ROM).**

First you have to have these certificates ready on your client computers for uploading to TK-IP101 via a Web browser. If you haven't obtained your own TK-IP101 certificates, you can use the default set of certificates (could be found on the TK-IP101 support CD-ROM).

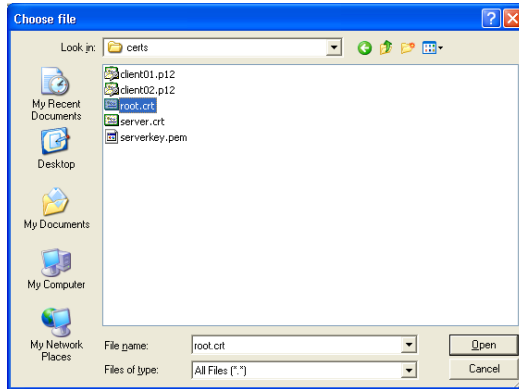
Certificates to be installed on TK-IP101:

- (1) the root certificate (*root.crt*)
- (2) the server certificate (*server.crt*), and
- (3) the server private key (*serverkey.pem*)

Step 1: Access TK-IP101 Web Management Interface and go to the Security page.



Step 2: Click the *Browse* Button and use the *Choose File* dialog box to browse to your certificate files



Step 3. Click **UPLOAD** button to upload the root certificate to **TK-IP101**. After the uploading is completed, you can then see the prompt page for reboot.



Click *Reboot* and wait till TK-IP101 is booted up, then likewise try to import the *server.crt* and the *serverkey.pem*.



You don't have to reboot each time when you finish uploading one certificate. You could do one complete reboot at the end when you finish uploading all of them. To return to the previous Security page for uploading another certificate without going to immediate reboot, you just click the *Security* page hyperlink on the left frame of the browser window.

2.8 Select a Security Level for Viewer Connection

Step 1. Go to the Security page on the TK-IP101 Web management interface and select a viewer connection security level.


There are three security levels for choice:

- Level 1: No encryption (No SSL)
- Level 2: 256-bit encryption, no user certificate required for user authentication
- Level 3: 256-bit encryption, user certificate required for authentication (PKI)

Security level 1 offers a non-secured connection, and hence should be used with caution when TK-IP101 is intended to be accessed through external network. For level 1, there's virtually no encryption.

Security Level 2 offers a secured SSL connection that provides encryption for mouse, keyboard and video but uses no PKI-authentication.

Security Level 3 offers a secured SSL connection that provides encryption for mouse, keyboard and video, and uses 1024-bit PKI-authentication.

 The choice of a security level to be implemented for the TK-IP101 viewer connection is of most importance, especially when your remote server connections requires a high security that can keep your servers safe from unauthorized entries and/or network sniffers.

Step 1-a. If you choose to implement PKI authentication feature on TK-IP101 viewer, you have to select Level 3 viewer security connection on the Security page of your TK-IP101 browser interface.



Then Enter the server password.

Here you should enter the password that has encrypted the *server private key* in the server private key file, *serverkey.pem*. You should enter the correct server password here in order to make successful viewer connection with **TK-IP101** in level 3 security setting. If you use the standard set of certificates provided on the Support CD ROM disc, the password that encrypts the server private key is **serverpwd**. However, if you use your own set of certificates, you should get the correct server password from the Certificate Authority that issues those certificates.

Step 2. Go to the *Apply Setting* page and hit the *Apply Setting* button to validate your selection.

2.9 Select a User Password Policy

Step 1. Select a User Password Policy.

TK-IP101 offers three types of password policies On the drop-down combo box, you can select your password policy for viewer connections:

- No Password
- Global Password
- User Password

No Password – the viewer will prompt you for no password. Anyone who is with the viewer and passes the security level check of the viewer could well establish the connection.

Global Password – the viewer will prompt you for a global password, which is used by all who want to make viewer connections to **TK-IP101**.

User Password – the viewer will prompt you with user-specific password. With this setting, each login user will be checked against his or her corresponding password before allowing viewer connection.

Global user password: If you adopt the Global Password Policy. Here you should enter the password that is used when the global user password setting is enabled as your active password policy.

Step 2. Go to the *Apply Setting* page and hit the *Apply Setting* button to validate your selection.



There are altogether nine (3 x 3) possible combinations of Viewer Security Levels + Password Policies that are available for a flexibility to adapt to your security needs. The administrator can choose an optimized combination of user password policy and the SSL / PKI Authentication according to his security/convenience concern.

SSL / PKI Authentication	User Password Policy			
		No password	Global Password	User-specific Password
No SSL-No PKI	N - N - N	G - N - N	U - N - N	
SSL - No PKI	N - S - N	G - S - N	U - S - N	
SSL - PKI	N - S - P	G - S - P	U - S - P	

G - Global Password U - User-specific Password

S - 256-bit SSL Encryption

P - 1024-bit PKI Authentication

N - Not available



Please note: Either Password Policy or Security Level (SSL/PKI authentication) settings should be used with due precaution: If you adopts No Password Policy and No SSL encryption/No SSL authentication, anyone with a viewer and knowledge of the access IP and port number of TK-IP101 can establish a remote connection

Now your TK-IP101 is ready for a PKI-authenticated plus SSL-encrypted viewer connection! All you have to do is to distribute the followings to you remote connection client:

1. Certifidcates: (as you have obtained from your CA (Certification Authority). They are required only if you select level 3 viewer security)

root.crt
client_name.p12. (client_name is freely chosen)

2. Certificate password: (as you have obtained from your CA. It is required only if you select level 3 viewer security)

clientpwd (if you use the default set of certificate provided on TK-IP101 CD-ROM)

3. User account and password: (as you have specified in the *User Management* page. It is required only if you choose User Password Policy)

Superuser / superu
Admin / 123456
User / 123456

(If you use the default user accounts/passwords)

4. Global Password: (as you have specified in the Security Page. It is required only if you use the Global Password Policy)

(You will be prompted when choosing it as your password policy on the Security Page.)

3 MAKING A VIEWER CONNECTION

The TK-IP101 provides a win32 viewer for Windows clients and a Java viewer for cross-platform on any major operating systems.

3.1 Install Win32 Viewer on the Client Computer

Go to the *Download* page to download the Win32 viewer, *winview_install.exe*. Install the viewer program on the client computer that will connect to TK-IP101. After installation, a desktop icon will be created on your client desktop.




3.2 Install Java Viewer on the client computer

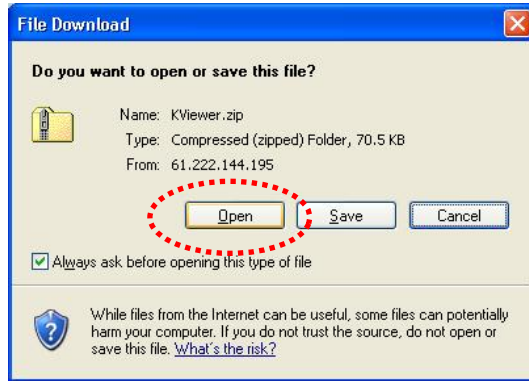
Before you can use the java viewer, *KViewer.jar*, on any OS platform, you should first install the Java Runtime Environment, JRE 1.5.0 or higher, which is downloadable from <http://www.java.com>.


To download Java Viewer, just go to the Download page of the Web Management interface.




KViewer.jar

 After all, to run the small java program, you don't have to actually save the *Kviewer.jar* to your local hard disk, since it is small (only 70 KB), you can choose to open it directly while download is completed.




 On some client platforms such as Linux, after you have installed the JRE on your client platform, you have to set the path information in order for the client system to know where the Java compiler program is.

3.3 Import certificates to TK-IP101 viewer on the client computer

 If you will be using only the non-PKI authenticated viewer connections to **TK-IP101** (such as Level 1 - *No encryption and No Authentication*, and Level 2 - *256-bit SSL encryption and only server authentication by client*), you are not obliged to use or import any certificates. If so you can skip this section and proceed to the next.

To make full PKI authenticated viewer connection with TK-IP101, you need to import client certificates to the Win32 viewer and Java Viewer on the client computer.

The **TK-IP101** is already preinstalled with a default set of certificates. You can use the default client certificates provided on CD ROM. However, it also allows you to use your own set of certificates.

 Note that if you intend to use your own set of certificates instead of the default set of certificates, you should not only import the client certificates to the win32 viewer/java viewer on remote client computer, but you should also import the root certificate, server certificate and the server private key to the TK-IP101. To import certificates to the TK-IP101, please go to the Security page of the TK-IP101 Web Management to upload your own set of certificates. For details, please refer to *Section 4.15, Security - Certificate Installation, Viewer Encryption and Password Policies*.

Generally, the naming requirements of these certificates are as follows:

- [Certificates and private key for TK-IP101 to authenticate viewer user logins]
 - root.crt - **TK-IP101** root certificate, mandatory file name
 - server.crt - **TK-IP101** server certificate, mandatory file name
 - serverkey.pem - **TK-IP101** server private key, mandatory file name

- [Certificates for remote login users with viewer connections]
 - client_name1.p12 - client certificate, client name could vary
 - client_name2.p12 - client certificate, client name could vary
 -

Specifically, we should import client certificate(s) in .p12 format, to the win32 viewer and Java Viewer on your client computer, using each of their own certificate import utilities.

First, you have to have your certificates ready, either on a removable media or you can copy them to your local disk on the client computer.



Note that if you copy certificates to your local hard disk, you might need to delete them from your local hard disk after finishing importation, so that others won't have access to your certificate files. Although the personal client certificate (that is, the *client_name1.p12*) is password-protected, more caution is never to blame!

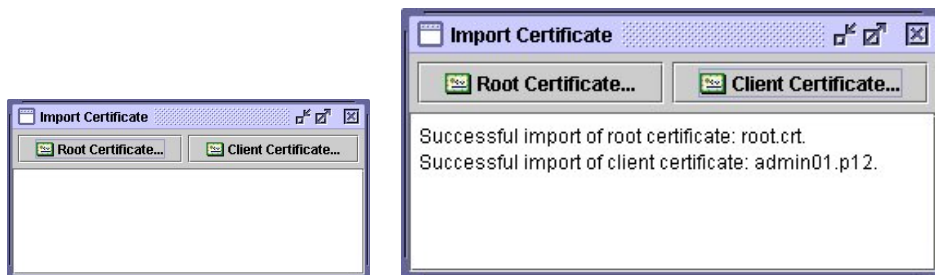
Note that the win32 viewer and the java viewer require separate certificate importation utility to get the job done.

Import client certificate to Win32 Viewer

Run the importation utility by accessing *Start/Programs/Trendnet /IP Viewer/Import Certificates*. Click *Root Certificate* to import root certificate and then click *Client Certificate* to import client certificate.



Import the certificates for the Java-based TK-IP101 Viewer



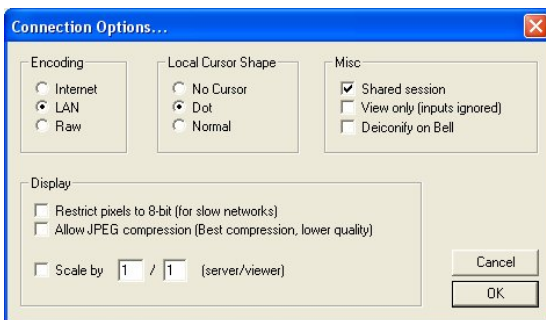
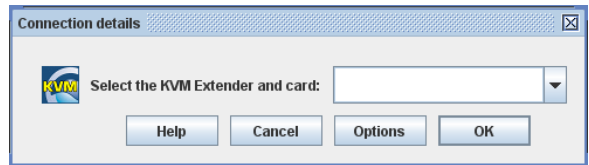
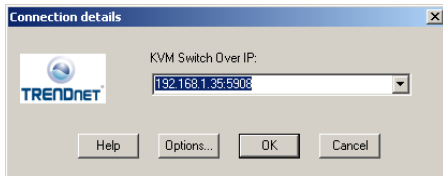
Now you have imported certificates to the viewers on the client computer and are now ready for making a viewer connection of any security level setting

3.4 Specify the Viewer Connection Option before Making a Connection

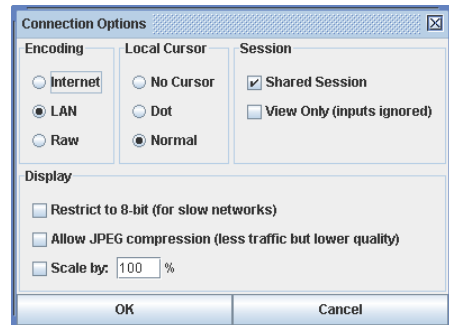
The viewer connection option interface provides you with several alternative options to use in combination for optimization of your viewer connection.

Connection details box

Click the *Options* button on the *Connection Details* dialog box.



Win32 Viewer



Java Viewer

Setting connection options

Encoding

Internet: Video quality is optimized for viewer connection across internet

LAN: High Video Quality for viewer connection over LAN

Raw: Best Video Quality with no compression

Local Cursor Shape

No cursor: local cursor invisible on IP Viewer.

Dot: dot shape for local cursor on IP Viewer.

Normal: arrow shape for local cursor on IP Viewer.

Misc

Shared Session: multiple users access same server desktop

View Only (inputs ignored): Keyboard and mouse inputs are ignored (not restricting keyboard and mouse access on other users).

Display

Restrict pixels to 8-bit (for slow networks): color reduction to 256 colors for slow connection

Allow JPEG compression (Best compression, lower quality): JPEG compression for slow connection.

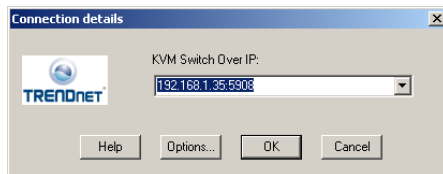
Scale x/y (server/viewer): Scale the display output on viewer (not affecting the actual transmission bandwidth)

3.5 Establish the viewer connection

Using Win32 IP Viewer for Connection

First, run the viewer program, enter the access IP and port number for TK-IP101.

Default IP address: 192.168.1.200



Login dialog box (Win32 Viewer)

At the password or private path phrase prompt, just enter the user name and password as required:

Default user & specific password:

User: superuser

Password: superu

Or, if you are using the Global Password policy setting ...

Default global password: 123456

Or, if you are using the Level 3 security setting that requires installation of certificates for PKI authentication (For details, please refer to section 3.3, Import certificates to IP Viewer on the client Computer, and Section 4.15, Security – Certificates Installation, Viewer Encryption and Password Policies.)

Default private path phrase: clientpwd

After you have entered either the global password, user name and password, or private path phrase as its security and password policy require, a viewer connection will be established successfully.

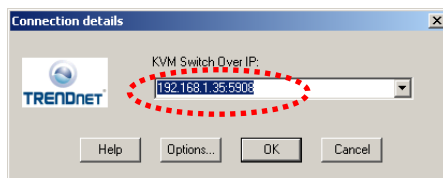


Some Tips about Viewer Connection



If you want to specify the type of your viewer connection rather than using the default one, you can click the *Options* button and optimize your connection parameters. Please refer to previous section for details.

Note that you can simply type in the access IP of **TK-IP101** server without specifying its port number only when the port number is default to 5900



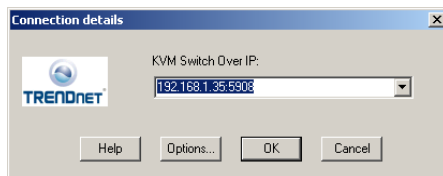
IP_address [only if port number is default to 5900]
192.168.1.200

Of course, you can always type

IP_address:port_number
192.168.1.200:5900

However, if the port setting on TK-IP101 is already changed to other port number, you have to specify its specific port number following the IP address. For example, if you want to connect to port 5910 on the **TK-IP101** server, type, for example:

192.168.1.8:5910



To configure the port base number, please refer to *Section, 4.11., LAN TCP/IP - Port and IP Settings.*

Connection Performance Tuning

However, if you are using a dial-up modem line and experiencing slow keyboard mouse movement and response, you might check whether you are using the default LAN encoding scheme or even the RAW scheme, which requires much more packet quantity in transmitting a video frame; or there is a network bottleneck somewhere in between **TK-IP101** and your client desktop. For more details, please refer to *Section 3.13, Common Video Display Problem Troubleshooting.*

3.6 Mouse Cursors Synchronization

Normally, you will see both the local cursor and the remote cursor on the view area. You can specify the shape of the local cursor as seen within the Viewer Window either as a dot, an arrow or none (not showing any local cursor within the viewer area). Also if these two cursors become out of sync, all you need to do is to hit default the mouse synchronization hotkey (*right*) *Ctrl* – (*right*) *Ctrl* – *Home* to synchronize the two cursors.



