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TekSmartLab™
TBX3000A and TSL3000B

User Manual

077-1110-01

TekSmartLab™
TBX3000A and TSL3000B

User Manual

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14150 SW Karl Braun Drive
P.O. Box 500
Beaverton, OR 97077
USA

For product information, sales, service, and technical support:
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[W16 – 15AUG04]

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[W9b – 15AUG04]

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Important safety information

This manual contains information and warnings that must be followed by the user for safe operation and to keep the product in a safe condition. To safely perform service on this product, additional information is provided at the end of this section. (See *Service safety summary*.)

General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

Comply with local and national safety codes.

For correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

Only qualified personnel who are aware of the hazards involved should remove the cover for repair, maintenance, or adjustment.

This product is not intended for detection of hazardous voltages.

While using this product, you may need to access other parts of a larger system. Read the safety sections of the other component manuals for warnings and cautions related to operating the system.

When incorporating this equipment into a system, the safety of that system is the responsibility of the assembler of the system.

To avoid fire or personal injury

Use proper power cord. Use only the power cord specified for this product and certified for the country of use.

Do not use the provided power cord for other products.

Ground the product. This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, make sure that the product is properly grounded.

Power disconnect. The power cord disconnects the product from the power source. See instructions for the location. Do not position the equipment so that it is difficult to operate

the power cord; it must remain accessible to the user at all times to allow for quick disconnection if needed.

Use proper AC adapter. Use only the AC adapter specified for this product.

Observe all terminal ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

The measuring terminals on this product are not rated for connection to mains or Category II, III, or IV circuits.

Do not operate without covers. Do not operate this product with covers or panels removed, or with the case open. Hazardous voltage exposure is possible.

Avoid exposed circuitry. Do not touch exposed connections and components when power is present.

Do not operate with suspected failures. If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Disable the product if it is damaged. Do not use the product if it is damaged or operates incorrectly. If in doubt about safety of the product, turn it off and disconnect the power cord. Clearly mark the product to prevent its further operation.

Examine the exterior of the product before you use it. Look for cracks or missing pieces.

Use only specified replacement parts.

Do not operate in wet/damp conditions. Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

Do not operate in an explosive atmosphere.

Keep product surfaces clean and dry. Remove the input signals before you clean the product.

Provide a safe working environment. Always place the product in a location convenient for viewing the display and indicators.

Avoid improper or prolonged use of keyboards, pointers, and button pads. Improper or prolonged keyboard or pointer use may result in serious injury.

Be sure your work area meets applicable ergonomic standards. Consult with an ergonomics professional to avoid stress injuries.

Service safety summary

The *Service safety summary* section contains additional information required to safely perform service on the product. Only qualified personnel should perform service procedures. Read this *Service safety summary* and the *General safety summary* before performing any service procedures.

To avoid electric shock. Do not touch exposed connections.

Do not service alone. Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect power. To avoid electric shock, switch off the product power and disconnect the power cord from the mains power before removing any covers or panels, or opening the case for servicing.

Use care when servicing with power on. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

Terms in this manual

These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Symbols and terms on the product

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

When this symbol is marked on the product, be sure to consult the manual to find out the nature of the potential hazards and any actions which have to be taken to avoid them. (This symbol may also be used to refer the user to ratings in the manual.)

The following symbol(s) may appear on the product:

Caution

Refer to Manual

Compliance information

This section lists the EMC (electromagnetic compliance), safety, and environmental standards with which the instrument complies.

EMC compliance

EC Declaration of Conformity – EMC

Meets intent of Directive 2004/108/EC for Electromagnetic Compatibility. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

EN 61326-1 2006. EMC requirements for electrical equipment for measurement, control, and laboratory use.[1] [2] [3]

- CISPR 11:2003. Radiated and conducted emissions, Group 1, Class A
- IEC 61000-4-2:2001. Electrostatic discharge immunity
- IEC 61000-4-3:2002. RF electromagnetic field immunity
- IEC 61000-4-4:2004. Electrical fast transient / burst immunity
- IEC 61000-4-5:2001. Power line surge immunity
- IEC 61000-4-6:2003. Conducted RF immunity

[1] This product is intended for use in nonresidential areas only. Use in residential areas may cause electromagnetic interference.
[2] Emissions which exceed the levels required by this standard may occur when this equipment is connected to a test object.
[3] For compliance with the EMC standards listed here, high quality shielded interface cables should be used.

- IEC 61000-4-11:2004. Voltage dips and interruptions immunity

EN 61000-3-2:2006. AC power line harmonic emissions

EN 61000-3-3:1995. Voltage changes, fluctuations, and flicker

European contact.

Tektronix UK, Ltd.
Western Peninsula
Western Road
Bracknell, RG12 1RF
United Kingdom

Australia / New Zealand Declaration of Conformity – EMC

Complies with the EMC provision of the Radiocommunications Act per the following standard, in accordance with ACMA:

- CISPR 11:2003. Radiated and Conducted Emissions, Group 1, Class A, in accordance with EN 61326-1:2006.

Australia / New Zealand contact.

Baker & McKenzie
Level 27, AMP Centre
50 Bridge Street
Sydney NSW 2000, Australia

Safety compliance

This section lists other safety compliance information.

Equipment type

Test and measuring equipment.

Pollution degree descriptions

A measure of the contaminants that could occur in the environment around and within a product. Typically the internal environment inside a product is considered to be the same as the external. Products should be used only in the environment for which they are rated.

- Pollution degree 1. No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms.
- Pollution degree 2. Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This

location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.

- Pollution degree 3. Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind.
- Pollution degree 4. Pollution that generates persistent conductivity through conductive dust, rain, or snow. Typical outdoor locations.

Pollution degree rating

Pollution degree 2 (as defined in IEC 61010-1). Rated for indoor, dry location use only.

Environmental considerations

This section provides information about the environmental impact of the product.

Product end-of-life handling

Observe the following guidelines when recycling an instrument or component:

Equipment recycling. Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. To avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.

This symbol indicates that this product complies with the applicable European Union requirements according to Directives 2002/96/EC and 2006/66/EC on waste electrical and electronic equipment (WEEE) and batteries. For information about recycling options, check the Support/Service section of theTektronix Web site (www.tektronix.com).

Restriction of hazardous substances

This product is classified as an industrial monitoring and control instrument accessory, and is not required to comply with the substance restrictions of the recast RoHS Directive 2011/65/EU until July 22, 2017.

TBX3000A

Overview

This guide introduces the TBX3000A and provides a step by step demonstration of how to use the product.

Packing list

Please confirm that you have received all the items listed in the packing list:

- The TBX3000A
- 4 USB cables
- 1 power cable
- 1 DC power adaptor

Get Acquainted with TBX3000A

Main features

TBX3000A is used to connect Tektronix and Keithley products: oscilloscope, signal generator, digital multimeter, and power supply.

- It is equipped with USB 2.0 ports and RJ45 10/100Mbps Ethernet port
- It can be connected to WIFI after installing a USB WIFI dongle
- It is powered by a DC power adaptor (5V/3A)

Appearance

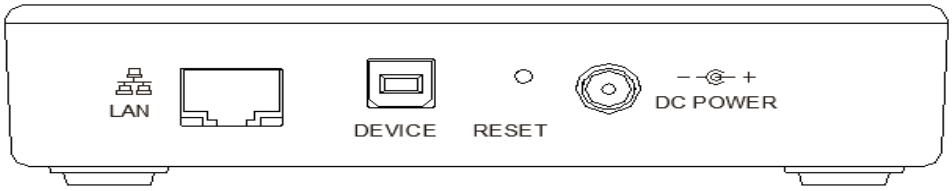


Figure 1: Side view 1 of TBX3000A

One side of TBX3000A has the following connectors, buttons, and indicators:

- Ethernet LAN port: The TBX3000A is connected to the network through this port.
- USB device port: The original code of the product is burned through this port, which is used by manufacturer only.
- Reset button: If you press this button and hold down to 5 seconds, the SYS indicator will blink rapidly for 5 seconds, then the default setting (including password and IP parameters) will be restored.
- DC power socket: Use this connector for the DC power supply that came with your instrument.

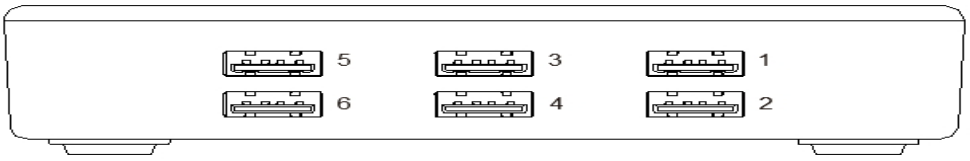


Figure 2: Side view 2 of TBX3000A

The figure above shows another side of TBX3000A with six USB 2.0 ports. You can connect TBX3000A to other instruments by USB cable.

The figure below is the top view of TBX3000A, showing the Tektronix logo and indicators.

Figure 3: Top view of TBX3000A

- The first six are USB indicators. If the indicator is on or blinking, it means some instrument is connected to TBX3000A through a USB port.
- The one next to the USB indicators is the WIFI indicator:
  - If it's not on, it means the USB WIFI dongle is not installed or the WIFI dongle is not compatible with the instrument.
  - If it blinks once at a time, it means the USB WIFI dongle is installed, but TBX3000A is not connected to the WIFI.
  - If it blinks twice at a time, it means the USB WIFI dongle is installed, and TBX3000A is connected to the WIFI.
- The last indicator is the system indicator (SYS):
  - If it blinks rhythmically, it means the power is on and the system is functioning.
  - If it's not on, it means the power is not on or the system is malfunctioning.
  - If it blinks unrhythmically, it means the firmware is upgrading.

The figure below shows the bottom aspect of TBX3000A.

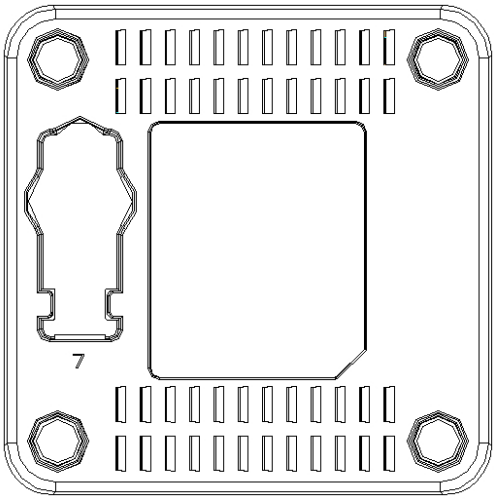


Figure 4: Bottom view of TBX3000A

The part illustrated as 7 is a socket for USB WIFI dongle like Netgear WNA1000M.

Configure the TBX3000A

When the TBX3000A is connected to the network, you can configure instrument parameters. The default IP address for the instrument is 192.168.1.101. Enter the default address into a web browser, press Enter, and the welcome page shown in Figure 5 is displayed.

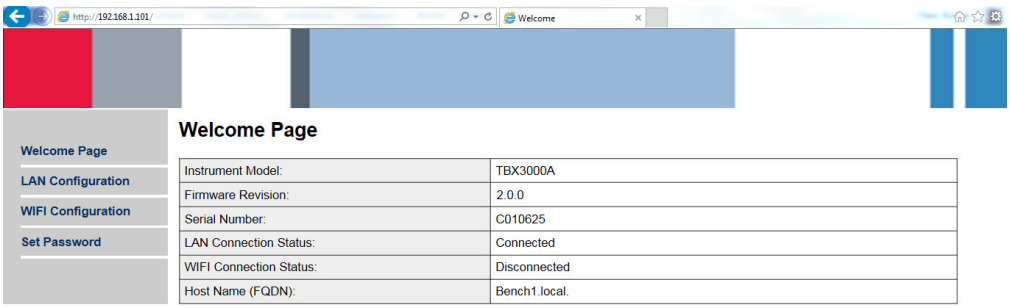


Figure 5: Welcome page for TBX3000A configuration

The Welcome page shows the firmware version, serial number, LAN connection status, WIFI connection status, and the hostname of the TBX3000A.

LAN Configuration

Click **LAN Configuration** in the navigation bar on the left to show the LAN Configuration page.

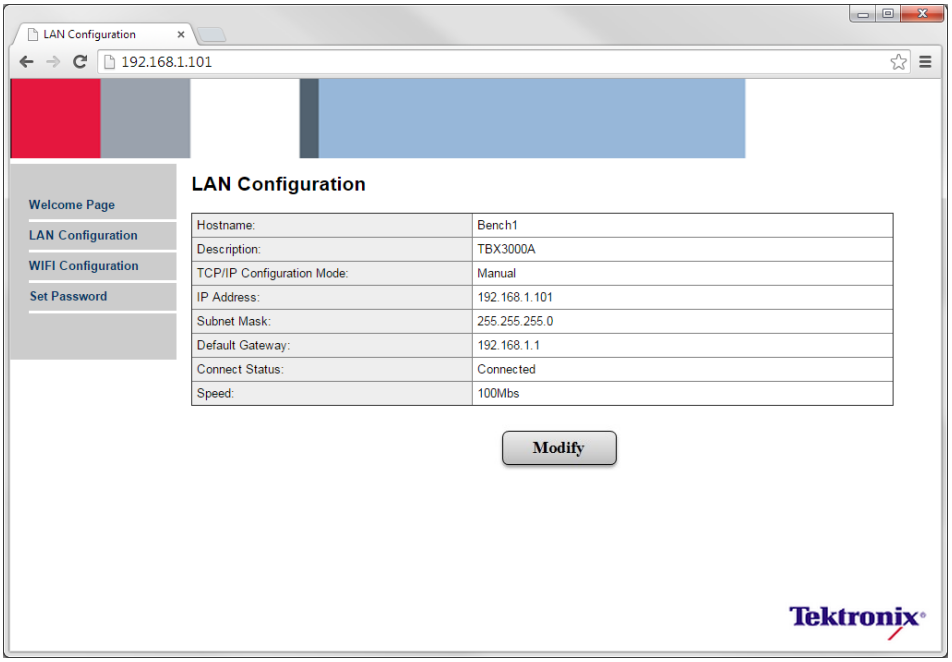


Figure 6: LAN configuration

Click **Modify** to configure the LAN parameters and the host name.

The default LAN configuration values are shown below:

Host Name	Bench1
TCP/IP Configuration Mode	Manual
IP Address	192.168.1.101
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1

WIFI Configuration

Click **WIFI Configuration** in the navigation bar on the left to show the WIFI Configuration page.

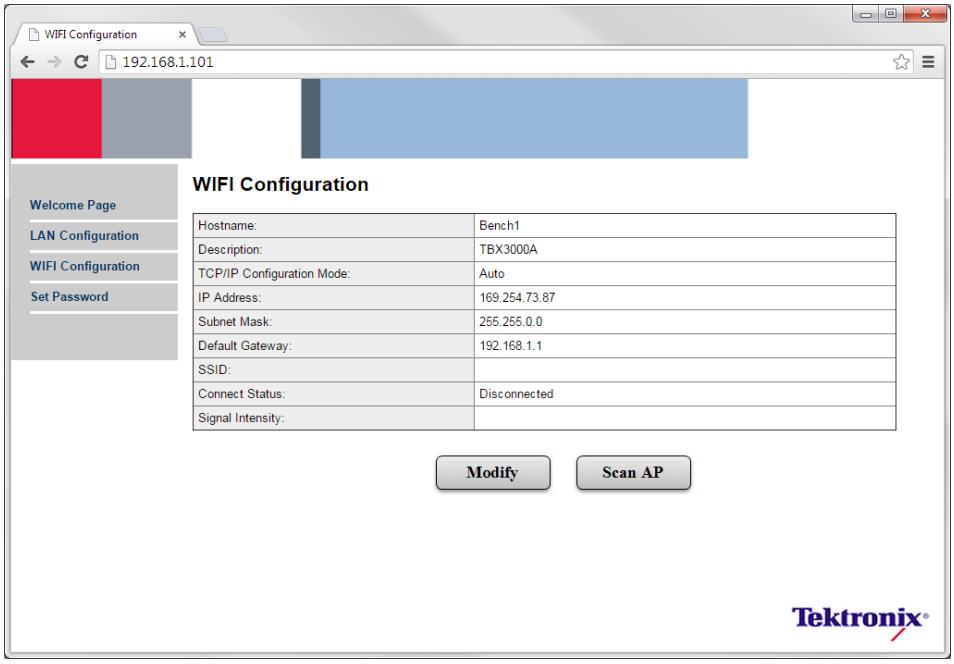


Figure 7: WIFI configuration

Click **Modify** to configure WIFI network parameters.

Click **Scan AP** to search for the SSID of the WIFI network.

NOTE:

The TBX3000A will connect to the WIFI network, only after the USB WIFI dongle is installed on the instrument.

Set Password

Click **Set Password** in the navigation bar on the left to change the password for the instrument.

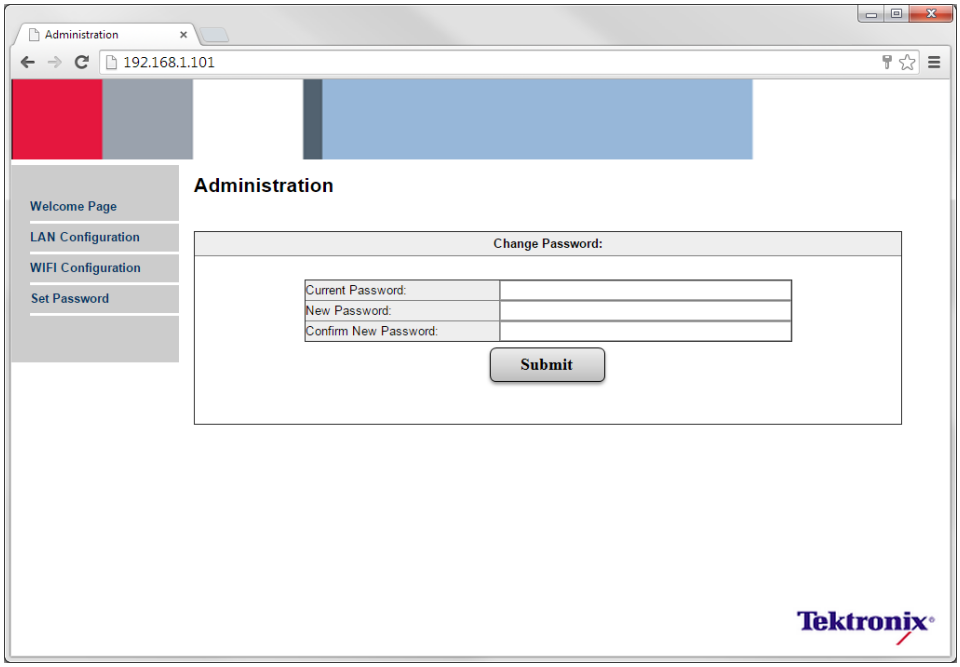


Figure 8: Set password

You can change the password on this page. The default password is **admin**.

TSL3000B Installation

Hardware and Software Requirements for the Server

Hardware Requirements

- CPU: 2.3 GHz dual-core or higher
- Memory: 4 GB DDR3 or higher
- Display: Resolution of 1366 by 768 or higher
- Storage: 160 GB or higher

Software Requirements

- Operating system: Win7 Professional, Enterprise, or Ultimate
- .Net Framework 4.5 or higher (for installation instructions, please refer to Installing .Net Framework)
- Internet Information Service: IIS 6.0 or higher (for installation instructions, please refer to IIS Installation and Configuration)
- Database system: SQL Server 2014 Express or SQL Server2014 Enterprise (for installation instructions, please refer to Installing SQL Server 2014 Express)

Installing TSL3000B

Visit www.tek.com, and search for 'TSL3000B'. Search through the results and find the latest version of the software. Download and install the software, following the software installation instructions on screen.

Installing .Net Framework

Visit http://www.microsoft.com/en-US/download/details.aspx?id=30653, and choose the language consistent with your operating system. Then download and install .Net Framework 4.5. If you already have a higher version of .Net Framework installed on your computer, you don't have to install this software.

Installing SQL Server 2014 Express

Downloading the Installation Pack

Visit http://www.microsoft.com/en-in/download/details.aspx?id=42299&WT.mc_id=rss_alldownloads_devresources, and choose the installation pack consistent with the bit number of your operation system. For example;

- For 64-bit Win7, choose ExpressAndTools 64BIT\SQLEXPRWT_x64_ENU.exe
- For 32-bit Win7, choose ExpressAndTools 32BIT\SQLEXPRWT_x86_ENU.exe

NOTE: *The size of the installation pack is around 800MB.*

The installation cannot be carried out if the bit number of the installation pack is not consistent with your operation system.

Installing the Software

In this procedure, we use the 64-bit Win7 installation package as the example. This section explains how to install the database system.

1. Double-click SQLEXPRWT_x64_ENU.exe, and choose the directory for extracted files. The following figure is displayed.

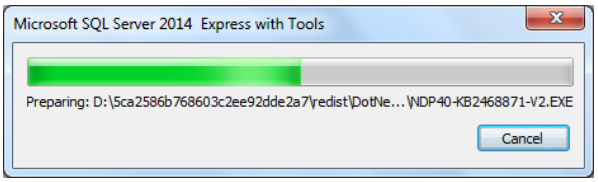


Figure 9: Extracting files

You may have to wait up to two minutes while the installer extracts the TSL3000B installation files. Then the following figure is displayed.

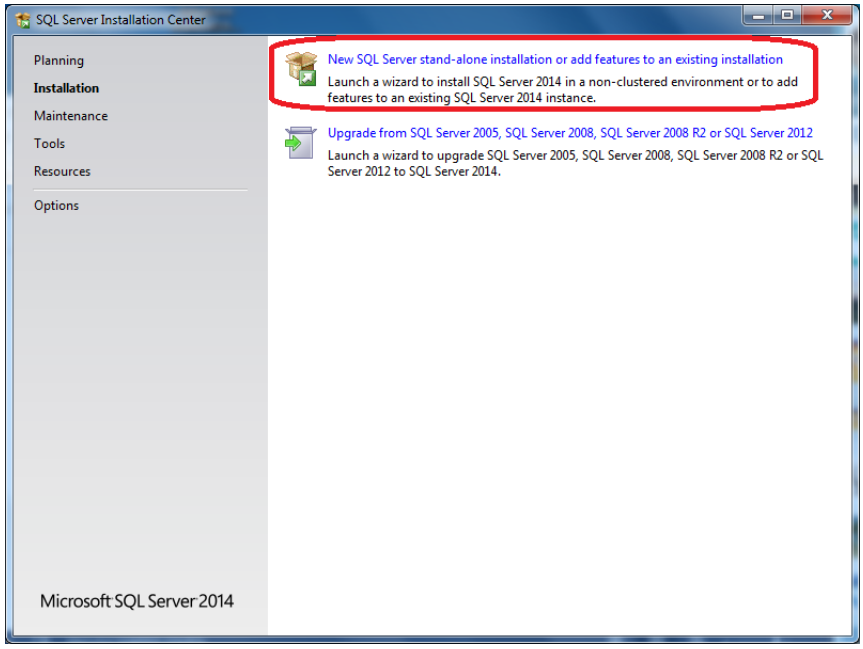


Figure 10: Installation center

2. Click **New SQL server stand-alone installation or add features to an existing installation**. The following figure is displayed.