Mouse cursors out of sync



Mouse cursors in Sync

Local/remote cursor resynchronization hotkey- RCtrl-RCtrl-Home

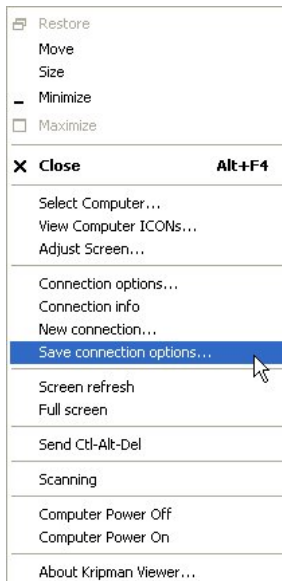


Note that, while operating your mouse, it is not necessary to wait till the remote cursor has actually caught up with the local one before you can click on the target in the view area. Actually, you can click the target just using the local cursor well before your remote cursor catches up the target!

3.7 Save the Connection Options

After you have optimized you connection options, you might want to save the connection options. Next time when you log in with the IP viewer to TK-IP101 server, the viewer on that specific client computer will use the stored connection parameters as well as the password (but not the private path phrase, which is not saved since it is used by secured/PKI-authenticated connection) for connection with TK-IP101.

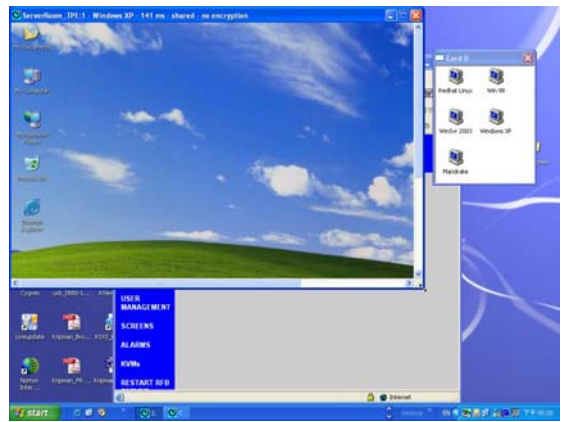
To save connection options, click the **KVM** icon on the Viewer title bar to call forth the Viewer Quick Menu and select *Save the connection options*.



IP Viewer Quick Menu (Win32 viewer)

3.8 Win32 Viewer Characteristics

Adjust the Window Size



Viewer Window with scroll bars (Win32 viewer)

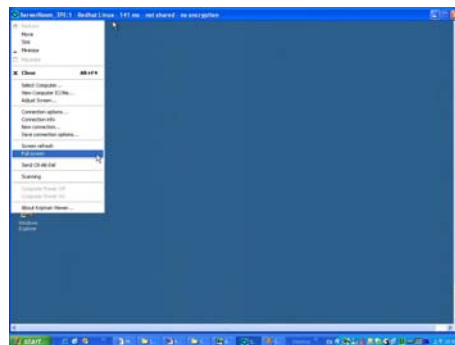
The size of the **IP** viewer window can be adjusted by dragging the border of the viewer windows.

Change the Viewer size to full screen mode



Note that only the win32 viewer supports full screen mode. The java viewer does not support full screen mode.

Click the **IP** viewer icon on the title bar of the viewer window to evoke the *Quick Menu*. Select the *Full Screen* option on the *Quick Menu*



A message box will appear to remind you how to exit the full screen mode:

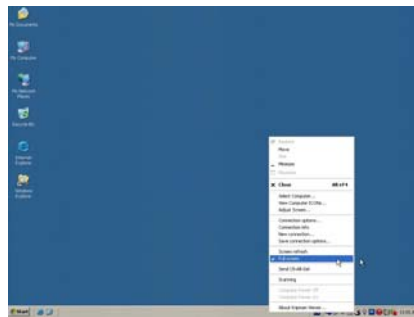


Full screen prompt – Ctrl – Esc to return to normal mode

Click *OK*, and the viewer goes to full screen mode.

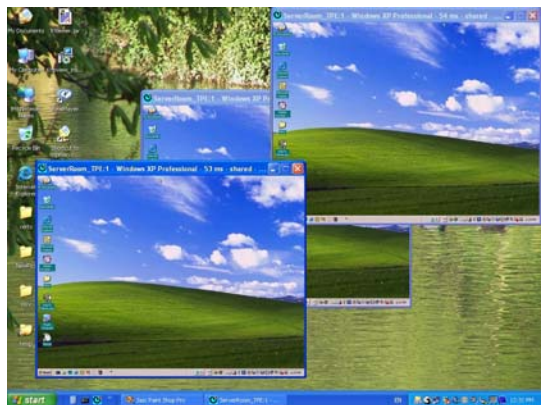


To exit the full-screen mode, just hit Ctrl-Esc to bring up the local task bar. Right-click the viewer taskbar icon to bring up Quick Menu, then click to deselect the full screen mode to restore it to window mode.



Scale the Window Size of your viewer

Click the **IP** viewer icon on the title bar of the viewer window to evoke the Quick Menu. Select *Connection options* on the Quick Menu

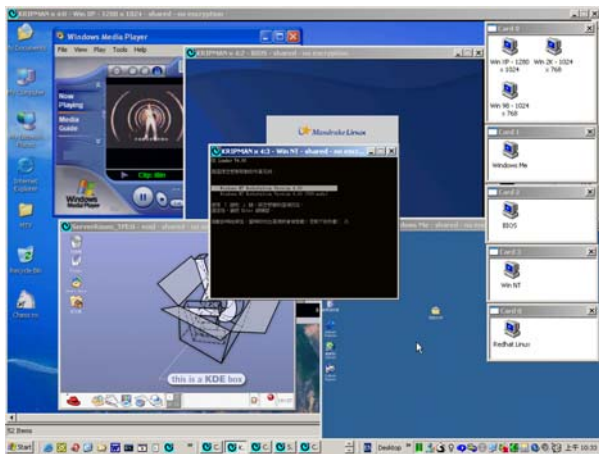


Scale the viewer window to 1/2 size

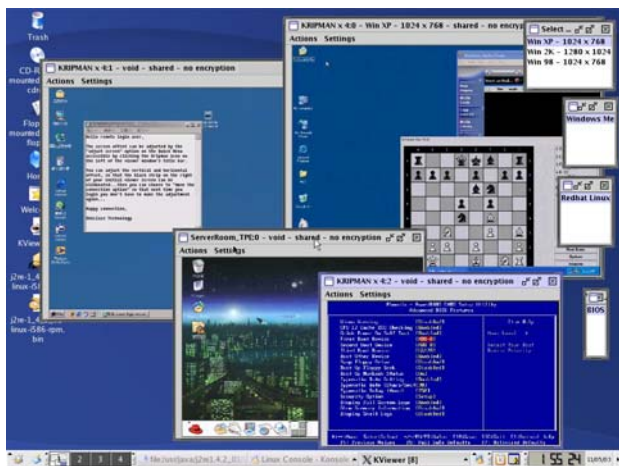
On the *Connection Options* dialog box, specify the preferred proportions of the viewer window, for example: 1/2, and then check the option. Click *OK* to scale the window to half size.

Centralize your remote server control

If you have multiple **TK-IP101** units installed in a distributed manner among your global branch offices, you can then simultaneously monitor different remote servers distributed over this TK-IP101 infrastructure on a single client desktop.



Five Win32 viewers on a Windows client desktop (each showing one different remote server desktop)



Four Java Viewers on a Linux client desktop (each showing one different remote server desktop)

3.9 Title Bar Information

ServerRoom_TPE: This is the name you specified for your Video Server.

Window XP Professional: This is the name you specified for this connected computer

53 ms: This is the capture time that is used for capturing the video image

Shared: This is a shared session that allows other authorized user logins

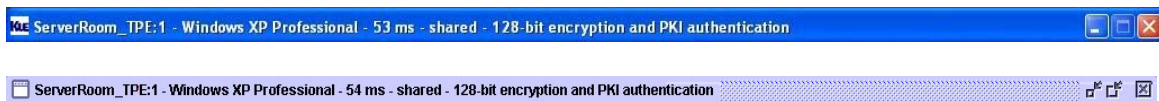
OPTIMISING: This indicates that the KVM video server is optimizing the video capture from the server desktop.

Not shared: This indicates a non-shared session that blocks others from subsequent logins

No Encryption: This indicates no encryption for signal transmission (Level 1)

256-bit encryption: The current viewer session is using 256-bit SSL connection (Level 2 and 3)

PKI Authentication: The current viewer session is PKI-authenticated (Level 3)



Connection Information shown on the Title

3.10 The Select Computer box

Win32 Viewer

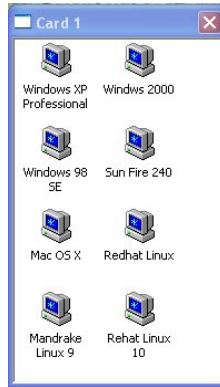
The Select Computer box allows the user to perform intuitive *Click-and-Switch* operation without memorizing the varying port-switching hotkey commands of all kinds of KVM Switches possibly installed behind **TK-IP101**. However, to use the *click-and-switch* feature provided by it, you must first configure the KVM switching hotkey commands for that KVM Switch model via the Web Management Interface . Please refer to *Section 4.10, KVMs – Keeping and adding your KVM Data Base*

The *Select Computer* box shows always on top of your screen once the **IP** Viewer connection is successfully made. On the box, you can see the computer icons together with the computer names you have already specified for each of them using the web management interface.

Click-and-Switch

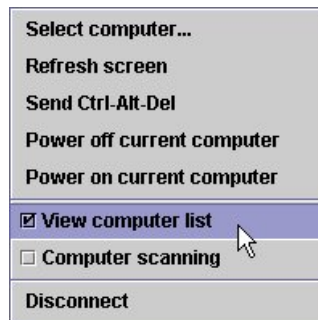
To switch to a computer, just click a computer icon on the box.

Note that those computer icons represents only the computer names you have already registered using **TK-IP101** Web management interface, not indicating any status of its connection such as whether it is in powered-on or powered-off state.



Java viewer

To bring up the *Select Computer Box*, click the Viewer Computer List option on the *Quick Menu*. For the java viewer, the Select Computer Box will not appear by default.



Quick Menu (Java Viewer)

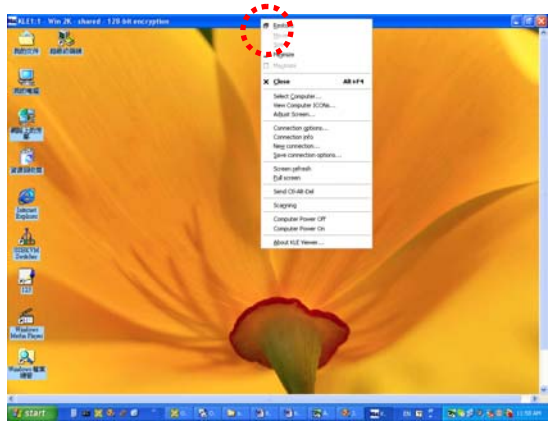
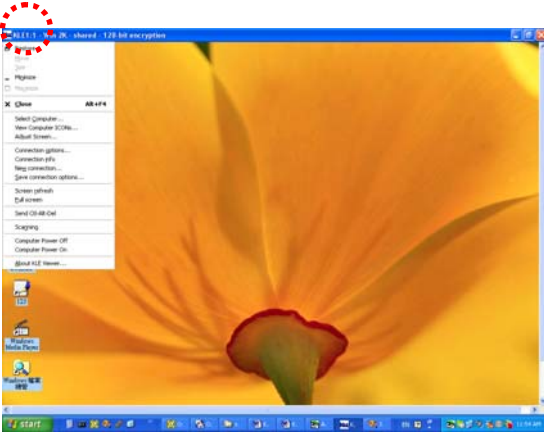
To switch to specific computer, just click any item on the listing ...



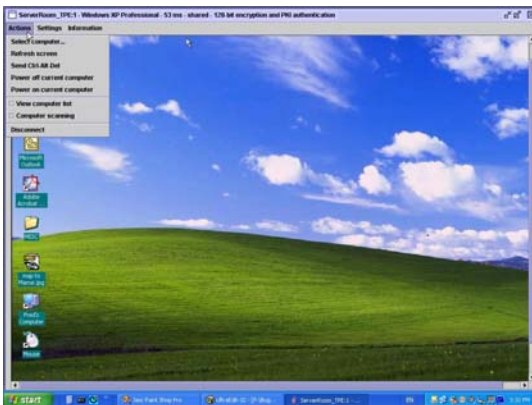
Select Computer Box (Java Viewer)

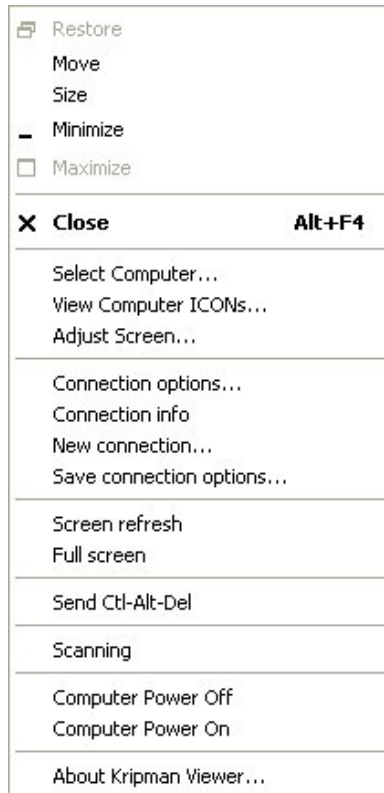
3.11 Viewer Quick Menu

The *Quick Menu* of **TK-IP101's** Win32 Viewer can be evoked by clicking the program icon on the left most of the title bar, or right-clicking anywhere on the title bar.



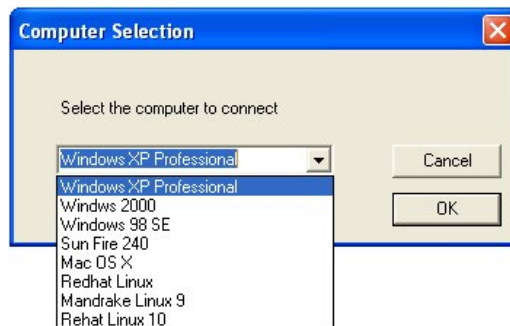
For the Java Viewer, Just click the Menu options under the Title Bar to evoke the Quick Menu.





Select computer

Select the remote computer by a drop-down combo box



View Computer ICONs

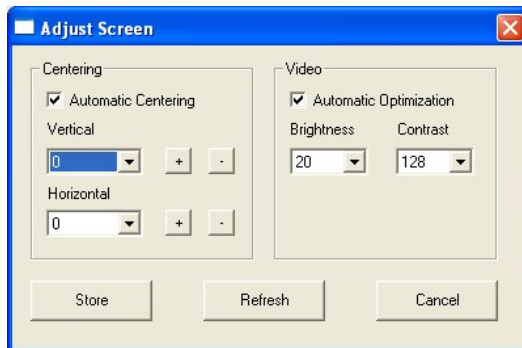
Open the *Select Computer* box for computer selection by clicking icons



Select Computer Box (Win32 viewer)

Adjust Screen

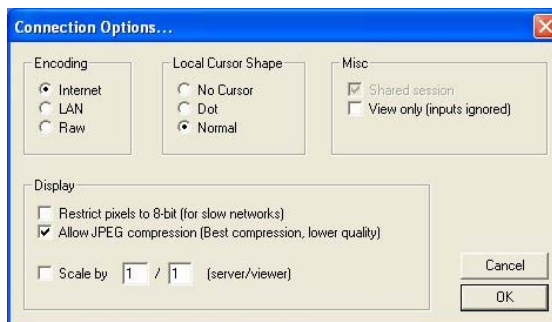
Fine-tune the screen area by pixel shifts.



Adjust Screen Box (Win32 viewer)

Connection options

Open the *Connection Options* dialog box



Connection Options dialog Box (Win32 viewer)

Connection info

Show the Connection information of the viewer session.



Connection Info (Win32 viewer)

New connection

Make another new connection by the viewer.

Save connection options

Save the connection options settings such as those connection parameters specified within the *Connection Options* Box and also the password within the registry of the client computer.

By selecting this option, you can save your session password as well as other connection parameters in the registry of your client computer, so that next time when you log in the viewer for a new session, you will not be prompted for session password again. However the client path phrase required in the connection of Level 3 security (*256-bit SSL encryption and PKI Authentication*) will not be saved and will be asked for every time when you login under Level 3 security setting.

Screen Refresh

Force updating of the viewer screen output

Full Screen

Change the viewer screen to Full Screen mode (*Only the Win32 Viewer supports this Full Screen option*).

Send Ctrl-Alt-Del

Send a *Log On (Log Off)* key sequence to the remote end.

Scanning

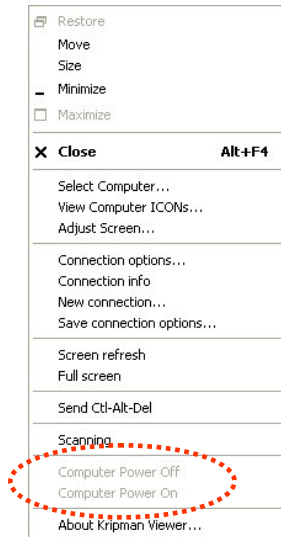
Start scanning through computers by issuing a programmable port switching commands with a delay time to a conventional KVM Switch behind **TK-IP101**.

Computer Power Off

Send a Power Off serial port command to the remote power control unit (Only SUPERADMIN or ADMIN is allowed).

Computer Power On

Send a *Power On* serial port command to the remote power unit (Only SUPERADMIN or ADMIN is allowed)



Power-on/off options grayed-out (unavailable for User privilege)

Now you have got yourself well familiar with **IP** viewer interface, so go ahead to use and enjoy the remote viewer connection!

3.12 Java Viewer Characteristics

You can perform likewise operations (except full screen) on java viewer. Although the java viewer has slightly different menu arrangement, you should find it as easy to operate on as the win32 viewer interface.

3.13 Common Video Display Problem Troubleshooting

IP video server supports most major display modes up to 1280 x 1024. However, some display problems will occur, when either there is abnormal or unusual display output from your server or the display resolution is over the biggest support of 1280 x 1024, or the display vertical frequency is beyond the support range in that pixel dimension.

To yield best video results on the viewer screen display on remote login client, you should also refer to *Section 2.2, Prepare your Computers for Connections to TK-IP101*, and *Section, 2.3, More Tips for Server Desktop Configuration* for more details about how to prepare your servers/computers before getting them connected to your TK-IP101.

The followings are some common video display problems and their troubleshooting....

Q. There seems to be many artifacts or residuals not getting refreshed on the viewer screen. Is there any way to improve the video display quality on viewer screen?

A: The causes of these artifacts or residuals could be:

- (1) *The video filter currently active on TK-IP101 is either set at Medium Quality or Low Quality Level.* These two video filter levels are for faster response than the High Quality Level as to increase the response speed over limited bandwidth condition. If your bandwidth allows or you need higher video quality instead of higher speed, just change the video filter from Low to Medium or even to High to increase the video display quality on viewer screen on the remote login client. To raise the Video Filter Level, please go to the *Video Server Page* in TK-IP101 Web Management Interface, and select the filter as either Medium or High Quality according to your requirements. Note that High Quality video filter gives high quality always on the expense of video response speed on the viewer screen.
 - (2) *The transitional effect of Windows XP is enabled.* The transition effects of menu will cause refreshing problems in Low/Medium Video Filter settings. Thus, if you are using a Low/Medium Quality Level of video filter, either try to raise the video filter level to High Quality (at the expense of response speed) or just turn off the transitional effects of Windows XP. To turn off the transitional effects of menu on Windows XP, please refer to *Section 2.2, Prepare your Computers for Connections to TK-IP101*
- Also note that TK-IP101 local console is not affected at all by the Video Filter settings or by the transitional effects on Windows XP.

Q. The TK-IP101 booting time has become unduly longer over several minutes. What's wrong?

A. Please make sure that the external authentication, PPP server/client, time server as well as power control settings are correct. If you don't use all these features or the authentication/time servers are not available, just try to disable them to save booting time since if you don't have all these servers present, the TK-IP101 will try to look for them till timeout. That will waste TK-IP101 booting time considerably.

Q: Video response seems slower in limited bandwidth condition, are there ways to increase the response speed?

A: There are several ways to increase the response speed on the viewer screen:

- (1) Under bandwidth limited condition, you should select a more economical encoding scheme such as *Internet Encoding* scheme instead of the LAN or RAW encoding scheme from the viewer connection option menu. However, if the connection is made only within LAN with plenty connection bandwidth, LAN or RAW encoding scheme should be quicker than Internet scheme – since your client computer won't have to dissipate extra computing power for decoding the more-compressed internet scheme.
- (2) Use 8-bit color reduction (with only 256 colors instead of the 65K colors in 16-bit settings)
- (3) Use JPEG compression (for best video quality with optimized packet quantities)
- (4) Additionally, you could always select either Medium Quality/Low Quality level for more speed as your Video Filter setting in the Video Server Page of the TK-IP101 Web Management Interface. You could also do something to increase the response speed: use a server desktop of small resolution (such as 800 x 600) and use a solid plain color background for server desktop.

Finally, you should check also the networking environment to find if there is some bottleneck that can be improved or eliminated for more bandwidth throughput.

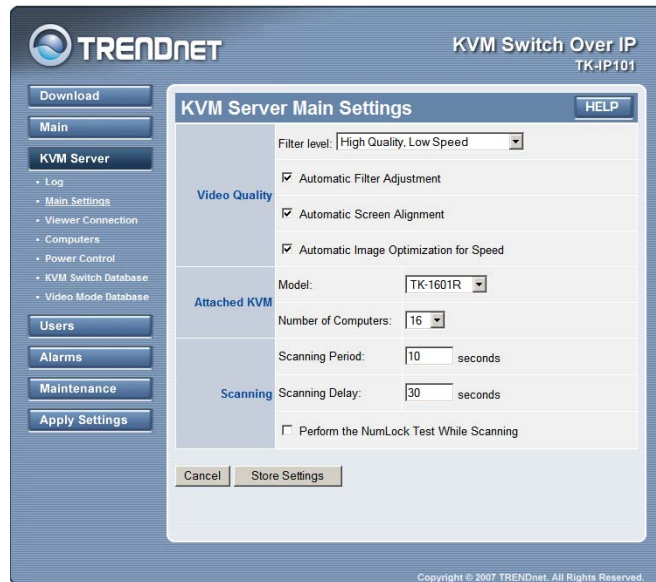
Q. When connection is first made, the display on the viewer screen seems not centered correctly and there is black margin on the edge of the viewer screen. How could I eliminate the black strip?

A. The black strip is the offset that will be seen when the display on viewer screen is not centered corrected. Probably you have not enabled automatic centering option on TK-IP101, so please check the followings:

- (1) Go to the Video Server page on TK-IP101 Web Management Interface to check whether the *Automatic Screen Alignment* option is enabled. If it is not yet enabled,

please check the option, click *Submit* button and then go to *Apply Settings* page to click the *Apply Settings* button to restart Tk-IP101 with new setting.

- (2) When the viewer connection is made, select the *Adjust Screen* option on Viewer's Quick Menu, and the Adjust Screen dialog box appears. On it, check whether you have *Automatic Centering* enabled. If it is not yet enabled, please check this option to enable it. If it is already checked, please uncheck it and then wait for at least 15 seconds and then check the option again to force the video server to align (center) the display in the viewer screen.



Q: I can log in and make successful browser connection with TK-IP101. However, I cannot make a valid viewer connection or the TK-IP101 does not respond to my viewer connection request. What can I do about it?

A: The TK-IP101 video server might not function properly. First, make sure your account have the SUPERADMIN privilege. If not, you should request one that has the SUPERADMIN privilege to do the troubleshooting job for you. Next, go to the Apply Settings Page on the Web Management Interface and then hit the Apply Settings button to restart TK-IP101. Then wait for at least 10 more seconds for it to start completely. Try to make the viewer connection again to see if it is back to normal. Second, If the Apply settings button could not bring back the IP video server to normal working condition, try to hit the Emergency Reboot button (could be found on the Maintenance Page of the Web Management Interface) for a complete start from ground level. An Emergency Reboot is a clean reboot, and it takes longer time for TK-IP101 system and video server to load, thus you have to wait at least a minute for the

system to be up and running. Then try to make the viewer connection again to see if it is brought back to normal function again. A cold boot of TK-IP101 is always a last resort to bring the TK-IP101 back – just try to disconnect the power adapter from TK-IP101 and wait for sometime (30 seconds) before plugging in again for a cold start over.

4 TK-IP101 UNIT MANAGEMENT OVER A SECURE HTTPS BROWSER CONNECTION

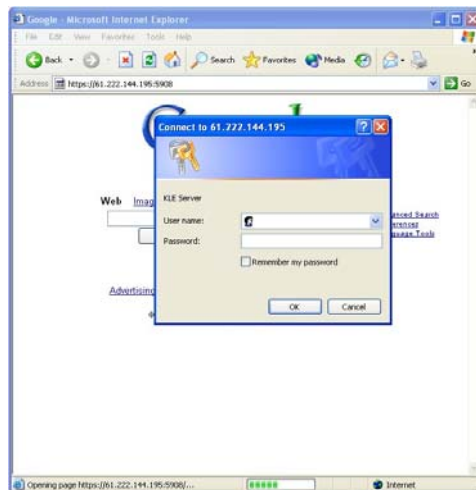
TK-IP101's Web Management interface uses only password authentication to authenticate login user's identity. After user identity is authenticated (that is, if you have typed in the right user name with a right password in the login prompt...), an SSL-secured browser connection using 256-bit cipher strength is established.

4.1 Web-based Management Interface

Type in the correct IP address and port number:

```
https://<IP_address>:<port_number>
```

```
https://61.222.144.195:5908
```



Remember that it's a secure SSL encrypted connection, so you should type "https" instead of the usual "http". Otherwise, the connection will not be established. The port number might vary according to its setting on the **TK-IP101** server. By default, the browser connection uses port 5908. Both the user name and password are case-sensitive.

Three User Privileges – SUPERADMIN, ADMIN, USER

TK-IP101 offers three categories of user privileges for Web Management: SUPERADMIN, ADMIN and USER.

SUPERADMIN – Full access to Web Management features [and Power ON-OFF feature on viewer]
ADMIN - Partial access to Web Management features [and Power ON-OFF feature on viewer]
USER – Only minimal access to Web Management features (only the Download and the Logout pages)



Full access - SUPERADMIN



Partial access - ADMIN



Minimal Access (User privilege)

TK-IP101 Browser Management Access Privilege			
Feature Page	SUPERADMIN	ADMIN	USER
Download	✓	✓	✓
Viewers	✓	✓	×
Date & Time	✓	✓	×
Video Server	✓	✓	×
Power Control	✓	✓	×
Computers	✓	✓	×
Server Log	✓	✓	×
Video Modes	✓	✓	×
Alarms	✓	✓	×
KVMs	✓	✓	×
LAN TCP/IP	✓	×	×
WAN PPP	✓	×	×
User Status	✓	×	×
User Manag.	✓	×	×
Security	✓	×	×
Maintenance	✓	×	×
Logout	✓	✓	✓
Apply Settings	✓	✓	×

4.2 Download – Download Programs for Viewers



TK-IP101 Viewer Download Page

The win32 viewer program supports all the current Windows platforms such as Windows 98/Me/NT/2000/XP/2003 Server, and the java viewer is truly cross-platform for all major Operating Systems including Windows, Linux, MacOS, etc. However, you should install Java Runtime Environment specific for your TK-IP101 client platform before using the Java Viewer. To get the Java Runtime Environment, please download from the Java website: <http://www.java.com>.

4.2 Viewer – Video Server Name & Keyboard Type Settings

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.

The screenshot shows the TRENDnet KVM Switch Over IP TK-IP101 web interface. The main navigation menu on the left includes: Download, Main, KVM Server (with sub-items: Log, Main Settings, Viewer Connection, Computers, Power Control, KVM Switch Database, Video Mode Database), Users, Alarms, Maintenance, and Apply Settings. The central panel is titled "Viewer Connection Settings" and contains the following fields:

- Server Name for Viewers: Text input field containing "KLE".
- Keyboard Layout: Dropdown menu set to "US".
- Largest Possible Screen: Dropdown menu set to "1600x1200".
- Viewer Hot Keys: Four dropdown menus, the first two are set to "CTRL". A note below reads "(refer to keyboard drawing)".
- Mouse-Resynchronize Key: Dropdown menu set to "HOME" with the text "(after Hot-Keys)".
- Double-Byte Languages: A checkbox for "Enable Hot-Keys Transparent Mode" which is currently unchecked.

At the bottom of the settings panel are "Cancel" and "Store Settings" buttons. The footer of the interface reads "Copyright © 2007 TRENDnet. All Rights Reserved."

Viewer Related Settings

Server Name for Viewers

Enter the server name you choose and it will appear on the title bar of your **TK-IP101** Viewer window.

Keyboard Layout

Choose the keyboard layout for TK-IP101 according to the real keyboard you'll be using on the remote login client. Choosing the correct keyboard layout for your keyboard is very important since some keycodes are represented by different key locations in different keyboard layout. And keyboard layout setting ensure you will have a matching keycode output as you have on the physical keyboard on client computer. The default keyboard layout is the *US* keyboard (*US*).

Largest Possible Screen

Select the largest workable resolution for your display device.

- 640 x 400
- 640 x 480
- 800 x 600
- 1024 x 768
- 1152 x 864
- 1280 x 1024

TK-IP101 supports up to 1280 x 1024 pixels for resolution.

Hot keys

The Hot Keys as here specified are the key sequence that precedes the command string and they are to be directed not to your local client PC, nor to your remote server, but to **TK-IP101** itself. The hot keys here are default to *CTLR – CTLR*, that is, two consecutive *Right Control* keys (Please note that **this is the right control key (CTLR), NOT the left control key, CTRL**). And the **Mouse-Resynchronize Hotkey** is default to Home key (HOME). For example, to synchronize the remote and the local mouse cursor, you have to hit **CTLR – CTLR – Home**. (*To find out the key positions on a standard keyboard, please click the [Keyboard drawing](#) hyperlink for a detailed key mapping.*)

Of course, you can also customize the mouse resynchronization hotkey for your own preference.

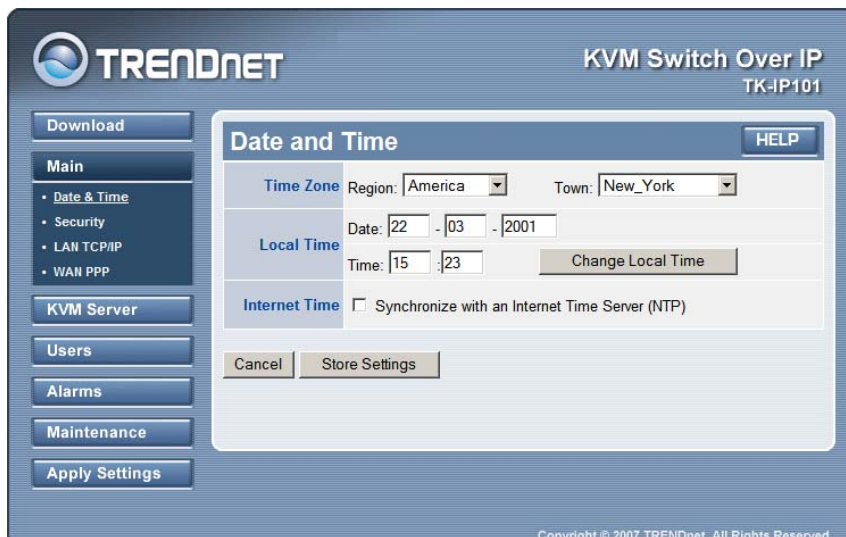


If you are using MacOS as your TK-IP101 client for connection, you might find that the default mouse resync hotkey - *CTLR-CTLR-Home* - does not work on Java viewer running on your MacOS. That is because the *Right Control* key on Mac keyboard sends out different keycode as the PC keyboard. If that is the case, you might consider to configure your mouse resync hotkey as, for example, *CTLL- CTLL - S*, so that you could sync mouse cursors from your Macintosh computer or notebook.

ESC	F1 F2 F3 F4				F5 F6 F7 F8				F9 F10 F11 F12				PRINT	SCRLK	PAUSE	Num Lock	Caps Lock	Scroll Lock			
TLDE	1	2	3	4	5	6	7	8	9	0	MIN	EQ	BKSL	BSP	INS	HOME	PGUP	NUMLK	KPDIV	KPMUL	KPSUB
TAB	Q	W	E	R	T	Y	U	I	O	P	BRKTL	BRKTR	DEL	END	PGDN	KP7	KP8	KP9	KPAD		
CAPS	A	S	D	F	G	H	J	K	L	SMCLN	APOS	BKSL	ENTER	UP	KP4	KP5	KP6	KPENT			
SHL	LSGT	Z	X	C	V	B	N	M	COM	PER	SLH	SHR		LEFT	DOWN	RIGHT	KP1	KP2	KP3	KPENT	
CTRL	WINL	ALT	SPACE							ALTR	WINR	MENU	CTLR	LEFT	DOWN	RIGHT	KP0	KPDEL			

4.3 Date & Time – Date, Time, Global Time Zone Support and NTP server synchronization

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.



The screenshot shows the TRENDNET KVM Switch Over IP TK-IP101 web interface. The main content area is titled "Date and Time" and includes a "HELP" button. The configuration is divided into three sections: "Time Zone" with "Region" set to "America" and "Town" set to "New_York"; "Local Time" with "Date" set to "22 - 03 - 2001" and "Time" set to "15 : 23", and a "Change Local Time" button; and "Internet Time" with an unchecked checkbox for "Synchronize with an Internet Time Server (NTP)". At the bottom of the form are "Cancel" and "Store Settings" buttons. A sidebar on the left contains navigation buttons for "Download", "Main" (with sub-items "Date & Time", "Security", "LAN TCP/IP", and "WAN PPP"), "KVM Server", "Users", "Alarms", "Maintenance", and "Apply Settings". The footer of the interface reads "Copyright © 2007 TRENDnet. All Rights Reserved."

Current Date and Time

Enter the correct date and time here and click *Set Current Date and Time* button to set current system time on **TK-IP101**.