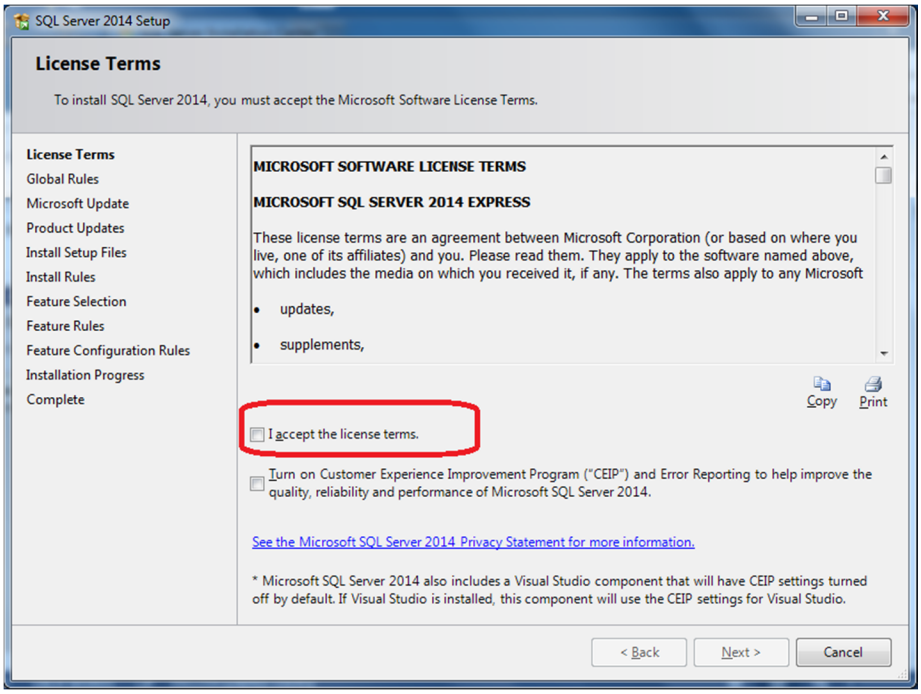


Figure 11: License terms

3. Select **I accept the license terms**.

4. Click **Next**. The program will check whether the files for installation are correct.

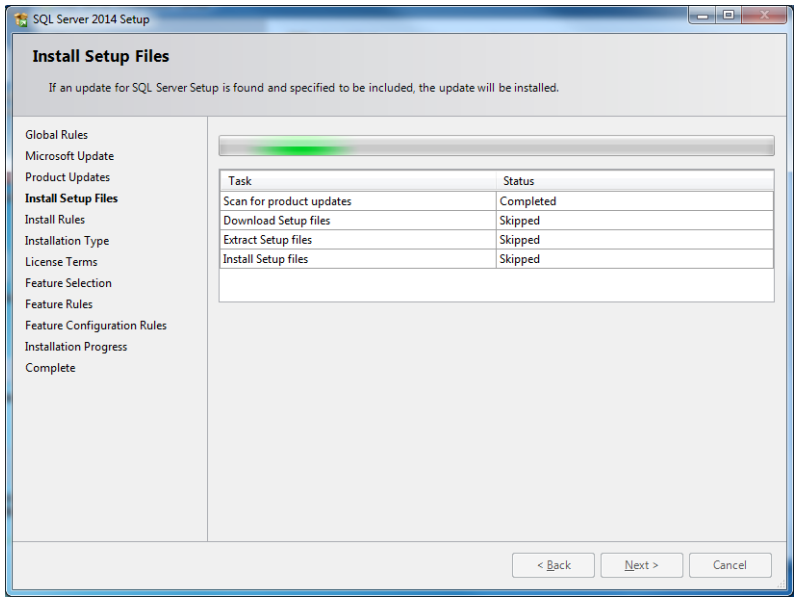


Figure 12: Setup files check

After verifying the files, the following figure is displayed.

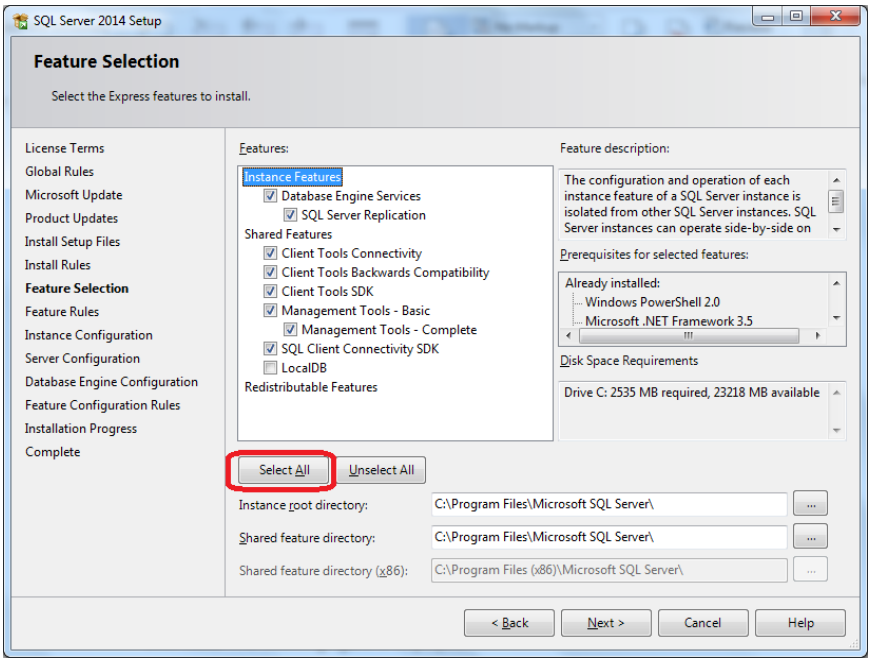


Figure 13: Feature selection

5. Click **Select All**.

6. Click **Next**. The following figure is displayed.

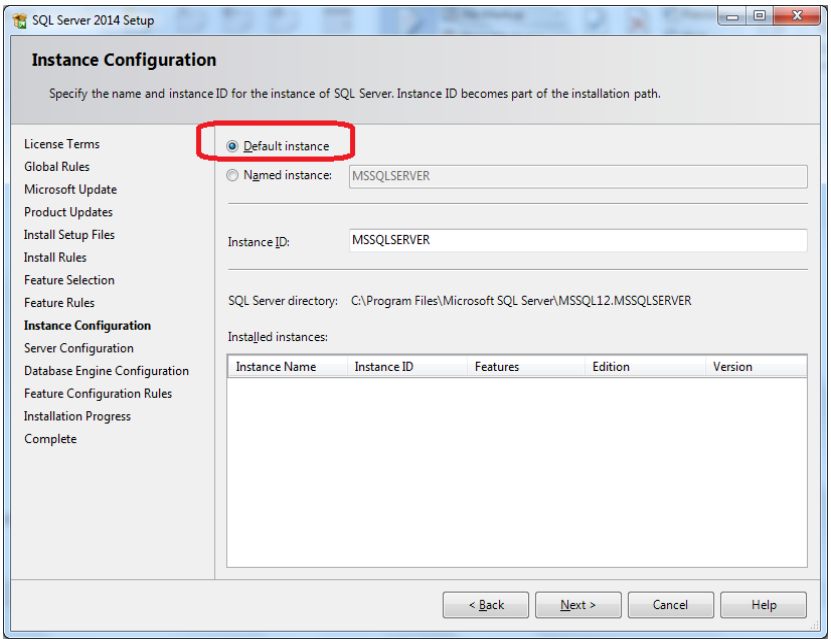


Figure 14: Instance configuration

7. Select **Default Instance**.

8. Click **Next**. The following figure is displayed.

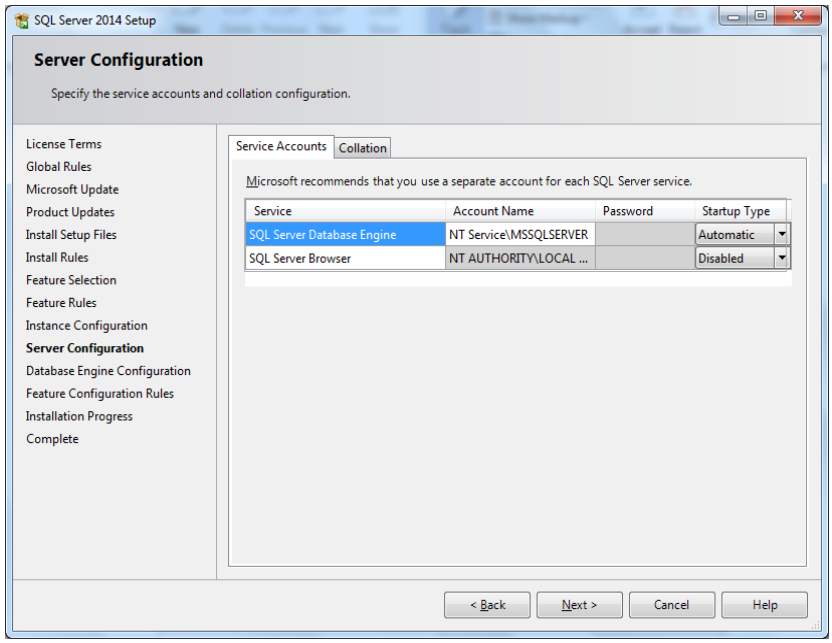


Figure 15: Server configuration

9. Click **Next**. The following figure is displayed.

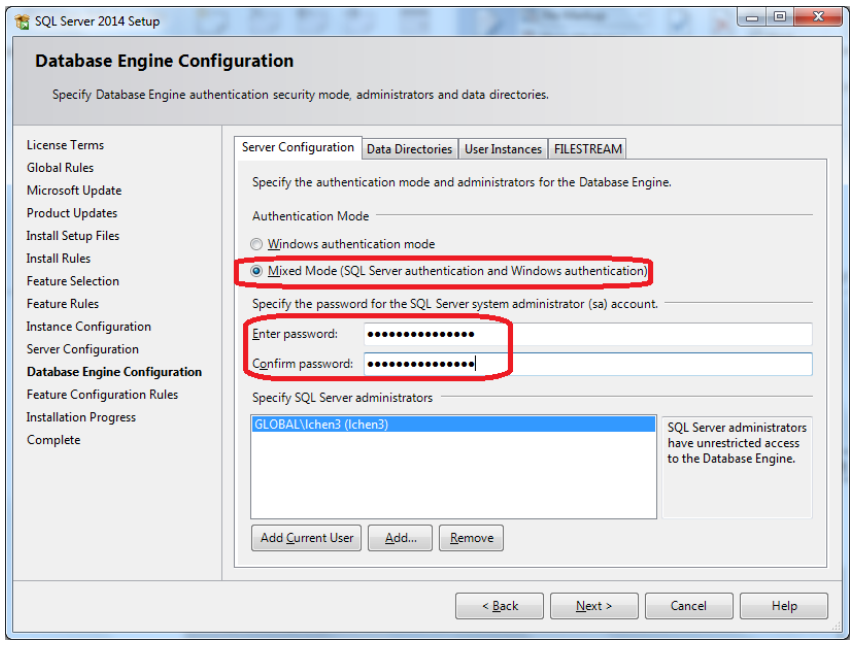


Figure 16: Database engine configuration

10. For authentication mode, select **Mixed Mode**.

11. Input the system administrator (sa) password “TekSmartLab2015”.

NOTE: *This password is mandatory. Make sure that T, S, and L are all uppercase.*

12. Click **Next**. The following figure is displayed.

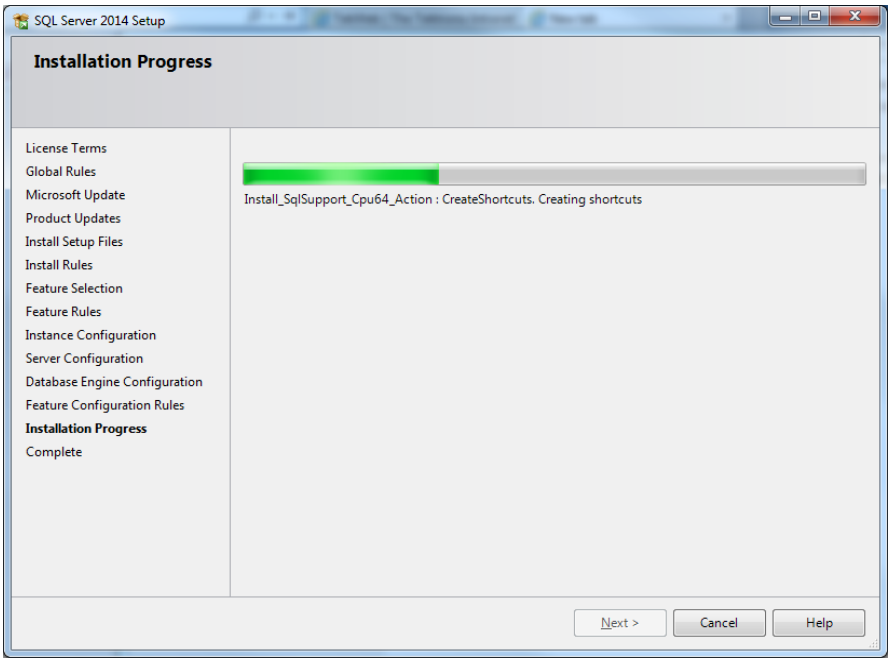


Figure 17: Installation progress

While this figure is being displayed, the database system is being installed. This typically takes about 10 to 20 minutes to complete. When complete, the following figure is displayed.

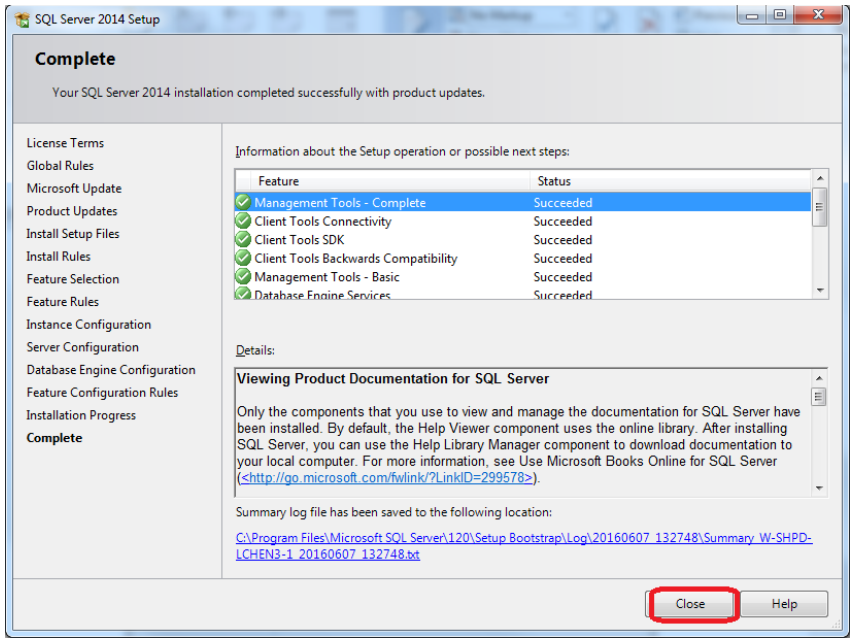


Figure 18: Installation complete

13. Click **Close**.

The installation of the database system is complete.

Configuring the Database

1. Select **SQL Server 2014 Configuration Manager** in the **Start** menu of Windows, as shown in the following figure.

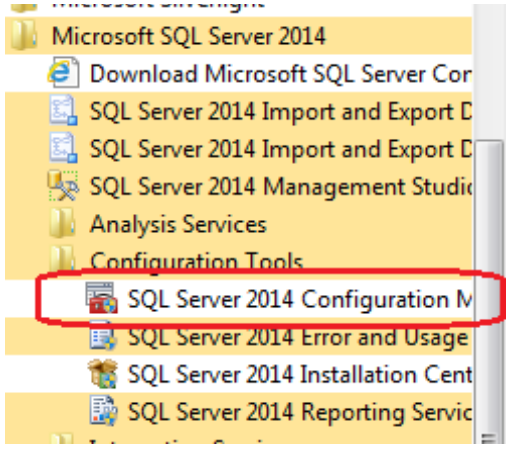


Figure 19: Select configuration manager

The path to this link is:

Start >> All Program >> Microsoft SQL Server 2014 >> Configuration Tools >> SQL Server 2014 Configuration Manager

2. In the SQL Server Configuration Manager, click SQL Server Network Configuration >> Protocols for MSSQLSERVER, and then right-click **TCP/IP** in the right panel as shown in the following figure.

Depending on the operating system, the SQL Server Network Configuration link might be (32 bit) or (64 bit).

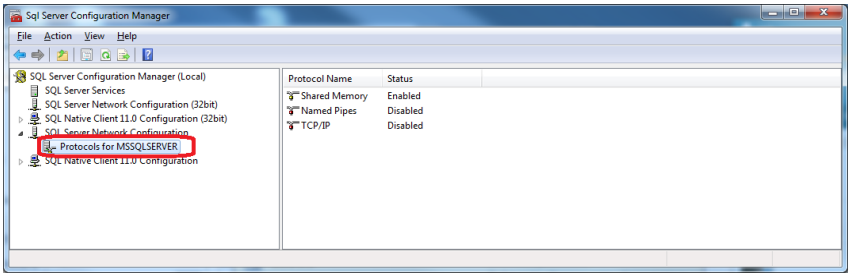


Figure 20: Enable TCP/IP protocol

3. Select **Enable** in the pop-up menu.

The following figure is displayed after you enable TCP/IP.

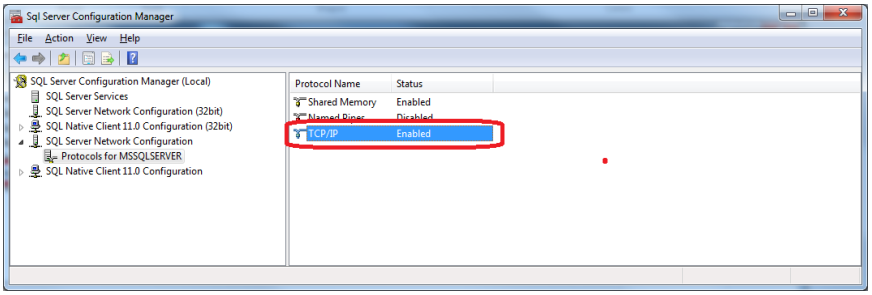


Figure 21: TCP/IP protocol enabled

4. Click **SQL Server Services** in the left panel. The following figure is displayed.

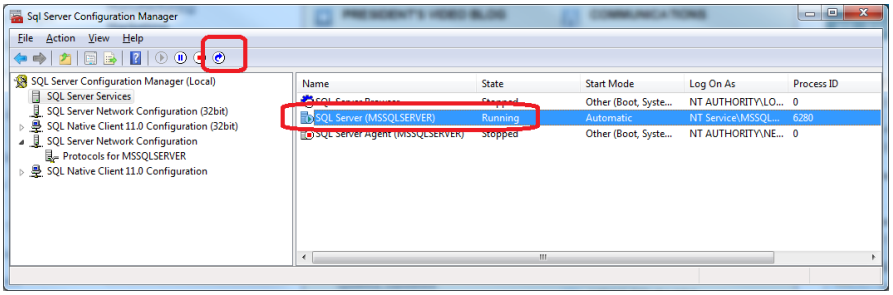


Figure 22: SQL server services

5. Click **SQL Server (MSSQLSERVER)** in the right panel.

6. Click in the tool bar to restart the SQL server service.

7. Close the window.

8. Click Start >> All Programs >> Microsoft SQL Server 2014 >> SQL Server 2014 Management Studio, as shown in the following figure.