💡 Note that if you check the option to *Automatically Synchronize with an Internet Time Server (NTP)*, the time setting will be periodically synchronized to the time of NTP server specified on each restart of the **TK-IP101** and every hour.

Time Zone

Select the Time Zone / Region and City or Town from the available list as seen in the drop down combo boxes. For example: you can choose **Australia** as your Time zone and **Melbourne** as your region.

Select the Region Zone

Select the Time Zone / Region.

Select the Town for the Selected Region

Specify a Town in the selected Time Zone / Region to be the place you install TK-IP101 and synchronize its system time accordingly.

Internet Time

The option here is for the automatic synchronization of **TK-IP101** time with a Time Server on the Internet. You can check the option and then specify the time servers you prefer. **TK-IP101** will try to synchronize with the timer servers every time it starts or restarts and will continue to synchronize every hour thereafter.

The Primary NTP server is the server **TK-IP101** will first try to synchronize with, and the secondary NTP server is the backup time server that **TK-IP101** will synchronize with when the first time server is not available.

Automatic synchronize with a Time Server (NTP)

Synchronize TK-IP101 system with time server you specify. Note that if you choose this option the original *Current Date and Time* settings you manually entered will be refreshed with the time provided by the internet time server.

Primary time server

Enter the domain name of the time server you choose as your primary time server. The default one is **time.stdtime.gov.tw**

Secondary time server

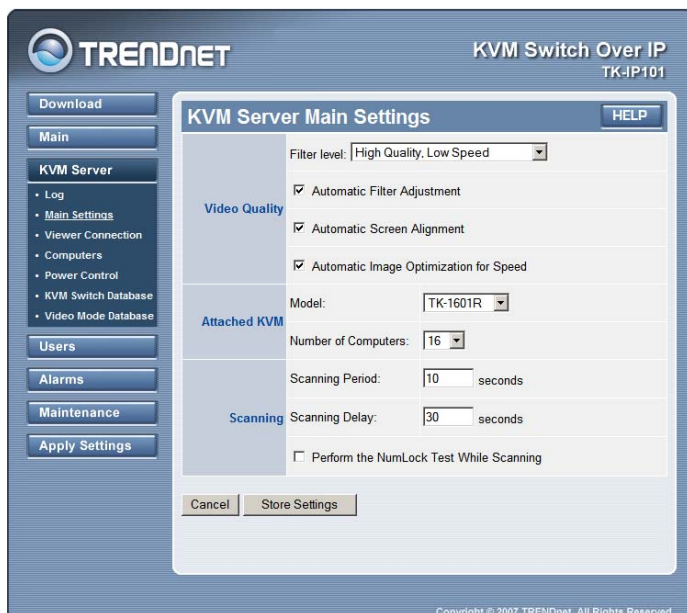
Enter the domain name of the time server you choose as your secondary time server. The default one is **tick.stdtime.gov.tw**



There are many internet time servers available. You can search in the Internet for ones that are nearer to the location you install **TK-IP101**. Note that you should choose your internet time servers based on the principle that a time server nearer to you will reduce time latency in time synchronization.

4.4 Video Server – Miscellaneous Settings for Video Servers

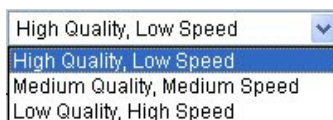
⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.



Default Settings

Filter

Specify the Video Filter Level for the **TK-IP101** video server.



Based on the bandwidth availability, you can select one of the three modes of video fileter levels:

- High Quality, Low Video
- Medium Quality, Low Speed
- Low Quality, High Speed

Each of the three video filter levels is adapted to different combination of video quality and bandwidth requirements. Users can select their preference according to actual video quality preference and network bandwidth availability. However, there's always a trade off between video quality and response speed when under limited network bandwidth availability.

High Quality, Low Speed (Light Filter): - This level is recommended for ample bandwidth networking condition such as LAN or broadband internet. With this setting, the viewer screen will be updated on minimum amount of video change. This setting will require more bandwidth than the other two filter levels and video refresh speed will be slower (however, only noticeable when bandwidth is very limited). This filter provides the best image quality.

Medium Quality, Medium Speed (Medium Filter): This level is recommended for internet connection to connect to **TK-IP101** half a world away across internet with not so ample bandwidth like in LAN for a smooth video performance. This setting may require more bandwidth than the High Speed, Low Video Quality option. This is most often the best speed / bandwidth compromise.

Low Quality, High Speed (Strong Filter): This level is recommended for very limited bandwidth condition, such as a dial-up modem line to the Internet) With this setting, **TK-IP101** viewer screen will be updated on maximum amount of video change. Strong filter requires less video bandwidth, hence can offer high speed for keyboard/mouse/video response.

Automatic Screen Alignment

This option is to center the view screen automatically to eliminate the offsets sometimes seen in the viewer screen as black gaps.

Automatic Image Optimization for Speed

This option is to optimize the screen frame images **TK-IP101** captures for more display.

Attached KVM

KVM Model

Select the model of the conventional KVM Switch to be attached to the backpanel of **TK-IP101**. Note that you can also add specific models to the available list so that your computer icon could support the port switching hotkeys of any specific KVM model upon clicking.

Number of Computers

Specify a maximum number of total connected PCs for the KVM Switch behind TK-IP101. You can specify a maximum of 256 computers, as you might have a cascaded configuration of several cascaded KVM Switch units behind TK-IP101.

Scanning

Scanning Period

Specify the scanning duration for each connected PC, if no KVM (Keyboard - Video - Mouse) event happens to interrupt the scanning.

Scanning Delay

Specify the delay time that **TK-IP101** will wait after it last perceives a KVM event before it switches to the next connected PC.

Performing the NumLock Test while scanning

Check this option if you want to perform autoscanning, **TK-IP101** will send an alert e-mail or SNMP message to the designated e-mail address if the NumLock test fails.



While scanning, TK-IP101 will also send a NumLock signal to the PC. If the PC returns a response, then the NumLock LED will be lit. The NumLock test can serve as a test to see if the connected PC is still responsive to keyboard event. And also the NumLock signal will serve as a “wake up” signal if the PC is in sleep mode.

4.5 Power Control – Miscellaneous Settings for Video Servers

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.

The screenshot shows the 'Power Control' configuration page in the TRENDNET KVM Switch Over IP TK-IP101 web interface. The page has a blue header with the TRENDNET logo and the title 'KVM Switch Over IP TK-IP101'. On the left is a navigation menu with buttons for 'Download', 'Main', 'KVM Server', 'Users', 'Alarms', 'Maintenance', and 'Apply Settings'. The 'KVM Server' menu is expanded, showing sub-items: 'Log', 'Main Settings', 'Viewer Connection', 'Computers', 'Power Control', 'KVM Switch Database', and 'Video Mode Database'. The 'Power Control' section contains three settings, each with a checked checkbox and a 'HELP' button: 'Enable Power Control through the Serial Interface' (Enabled, with a note: 'Note: this disables the PPP automatically'), 'Simple Users Can Control Power' (Enabled), and 'Power Device Login' (The Power Device Needs a Login). Below these is a 'Login Dialog (chat style)' section with a large empty text area and a scroll bar. At the bottom are 'Cancel' and 'Store Settings' buttons. A copyright notice 'Copyright © 2007 TRENDnet. All Rights Reserved.' is visible at the bottom right.

Power Control

Enable the power control via the serial port : Check this option if you want to enable the remote power control over **TK-IP101** viewer interface.

Power Control device initialization-dialog (chat script style) : Specify a login script for your power control device. However, if your power control device does not require a login script, just leave blank the field for login script.



For the individual setting of the serial ASCII port commands that should be sent for Power ON / OFF of each port, you should go to *Computers* page for configuration.

4.6 Computers – Miscellaneous Settings for Video Servers

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.

The screenshot shows the 'Computers' configuration page in the TRENDnet KVM Switch Over IP TK-IP101 web interface. The page has a sidebar on the left with navigation buttons: Download, Main, KVM Server (with sub-items: Log, Main Settings, Viewer Connection, Computers, Power Control, KVM Switch Database, Video Mode Database), Users, Alarms, Maintenance, and Apply Settings. The main content area is titled 'Computers' and includes a 'HELP' button. The configuration fields are: Port Number (4), Computer Name (TrendNet_XP), Scanning (checked 'Do not Include in Scanning Process'), Alarms (checked 'Do not Generate Alarms'), and Power Management (Delay (seconds): 5). There are 'Cancel' and 'Store Settings' buttons at the bottom. The footer contains the copyright notice: Copyright © 2007 TRENDnet. All Rights Reserved.

Select the KVM Port Number : Select the target KVM port to which your target computer is connected. You can just select from the drop down combo box for the target port number to be designated with various port specific settings on this page, such as computer name, the scanning and alarm options, power-on and power-off commands.

You can use the drop-down combo box or use the *Previous* and the *Next* button to select KVM port for setting.

Computer Name

Enter a character string (32 characters max) : Designate the computer name (in this case, it is Redhat Linux) for the computer you will connect to that specific port (in this case, it is port 6) on the conventional KVM Switch behind **TK-IP101**. A Maximum length of 32 characters for each name is allowed. The computer names you specify here for each port will appear all together in the Select Computer Box when logging in **IP Viewer**.

Computer Scanning and Alarms

Do not include in scanning process : If you do not want any KVM port (in this case, it is port 6) to be included in **TK-IP101** auto-scanning, you should check this option to exclude it.

Do not generate alarm : If you do not want the scanning process to generate alarm or SNMP messages for this computer then you should check this option to exclude it.

Power Management

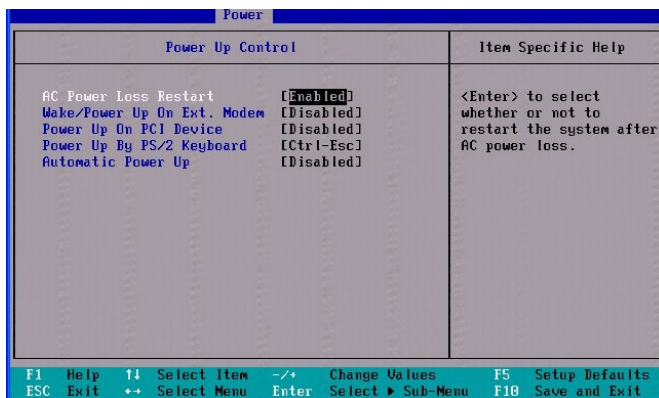
Power Down Command : Specifies the power down command sent over the serial control port for the additional remote power control unit you connect to the serial control port of **TK-IP101**, e.g. `"/F016\"` to power down power bank 01 port 6 with the cascable power control module such as the TK-RP08; `"/F000\"` to power off all ports on all bank. To send the power down command to a specific port over the viewer, just switch to that port and evoke the viewer Quick Menu to click *Power off*

Delay (sec.): Specify the delay time between the sending of power down commands and that of the power on command, when the *Restart Computer* option is enabled and **TK-IP101** receiving a specified alarm (either No Video, Blue Screen, NumLock Test failure). For more details, please refer to the *Section 4.9, Alarms – e-mail Notifications and SNMP Logging Support for Server Alerting Events*. The delay time between the power off and the power on command is default to 5 seconds.

Power On Command : specifies the power on command sent over the serial control port for the additional remote power control unit you connect to the serial control port on the backpanel of **TK-IP101**, e.g. `"/O016\"` to power on power bank 01 port 6 with the cascable power control module such as the ioPower; `"/O000\"` to power on all ports on all bank. To send the power on command to a specific port over the viewer, just switch to that port and evoke the viewer Quick Menu to click *Power on*



When using a remote power control device for power control of your connected server, please note that some newer motherboard form factors, such as ATX, etc, will require BIOS option adjustment to respond to the resumed power feed from its power bus by your power control device. Usually, you should enable the *Power Loss Restart* option on your Motherboard BIOS (or similar option depending on your BIOS vendor), so that your connected servers can boot up when your power control device is feeding power to its power bus.



4.7 Server Log – Logging Server Events

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.



Each log item in the server log file records a specific server event and is preceded by the date and time it is written and then followed by the description for that specific log event.

Enable : Check this option enable the logging of **TK-IP101** server events.

Print Statistics : To record the statistics of the video server and port switching activity by **TK-IP101** remote users, you should check this option to print statistics to the server log file.

Refresh : Click the *Refresh* button to refresh the screen output of the log file. Since newer server log events may have happened and being logged after your previous access of this server log page, you need to click the *Refresh* button to read newer log events.

Clear : Click the *Clear* button to empty the log file contents.

⚡ Note that server log will also be erased after you perform a complete reboot remotely by hitting the *Emergency Reboot* button in the Maintenance page or when TK-IP101 suffers a power loss.

4.8 Video Modes – Keeping, Modifying and Augmenting your Video Mode Data Base

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.

The screenshot shows the 'Video Mode Database' configuration page in the TRENDNET KVM Switch Over IP TK-IP101 interface. The page includes a navigation sidebar on the left with options like Download, Main, KVM Server, Users, Alarms, Maintenance, and Apply Settings. The main content area features a warning message: 'Warning! Modifying the video-mode data-base can obliterate the video capture. Do not modify anything unless you know exactly what you are doing!'. Below the warning, there is a 'Video Mode' dropdown menu set to '1280x1024 @ 60 Hz', a 'Refresh Rate' input field set to '60', and a table of parameters for the selected mode. The 'Width' section includes 'Screen Width' (1280), 'Total Width' (1687), and 'Hsync Start' (351). The 'Height' section includes 'Screen Height' (1024), 'Total Height' (1066), and 'Vsync Start' (40). At the bottom, there are three buttons: 'Store New Settings', 'Suppress Selected Mode', and 'Restore Previous Settings'.

Select a Video Mode: Select a video mode already built in within **TK-IP101**'s video mode database. Each video mode is indicated by the pixel dimension (length by width) at a certain vertical refresh frequency:

Width_in_pixels x Height_in_pixels @ Refresh_Rate_in_Hz

For example, 1024 x 768@60Hz is a video mode and 1024 X 768@72 Hz is another video mode.

Video Setting

To modify or add a new display mode involves special technical details. For ordinary users, we do not recommend you to modify the existing video mode database. Incorrect modification of an existing video mode might cause improper display of that video mode on the viewer screen.

To modify an existing video mode, just select one existing video mode from the list and then modify the parameters therein, and then click *Save* button to save the new settings for the video mode.

To add a new video mode, just enter a new video mode in the *Select a Video Mode* field, and then enter all the parameters here below:

Refresh rate: Refresh rate of the target video mode.

Screen Width: Screen width of the target video mode.

Total Width: specifies the total screen width of the target video mode.
Hsync Start: specifies where the horizontal synchronization should start.
Screen Height: specifies the screen height of the target video mode.
Total Height: specifies the total screen height of the target video mode.
Vsync start: specifies where the vertical synchronization should start.

⚡ To change these parameters, you should follow VESA standard specifications in order for the video capture function of **TK-IP101** to work properly.

Write New Settings

Just click the *Submit* button to write new setting to your video mode database.

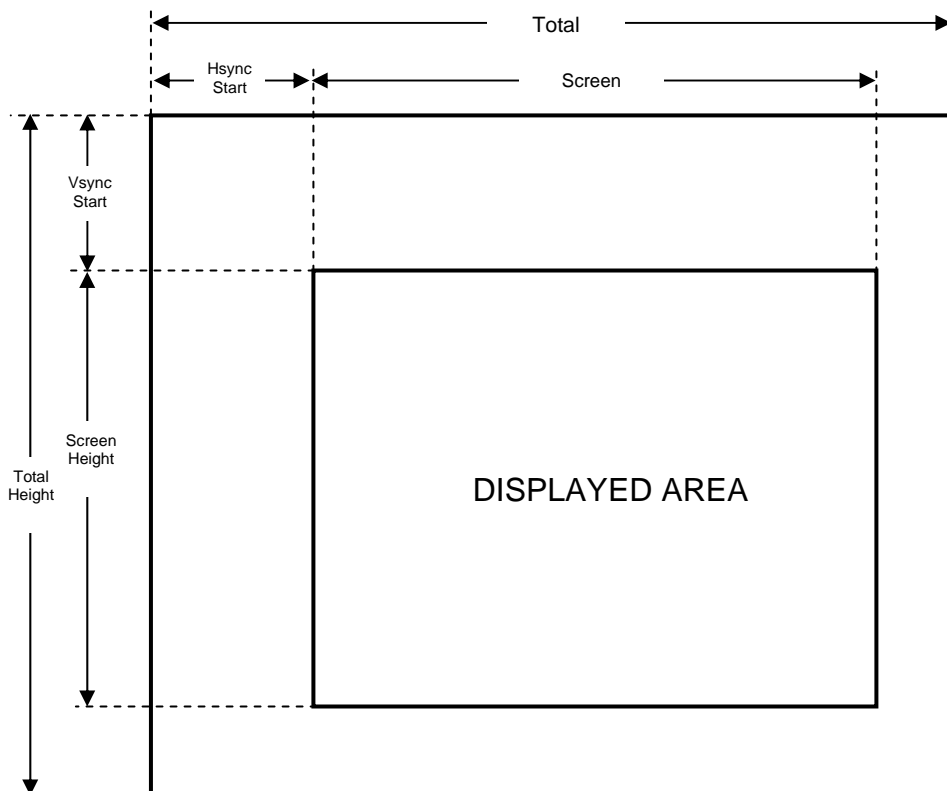
Suppress the selected video mode

To eliminate the target video mode from the video mode database, click the *Suppress* button. Normally, one does not have to suppress a screen definition.