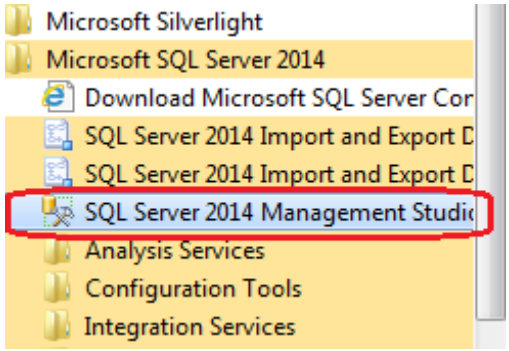


Figure 23: Select SQL Server Management Studio

9. In the Connect to Server window, select **Database Engine** for Server type.

10. Select the name of the computer for Server name.

11. Select **SQL Server Authentication** for Authentication.

12. Enter **sa** for Login.

13. Enter **TekSmartLab2015** for Password, as shown in the following figure.

Figure 24: Connect to server

14. Click **Connect** to log in. The following figure is displayed.

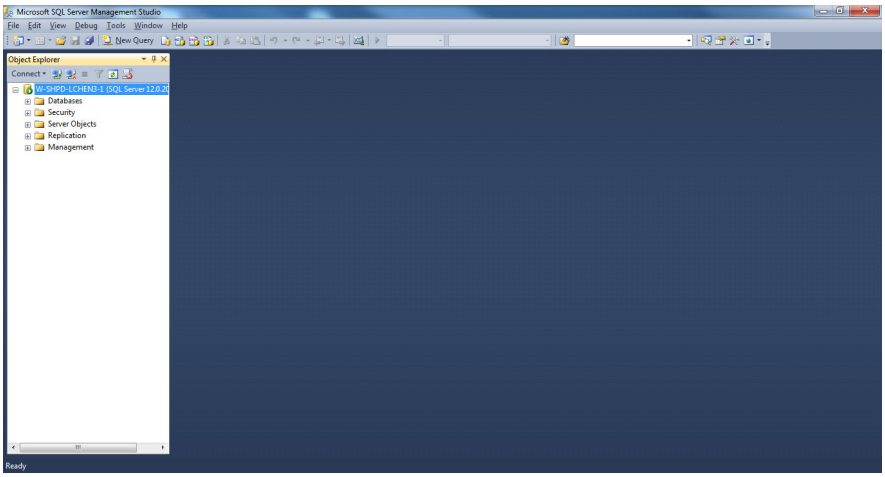


Figure 25: Main screen

15. In the left panel, right-click **Database**.

16. Select **Restore Database** from the popup menu, as shown in the following figure.

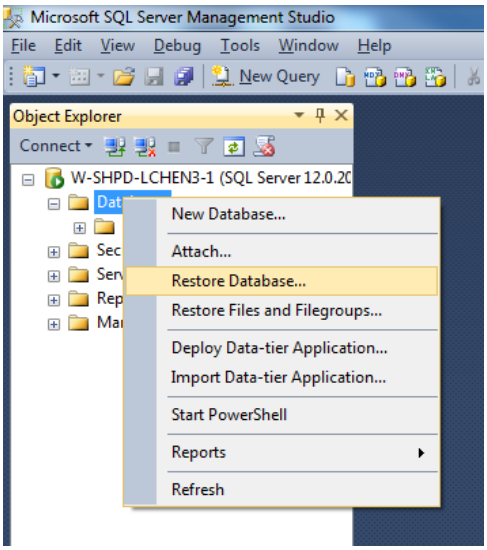


Figure 26: Restore database

17. Enter **TSLDatabase** next to **Database**.

18. Select **Device**.

19. Select '…'.

20. Click **Add**, as shown in the following figure.

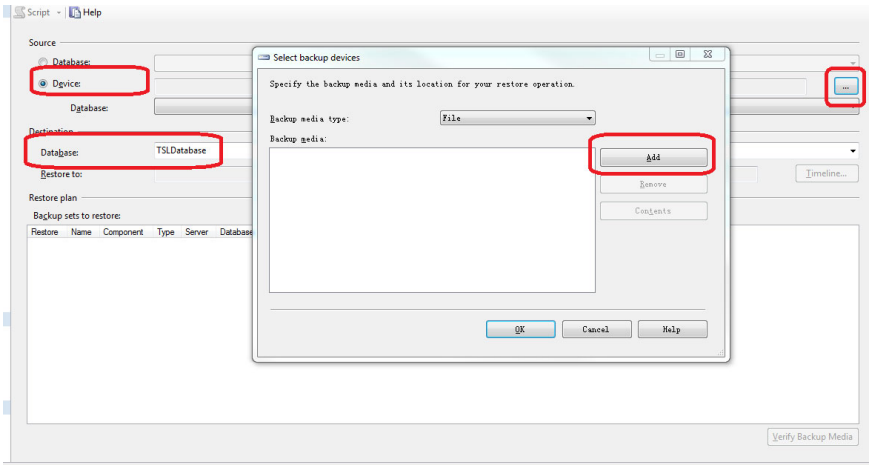


Figure 27: Specify backup

21. Find the file TSLDatabase.bak in one of the following directories:

- For 64-bit Win7: C:\Program Files (x86)\Tektronix\TekSmartLab\ TSLDatabse.bak
- For 32-bit Win7: C:\Program Files\Tektronix\TekSmartLab\ TSLDatabse.bak

NOTE: *If you are not able to find the file, select All Files next to Files of type, as shown in the following figure.*

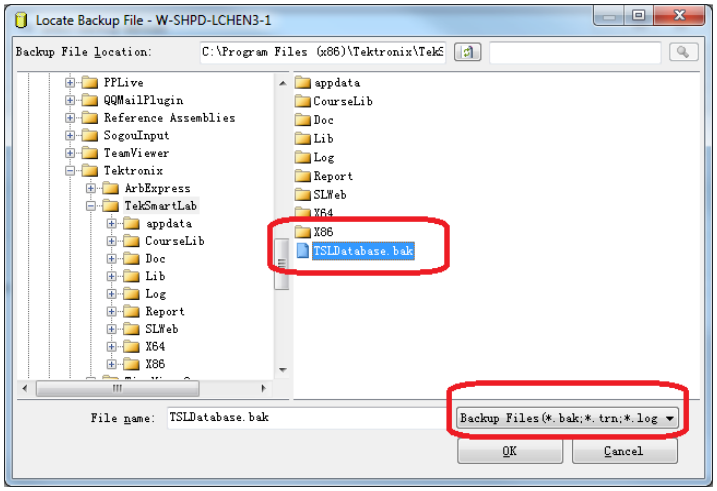


Figure 28: Change file type

22. Click **OK** after you find the file, and the following figure is displayed.

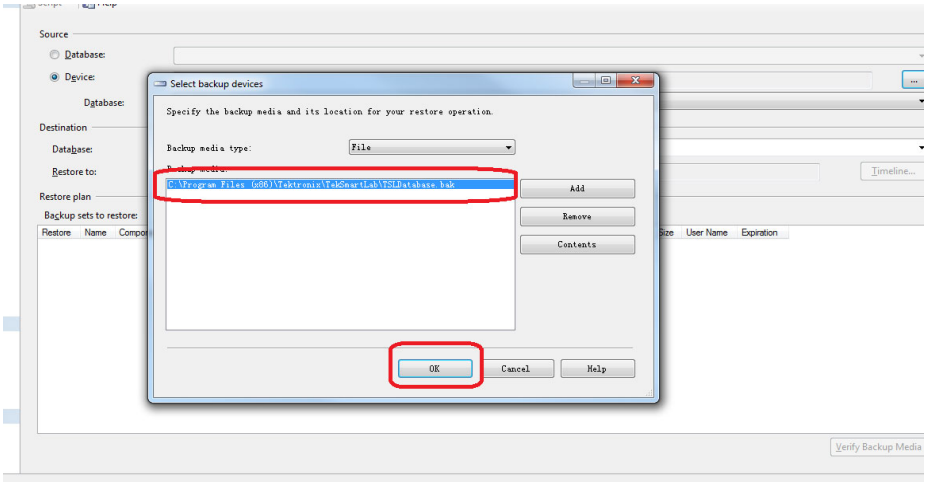


Figure 29: Backup file found

23. Select the file using the checkbox in the **Restore** column, and then click **OK**. The following figure is displayed.

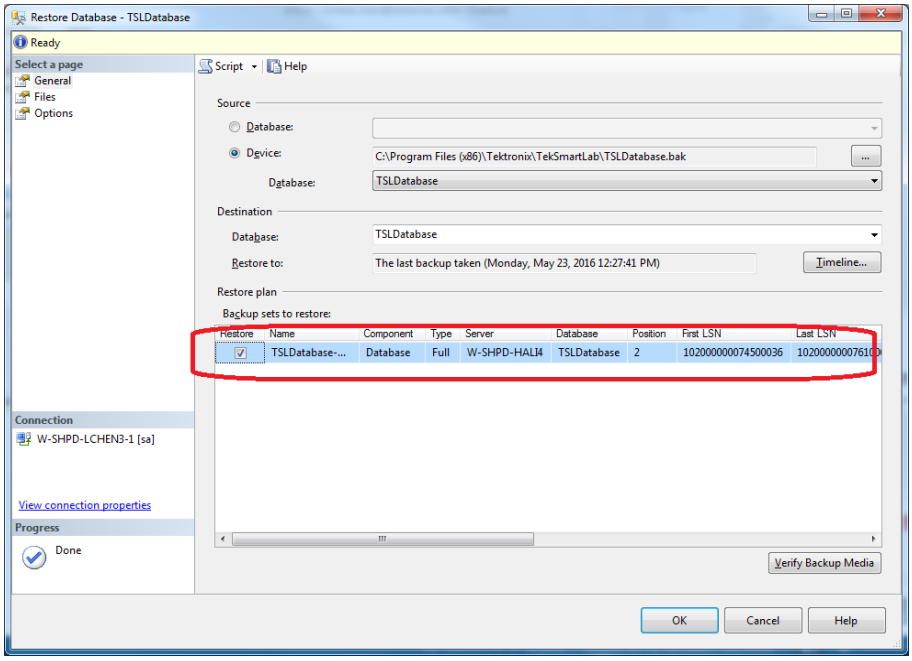


Figure 30: Select the most recent database

24. Click **OK** to complete the configuration and a confirmation message is displayed, as shown in the following figure.

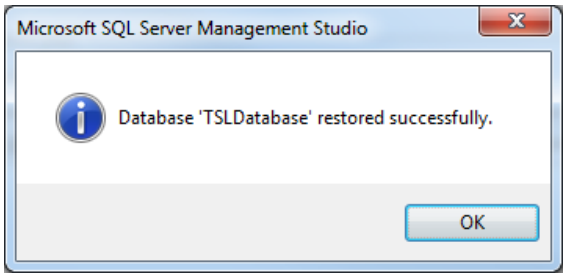


Figure 31: Database configuration complete

NOTE: *If you had installed* ***SQL Server 2008 R2 Express*** *and restored the* ***TSLDatabase.bak*** *before, select* ***Options*** *and then select* ***Overwrite the existing databse (WITH REPLACE)*** *as below before restoring the file.*

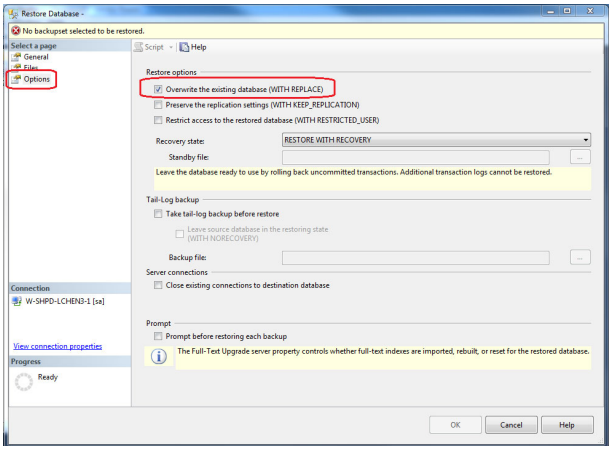


Figure 32: Overwrite the existing database

IIS Installation and Configuration

Installing IIS in Win7

1. Click Start >> Control Panel >> Programs >> Turn Windows features on or off, and then select **Internet Information Services** as shown in the following figure.

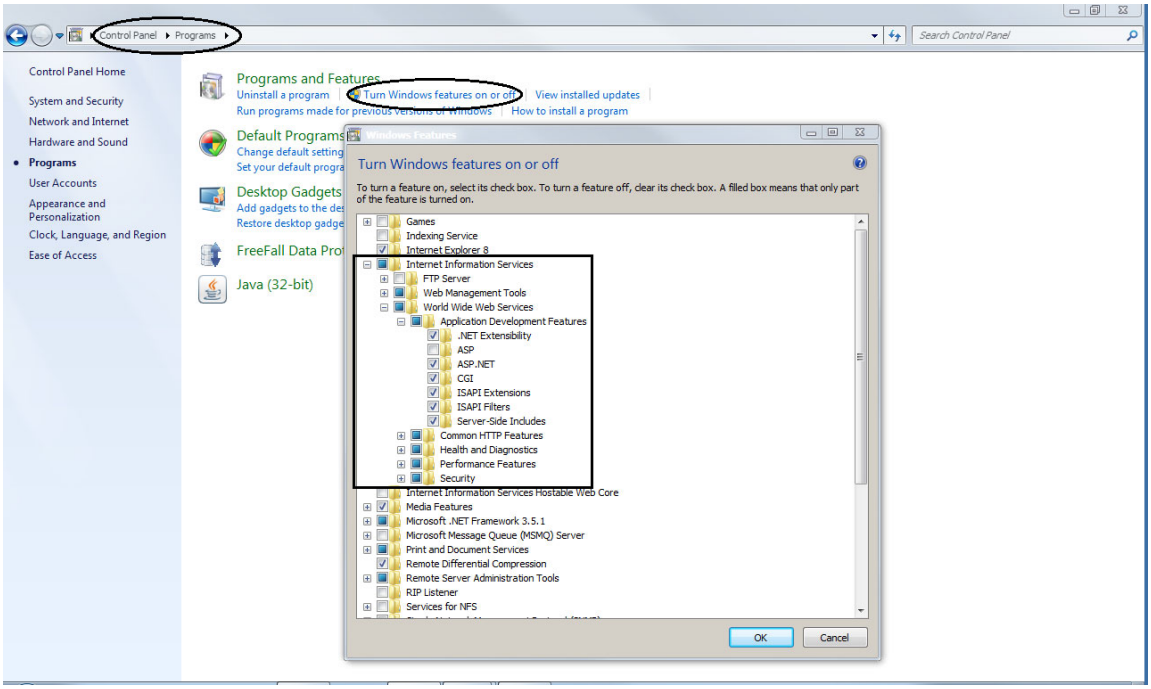


Figure 33: Select Internet information services

NOTE:

If you are installing IIS for the first time, make sure that you follow the instructions above.

2. Browse to World Wide Web Services >> Application Development Features, and then select the following:

   - .NET Extensibility
   - ASP.NET
   - CGI
   - ISAP Extensions
   - ISAP Filters
   - Server-Side Includes

Browse to World Wide Web Services >> Common HTTP Features, and select the following:

- Default Document
- Directory Browsing
- HTTP Errors
- HTTP Redirection
- Static Content

3. Click **OK**.

NOTE: *Make sure that* ***Web Management Tools*** *is selected by default.*

After a few minutes, the installation will finish.

Installing IIS for Web Server

1. Open the **Internet Information Services (IIS) Manager** on your computer one of the following two ways:
   - Click **Start**, and enter **IIS** in the search box. Then open the Internet Information Services (IIS) Manager from the search results.
   - Right-click **Computer**, and then select **Manage**. You can find **Internet Information Services (IIS) Manager** under **Services and Applications**, as shown in the following figure.

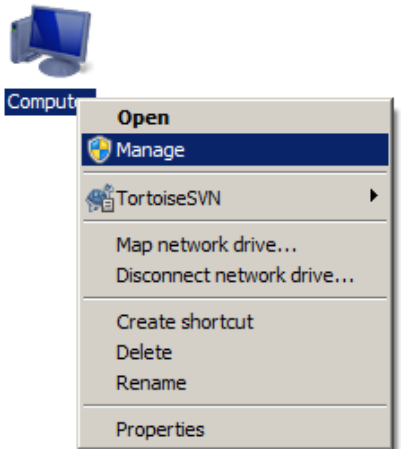


Figure 34: Open Internet Information Service Manager

2. Collapse the items in the left panel.

3. Under **Sites**, select **Default Web Site**.

4. Click **Stop** under **Manage Web Site** in the right panel, as shown in the following figure.

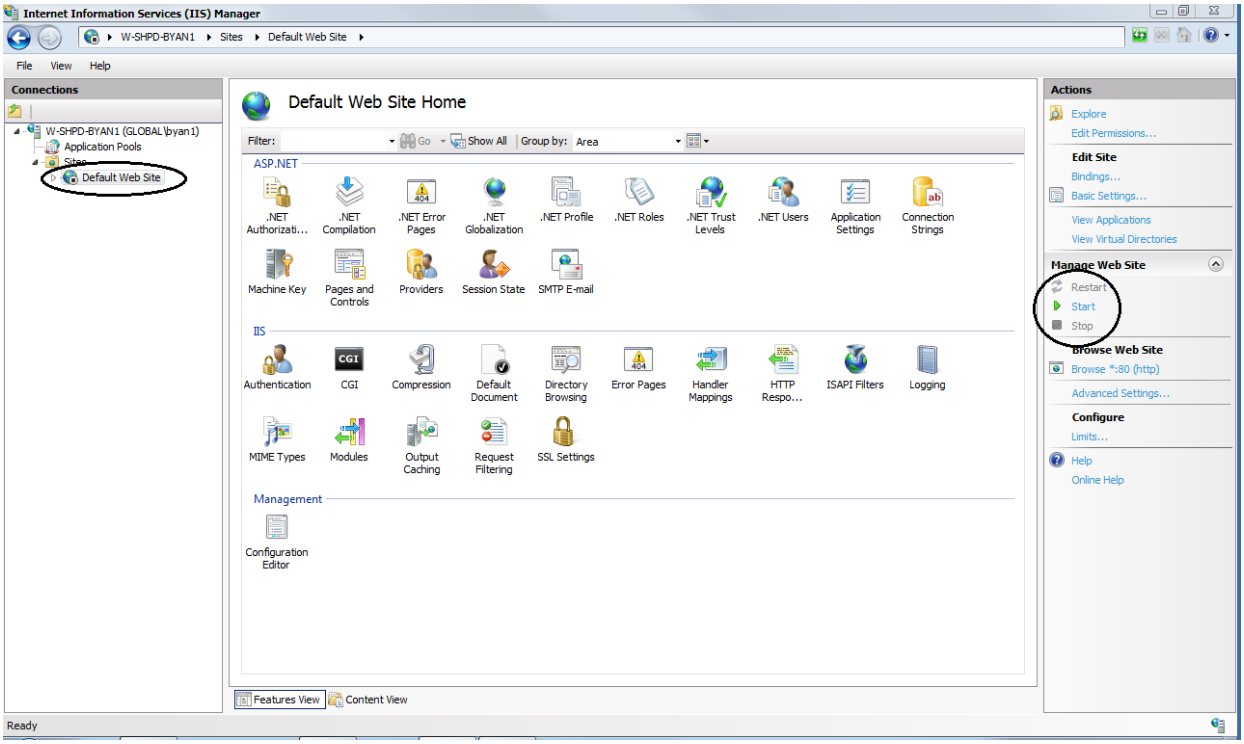


Figure 35: Internet Information Services (IIS) manager

5. Right-click **Sites** and select **Add Web Site…**, as shown in the following figure.

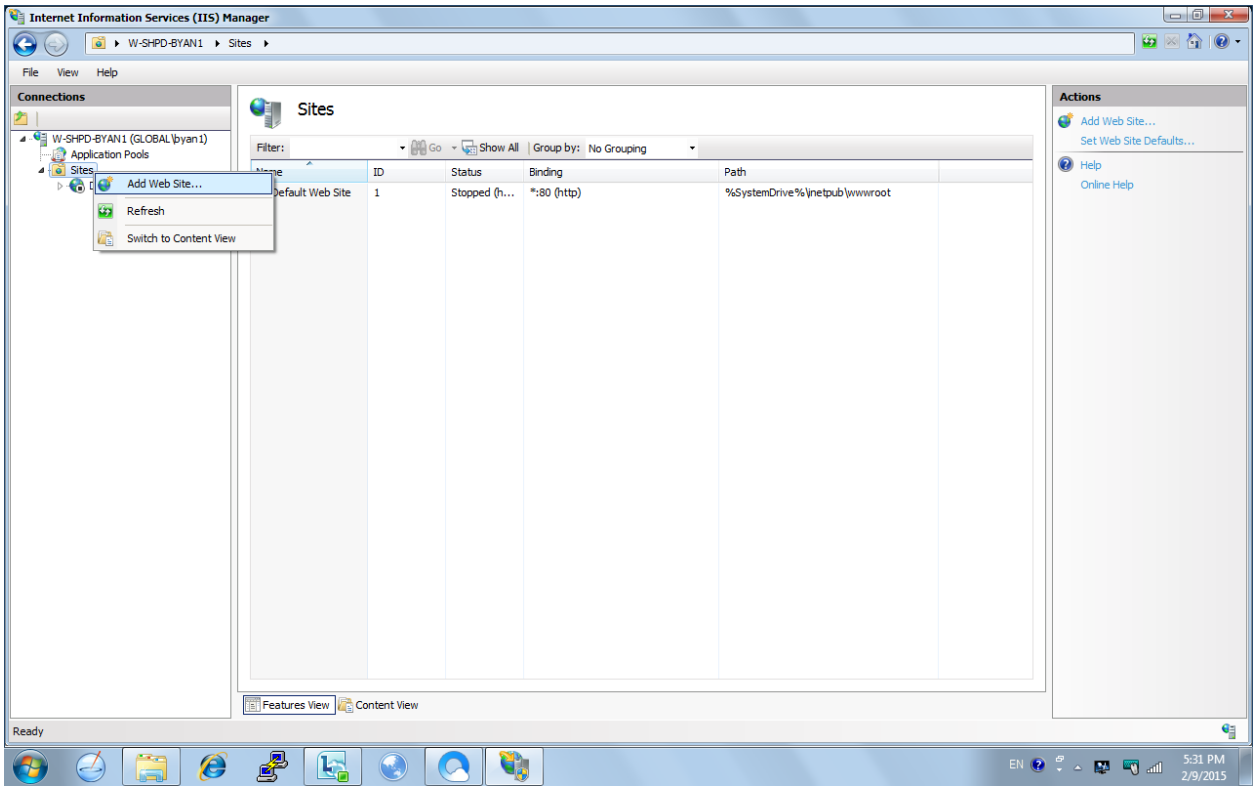


Figure 36: Add a web site

6. Enter **SLWeb** under **Site name**.
7. Under **Physical Path**, select one of the two directories for the SLWeb file.
   - For 64-bit: C:\Program Files (x86)\Tektronix\TekSmartLab\SLWeb
   - For 32-bit: C:\Program Files\Tektronix\TekSmartLab\SLWeb
8. Click **OK**, as shown in the following figure, to finish.

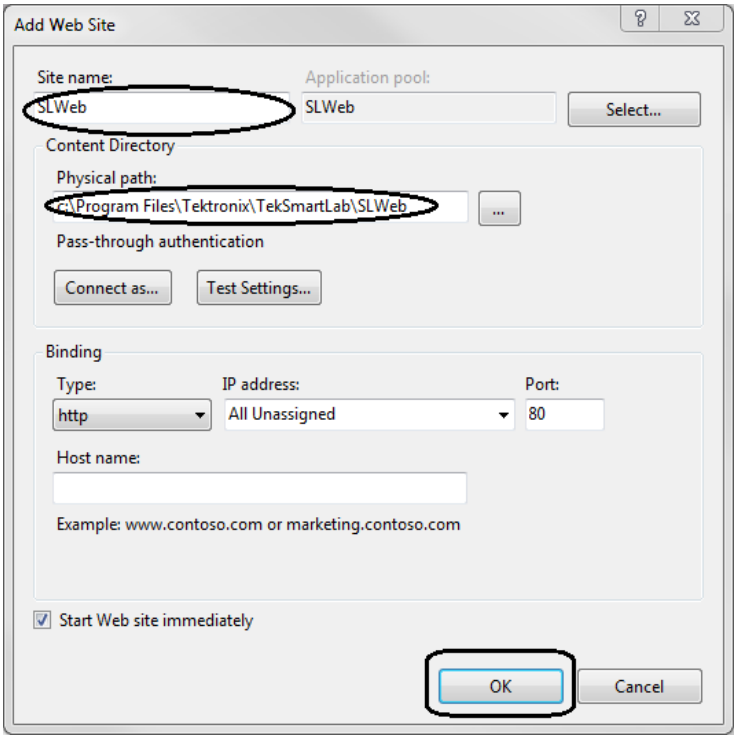


Figure 37: Select the SLWeb file

Configuring ASP.NET 4.0

1. Open **Internet Information Services (IIS) Manager** as described before.
2. Select the server name in the left panel (highlighted in the following figure).

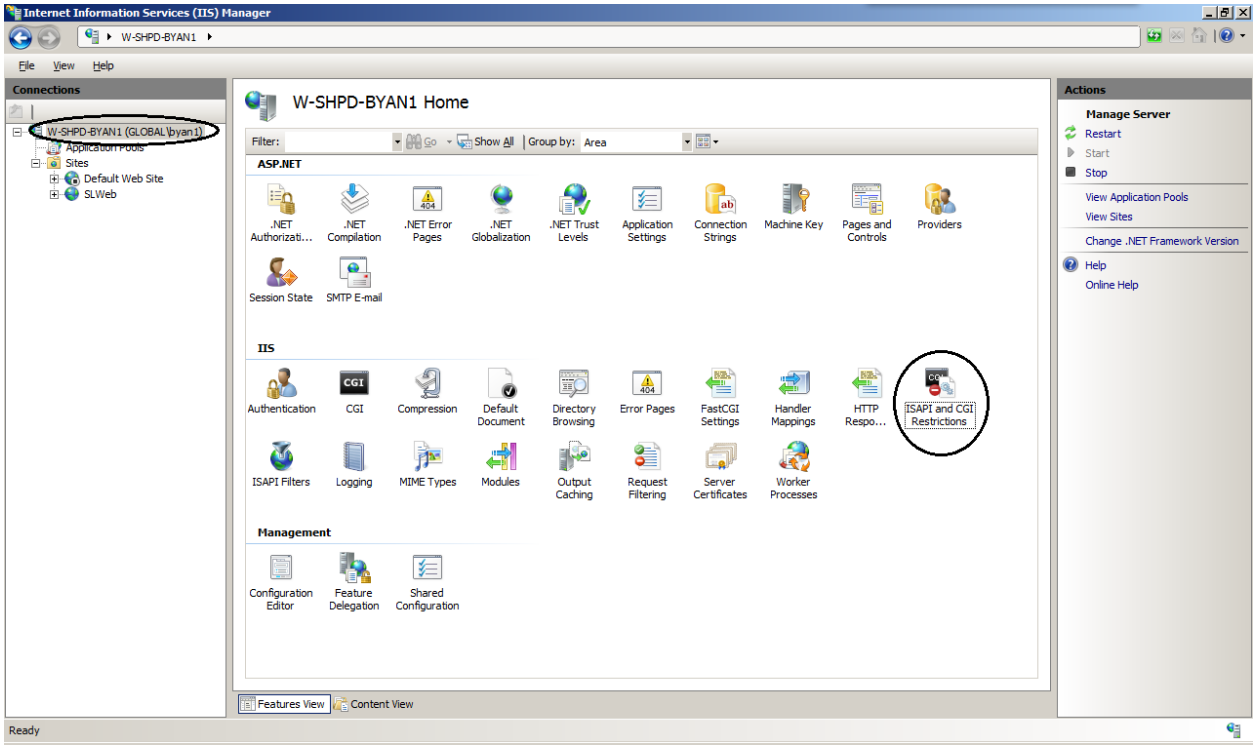


Figure 38: IIS manager

3. Double-click **ISAPI and GGI Restrictions** in the middle panel.

4. Right-click the two ASP.NET 4.0 entries to change the restriction to be **Allowed**, as shown in the following figure.

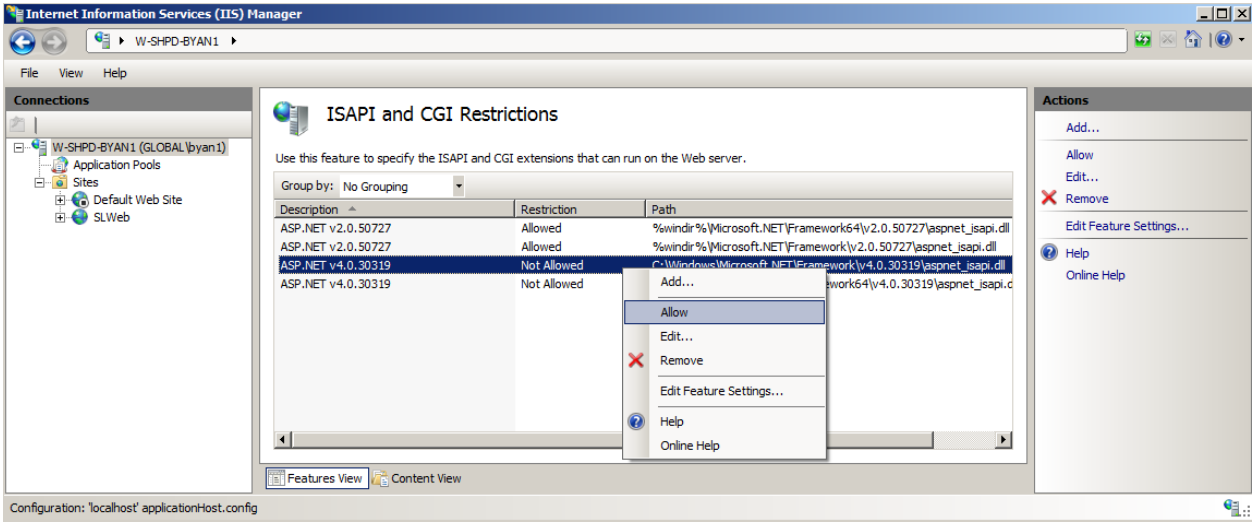


Figure 39: Allow ASP.NET 4.0

After you've changed the status of the two entries, the following figure is displayed.

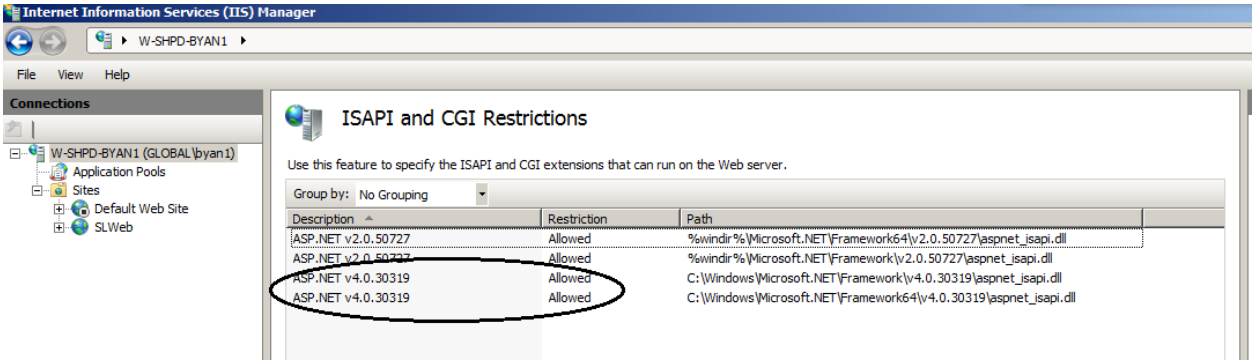


Figure 40: ASP.NET 4.0 allowed

NOTE: *Under some conditions, you may not be able to find ASP.NET v4.0, as shown in the following figure.*

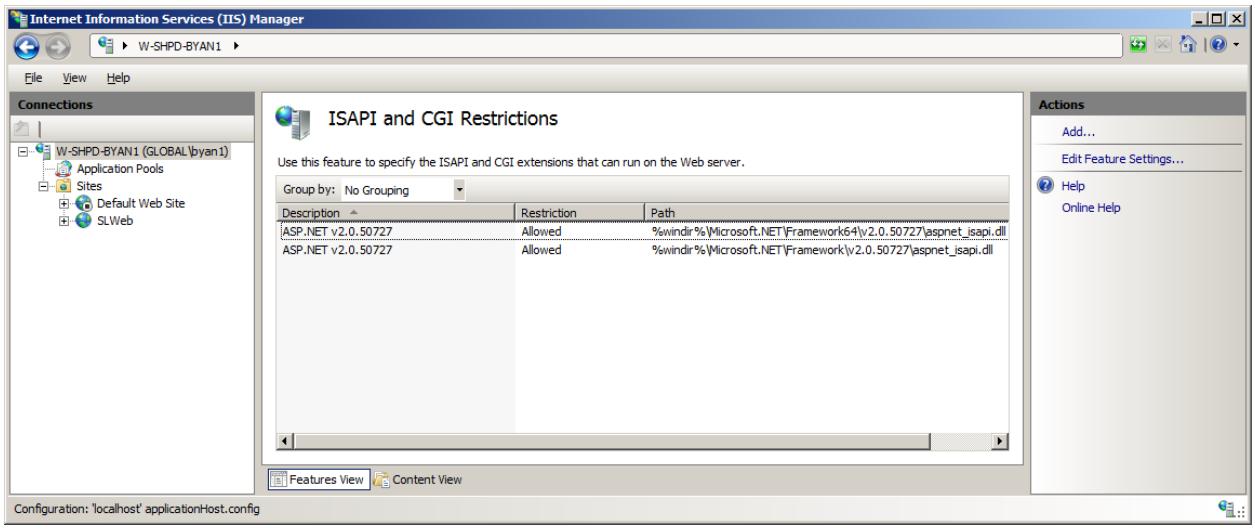


Figure 41: ASP.NET v4.0 not found

In this case, you can solve the problem by using a DOS command (as administrator).

a. Under Start >> All Programs >>Accessories, right-click **Command Prompt**.

b. Select Run as administrator.

c. Enter one of the following commands in the window:

- For 64-bit Win7:
  C:\Windows\Microsoft.NET\Framework64\v4.0.30319\aspnet_regiis.exe –i
- For 32-bit Win7:
  C:\Windows\Microsoft.NET\Framework\v4.0.30319\aspnet_regiis.exe –i

You can also copy and paste the command in the window, as shown in the following figure.

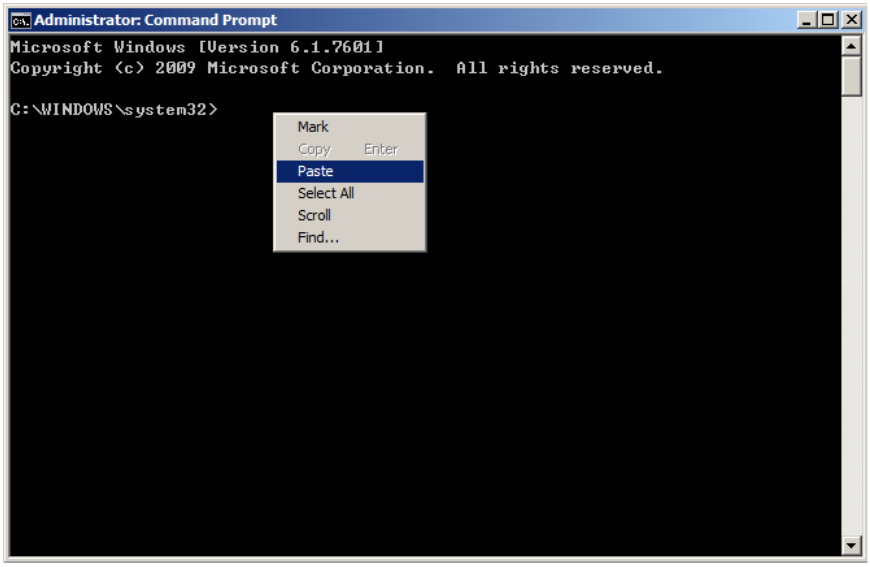


Figure 42: Paste command by right key

After you enter the command, the following figure is displayed.

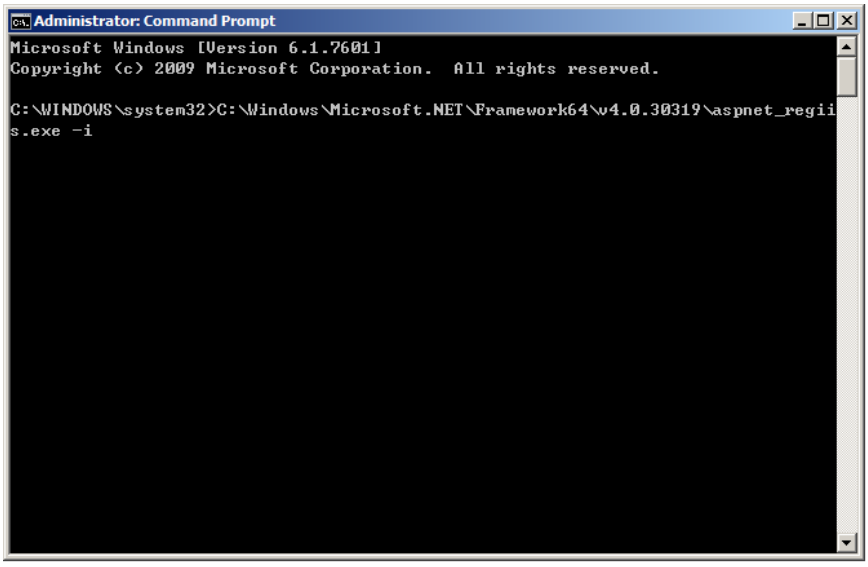


Figure 43: Command window after entering the command

Press **Enter** to run the command, the following figure is displayed.

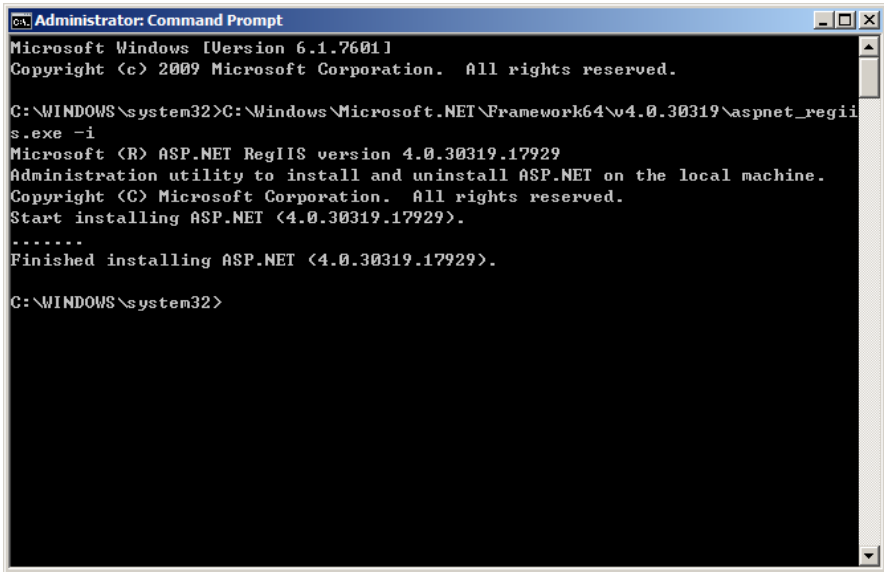


Figure 44: Result of the command running

As shown in the figure, ASP.NET v4.0 is installed. You should now be able to configure ASP.NET v4.0 according to the procedures described in this section.

Configuring ASP.Net State Server

1. On the desktop, right-click **Computer**.
2. Select **Manage**. The Computer Management screen is displayed, as shown in the following figure.

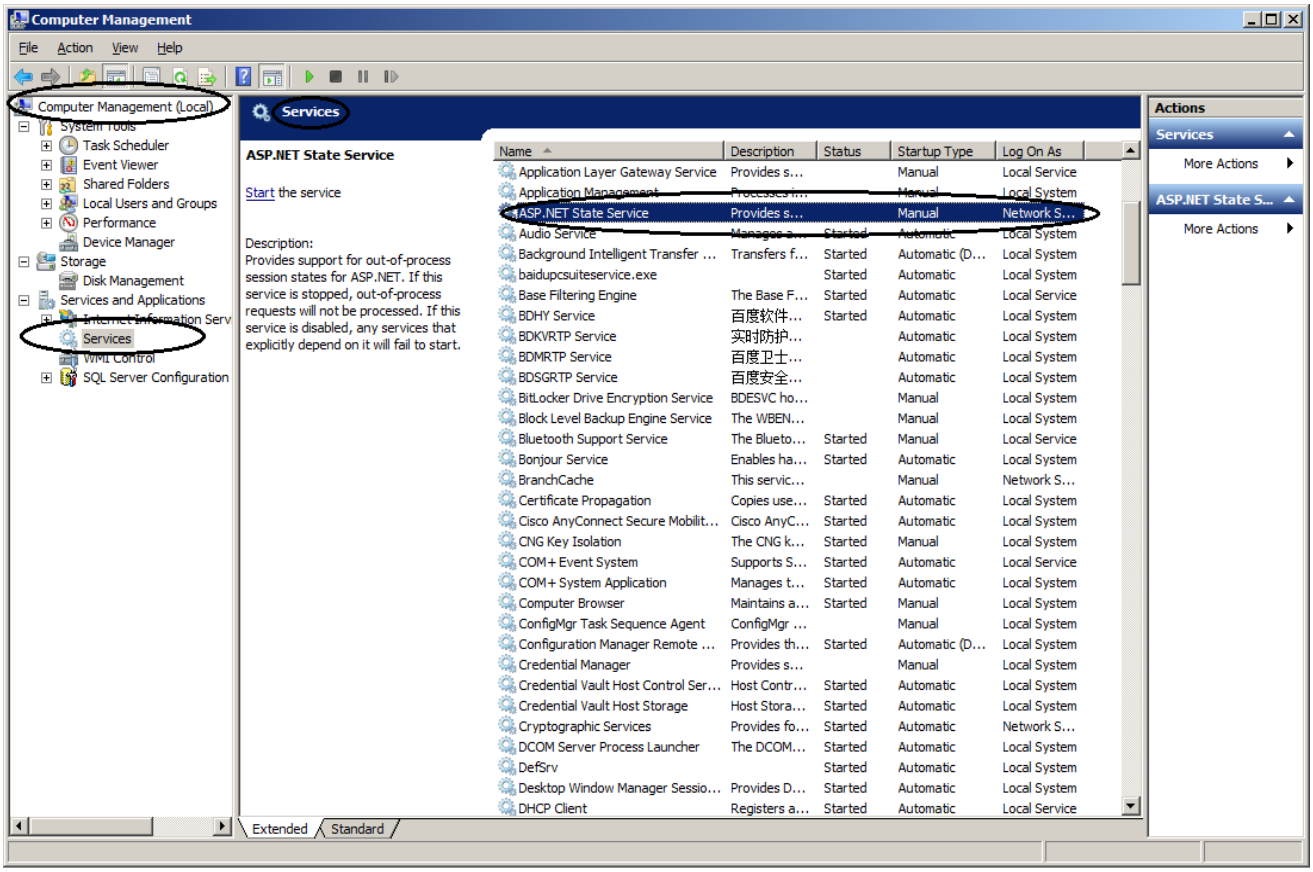


Figure 45: Computer management

3. Select Computer Management (Local) >> Services and Applications >> Services.
4. Select **ASP.Net State Service** in the right panel to confirm that the status is 'Started' and Startup Type is 'Automatic'.

If not, change them by following the steps:

1. Right-click **ASP.Net State Service**.
2. Select **Start** or **Restart**.
3. Double-click **ASP.Net State Service**.
4. Change the Startup Type to **Automatic**, as shown in the following figure.

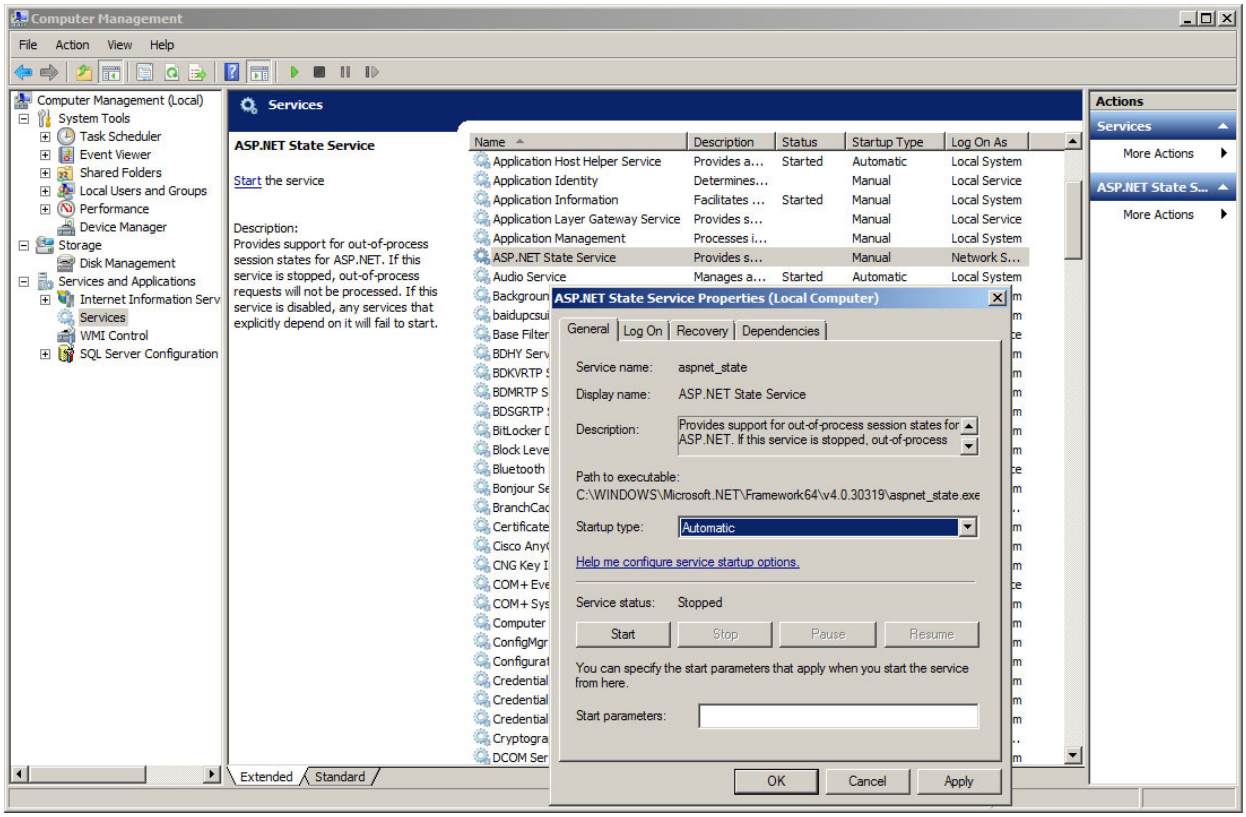


Figure 46: Configure ASP.Net State Service

5. Click **OK** to complete the setting.
6. Close the Computer Management screen.

Windows Firewall Configuration

You can open the firewall setting screen by navigating to Start >> Control Panel >> System and Security >> Windows Firewall >> Advanced Setting'.

Adding Inbound Rules

1. Double click **Inbound Rules** and then right-click it to display the pop-up menu.
2. Select **New Rule…**, as shown in the following figure.