Restore previous settings

To undo the previous one addition or elimination of a video mode, just click the **Restore** button. Note that you can only undo previous one move.

The following diagram explains about the all these parameters in geometric relations to a formation of a video mode...



4.9 Alarms – e-mail Notifications and SNMP Logging Support

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.

💡 This Alarms feature should be used in conjunction with TK-IP101's auto-scanning function, thus TK-IP101 can serve as a non-stop server health-monitoring agent.

This page pertains to the alarm event notification. TK-IP101 is capable of sending immediate e-mail alerts as well as SNMP trap messages (SNMP logging) when there is blue screen, no video, or NumLock test failure from a remote computer.

When **TK-IP101**'s scanning function is enabled, it scans through the connected computers, and when detecting any outbreaks of critical server events, it will trigger e-mail notifications as well as SNMP logging.

The screenshot shows the Trendnet KVM Switch Over IP TK-IP101 web interface. The main navigation menu on the left includes: Download, Main, KVM Server, Users, Alarms (with sub-items: Emails, SNMP, Selection), Maintenance, and Apply Settings. The 'Email Alarms' configuration window is open, featuring a 'HELP' button in the top right. The form contains the following fields: 'Email From' (pre-filled with 'myemail@myaddress.any'), 'Email To' (empty), 'Copy To' (empty), and 'SMTP Server' (pre-filled with 'mysmtp.any'). At the bottom of the form are 'Cancel' and 'Store Settings' buttons. The footer of the interface reads 'Copyright © 2007 TRENDnet. All Rights Reserved.'

Log SMTP

Email from: Enter the e-mail address for **TK-IP101** that will appear as the e-mail sender on the alert mails, for example: **PM@Trendnet.net**

Email to: Enter the recipient e-mail address(es), for example: support@**Trendnet.net**

Copy to: Enter the e-mail address(es) for the c.c. list, for example: contact@**Trendnet.net**

SMTP server: Here you enter the server name or IP address of the SMTP server (mail server) that will help **TK-IP101** to send out e-mail alerts to its recipients. We have the SMTP server name here as, for example, smtp.wanadoo.fr.

Use comma to separate multiple e-mail entries, for example:

Email to: support@**Trendnet**.net, emma@international.com, joe@netview.co.jp
Copy to: charles@unisum.com.tw, daniel@runfast.com, coco@TK-IP101pro.com.au

Log SNMP

TK-IP101 supports SNMP traps so that it can provide the alarms information to the SNMP manager devices on the network.

Primary Manager: Specify the IP address of the Primary SNMP manager device on your network.

Secondary Manager: Specify the IP address of the Secondary SNMP manager device on your network.

SNMP Community: Specify the name of the SNMP Community to which your SNMP Management host and SNMP agent should belong.



Note that the SNMP manager devices and agents should belong to an SNMP community, which is a collection of hosts grouped together for administrative purposes.

There are three types of alarm triggering events **TK-IP101** can respond to: **No video**, **Blue Screen** and **NumLock test failure**. According to the settings you have specified, these alarm triggering events can be configured to trigger **TK-IP101**'s immediate responses, such as **restart the computer**, **alert emails** or **SNMP trap messages**.

No Video Alarm (Power-Off or Out-of-Range Video)

No Video could be a result from power failure or an out-of-range video mode. If you want **TK-IP101** to respond immediately to this alarm event, just check the *Enable Alarm* option.

⚡ Note that you first have to check the *Enable Alarm* option before the *Restart Computer* and *Send an Email* option could be enabled. If the *Enable Alarm* option is left unchecked, it won't restart computer or send an e-mail even if these two options are selected!

Blue Screen Alarm (Text mode)

Blue screen is a result of *Operating System* fatal error. If you want **TK-IP101** to respond immediately to this alarm event, just check the *Enable Alarm* option.

⚡ Since the output of a blue screen is sometimes identical with a text mode screen in terms of its resolution being 600 x 400 or 600 x 480. Therefore, **TK-IP101** will regard a text mode output either of 600 x 400 or 600 x 480 as identical to a blue screen, and send out alert e-mails or SNMP trap messages according to its configuration.

NumLock Test Alarm (Frozen Keyboard)

The NumLock test is to send a NumLock signal to the computer, and the computer normally should return a response immediately so that the NumLock LED indicator on the keyboard will be lit to indicate the success of the test. The failure of a NumLock test indicates at least a keyboard failure to respond to this NumLock signal, or it might be due to bigger problem such as system failure, or simply a powered-off state.

Enable Alarm: Check this option to enable **TK-IP101** to respond to specific alarm triggering events.

Restart Computer: Check this option to restart computer upon specific alarm triggering events.

Send an e-mail: Check this option to send an alert e-mail upon specific alarm triggering events.

Send an SNMP Trap: Check this option to send an SNMP trap message upon specific alarm triggering events.

⚡ If you uncheck the *Enable Alarm* option, you won't trigger any alarm types even if you have checked the *Restart Computer* and *Send an E-mail* option.



For the MIB structure of TK-IP101, please refer to the followings: (you can also find it in the form of a file, *TK-IP101-MIB.txt*, on the TK-IP101 Support CD-ROM).

```
TK-IP101-MIB DEFINITIONS ::= BEGIN

IMPORTS
    enterprises
        FROM RFC1155-SMI
    OBJECT-TYPE
        FROM RFC-1212
    TRAP-TYPE
        FROM RFC-1215
    DisplayString
        FROM RFC1213-MIB;

prosum      OBJECT IDENTIFIER ::= { enterprises 997 }
products    OBJECT IDENTIFIER ::= { prosum 5 }
kvmIP       OBJECT IDENTIFIER ::= { products 4 }
TK-IP101    OBJECT IDENTIFIER ::= { kvmIP 1 }      -- trap numbers can be under
here
trapInfo    OBJECT IDENTIFIER ::= { TK-IP101 1 } -- typical root for the trap
variables

-- TK-IP101 Object

alertMessage OBJECT-TYPE
    SYNTAX      DisplayString (SIZE (0..256))
    ACCESS      read-only
    STATUS      deprecated
    DESCRIPTION
        "The text of the alert message."
    ::= { trapInfo 1 }

TK-IP101Name OBJECT-TYPE
    SYNTAX      DisplayString (SIZE (0..256))
    ACCESS      read-only
    STATUS      deprecated
    DESCRIPTION
```

```

                                "The Name of the TK-IP101 unit that generated the trap."
 ::= { trapInfo 2 }

computerNumber      OBJECT-TYPE
SYNTAX      INTEGER (1..65535)
ACCESS      read-only
STATUS      deprecated
DESCRIPTION
    "the number of the computer that originated the trap."
 ::= { trapInfo 3 }

computerName        OBJECT-TYPE
SYNTAX      DisplayString (SIZE (0..256))
ACCESS      read-only
STATUS      deprecated
DESCRIPTION
    "The Name of the computer that originated the trap."
 ::= { trapInfo 4 }

videoMode           OBJECT-TYPE
SYNTAX      DisplayString (SIZE (0..256))
ACCESS      read-only
STATUS      deprecated
DESCRIPTION
    "The blue screen video resolution."
 ::= { trapInfo 5 }

-- TK-IP101 Traps

noVideo             TRAP-TYPE
ENTERPRISE         TK-IP101
VARIABLES          {
                    alertMessage,
                    TK-IP101Name,
                    computerNumber,
                    computerName,
                    }
DESCRIPTION        "No Video (Power-Off or Out-of-Range Video) Alert "
 ::= 1

blueScreen          TRAP-TYPE
ENTERPRISE         TK-IP101
VARIABLES          {
                    alertMessage,
                    TK-IP101Name,
                    computerNumber,
                    computerName,
                    videoMode
                    }
DESCRIPTION        "Blue Screen (text mode) Alert "
 ::= 2

numockTest          TRAP-TYPE
ENTERPRISE         TK-IP101
VARIABLES          {
                    alertMessage,
                    TK-IP101Name,
                    computerNumber,
                    computerName,
                    videoMode
                    }
DESCRIPTION        "Numlock Test(Frozen keyboard) Alert "
 ::= 3

```

END

4.10 KVMs – Keeping and Adding your KVM Data Base

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.

The screenshot shows the 'KVM-Switch Database' configuration page. It includes a sidebar with navigation options and a main configuration area. The 'KVM Model' is selected from a dropdown. The 'Model Name' is 'TK-1602R'. The 'Number of Ports' is set to 16. The 'Escape Hot Key Sequence' is 'SCRLK'. The 'Delay Between Keys' is 200 ms. A list of 'KVM Key Sequence for Port Selection' is provided, ranging from 0 1 0 1 to 0 1 1 6. At the bottom, there are 'Store' and 'Suppress' buttons.

Select a KVM Model

Select a KVM Switch definition from the drop-down combo box for modification. The KVM Switch definition you select will appear in the *Model Name* field just below.

KVM Model Setting

Model Name : This input field shows the KVM model of your selection. It is also the input field where you can enter a new KVM Switch model name and later adding it to the KVM Switch database.


Number of ports : Specify the maximum port capacity of the selected KVM Switch model.




Note that some models can be daisy-chained together to expand the total port capacity. If you intend to add a KVM switch model to the database and use it as in daisy-chained configuration with other KVM switches, you should here specify its maximum port capacity as expandable in this configuration. TK-IP101 allows a maximum setting of up to 256 ports.


Escape Hot key Sequence : The Escape Hot Key Sequence here is the key sequence that precedes the command string, together to be directed, not toward **TK-IP101**, but toward the conventional KVM Switch connected to **TK-IP101**'s PC port. There are

up to a maximum of 4 keys that can be specified for the Escape hot Key sequence. The Escape Hot Key sequence setting allows you to use the port switching hotkeys offered by the conventional KVM switch behind **TK-IP101**.

 Normally the Escape hotkey sequence uses only two consecutive strokes. The Escape hotkey sequence is vendor-specific and will vary according to different KVM switch manufacturers. Before you are adding a new KVM switch definition to the database, it is useful to know the Escape hotkey sequence for the target KVM Switch. In this case, we have the Escape Hotkey Sequence as two consecutive Scroll Lock keys.

Delay between keys (ms) : Specifies the delay time in milliseconds (from 10 to 1000 milliseconds) that **TK-IP101** should wait before sending out the next key in the sequence for port switching hotkeys.

 Normally, you will have no need to adjust the delay for any KVM Switch definition already there in the existing database, unless you experience some problem or irregularity in port switching due to improper delay time. However, if you intend to add a new KVM definition to the existing database and the default delay time is not appropriate for use, you then might need to adjust the delay time for optimal performance. To obtain the optimal delay time, you have to make a few trial port switching with different delay time settings to determine an optimal value.

 Also note: It is possible to insert a precisely programmed delay between two keys if you need to increase the common delay value selected above. To do so, just type d (xxx), xxx being the value in milliseconds up to 1000. For example, d (50) makes a 50 millisecond extra delay. For details, please refer to the following passage.

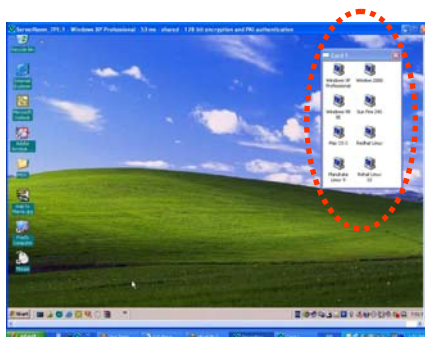
KVM key Sequence for Port Selection (Sent after hotkey) : Here you can edit the port selection command strings, one separate line for each port. For example, in the previous figure we have the typical settings of a non-cascadable 8-port KVM Switch.

The *Escape Hot Key Sequence*, together with what you have specified here in the editable area for the *KVM Key Sequence for Port Selection*, will jointly make up the port switching sequence that will be sent out when you click the icons within the *Select computer* Box. For example: in the editable area you have ...

- 1 → send out *Scrolllock – Scrolllock – 1* as port switching sequence when clicking 1st icon on the Select Computex Box.....
- 2 → send out *Scrolllock – Scrolllock – 2* as port switching sequence when clicking 2st icon on the Select Computex Box.....

.....

- 8 → send out *Scrolllock – Scrolllock – 8* as port switching sequence when clicking 8th icon on the Select Computex Box.....



However, some other command string you will see in the editable area might seem as complex as `0 1 0 1 d(1000) ESC`.

For example: in the editable area now you have ...


0 1 0 1 d(1000) ESC → send out *ScrollLock–ScrollLock–0-1-0-1*, then delay 1000 milliseconds and then send out an *Escape* key as port switching sequence when clicking 1st icon on the Select Computex Box....
 0 1 0 2 d(1000) ESC → send out *ScrollLock–ScrollLock–0-1-0-2*, then delay 1000 milliseconds and then send out an *Escape* key as port switching sequence when clicking 2nd icon on the Select Computex Box....

.....

0 1 0 8 d(1000) ESC → send out *ScrollLock–ScrollLock–0-1-0-8*, then delay 1000 milliseconds and then send out an *Escape* key as port switching sequence when clicking 8th icon on the Select Computex Box....

The hotkey sequence , `0 1 0 1 ESC`, means switching to bank 01 port 01 and then revoke the OSD menu by an ESC key. Note that you should have at least one white

space between keycode entries. Also you should enter one line of command string per port. To select a port, **TK-IP101** generates first the Escape hot key sequence selected above, followed by the port sequence into the line corresponding to the port number. Thus, together with the preceding hotkey sequence, ScrLk – ScrLk, this will make up a complete hotkey command for port selection.

 To specify the key sequence in this editable text area, you have to enter the keycodes. Note that the keycode for a specific key might not exactly correspond to what you have seen on that physical key. Instead, you should reference the “keyboard drawing” diagram that can be accessed via the hyperlink on the right side. Also reference the **CAUTION** warning on the bottom right of this page.

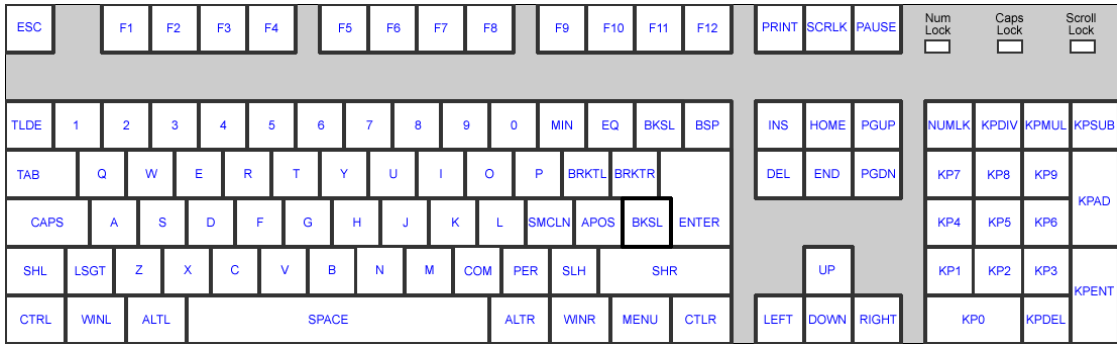


Figure 4-1 Standard Keyboard Mapping Diagram

Save the (new) KVM Model Settings : Click the *Save* button to save new settings into the database.

Suppress this KVM model : If you want to suppress the target KVM Switch definition, you can then click the *Suppress* button to eliminate it from the existing database.

4.11 LAN TCP/IP – Port and IP settings

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.

The screenshot shows the 'TCP/IP Settings' configuration page for the TRENDNET KVM Switch Over IP TK-IP101. The interface includes a sidebar with navigation options and a main form area. The form fields are as follows:

Field	Value
TCP Port Base	5900
Host Name	KLE
Domain Name	
Use DHCP	<input type="checkbox"/>
IP Address	192.168.1.200
Network Mask	255.255.255.0
Gateway	192.168.1.254
DNS	192.168.1.254

Buttons: Cancel, Store Settings

TCP/IP Settings

TCP Port base : Specify the port base for viewer connection with the **TK-IP101** server. You can choose any available port setting starting from the lowest port base alternative of 5900 with an increment of 10 right up to port 6090. The port base you choose is exactly the port number that **TK-IP101** uses for viewer connection and "port base + 8" is the exact port number used by secure http connection of the browser connection. After you have made the port base modification, remember to hit the *Submit* button, and then hit the *Apply Setting* button (found on the *Apply Settings* page) to reboot **TK-IP101**.

Host Name : Specify the host name for **TK-IP101** as appears within your Local Area Network.

Domain Name (Leave empty if unknown) : Specify the domain name for your **TK-IP101** host.