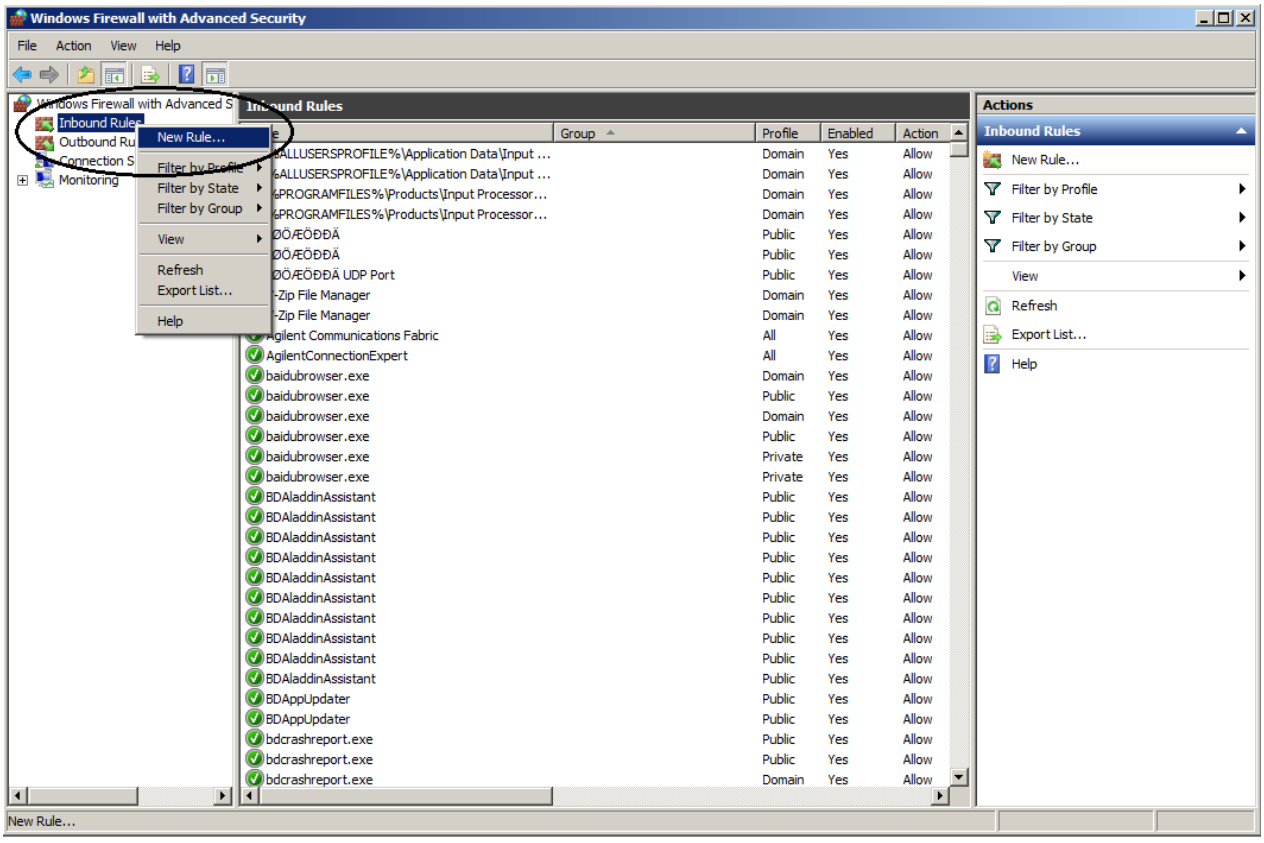


Figure 47: Add inbound rules

3. Select **Port**, and then click **Next**, as shown in the following figure.

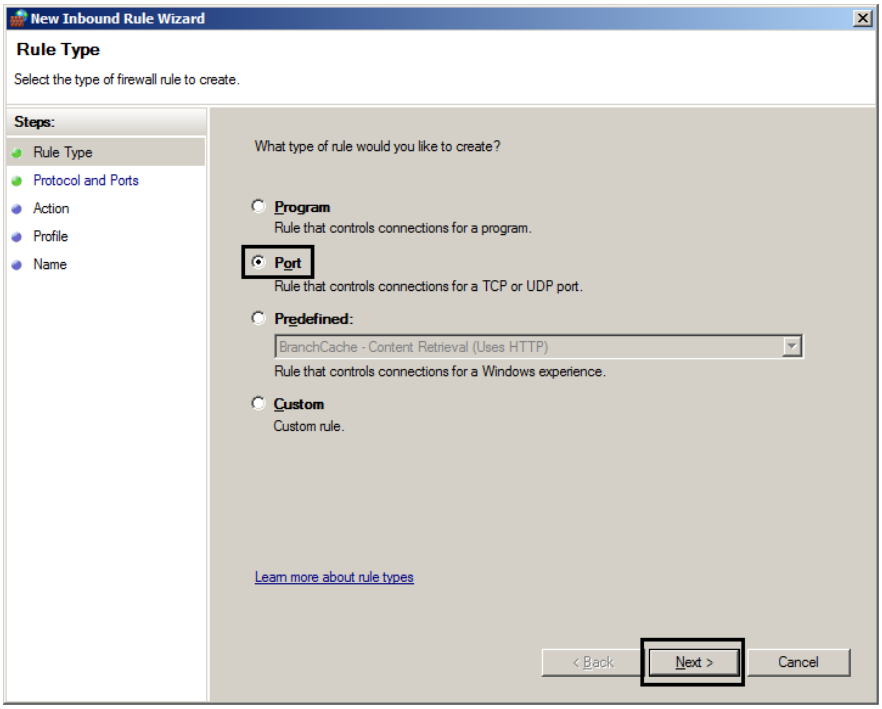


Figure 48: New inbound rule wizard

4. Select **TCP**.
5. Select **Specific Local ports**.
6. Enter **80** next to Specific Local ports.
7. Click **Next**.

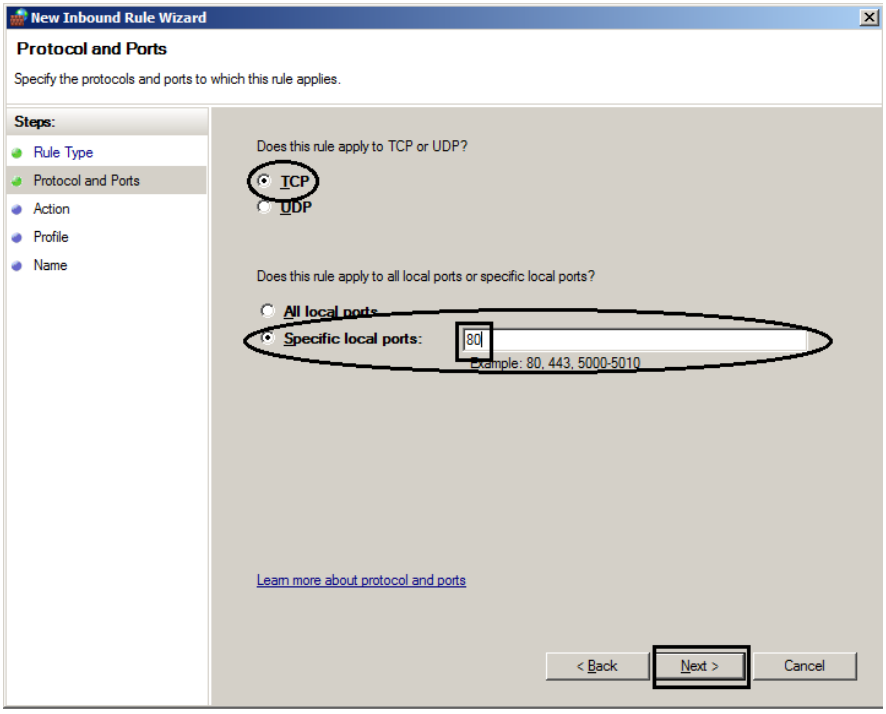


Figure 49: Protocol and ports

8. Select **Allow the connection**, and then click **Next**.

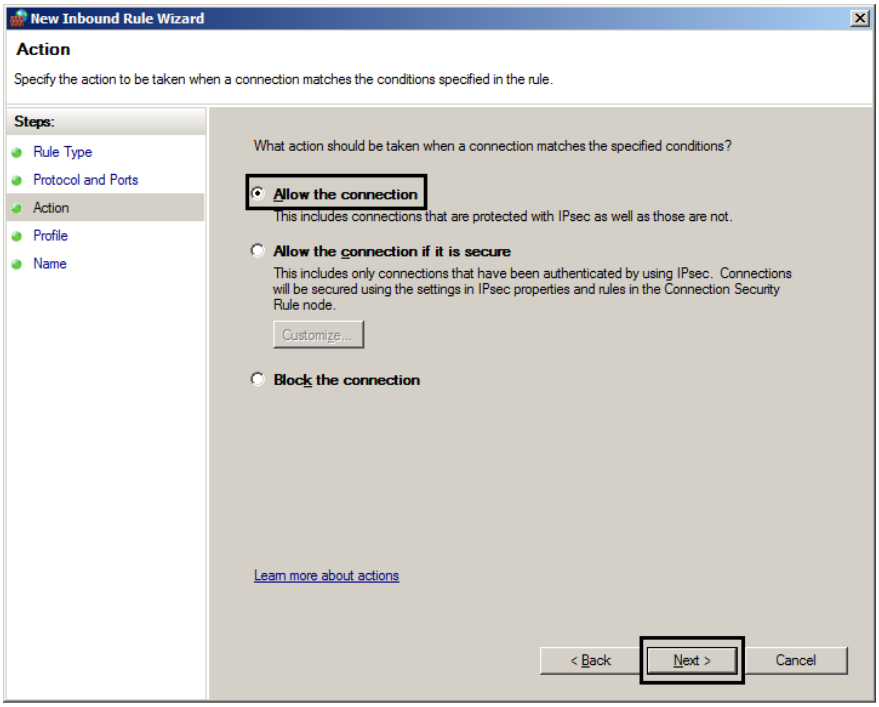


Figure 50: Action

9. Select all three checkboxes and click **Next**, as shown in the following figure.

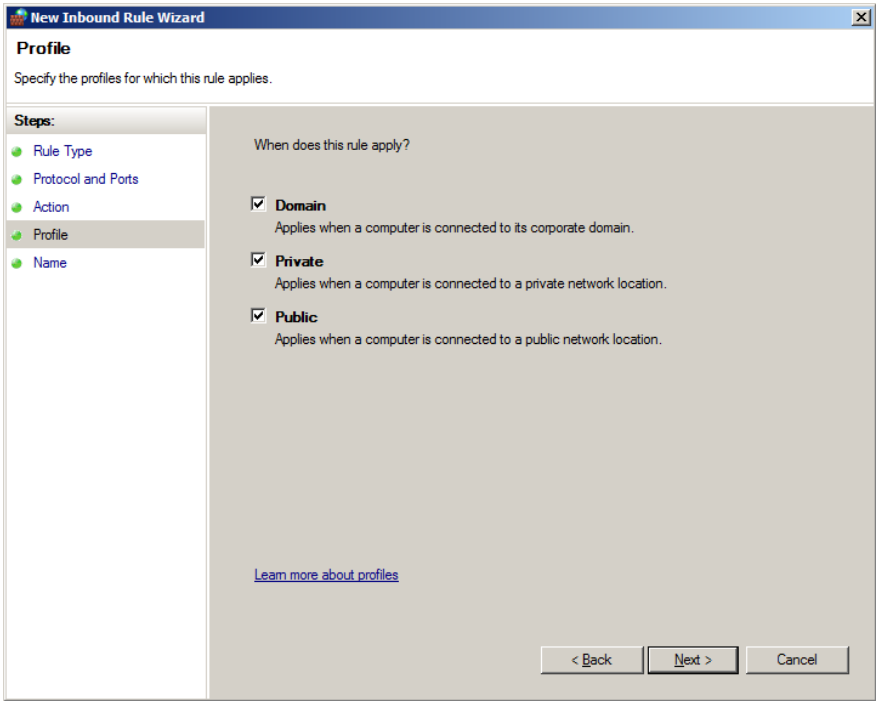


Figure 51: Profile

10. Enter **Web** under **Name**.

11. Click **Finish**, as shown in the following figure.

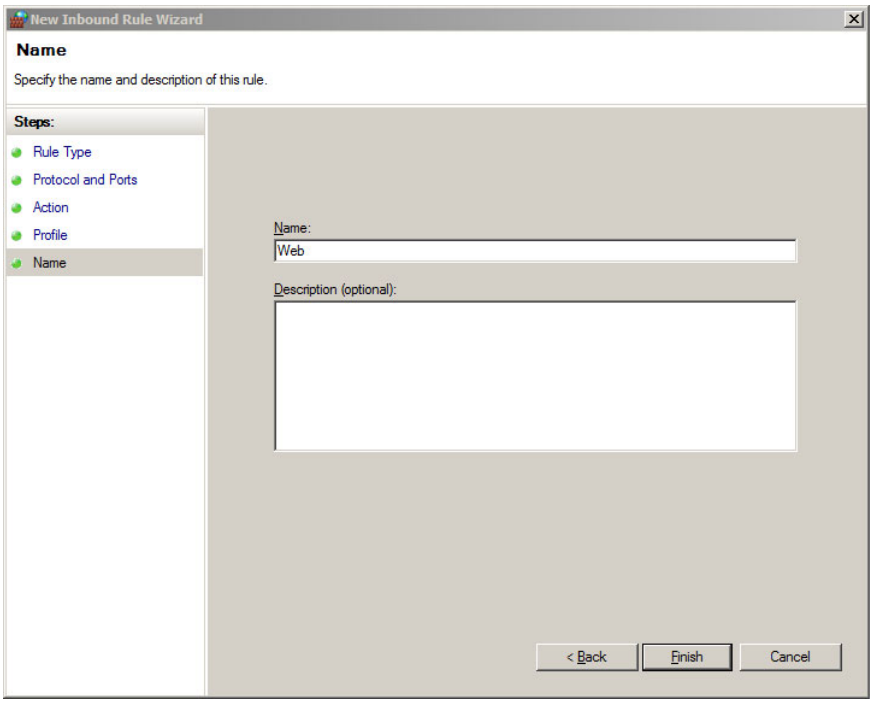


Figure 52: Name

After you click **Finish**, the following figure is displayed.

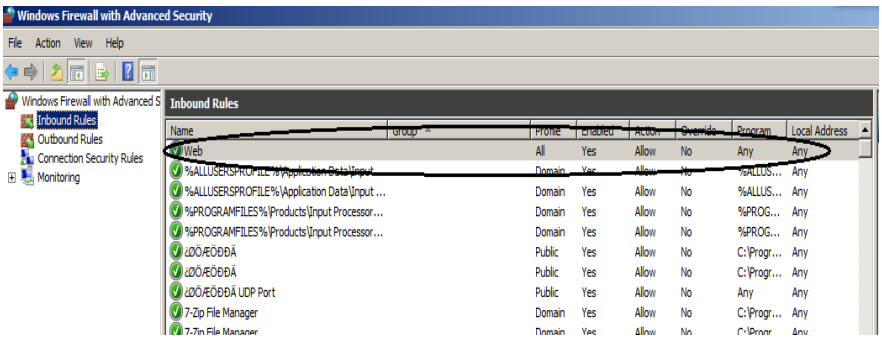


Figure 53: Inbound rules added

Adding Outbound Rules

Double-click **Outbound Rules** and right-click it again. Repeat the steps for adding inbound rules to add outbound rules. The following figure indicates that you have successfully added outbound rules.

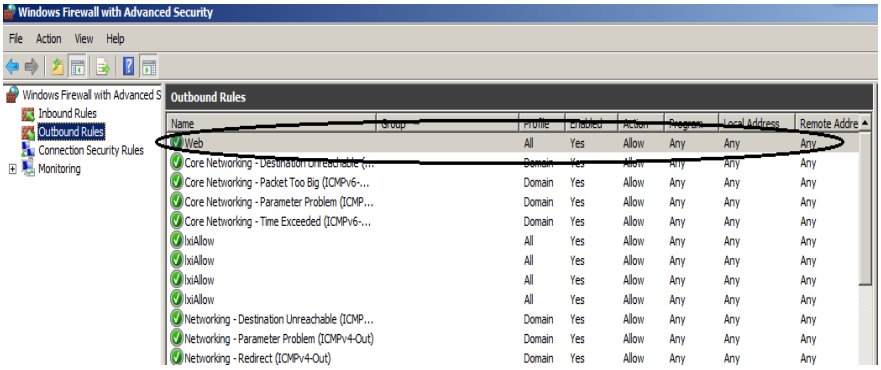


Figure 54: Outbound rules added

Close all the windows once you are finished.

Testing the Web Server

1. Open Internet Information Service (IIS) Manager as described before.
2. Select **Application Pools** in the left panel, as shown in the following figure.

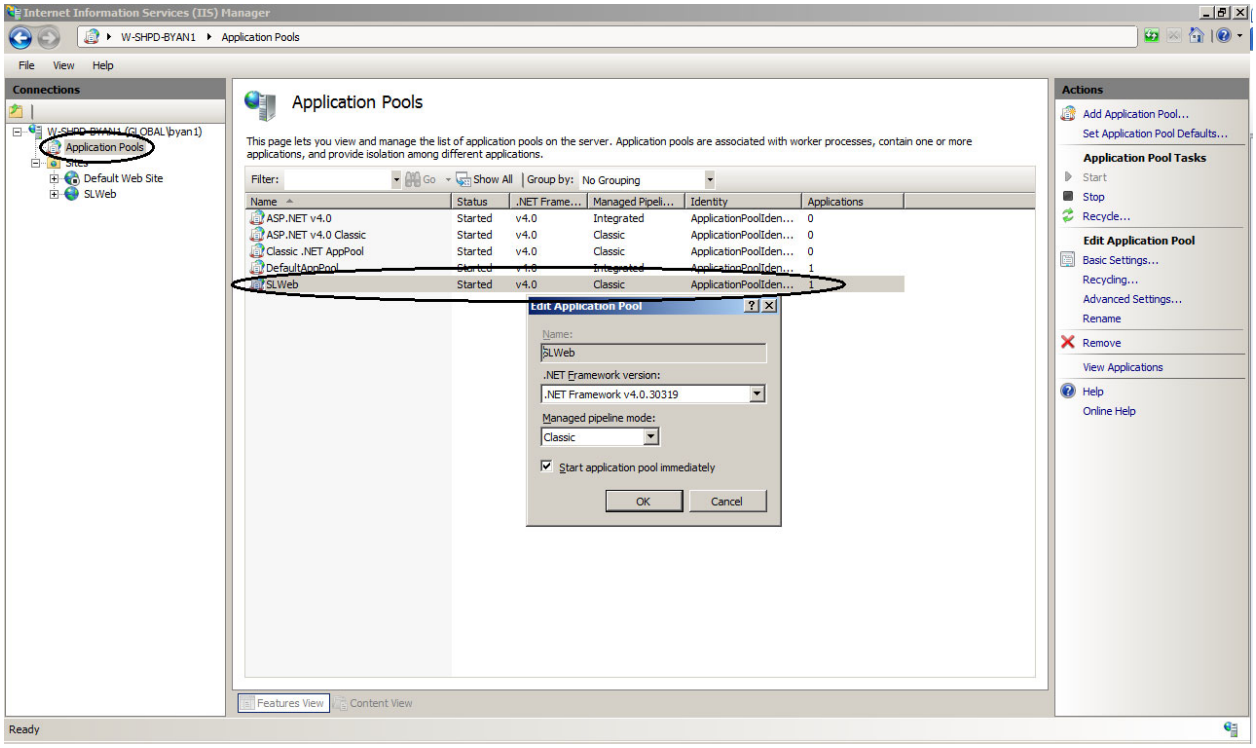


Figure 55: Application pools

3. Confirm that the parameters of SLWeb in the right panel are correct:
   - The version of .NET Framework should be 4.0 (or a version consistent with what is installed).
   - Managed pipeline mode should be **Classic**.

If the parameters are something else, you can double-click the entry to modify them.

4. Click **SLWeb** in the left panel under **Sites**.

5. Click **Browse*:80 (http)** in the right panel, as shown in the following figure.

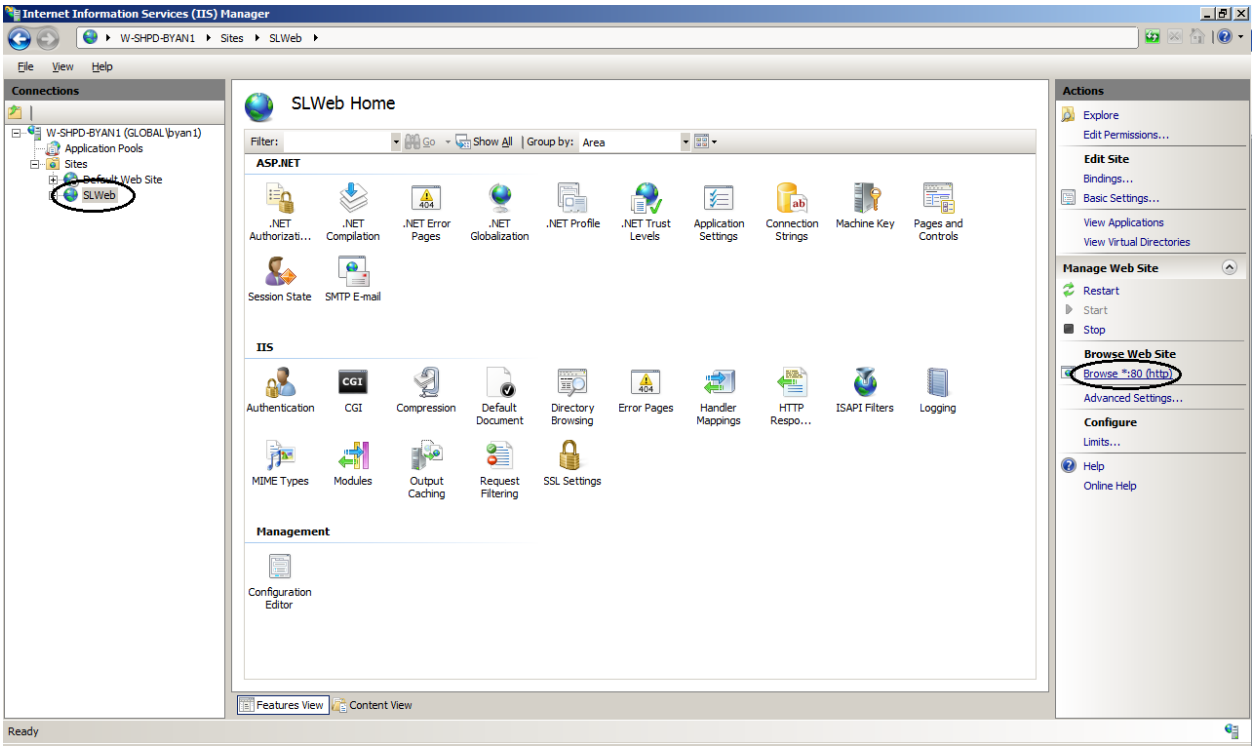


Figure 56: SLWeb home

Windows will automatically open Internet Explorer to http://localhost/. You can also enter http://localhost/ or http://127.0.0.1/ in the address box of your Web browser to visit the web page.

The following figure is the web page displayed.

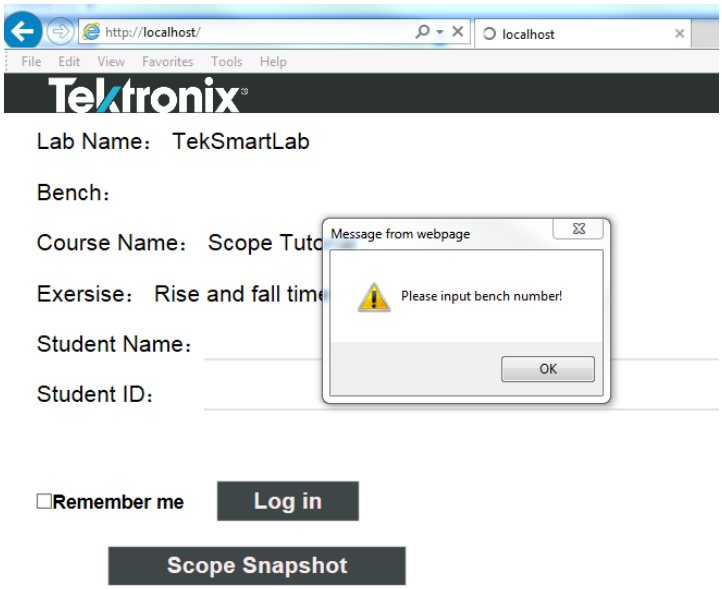


Figure 57: TekSmartLab web page

This web page indicates that the TekSmartLab web server works fine. (You can ignore the caution message in the figure above. When you visit the web page using a QR code, you will not see this message.)

If you are not able to visit the web page, please refer to IIS Installation and Configuration and confirm that IIS is properly configured.

TSL3000B

General Information

Home Page

The TSL3000B home page is shown as in the following figure.

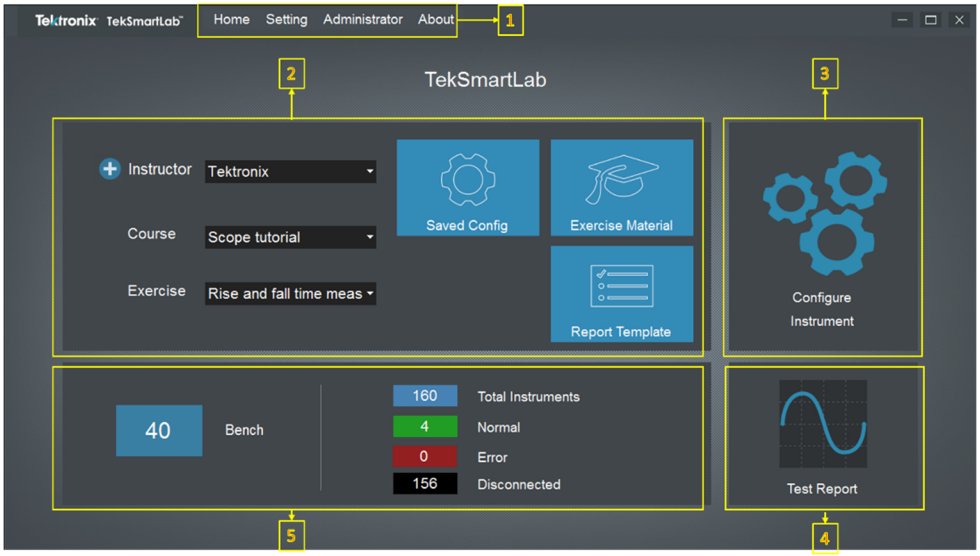


Figure 58: Home page

1. The menu bar: Menus allowing you to configure the software.
2. Course and exercise information: Controls to create and configure the courses and exercises in this area, as well as other related settings.
3. Configure instruments: Configure the instruments in batch by clicking this area.
4. Test report: View the test report submitted by students by clicking this area.
5. Lab information: Monitor and modify the parameters of instruments on certain bench by clicking this area.Displays the bench status and instrument status in the lab.

Menu bar

Click **Home** on the menu bar to return to the main page.

Change language

Click **Setting** -> **Language** on the menu bar to change the software language, as shown in the following figure.

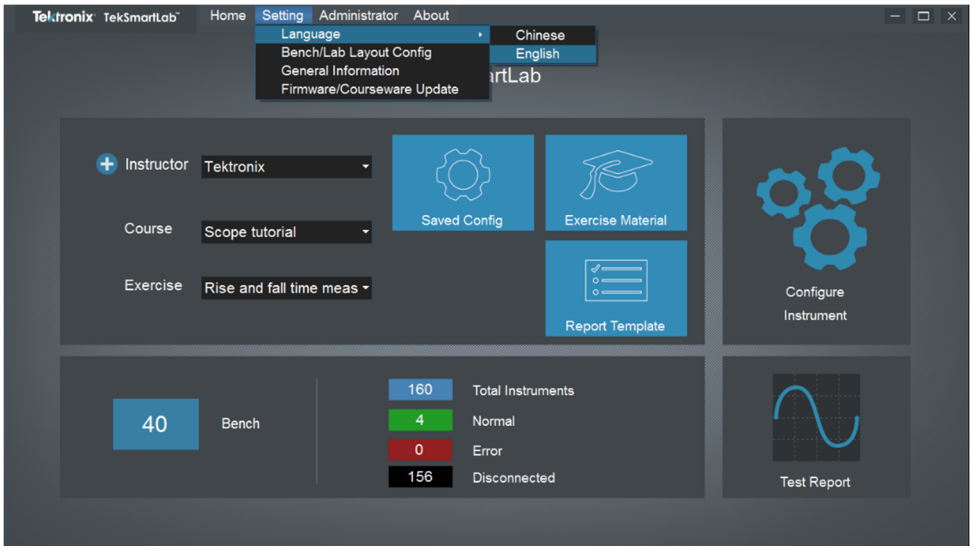


Figure 59: Change language

Lab General Information

Click **Setting** -> **General Information** on the menu bar to change the lab general information.

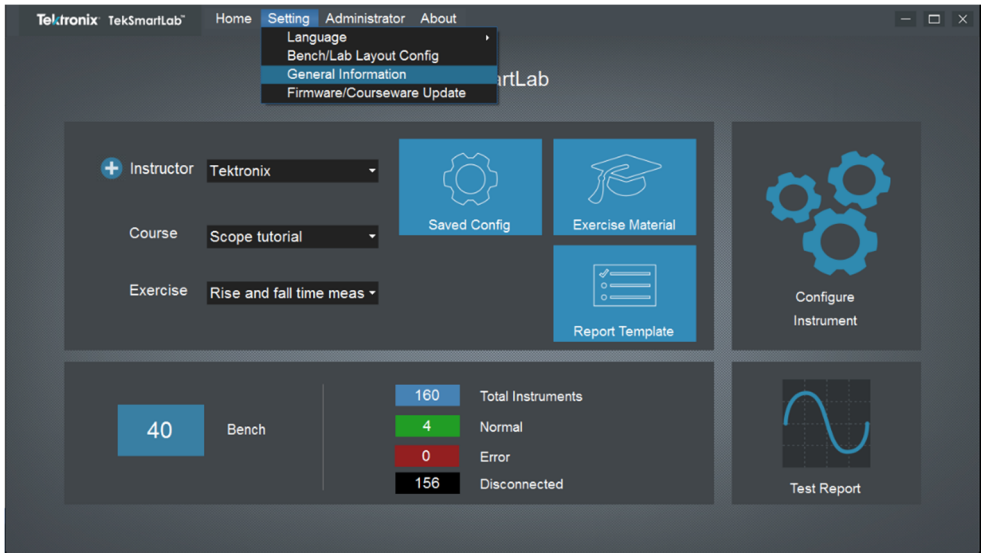


Figure 60: General information

The following figure is displayed after you click **General Information**. You can change the lab name in the upper part of the page.

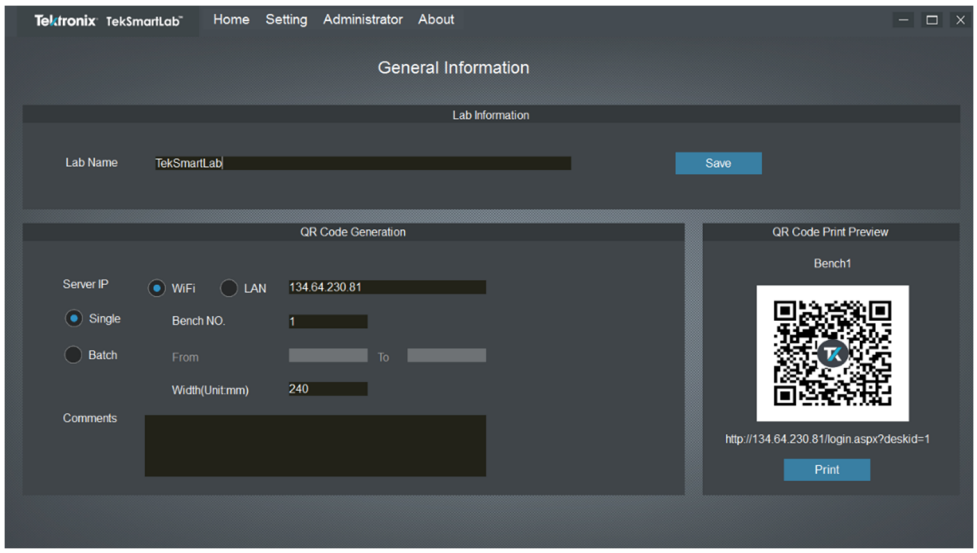


Figure 61: Edit general information

Change the password

Click **Administrator** -> **Change Password** on the menu bar to change the password, and the following dialog box is displayed.

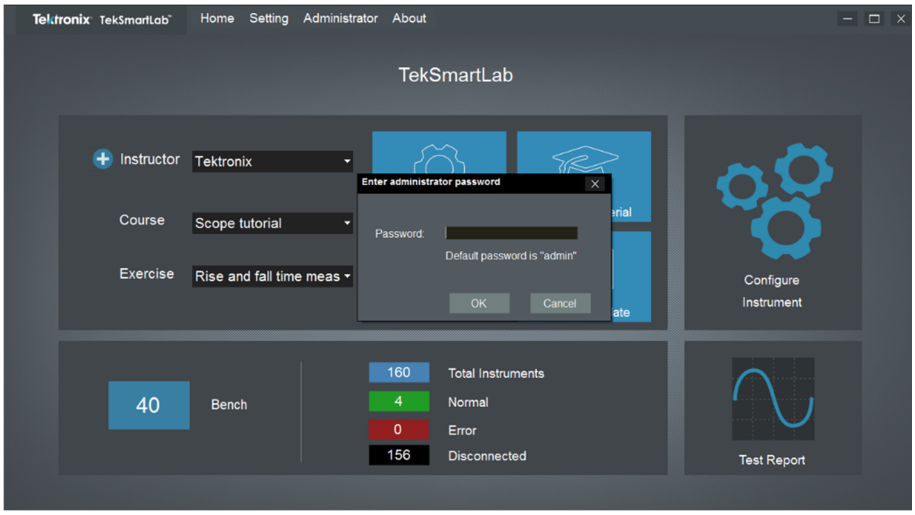


Figure 62: Change password

Input the old password, the following dialog box is displayed. The default password is “admin”

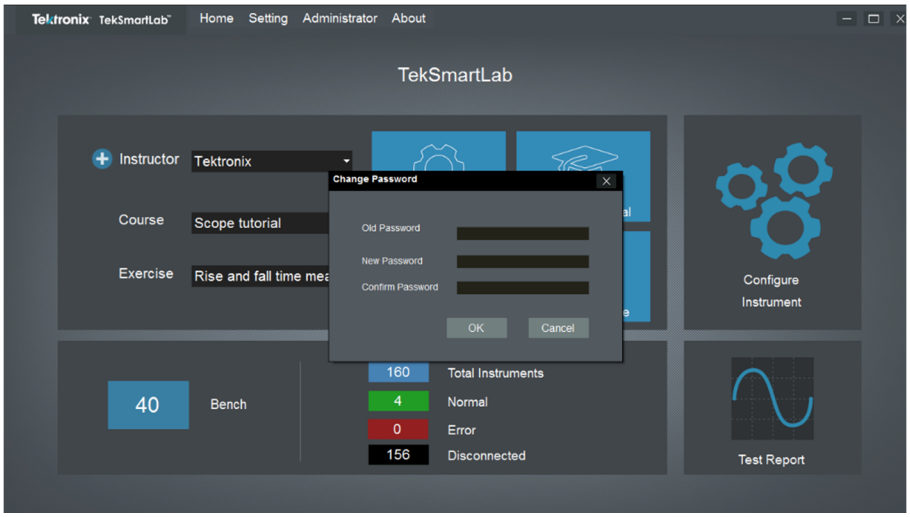


Figure 63: Input new password

Input the old password again and the new password twice, and click **Yes**. Then the password is changed.

Software Activation

Click **About** -> **Software Activation** on the menu bar to activate the software.

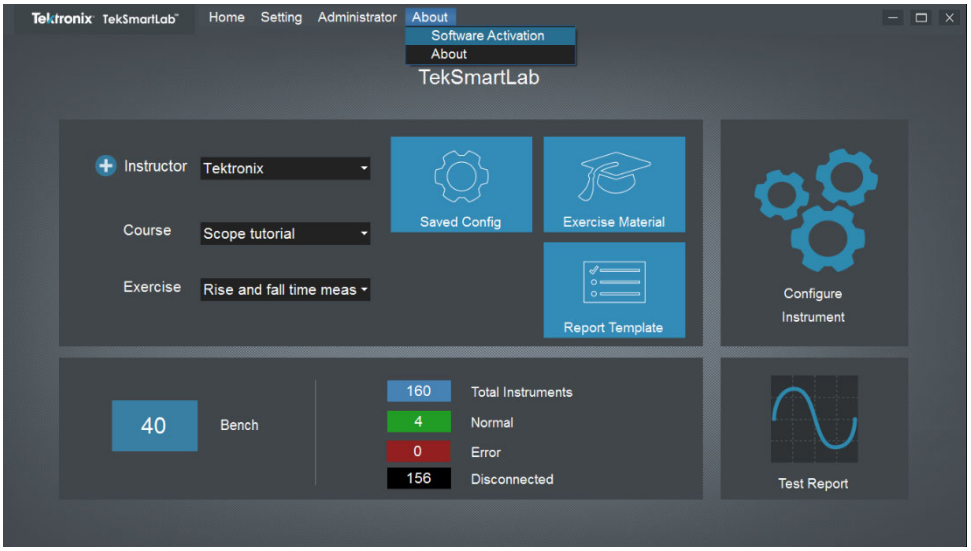


Figure 64: Software activation

7. The following figure is displayed.

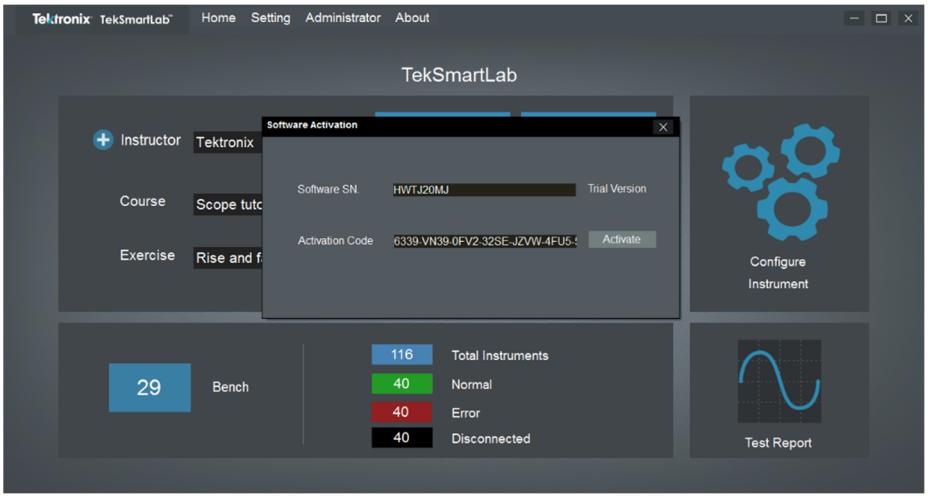


Figure 65: Input license

8. Enter the license you received from Tektronix next to **Activation Code**. Click **Active** to activate the software.

NOTE:

*The **Software SN** is generated automatically when the software is installed on the computer. **Trial Version** means the software is the trial version and supports only 5 benches. It will change to **Full Version** after activation.*

Once you purchase the TSL3000B software, Tektronix will send you the activation code you need to activate your software.

About

Click **About** -> **About** on the menu bar to display the software information, as shown in the following figure.

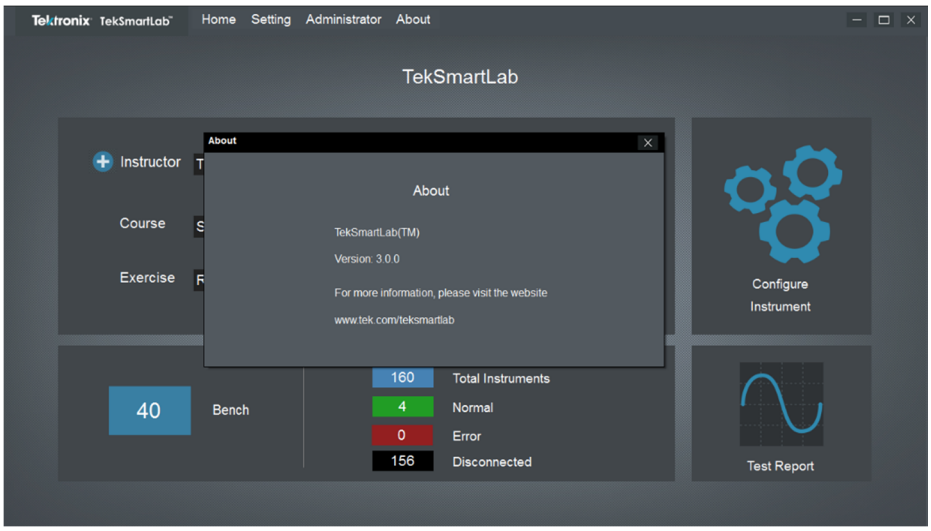


Figure 66: Software information

Lab Instrument Management

This part describes how to manage the instruments in the lab more effectively with TekSmartLab.

Configure Bench and Lab Layout

You can click **Setting** -> **Bench/Lab Layout Config** to set the lab layout as well as the bench layout.

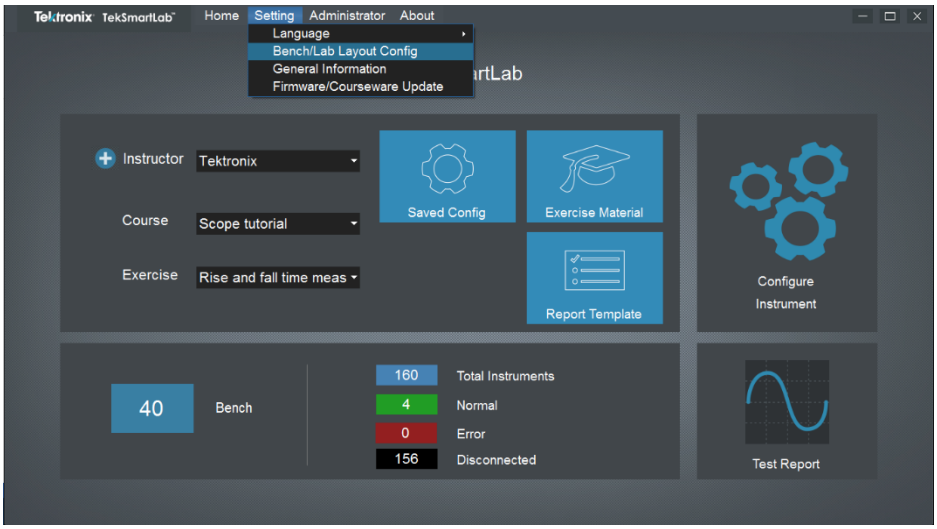


Figure 67: Bench/Lab Layout Config

Bench Layout Setting

The following figure is displayed when you click **Bench/Lab Layout Config**. The **Bench Layout Configuration** tab is chosen.

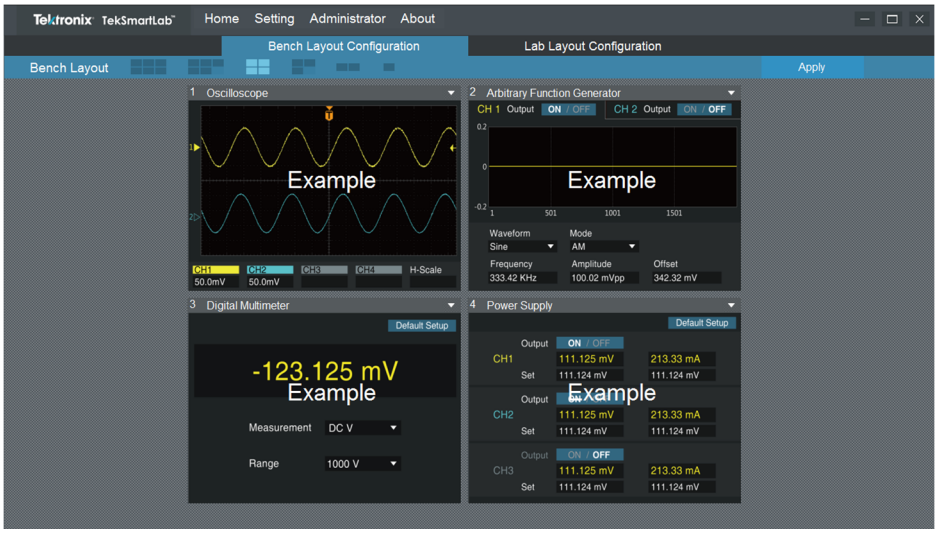


Figure 68: Bench layout configuration tab

You can choose the bench layout templates in the **Bench Layout Configuration** tab. The Four-instrument layout template is chosen by default, as shown above.

You can click the arrow in the upper right corner of the square representing each instrument to choose the type of the instrument, as shown in the following figure. Scope represents oscilloscope, AFG represents Arbitrary Function generator, DMM represents digital multimeter, and PWS represents power supply.

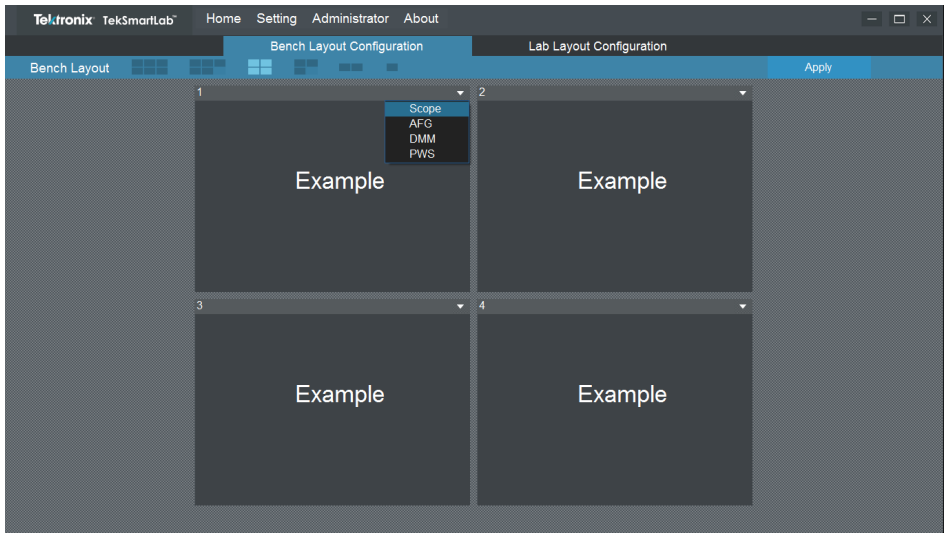


Figure 69: Choose the instrument type

The following figure shows the bench when four instruments are chosen.