IP Address: Enter a fixed IP address that will be used by **TK-IP101** in your local area network.

Network Mask: Enter the correct subnet mask for your local network.

Gateway: Enter the correct IP for your gateway.

Primary DNS Server: Enter the primary DNS Server for **TK-IP101**. This is a required setting for the e-mail alerts function in **TK-IP101**.



If you are hosting multiple **TK-IP101** units within your networking environment and you want to allow external internet access to these multiple **TK-IP101** units by using only an external IP together with a set of dedicated port numbers each for a different **TK-IP101** unit then, one usual practice is to configure a set of virtual servers on your router so as to map each *external_access_IP: port_number* pair to an *internal IP: port number* that is assigned to a specific **TK-IP101** unit. Thus, you need only one external IP address to allow remote clients to login multiple **TK-IP101** units only by using different port number mappings.

Use DHCP :



Normally, it is NOT recommended to use the DHCP setting for **TK-IP101**. However, if you have no choice but to use DHCP as the only available source for **TK-IP101** local IP, you can still have the choice to check the option to enable it.

This option allows you to configure **TK-IP101** as a DHCP client using the IP address assigned by a DHCP server.

4.12 WAN PPP – PPP Server and Client

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.

The screenshot displays the WAN PPP configuration interface for a TRENDNET KVM Switch Over IP TK-IP101. The interface includes a sidebar with navigation options like 'Main', 'KVM Server', and 'Apply Settings'. The main configuration area is titled 'WAN PPP' and contains the following fields and controls:

- PPP Mode:** Radio buttons for Disabled, Server (selected), and Client.
- Current Local IP Address:** Unknown
- Local IP Address:** 192.168.2.200
- Peer IP Address:** 192.168.2.201
- Maximum Speed:** 38400 Bps
- User Name:** bill
- Password:** Two input fields labeled 'Password' and 'confirm'.
- Modern Initialization (chat script style):** A dropdown menu showing 'TIMEOUT 3600' and 'CLIENT CLIENTSERVERic'.

At the bottom of the configuration area, there are 'Cancel' and 'Store Settings' buttons. The footer of the page reads 'Copyright © 2007 TRENDnet. All Rights Reserved.'

TK-IP101 can either serve as a PPP server for the peer computer to dial-in for connection, or as a PPP client to dial in a PPP server to connect to a network or the Internet. The PPP connection serves as a backup connection mode when direct network connection is not available or just broken down. With **TK-IP101**'s high speed serial control interface, it could offer excellent bandwidth to PPP connection either when **TK-IP101** is connected as PPP server or PPP client.

PPP Connection

Disabled PPP :

The default setting of this PPP connection option is default to *Disable PPP*.

If you have direct network connection, normally you don't have to choose PPP connection as your connection mode. Thus, the *Disable PPP* option is the default setting. However, if direct network connection is not available, you could choose to enable **TK-IP101** in PPP server mode or PPP client mode according to the real connection scenarios.



Enable TK-IP101 PPP Server for connection request from a peer computer

Enable PPP Server : Check this option if you want to enable **TK-IP101** as a PPP server, which could accept a peer computer’s PPP connection request either over a direct serial cable connection, or via a dial-in modem connection.



PPP Connection over direct serial cable with TK-IP101 as PPP Server

To enable **TK-IP101** as the PPP server, you should still specify the following settings

TK-IP101 IP address : Enter an IP address here (default = 192.168.2.200) to be used by the **TK-IP101** in the PPP connection. This IP address here entered will be used only in PPP connection by **TK-IP101** alone, and should be distinct from the IP address (default = 192.168.1.200) that is specified in the *LAN TCP/IP* page and used for connection via direct network.

Peer IP Address : Enter another IP address here (default = 192.168.2.201) to be assigned by **TK-IP101** to the peer computer that has requested a PPP connection to **TK-IP101** PPP server.

User Name : Here you should specify the user name for PPP connection login by the peer computer.

Password : Here you should specify the password that is used by peer computer.

Confirm password : Here type in the same password again for confirmation.

Modem Initialization (Chat Script Style) : the modem initialization script is a chat script that will initialize modem to be ready for connection. The standard script provided here by default should be able to work on most of the PPP connection over direct serial cable (Null Modem):

```
TIMEOUT 3600
CLIENT CLIENTSERVER\c
```

PPP Connection **TK-IP101** Local IP address : When the PPP connection is established, the **TK-IP101** local IP address that is used for PPP connection will be shown here, for example: 192.168.2.200. However, if the PPP connection is not yet established, the IP address will be shown as *Unknown*. Note that this IP address is used for **TK-IP101** PPP server, and is distinct from the one (default = 192.168.1.200) that is used by **TK-IP101** on local area network.

Enable **TK-IP101 PPP Client for Dial-in connection to a PPP server in your ISP or to an Enterprise PPP Server**

You could enable the PPP Client feature, if the only way to get your **TK-IP101** on network is through **TK-IP101**'s dial-in request to your ISP or enterprise PPP server. In most cases, you should request a fixed IP address for **TK-IP101** as a PPP client, so that remote users who will access **TK-IP101** will know how to access its correct IP. If, however, the a static IP is not available, as in some cases using a dial-in account given by ISP, you could always look up the dynamic IP assigned to **TK-IP101** by your ISP or enterprise PPP server and give it to those remote users who will want to access **TK-IP101** in this way.



First, you should have an Dial-in account from your ISP or enterprise RAS service that accept PPP connection over phoneline.

Enable PPP Client : Check this option if you want to enable **TK-IP101** as a PPP client, which could dial in via a phone modem to your ISP or Enterprise PPP server.

User Name : Here you should specify the user name used by **TK-IP101** as a PPP client to log in to the ISP or enterprise PPP server.

Password : Here you should specify the password that is used by **TK-IP101** for logging in to the PPP server.

Confirm password : Here type in the same password again for confirmation.

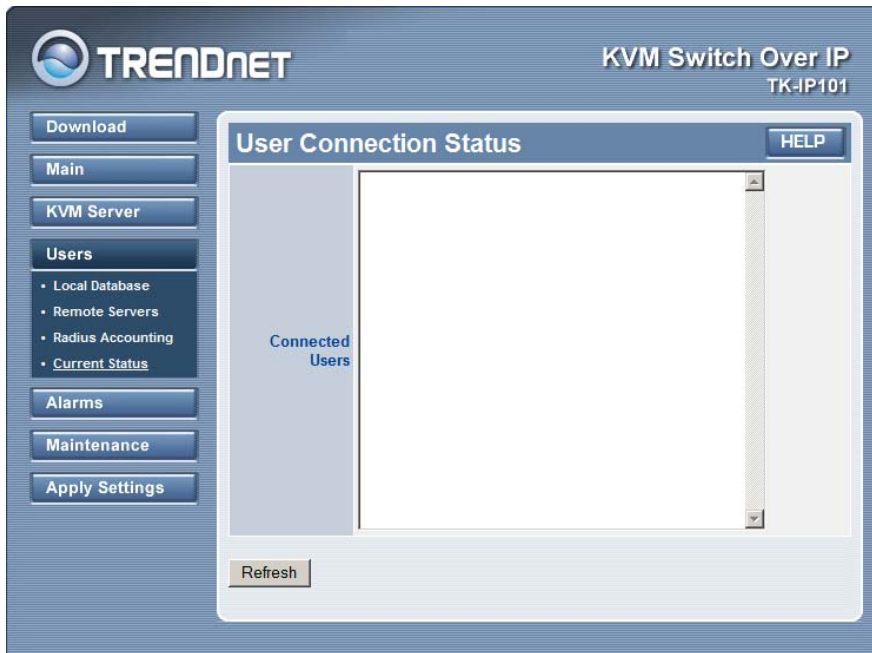


Modem Initialization (Chat Script Style) : the modem initialization script is a chat script that will initialize modem to be ready for connection. The standard script provided here by default should be able to work on most of the modem:

```
'ABORT' 'BUSY'
'ABORT' 'ERROR'
'ABORT' 'NO CARRIER'
'ABORT' 'Invalid Login'
'ABORT' 'Login incorrect'
'' 'AT&F'
'OK' 'AT%C3\\N3&K3B0N1'
'OK' 'ATD0860922000'
'CONNECT'
```

PPP Connection **TK-IP101** Local IP address : When the PPP connection is established, the **TK-IP101** local IP address that is used for PPP connection will be shown here, for example: 62.147.111.39. However, if the PPP connection is not yet established, the IP address will be shown as *Unknown*. Note that this IP address is used for **TK-IP101** PPP client, and in most cases, is assigned by the PPP server and thus is distinct from the one (default = 192.168.1.200) that is used by **TK-IP101** on local area network.

4.13 User Status – Show the Currently Connected Users



Connected Users :

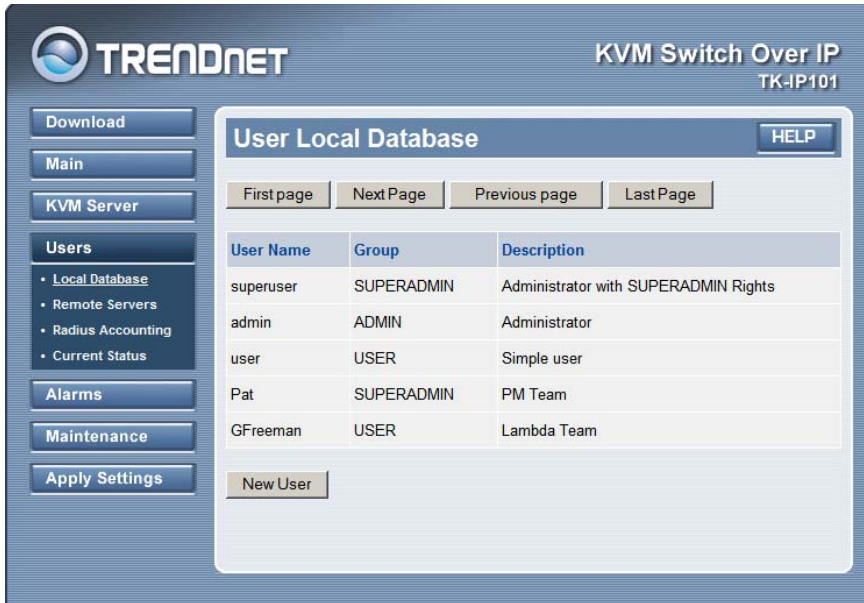
In this field, one can click the *Refresh* button below and see the currently connected users who are now having viewer connections with **TK-IP101**.



Note that: Only when you have selected your password policy to be User Password policy, will the currently connected users be registered and shown on this page. If you are using other password policies such as No Password or Global Password, you will not have any connected users shown on this page, since when adopting Global Password / No Password policies, you have already implied that the distinction of the user identities is not necessary.

4.14 User Management – Manage User Accounts, Radius Accounting and Remote Authentications

⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.



The screenshot displays the 'User Local Database' interface. On the left is a navigation menu with buttons for Download, Main, KVM Server, Users (with sub-items: Local Database, Remote Servers, Radius Accounting, Current Status), Alarms, Maintenance, and Apply Settings. The main area shows a table of users with the following data:

User Name	Group	Description
superuser	SUPERADMIN	Administrator with SUPERADMIN Rights
admin	ADMIN	Administrator
user	USER	Simple user
Pat	SUPERADMIN	PM Team
GFreeman	USER	Lambda Team

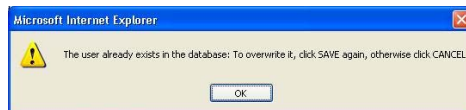
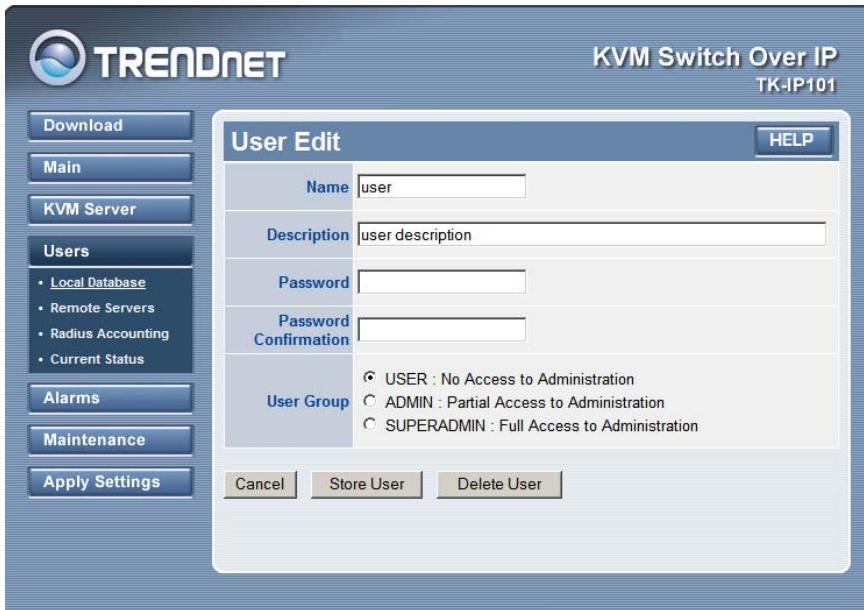
Navigation buttons include 'First page', 'Next Page', 'Previous page', and 'Last Page'. A 'New User' button is located below the table. A 'HELP' button is in the top right corner of the database area.

User Authentication

Edit : To edit an existing user account, select a user from the list and then press the *Edit* button. A *Use Edit* page appears with the selected user's *User ID* (User Name) and *User description* on it.

Make necessary editing and enter the *user password* and confirm it again, or maybe modify the access privilege as is necessary, then click *Save button*.

After clicking the *Save* button, a box appears to remind you that the *Save* action will overwrite an existing user account, and you should be aware of it. If the modification is just what you want, just click *OK*, and then click the *Save* button again to confirm your new modifications on that existing user account.



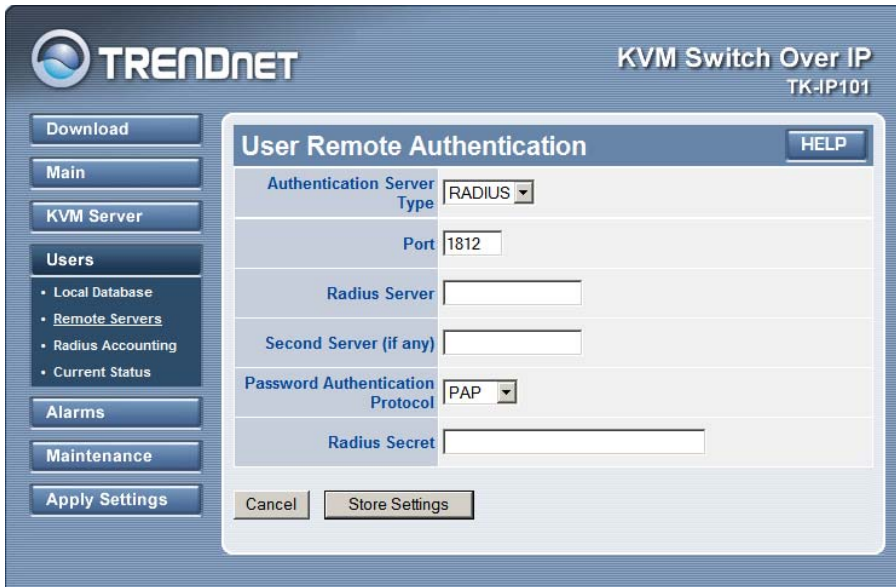
If you decide to abandon editing an existing user account, you can always click *Cancel* to abort and return to the *User Management* page.

New : To add a new user account, just press the *New* button. A default *User* page pops up for you to enter the *User ID*, *User Description*, *Password*. After you have completed, click *Save* to exit. If you decide to abandon the setting, you can always click *Cancel* to abort and return to the *User Management* page.

Delete : To delete a user account from the data base, just select it from the list and then press the *Delete* button to delete it immediately form the user list.

RADIUS Accounting

Normally, RADIUS accounting is disabled by default. However, if you have RADIUS accounting enabled on a RADIUS server or LDAP server, you can check the option of RADIUS Accounting and subsequently configure its relevant settings to take advantage of this feature.



Enable RADIUS Accounting : Check this option, if you want to enable RADIUS accounting support on **TK-IP101**.

Accounting Server : Here you should enter the IP address of the server that offers RADIUS accounting service.

Port : Here you should specify the port that is used for Radius accounting. By default, it is set to 1813.

Secondary Accounting Server (if any) : Here you should enter the IP address of the secondary server, if you've got any backup RADIUS accounting server that offers RADIUS accounting service.

RADIUS secret : Here you should specify the RADIUS secret, or Shared Secret, between the RADIUS client (i.e. **TK-IP101**) and the RADIUS server. Note that the RADIUS secret, or the Shared Secret, is a shared text string that is used as a password between the RADIUS client and RADIUS server.

Remote Authentication

By default, the Remote Authentication is configured at *None* – All remote authentications are disabled. In this case, the authentication is all done locally using the database on **TK-IP101** only. However, if you have remote authentication supports – such as a RADIUS server or LDAP server – available on your network environment, You can then always have the choice to enable remote authentication on **TK-IP101**, either using RADIUS or LDAP authentication.