Figure 70: Instruments chosen

You can click **Apply** in the upper right corner of the page to apply the settings to all the other benches in the lab.

A dialog box for you to confirm is displayed. Click **Yes**, the bench settings are applied to all the benches in the lab.

If you try to apply the settings without choosing the instruments, a warning pops up.

Lab Layout Setting

Select the **Lab Layout Configuration** tab, as shown in the following figure.

Figure 71: Lab layout configuration tab

You can arrange the layout by input the number of rows and columns in the **Lab Layout Configuration** tab.

You can number the benches by rows or columns. The benches are numbered by rows in the figure below.

You can double-click a bench to delete it, as shown in the following figure. You can also double-click the blank to add the bench back.

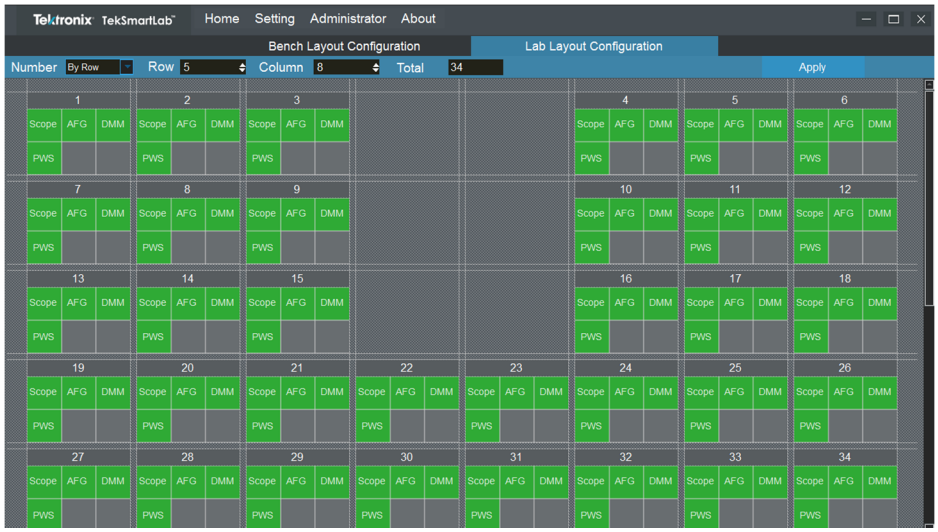


Figure 72: Arranging benches

NOTE: *If you switch between numbering the benches by row and by column, the adding and deleting done previously will be canceled.*

You can also select **Manual** to number the benches manually, as shown in the following figure.

Figure 73: Number the benches manually

Make sure you don't number two benches with the same digit, or the following warning pops up.

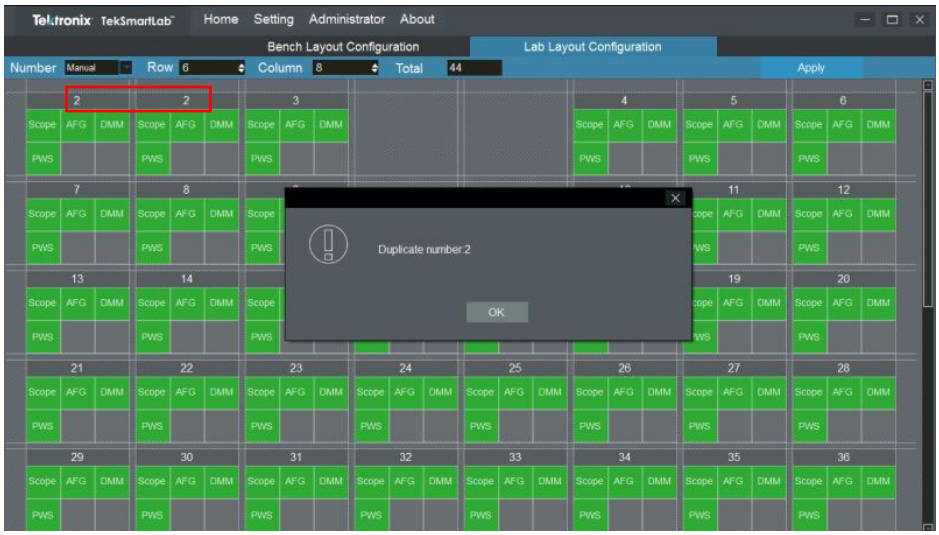


Figure 74: Two benches numbered the same

You can click **Apply** in the upper right corner of the page to apply the settings.

A dialog box for you to confirm the setting is popped up. Click **Yes** to complete the lab configuration.

Centralized Instrument Configuration

You can configure the instruments and then distribute the settings to up to 100 benches.

Configuring Instruments

Take the following steps to configure the instruments:

1. Click **Configure Instrument** pane on the home page. The following figure is displayed.

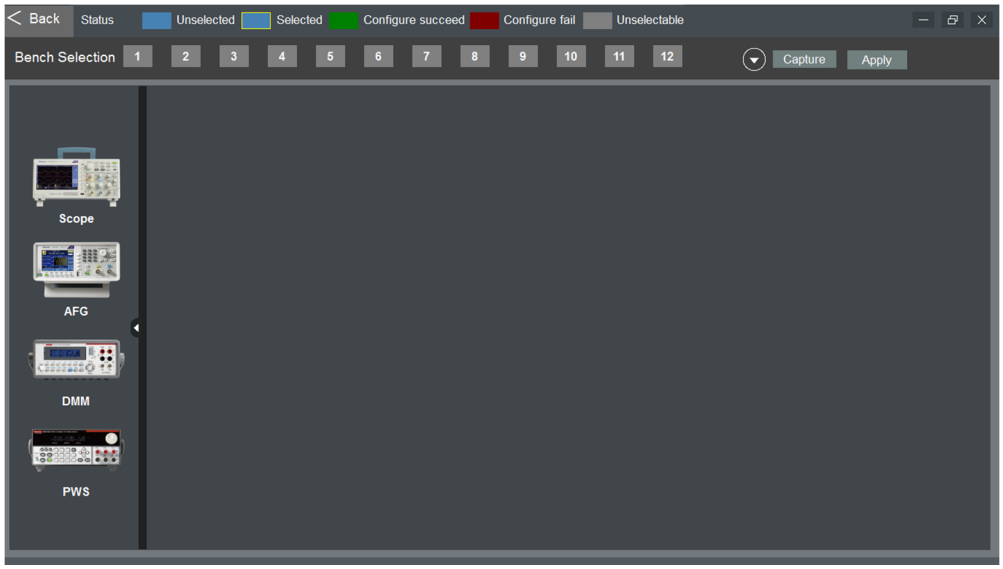


Figure 75: Configure instruments

2. Click the icon of an instrument to select it, and the following figure is displayed.

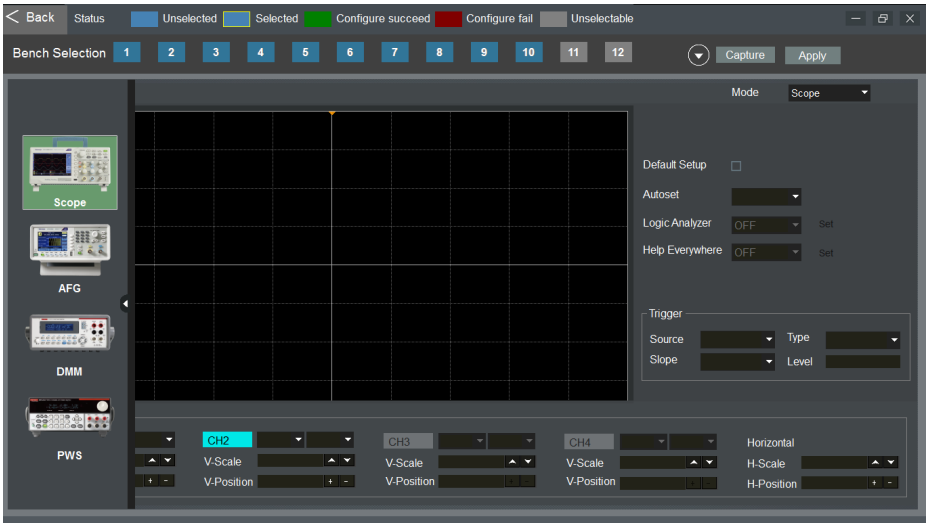


Figure 76: Instrument selected

3. Set the parameters of the instrument selected.

NOTE: *If you tick* ***Default Setup****, the instrument will be reset. Make sure you leave all the parameters unconfigured.*

If you tick ***Default Setup*** *and configure some parameters, the instrument will be reset and then the parameters will be configured.*

NOTE: *The parameters that can be set are based on the first such instrument connected to the software. For example, if the first oscilloscope detected by the system is two-channeled, the parameters for CH3 and CH4 cannot be configured.*

4. Click the white arrow on the right side of the **Bench Selection** bar to collapse it, and the following figure is displayed. The numbered bench icons in blue is selectable.

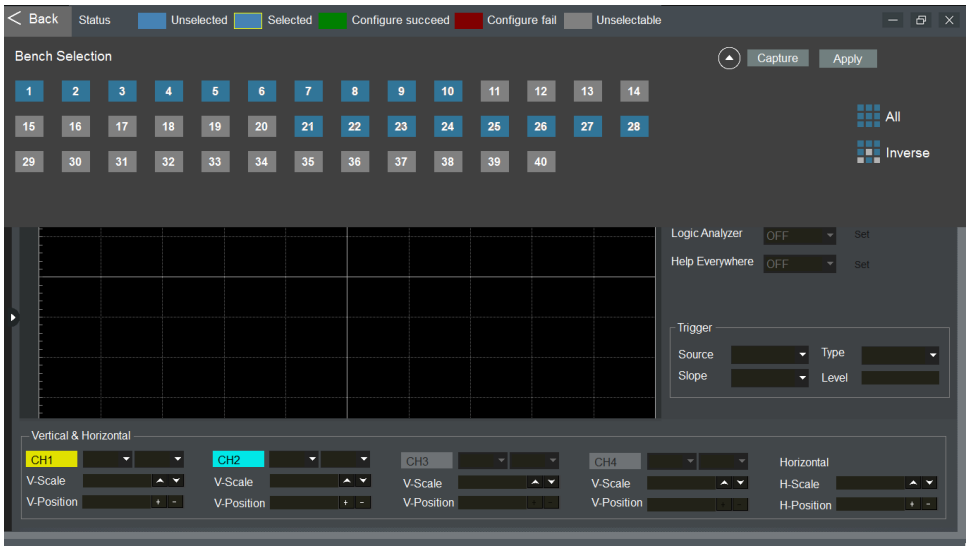


Figure 77: Select bench

5. Select the bench icon and click **Apply** on the upper right corner of the page, and the following figure is displayed. The numbered bench icon displayed in green means the bench is successfully configured. If the icon turns red, select the bench and repeat the configuration. If the icon stays red, please check the cable connection, and then restart the instruments and TBX3000A. If the fault is still not cleared, please perform a self-check of the instrument by referring to the instrument user manual.

Figure 78: Bench configured

6. You can also click **Capture** to get the configurations from a configured bench to distribute to other benches.

NOTE: *If two of the same instrument types are placed in the same bench, the configuration of one instrument will be applied to the other.*

It is recommended that the same instrument types that are connected to the system are of the same series, or even the same model. For example, if the system already have configurations for CH3 and CH4 for oscilloscope, the configuration won't succeed if one of the oscilloscope that is connected to the system is a two-channel oscilloscope.

Firmware Upgrade

Take the following steps to upgrade the firmware:

1. Select **Setting** -> **Firmware/Courseware Update** on the menu bar. The following figure is displayed.

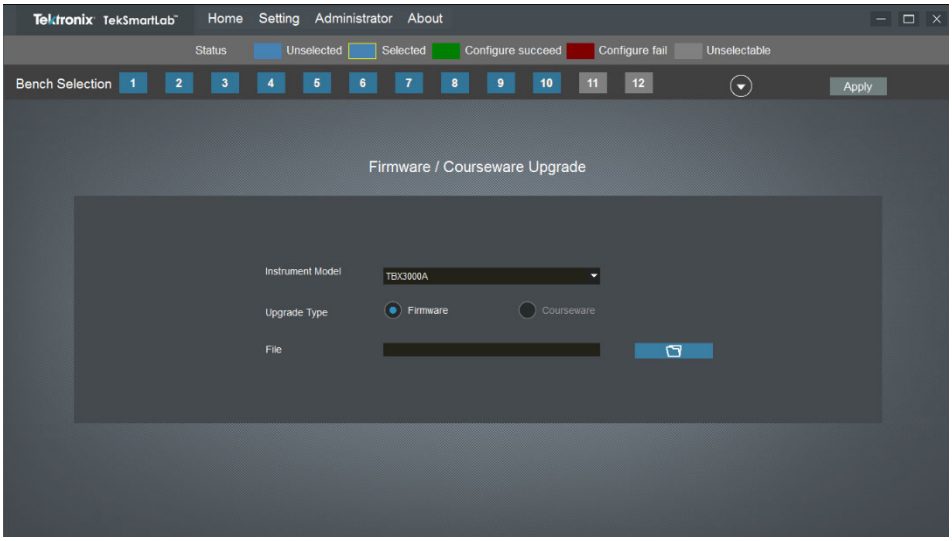


Figure 79: Firmware upgrade

2. Choose the instrument type
3. Choose **Firmware**.
4. Choose the upgrade file.
5. Click **Apply**.

Centralized Instrument Monitoring

Click the lab information area on the main (Home) page. The following figure is displayed.

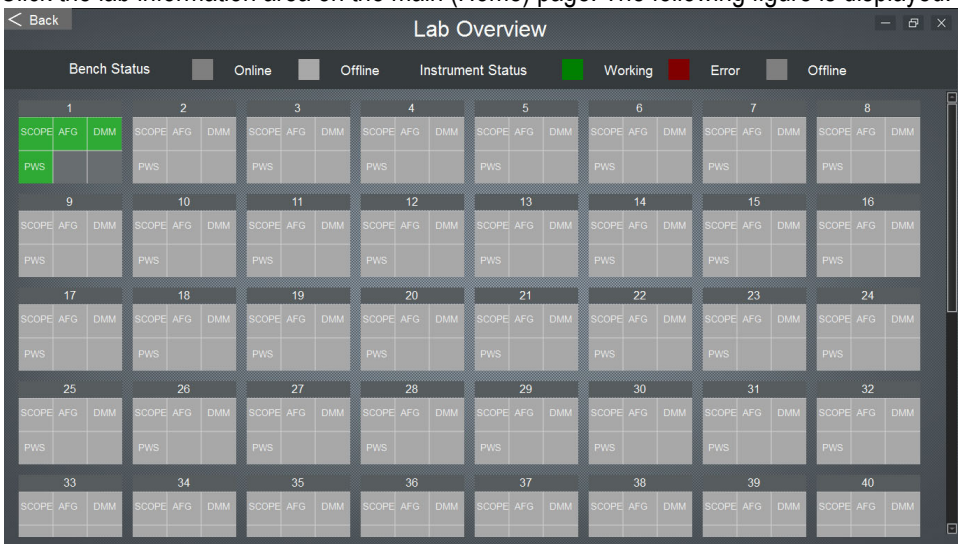


Figure 80: Lab overview

The status of the bench and instruments are represented by different colors, as explained in the status bar in the upper part of the page. For example, in the above figure, bench 1 is online, and the four instruments of bench 1 are working.

You can click the bench to enter the bench page and monitor the instruments, the following figure is displayed.

Figure 81: Bench page

For the MDO3000 oscilloscope, you can switch between two modes: Scope (oscilloscope) and SA (spectrum analyzer), as highlighted in the above figure.

You can monitor and control an instrument in detail by clicking the expanding icon (highlighted in yellow box) in the upper right corner on the instrument pane.

Using an oscilloscope as an example, the following page is displayed after you click the expanding icon. If you want to go back, click the restore icon in the upper right corner.

Figure 82: Oscilloscope page

If you select **Waveform**, the waveform is displayed in real-time on this page. If you select **Screen**, a snapshot of the waveform on the actual instrument is displayed here. You can right-click on the waveform to save it. You can click **Screen** again to take another snapshot.

You can disable **Autoset** on the upper right side of the page to have the students practice setting parameters manually for the experiment. The **Autoset** button is displayed in gray if you disable the function. If you enable the function, the **Autoset** button is displayed in blue. You can click the button to execute the auto setting.

As shown in the following figure, you can set the parameters for the waveforms in the **Vertical & Horizontal** part of the page.

Figure 83: Vertical & Horizontal settings

You can either input values into the boxes or click arrows or plus and minus symbols to set the parameters. In addition, the highlighted number 1 in yellow, number 2 in blue represents the V-position of the two channels; the highlighted yellow arrow represents trigger level. You can drag these symbols to change the values directly.

For the channels, DC is the mode of coupling, and 1X is the value for attenuation.

As shown in the following figure, you can also use cursors for measurements on this page.

Figure 84: Cursors

Use these steps:

1. Select the Source and Mode in the Cursor area.
2. If you select **Time** for the mode, cursors “a” and “b” are displayed on the waveform. Move the cursors and the measurement result is displayed automatically in the box at the upper right corner of the waveform display.

Asset Management

You can select **Administrator** -> **Asset Management** on the menu bar to manage the instruments. The following figure is displayed.

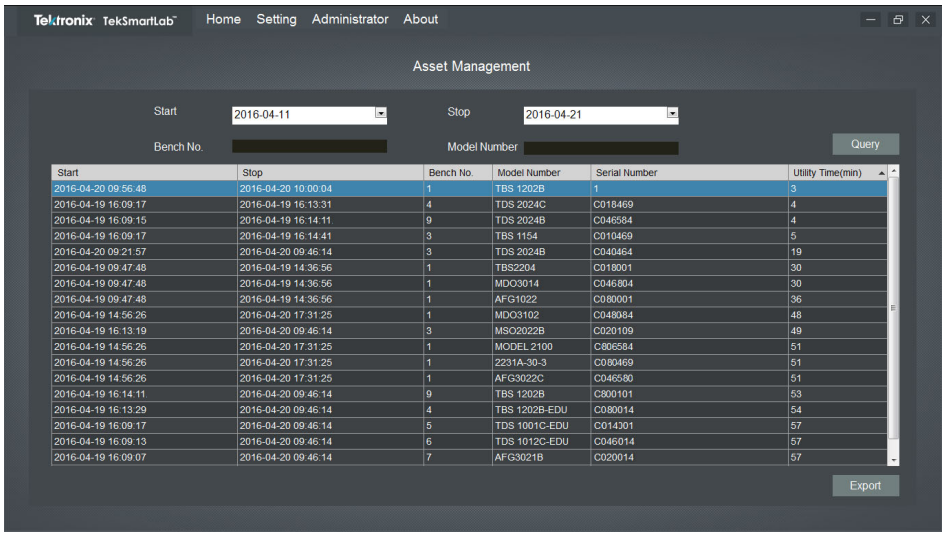


Figure 85: Asset management

You can set the parameters and then click **Query** to acquire the information about the instruments. Then you can click **Export** to export the result as an Excel document.

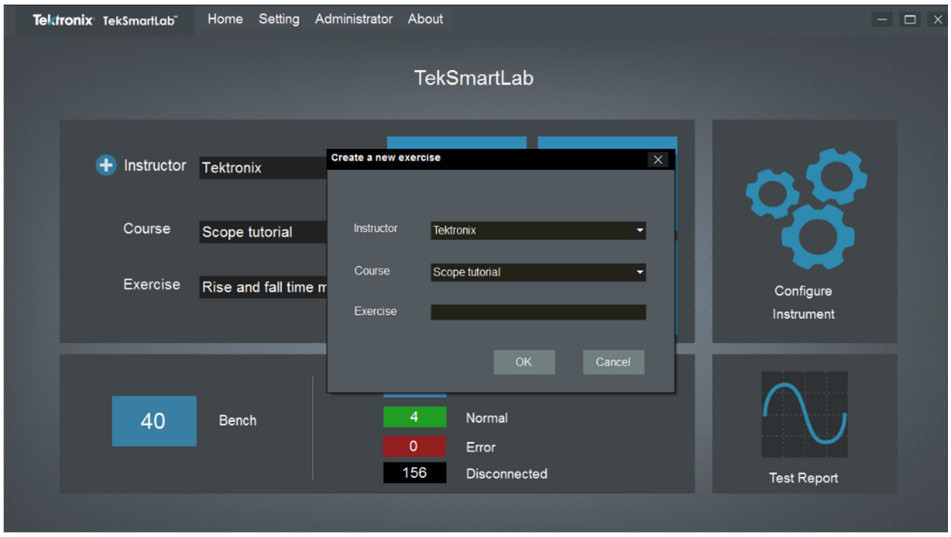
Lab Teaching Flow Management

This section describes how theTekSmartLab helps optimize lab teaching flow.

Create and Select an Exercise

As shown in the following figure, you can click the plus symbol in the course information area to create a new course. The dialog box pops up for you to input the information.

Figure 86: Create a new course



You can input the name of the instructor, the name of the course, and the name of the exercise, and then click **Ok** to save the exercise, as shown in the following figure.

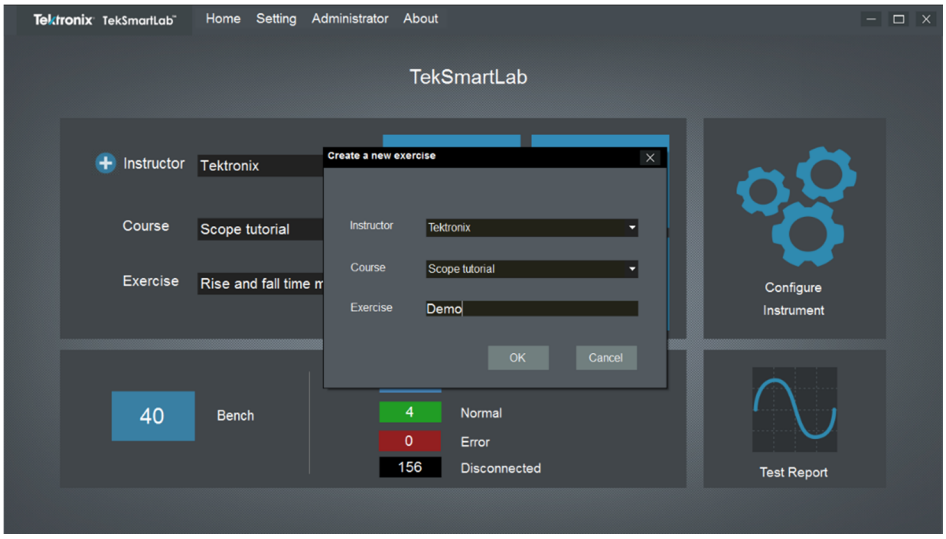


Figure 87: Create a new exercise

You can select an existing exercise, as shown in the following figure.