Enable Remote Authentication : You can select either None / LDAP / RADIUS support from the drop down combo box.

- None – Disable the Remote Authentication Support
- LDAP – Enable LDAP Authentication
- RADIUS – Enable the RADIUS Authentication

To enable the LDAP Authentication

The screenshot shows the TrendNet KVM Switch Over IP TK-IP101 web interface. The main navigation menu on the left includes: Download, Main, KVM Server, Users (with sub-items: Local Database, Remote Servers, Radius Accounting, Current Status), Alarms, Maintenance, and Apply Settings. The 'User Remote Authentication' configuration window is open, featuring a 'HELP' button in the top right. The configuration fields are: 'Authentication Server Type' set to 'LDAP' (dropdown), 'SSL Access' (checkbox, unchecked), 'Port' set to '389' (text input), 'LDAP Server' (text input), 'Second Server (if any)' (text input), and 'User Base Search DN' (text input). At the bottom of the window are 'Cancel' and 'Store Settings' buttons.

Enable Remote Authentication : Just select *LDAP* as the Remote Authentication method, and then configure subsequent settings:

SSL Access : Check this option if you want to enable SSL access of the LDAP authentication. However, to use this option, you should make sure your LDAP server support SSL and also you have to install a distinct set of certificates – *ldapcert.crt* and *ldapkey.pem* – onto the TK-IP101 by uploading them through the Security page (for details, please refer to *Section 4.15, Security – Certificates Installation, Viewer Encryption and Password Policies*).

Server : Enter here the IP address of the LDAP server.

Port : Enter here the port number used in LDAP authentication. By default, it is set to port 389.

Second Server (if any) : If there is a second LDAP server for authentication, you can enter its IP address here.

User Base Search DN : Here you should enter the *User Base Search DN*, which is typical to the LDAP server you use for authentication. By default, the User Base Search DN is:

`cn=users , dc=abc , dc=TK-IP101 , dc=com`

However, you should enter your own appropriate one. If you don't know, you should contact your LDAP server administrator.

To enable the *RADIUS* Authentication.....

The screenshot shows the 'Radius Accounting' configuration page in the TrendNet KVM Switch Over IP TK-IP101 web interface. The interface has a blue header with the TrendNet logo and the device name. A sidebar on the left contains navigation buttons: Download, Main, KVM Server, Users (with sub-items: Local Database, Remote Servers, Radius Accounting, Current Status), Alarms, Maintenance, and Apply Settings. The main content area is titled 'Radius Accounting' and includes a 'HELP' button. The configuration options are: 'Enable Radius Accounting' (checked), 'Port' (1813), 'Accounting Server' (empty), 'Second Server (if any)' (empty), and 'Radius Secret' (empty). At the bottom are 'Cancel' and 'Store Settings' buttons.

Enable Remote Authentication : Just select *RADIUS* as the Remote Authentication method, and then configure subsequent settings:

Server : Enter here the IP address of the RADIUS server.

Port : Enter here the port number used in RADIUS authentication. By default, it is set to port 1813.

Second Server (if any) : If there is a second RADIUS server for authentication, you can enter its IP address here.

Password Authentication Protocol : Here you should select the password authentication protocol to be either CHAP or PAP.

RADIUS secret : Here you should specify the RADIUS secret, or Shared Secret, between the RADIUS client (i.e. **TK-IP101**) and the RADIUS server. Note that the RADIUS secret, or the Shared Secret, is a shared text string that is used as a password between the RADIUS client and RADIUS server.

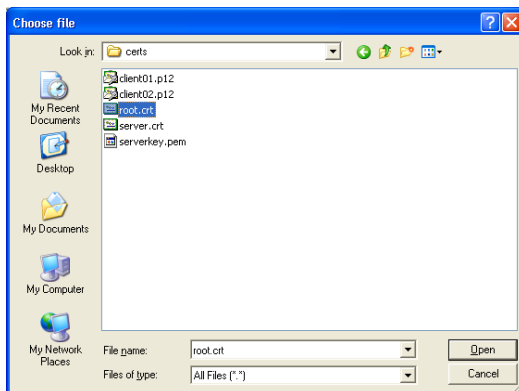
4.15 Security – Certificates Installation, Viewer Encryption and Password Policies

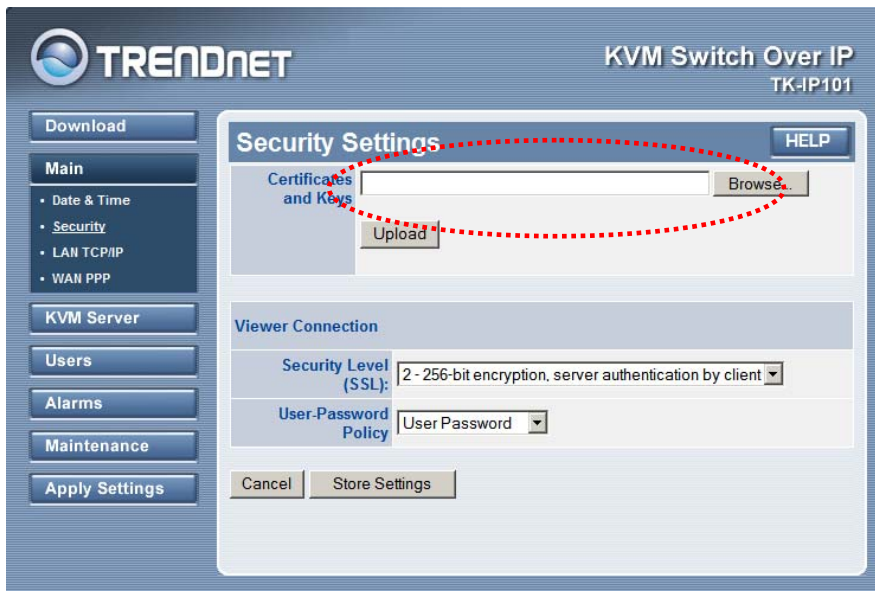
⚡ After any setting change, click the *Submit* button to save new setting to the TK-IP101 database, and then click *Apply Setting* to apply new settings to TK-IP101 immediately.



Certificate and Keys (*root.crt*, *server.crt*, *serverkey.pem*, *ldapcert.crt*, *ldapkey.pem*)

File path : Here you can specify the file path that is directed toward the certificates you are going to install into **TK-IP101**. You don't have to actually type in the path yourself, just hit the *Browse* button, and use the *Choose File* dialog box to browse to your certificate files





Then click **UPLOAD** button to upload your certificates, one at a time, to **TK-IP101**, and the certificate will begin uploading to **TK-IP101**. After the uploading is completed, you can then see the prompt page for reboot.



PKI Authentication for Level 3 security setting

You have to upload a set of certificates into **TK-IP101**:

*root.crt
server.crt
serverkey.pem*

SSL Access for LDAP Authentication Authentications

*ldapcert.crt
ldapkey.pem*

For details, refer to *Section 4.14, User Management – Manage User Accounts, Radius Accounting and Remote Authentications*.



You don't have to reboot each time when you finish uploading one certificates. You could do one complete reboot at the end when you finish uploading all of them. To return to the previous Security page for uploading another certificate just click its hyperlink on the left frame of the browser window.

Viewer Security Connection Level :

TK-IP101 offers three levels of security for viewer connection. On the drop-down combo box, you can just choose either one of the three viewer security levels as appropriate to your real demands on viewer connection security:

- Level 1 - No SSL encryption, no SSL authentication
- Level 2 - 256-bit encryption, server authentication by client
- Level 3 - 256-bit encryption, full authentication (requires the installation of certificates)

Level 1 uses No SSL data encryption and No authentication. This is the most straightforward setting that opens most convenience if there are no security concerns at all. Anyone who have a viewer and internet connection could easily connect to **TK-IP101** as long as the user passes the policy requests.

Level 2 uses SSL encryption for viewer connection, but only requires server-side authentication by viewer client. That is, remote users who want to make viewer connections are not require to install certificates on their client computers. However, the viewer connection is encrypted with 256-bit SSL technology to ensure any data contents transmitted via the viewer connection is protected, including keyboard, mouse and video signals.

Level 3 uses 256-bit encryption as well a bi-directional PKI authentication between **TK-IP101** server and viewer client. With this level of setting, all remote users who want to make viewer connection at all, should require installation of a proper client certificate, which is signed by the same private key of the CA that issues the root.crt and server.crt of **TK-IP101**.



There are altogether nine possible combinations of Viewer Security Levels + Password Policies that are available for a flexibility to adapt to your security needs.

TK-IP101 server password : Here you should enter the password that has encrypted the *server private key* in the server private key file, *serverkey.pem*. You should enter the correct server password here in order to make successful viewer connection with **TK-IP101** in level 3 security setting - 256-bit encryption, full authentication (requires the installation of certificates).

By default, the server private key is *serverpwd*, if you use the standard set of certificates provided on the Support CD ROM disc.

However, if you use your own set of certificates, you should get the correct server password from the Certificate Authority that issues those certificates.

User Password Policy :

TK-IP101 offers three types of password policies On the drop-down combo box, you can select your password policy for viewer connections:

- No Password
- Global Password
- User Password

No Password – the viewer will prompt you for no password. Anyone who is with the viewer and passes the security level check of the viewer, could well establish the connection.

Global Password – the viewer will prompt you for a global password, which is used by all who want to make viewer connections to **TK-IP101**.

User Password – the viewer will prompt you with user-specific password. With this setting, each login user will be checked against his or her corresponding password before allowing viewer connection.

Global user password : Here you should enter the password that is used when the global user password setting is enabled as your active password policy.

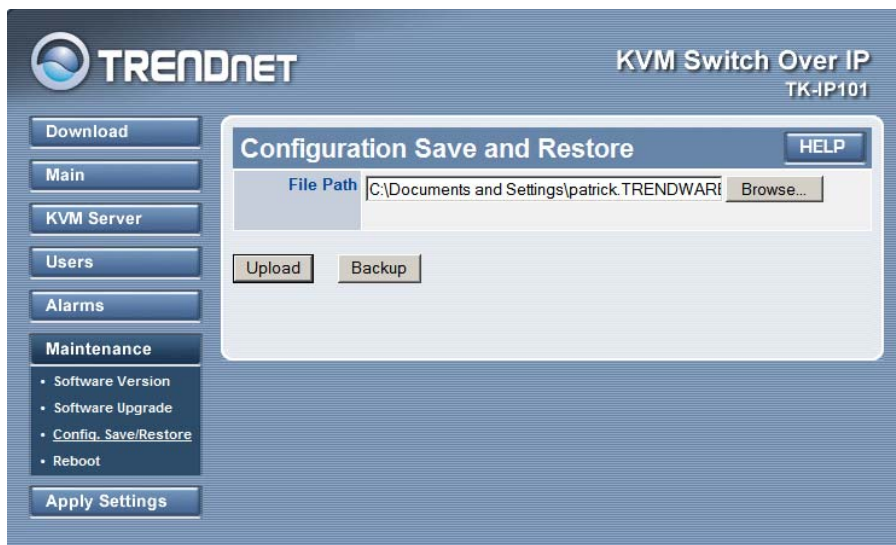


There are altogether nine possible combinations of Viewer Security Levels + Password Policies that are available for a flexibility to adapt to your security needs.



Please note: Either *Password* or *Security* (SSL/PKI authentication) settings should be used with due precaution since anyone with a viewer and knowledge of the access IP and port number of **TK-IP101** can establish a remote connection, if **TK-IP101** connection is set at *No Password* and no SSL / no PKI authentication (Viewer connection security - Level 1). With these settings, there will be no password protection and no encryption for data transmission over the viewer connection. Unless you have taken other proper security measures or you simply have no security concern, these “unsafe settings” is not suggested for critical/sensitive remote connection across internet.

4.16 Maintenance – Flash Image Version Information, Software Upgrade, Configuration Backup and Upload



Software version

Information about the versioning of the linux kernel and *Applications* are provided here.

Linux Kernel: Built on 09/27/05-12:39:09

Applications: Built on 12/02/05-14:00:13

Software Upgrade (kupdate-xx-xx-xx)

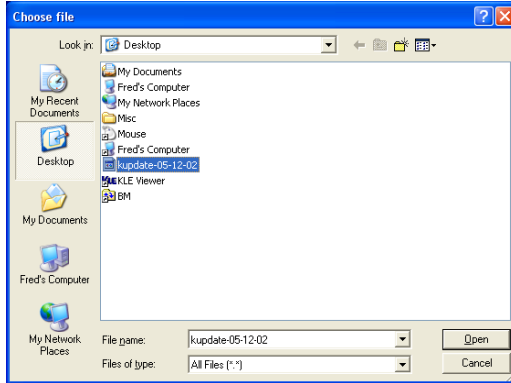
Generally, the **TK-IP101** upgrade file comes with a file name such as *kupdate-xx-xx-xx*, for example, *kupdate-17-09-05*.

The *kupdate* file is of an accumulative nature, that means you only have to apply the single latest *kupdate* patch to keep your TK-IP101 most up-to-date.

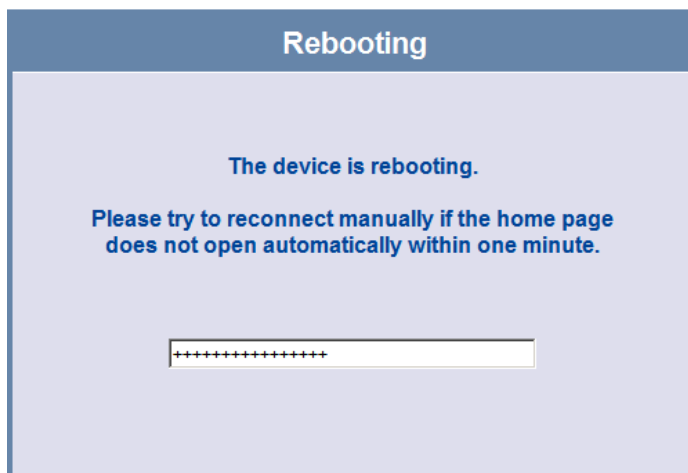
When you receive the upgrade file, you could copy to local computer and perform the update by uploading the upgrade file using **TK-IP101**'s Web management interface across LAN/internet.

To perform software upgrade for TK-IP101

File Path : Just browse to the location of the update file and then click the *UPLOAD* button.



A running progress indicator bar will be running then to indicate the on-going upload process. Depending on the upgrade file size and also the bandwidth availability across the network, file upload time could vary from 1 minute to 20 minutes. When the upload process is complete, **TK-IP101** will reboot by itself.



Configuration Files (*.tgz)

It is wise to backup your configuration files periodically so that you will always be free from risk of being required to configure **TK-IP101** anew when you have lost your configuration or when you have to configure another unit of **TK-IP101** with the same configuration like one that you have used.

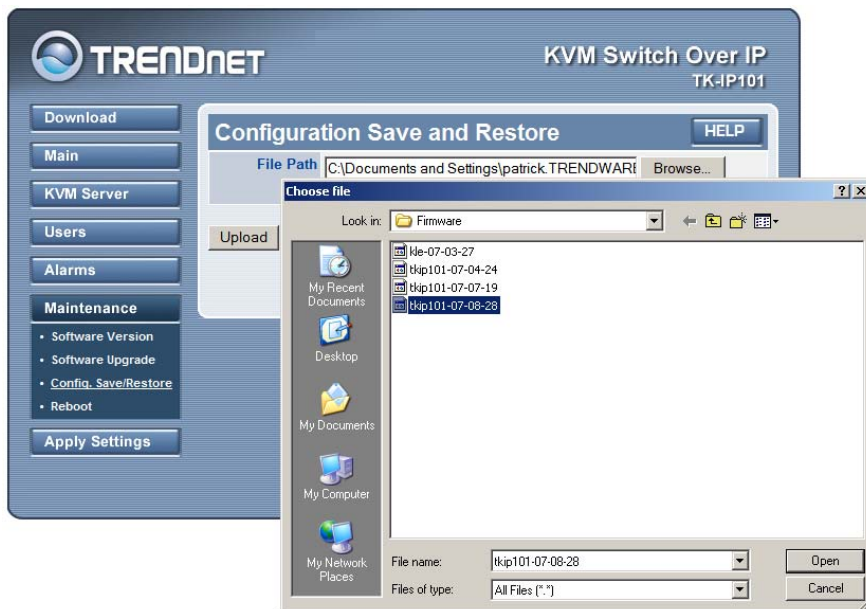
To upload the configuration file to TK-IP101

File Path : Just browse to the location of the update file (*.tgz) and then click the **UPLOAD** button.

A running progress indicator bar will be running then to indicate the upload process is running. Depending on the configuration file size and also the bandwidth availability across the network, file upload time could vary. When the upload process is complete, the progress bar will stop running and **TK-IP101** will reboot by itself.

To backup the configuration file from TK-IP101

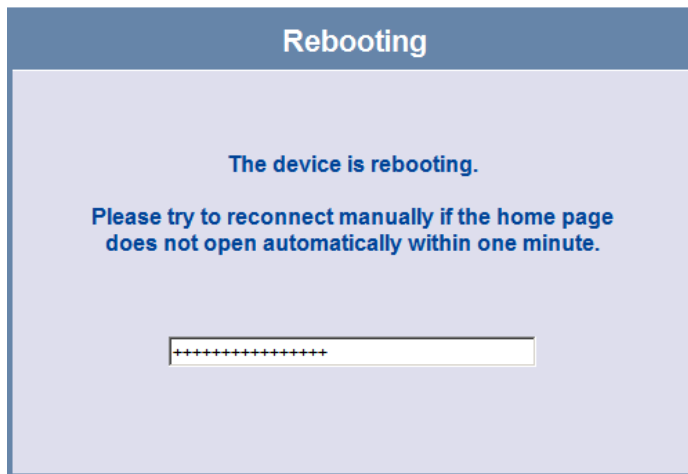
Just click the **BACKUP** button and then you'll see a file download prompt. Choose the location for saving your configuration file (*.tgz), and then click **Save** to save your configuration backup file to where you want.



Emergency Reboot

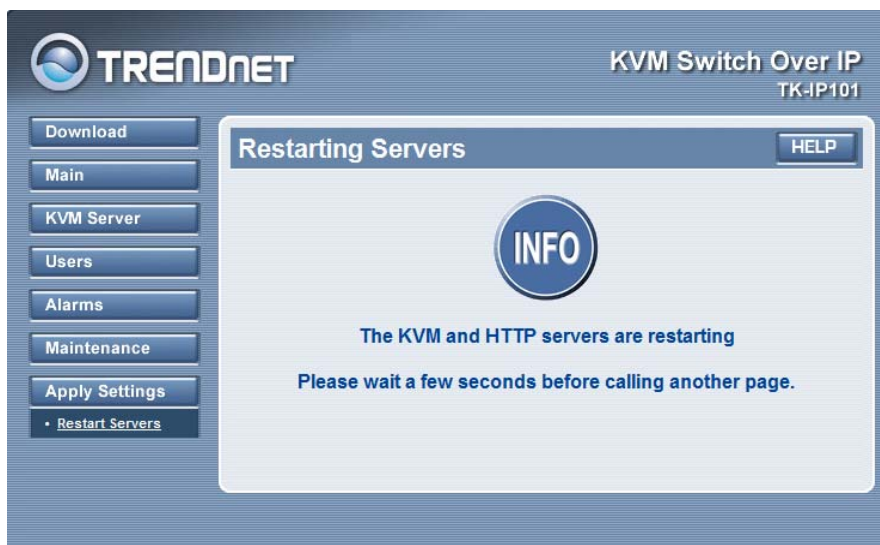
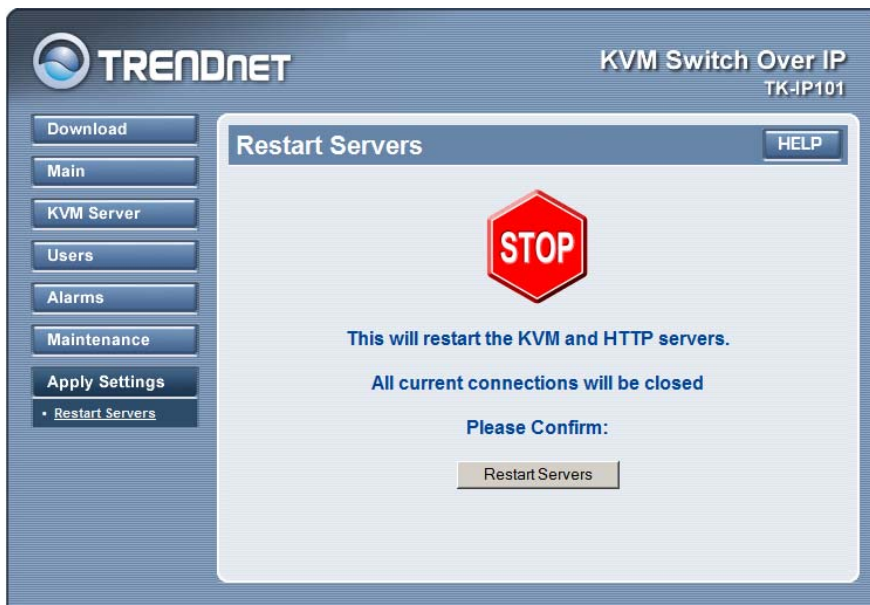
In most of the cases, you don't need to use this emergency reboot button to restart your **TK-IP101**. Normally, you should use the *Apply Settings* button on the *Apply Settings* Page for almost all the cases of restarting/rebooting **TK-IP101** with new settings. However, if you find the *Apply Setting* button could not bring the **TK-IP101** to a restart that works properly with the viewer, you can then try to use the *Emergency Reboot* button here. But as a rule of thumb, you should try the *Apply Settings* button first, before you try the *Emergency Reboot* button.

The *Emergency Reboot* button will boot the **TK-IP101** system completely from ground level up, and thus will take a longer time than when you hit the *Apply Settings* button. Thus before making new viewer connections, you should wait at least 1 minute to wait the **TK-IP101** system to boot up completely to normal function.



4.17 Apply Settings – Validate New Settings

All the new settings you have made could only be committed to **TK-IP101**'s database by clicking the **Submit** button on each setting page. However, just clicking the **Submit** button won't have these new settings immediately activated. You should *Apply Settings* so that new settings can be put into use at once.



The Apply Setting button will disconnect all current viewer connections.



In addition to the *Apply Settings* button, **TK-IP101** also provides an *Emergency Reboot* button on the *Security* page. The *Emergency Reboot* button is used only when the *Apply Settings* button could work no longer to bring **TK-IP101** to normal restart for a proper viewer connection. If you find the *Apply Settings* button no longer works to bring **TK-IP101** to an effective restart, you can click the *Emergency Reboot*

button on the *Maintenance* Page. Only bear in mind that The Emergency Reboot is a total reboot and takes longer time to boot up completely.

4.18 Configuration -TK-IP101 to work with TK-RP08

The TK-RP08 can be used as a power control accessory for TK-IP101 Switch, or any other KVM Switch that supports a standard serial power control.

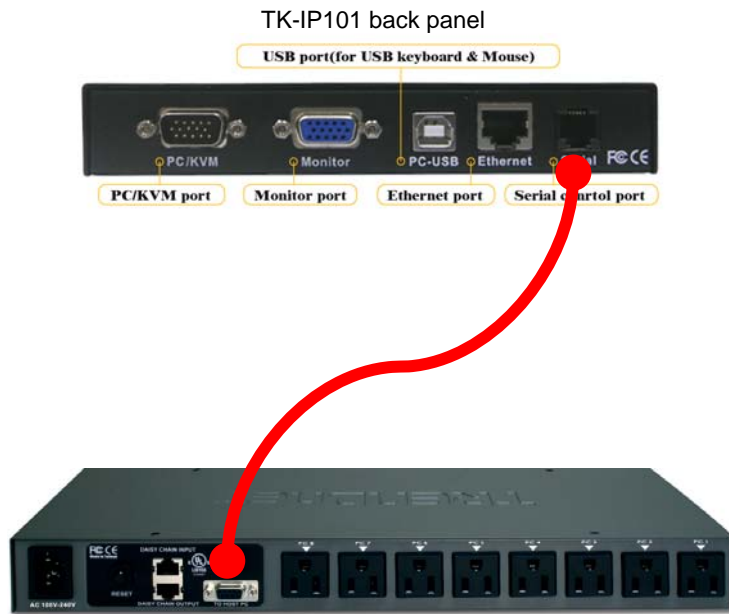
When used in conjunction with power device or KVM, you have to properly connect the TK-RP08 to the TK-IP101 via a serial interface connection, using the special serial cable that comes with your TK-IP101. Further, you have to correctly configure the setting on the TK-IP101, in order to enable the remote power control function that can be effected via the viewer menu interface on any of the remote connection client computers.

I. Connect TK-RP08 to TK-IP101



Before you connect the TK-RP08 to the TK-IP101, you might need to install them first into their own proper placements within a rack, that is, if you are going to use them within a rack. After you have installed the TK-RP08, TK-IP101 into the rack, or into their proper locations, you can now proceed with following steps for further connections.

Step 1. Use the serial power control cable that comes with your TK-IP101 package to connect the TK-RP08 serial interface to the serial port on the backpanel of the TK-IP101.



Serial power control cable
(can be found within the TK-IP101 package)



A real connection case of TK-RP08 and TK-IP101 Trendnet KVM back panel

Step 2. Make sure that the TK-IP101 and TK-RP08 are powered on. If not, power them up first before proceeding.


Next, you should access the TK-IP101 Web management interface to set up the various power control settings....

II. Enable the Power Control Feature on TK-IP101 Web Management Interface

Step 3. Access the Web Management Interface of your TK-IP101.

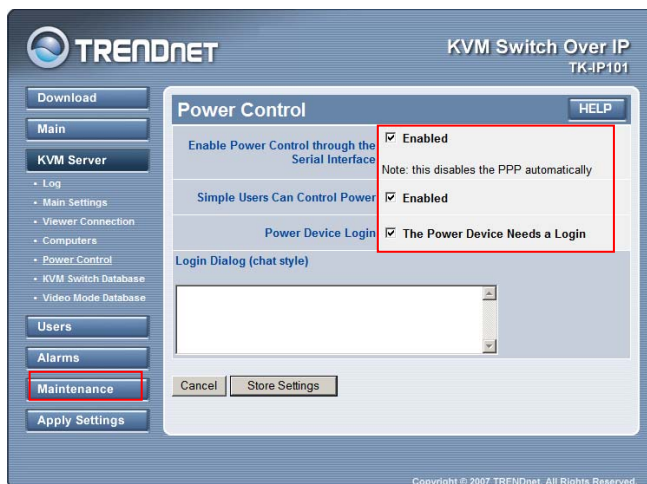
And from there, you can then go forth to **(1)** enable the power control feature of TK-IP101, and then **(2)** configure the Power control commands for each and every port on the TK-RP08. (Also please refer to TK-IP101 User Guide, Section 4.11, KVM Server/Power Control – Enable the power control.)....

Step 4. Go to the Power Control page. Then Enable and Select various Power Control features.

 The Power Control page allows you to enable or disable the power control feature via the serial port on the back panel of your TK-IP101. (Also please refer to TK-IP101 User Guide, Section 4.11, KVM Server/Power Control – Enable the power control.)



Step 5. Check the *Enabled* option to activate the remote power control support feature of the back panel serial port of the TK-IP101.



⚡ Once the *Enabled* option is checked, a subsequent Power Device Login option will appear for you to decide whether to enter the login script. The TK-RP08 does not require a login script. Hence you don't have to enter any script.

Other options:

Simple Users Can Control Power

Check this box if you want that simple users be able to power on and power off the computers. By default, the TK-IP101 allows only Super admin and admin the right to power on/off the computer from the viewer Quick Menu. If you want to allow this feature to simpler users, you can check this option.

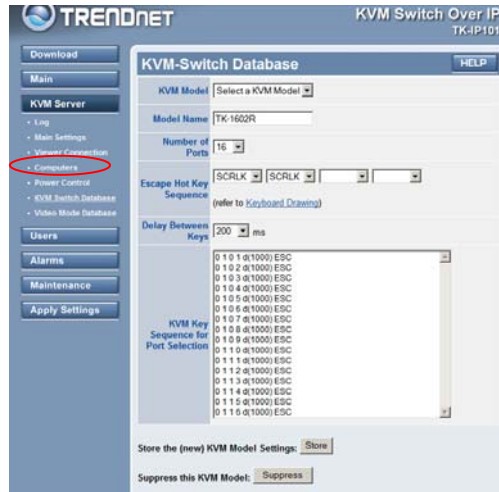
Power Device Login

Depending on the Serial Power control device you used behind TK-IP101, sometimes you will need a login script to login or initialize your power control device. If that is the case, just check the *Power Device Needs a Login* option, and a Login Dialog field will appear for you to enter your login script. In this case, you don't have to enter any script, since TK-RP08 does not need any.

After you have made all modifications, click Store Settings to save your settings and then hit Apply Settings/Restart Servers to validate these new settings. Every change you have made on this page will NOT apply until you hit Apply Settings/Restart Servers!

Configure the Power Control Command for each and every port on the TK-IP101

Step 6. Go to the KVM Server/Computers page.



The various settings on this page are KVM port-specific because a computer is first identified by the KVM port it is attached to. Select the target port on which your subsequent settings on this page are directed. You can use the drop-down combo box as well as use the *Previous* and the *Next* button to navigate to a specific port.

⚡ Important Note: when using a power control device, please note that some newer computers will require some BIOS option adjustment to restart when power is coming back. Otherwise they will not restart without a push of the computer power button. Usually, you should enable the *Power Loss Restart* option on your computer BIOS (or similar option depending on the BIOS vendor), so that your computer can boot up when the power control device is feeding power again

Step 6-1. Configure the Power down and Power On command for each and every port on the IP KVM Switch.

First, you select the 1st port and configure the Power Down and Power Off command, (and if necessary the delay time between the Power Off and Power On Command, or you can leave it as default) then hit the *Store Settings* buttons. Then, you go the 2nd port and then do the configurations likewise, then hit the *Store Settings* button. So you configure every port right through to the last port of your IP KVM switch, and then hit the *Store Settings* button. Then you hit the *Apply Settings* button to make the changes effective.

Power down command: /Fbbp

- F: OFF
- bb: 2-digit bank number on which the target port resides.
- p: 1-digit target port number.

e.g. If you want to turn off port 3 on bank 1. Then you have to enter:

```
/F013\
```

Power on command: /Obbp

O: ON

bb: 2-digit bank number on which the target port resides.


p: 1-digit target port number.

e.g. If you want to turn on port 3 on bank 1. Then you have to enter:

```
/O013\
```

Delay

Here you should specify the delay time between the sending of power-down and power-on commands to complete a power cycling. A power cycling is processed only if you have selected *Restart Computer* into the *Alarm page*. By default this delay is 5 seconds.

 **Important Note:** To remotely power on/ off this computer from the Windows or the Java Viewers, switch to this computer and then click *Power On/Power Off* in the Viewer menu. The command specified here will be sent automatically by TK-IP101 to the TK-RP08.

After you have made all modifications, click Store Settings to save your settings and then hit Apply Settings/Restart Servers to validate these new settings. Every change you have made on this page will NOT apply until you hit Apply Settings/Restart Servers! (Also refer to TK-IP101 User Guide, Section 4.10, KVM Server/Computers – Port and IP settings)

Verify the remote Power Control function via Viewer Quick Menu

Step 7. On a client computer that has been installed with the TK-IP101 viewer program, you can then make a viewer connection to the TK-IP101.

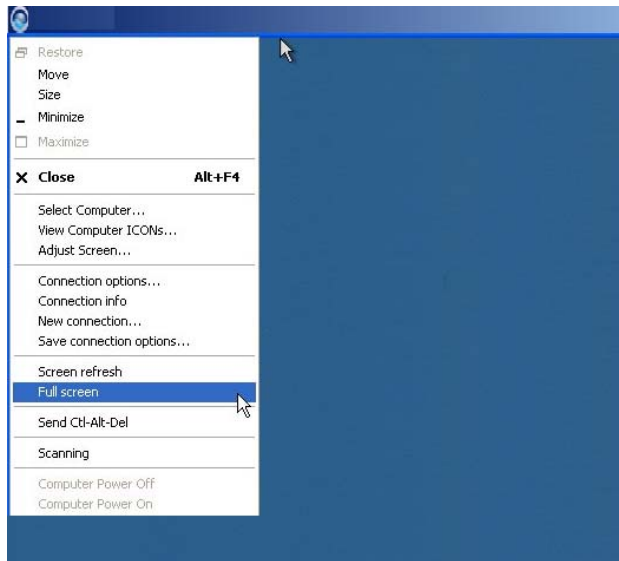


For viewer connection details, please refer to Chapter 4, Unit Management over a secure https browser connection.

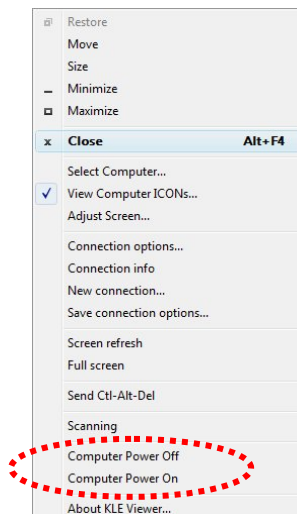
Step 7-1. To power off a specific computer, first you have to switch to that computer desktop by clicking its icon in the Select Computer Box to switch to whatever PC you WAN to perform power on/off from remote.



Step 7-2. Access the Viewer Quick Menu by clicking on the title bar of the viewer window.



Step 7-3. To power on or power off a specific computer desktop of your choice, you need only to select the Power On /Power Off option on the Viewer Quick Menu.



Now you can use the View Quick Menu to perform power on / power off command remotely across internet by using the TK-IP101 together with an TK-RP08.



Likewise, if you are using any other IP KVM switch that supports serial interface, then you can configure it according to its manual instructions.



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