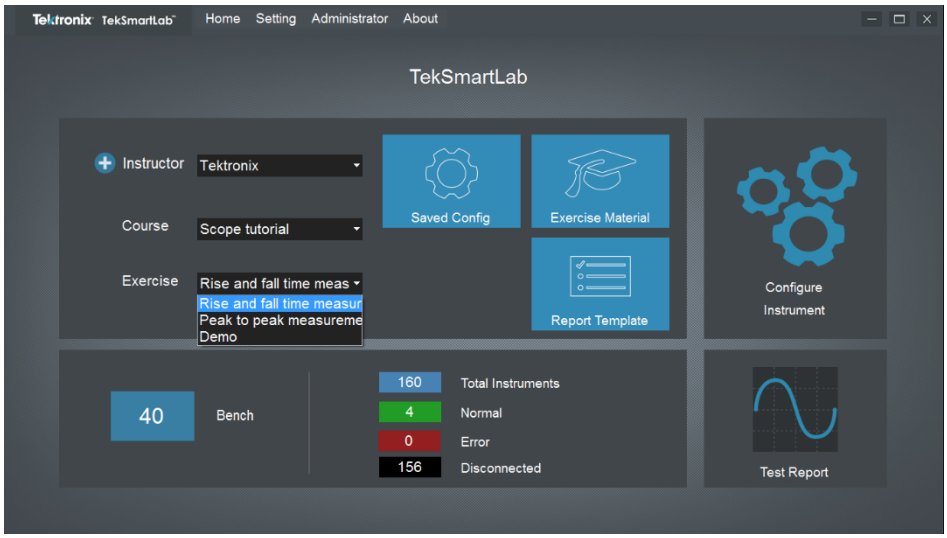


Figure 88: Select an existing exercise

NOTE: *You can delete an exercise by clicking Administrator -> Exercise Management. Only the administrator has the access for deleting exercises.*

Save/recall instrument configuration

This function allows you to save instrument configurations, or to recall instrument configurations.

You can click the **Saved Config** area on the home page to configure the instruments and then save the settings. The following figure is displayed.

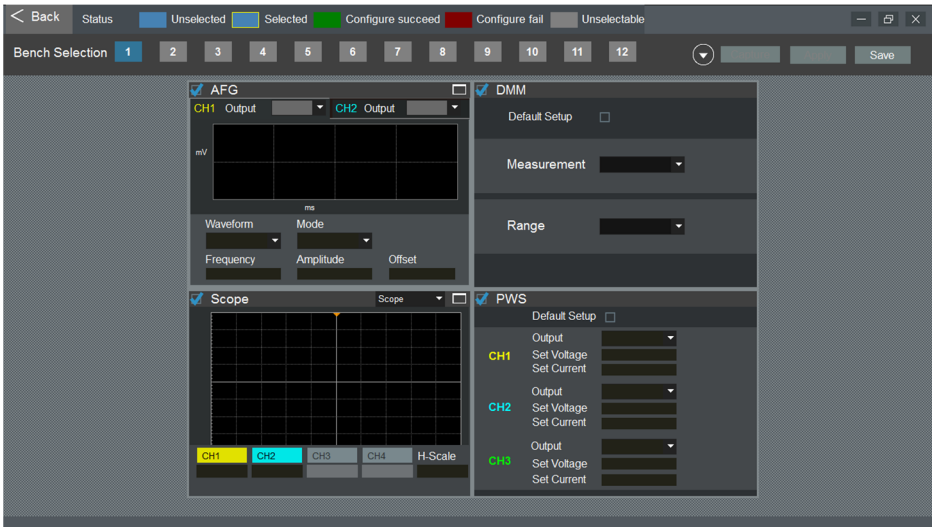


Figure 89: Configure the instruments

As shown in the above figure, all the instrument types that are supported by the software are displayed here. You can configure all the instrument types here as long as you tick the box in the left upper corner of each instrument type.

NOTE: *The differences between configuring instruments on the home page and here are that:*

- *The configuration can be done to four instrument types at the same time in this page.*
- *The configuration can be saved here and recalled for later use.*

NOTE: *If two of the same instrument types are placed in the same bench, the configuration of one instrument will be applied to the other.*

You can set the parameters for the instruments as shown in the following figure.

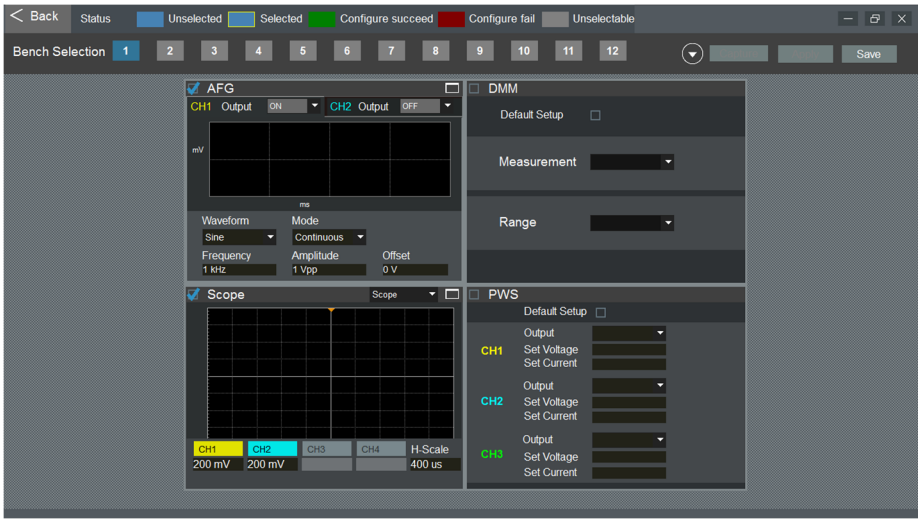


Figure 90: Configure the instruments

NOTE: *The parameters that can be configured are based on the first instrument of the type that is detected by the system.*

You can also select a preconfigured instrument in another bench and click **Capture** to acquire its configurations to apply to the instrument you want to configure. The waveform of the oscilloscope and arbitrary function generator will only be displayed when you click **Capture**.

You can click **Save** to save the configuration for future use.

You can also select other benches to apply the configurations.

Student Access

This chapter introduces features that this software provides for students to access the experiments on a webpage.

Generate QR Codes for Benches

The server generates a webpage for each bench for students to access the exercise. The students can log in the webpage by scanning the QR code generated for the webpage or the IP address.

Take the following steps to generate QR codes for the benches:

1. Select **Setting** -> **General Information** on the menu bar to generate QR codes for the benches, as shown in the following figure.

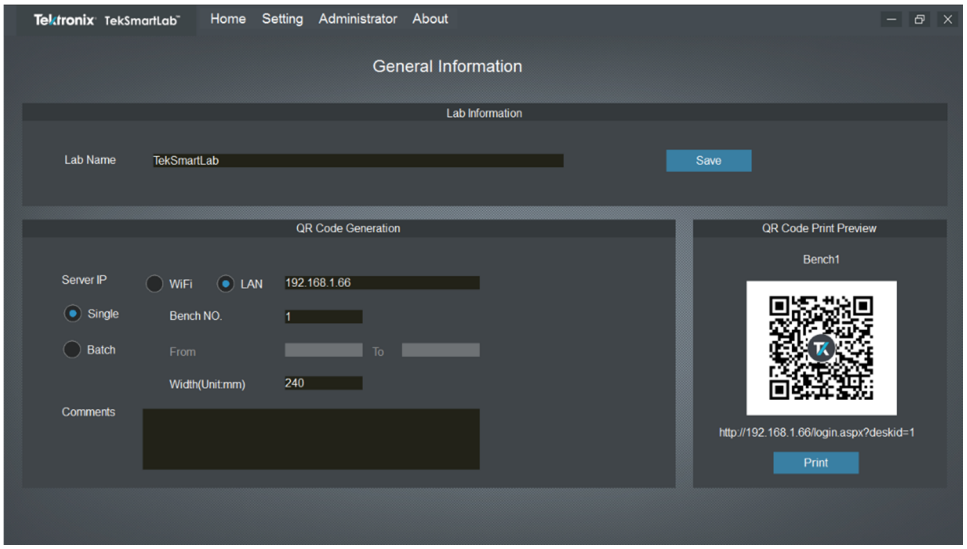


Figure 91: Generating QR code

2. Set the server IP in the TekSmartLab network. You can choose WiFi, LAN, or input the IP manually.

NOTE: *The server should be set with static IP so that the address for each webpage won't change.*

NOTE: *If computers for students installed on the benches and TekSmartLab server belong to the same campus network, then set the server IP as the IP address in the campus network. Thus, the computers on the benches are able to access the bench-specific IP address distributed by the server.*

3. Input the bench number. If you want to generate the QR codes in batch for benches, tick **Batch**, and then input the bench numbers.
4. Input comments if necessary.
5. Click **Print** under the QR code preview to generate the codes.

You can paste the printed QR codes on their correspondent benches in the lab.

Accessing the Webpage

Students can take the following steps to access the bench webpage:

1. Connect your smart phone or computer to the TekSmartLab network. If you are using the computer on the bench, and the bench and server are connected to the campus network, then you are not required to be connected to the TekSmartLab network.
2. Taking bench 1 as an example, scan the QR code, or input the address to log onto the bench webpage. The following figure is displayed.

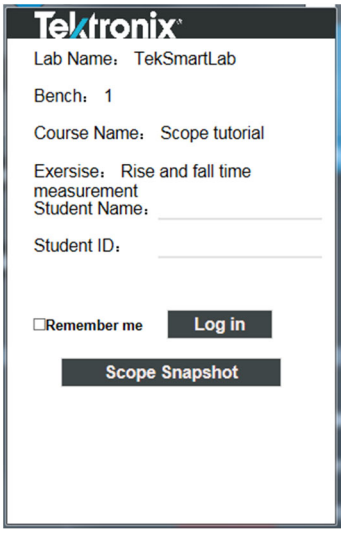


Figure 92: Log in the bench webpage

3. Input your name and ID to log in the webpage.

NOTE: *Your Student ID should be unique, whereas Student Name does not need to be unique.*

You can also take a snapshot of the oscilloscope screen by clicking ***Scope Snapshot*** *on this page.*

Exercise Material Sharing

In the course information area, you can click the **Exercise Material** area on the main (Home) page to share the exercise material with students. The following figure is displayed.

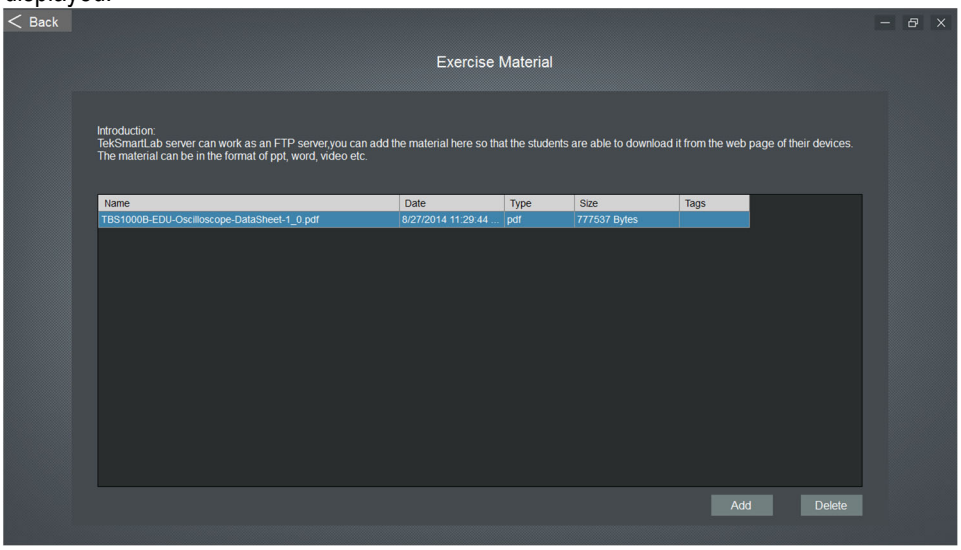


Figure 93: Edit exercise material

On this page, you can add or delete exercise material on the server.

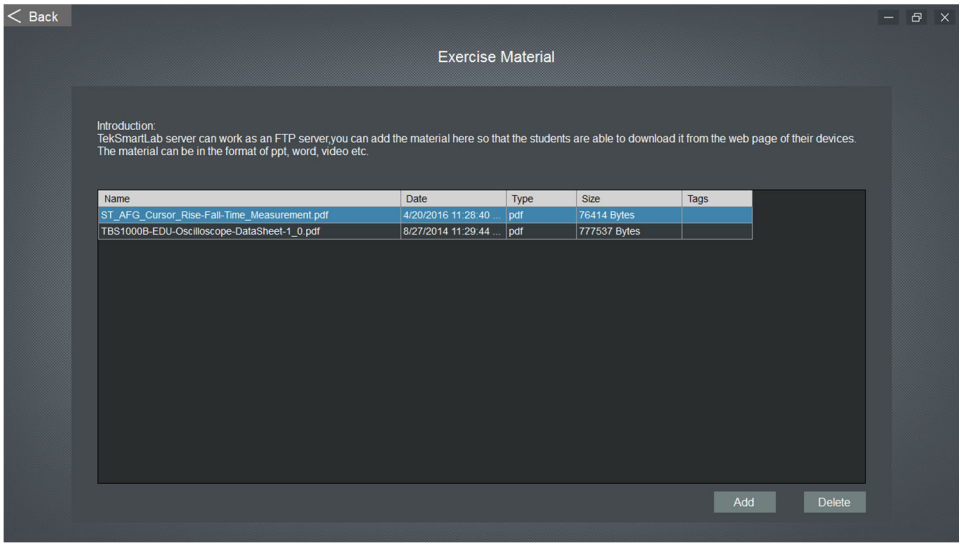


Figure 94: Add or delete exercise material

On a student's smart device, as shown below, students can download the exercise material to their devices.

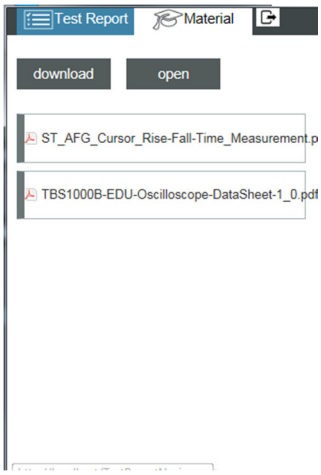


Figure 95: Download exercise material

Test Report Editing

In the course information area, you can click **Report Template** button to import a test report template to the server. You can create a test report template by using Microsoft word (only .docx format is supported) and then import the .docx file to the server, as shown in the following figure.

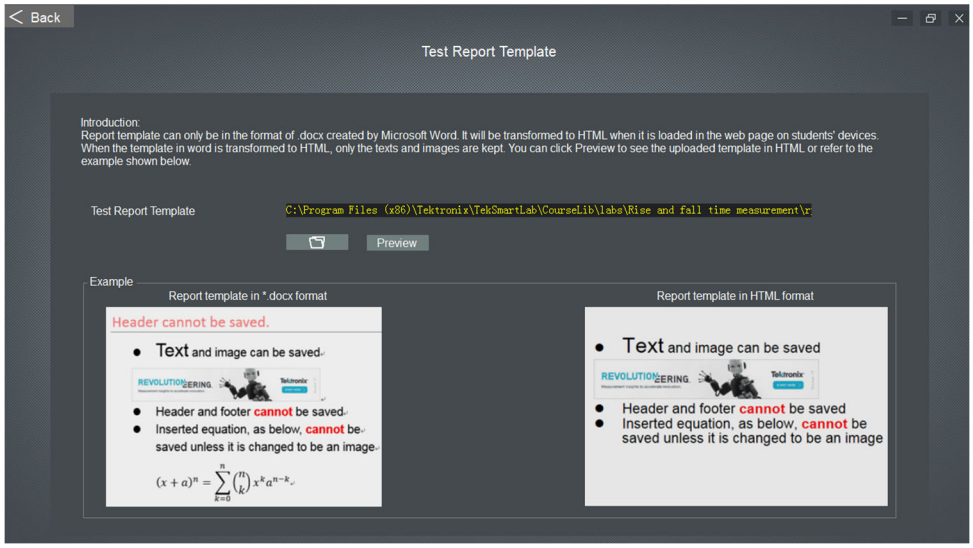


Figure 96: Importing test report template

The template is transformed into an HTML file once it's imported to the server. You can click **Preview** to see how it is displayed in HTML format.

On a student's smart device, as shown in the following figure, students can create a new test report by clicking **New Report**.

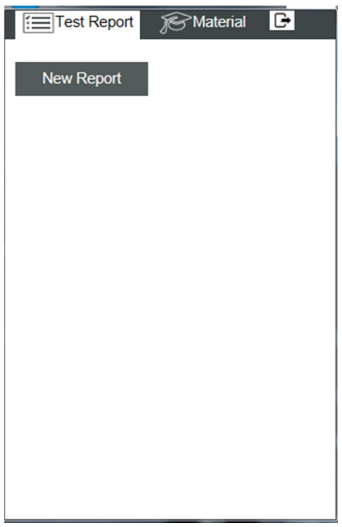


Figure 97: Create a new test report

When you create a new test report on your device, the defined template is automatically loaded, as shown in the following figure.

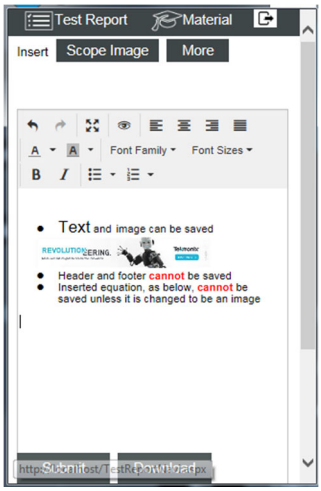


Figure 98: Create a new test report

You can edit the report and insert the test result. For example, click **Scope Image** to insert the oscilloscope snapshot into the test report, as shown in the following figure.

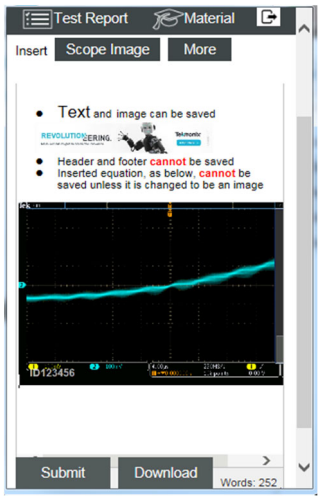


Figure 99: Scope snapshot inserted

After you are finished editing the test report, you can click **Submit** to submit it.

You can also download the test report locally to edit it in a Word file.

You can click **Test Report** on lower right side of the home page to check a student's test reports. The following figure is displayed.

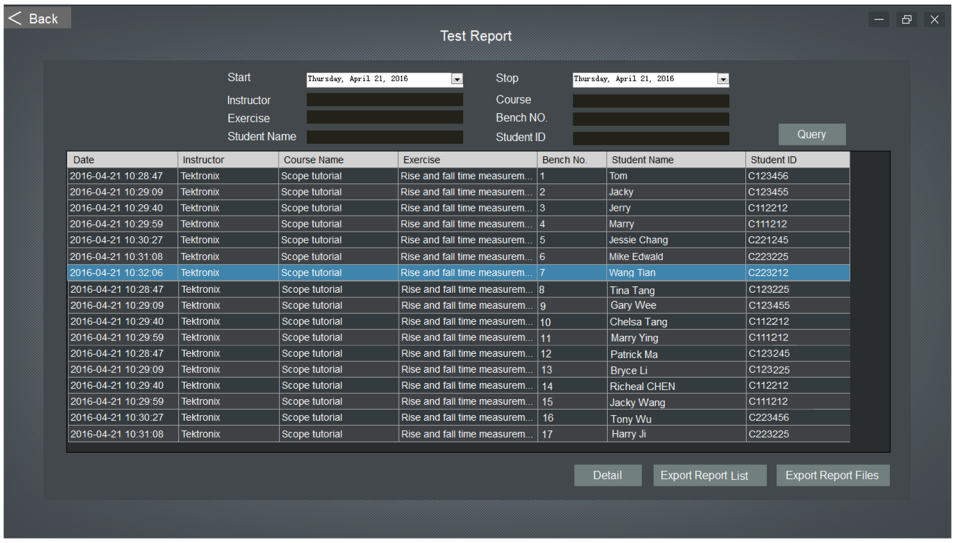


Figure 100: Query test report

You can input the time next to **Start** and **Stop** and click **Query** to get the students' report.

You can double-click a report to check it, or choose a report and click **Detail** to check it.

You can click **Export Report List** to export the query result in an Excel document. You can click **Export Report Files** to export all the text reports.

You can click **Delete** to delete the selected report.

Case Study

Set up a TekSmartLab Network System

Introduction

In order to ensure the stability and security of running the TekSmartLab solution, we should set up an independent network other than taking advantage of the existing network, for example, the campus network. If the lab server is connected to the campus network, we should add a network card or a USB WIFI dongle for TekSmartLab network. Thus the server is working simultaneously with the TekSmartLab network and the campus network.

The following figure illustrates that the server is connected to the TekSmartLab network through Wi-Fi, and also connected to the campus network through LAN.

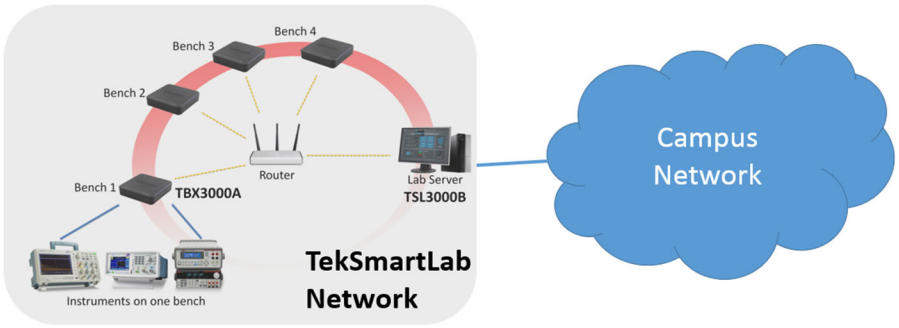


Figure 101: TekSmartLab network

You can set up the TekSmartLab network wireless, through cables, or a mix of both according to the actual lab requirements.

NOTE: *Make sure that TBX3000As on each bench are in the same network with the server at all times, which means that you can ping the IP address of the TBX3000As on the server successfully.*

Configure the Network

To set up a wireless network:

Configure the wireless network using these settings:

- Wireless network mode: 2.4GHz, 802.11n
- Set the number of the Max. Associated clients larger than the number of devices that are connected to the network. For example, if the network is connected to1 lab server, 20 benches through TBX3000A, and 20 smart phones from students, set the number of Max. Associated clients larger than 41.
- WIFI signal level: >= -50dBm (recommended)
- WIFI signal to noise ratio: >=35dB (recommended)

For the wireless equipment:

- If the number of benches is larger than 15, it is recommended to use corporate grade router (such as TP-LINK TL-R600VPN) plus Access Point devices (such as TP-Link EAP120) to form a network. 1 AP for every 15 benches is recommended.
- If the number of benches is equal to or smaller than 15, a corporate grade router (such as TP-LINK TL-ER604W) is enough for the network.

NOTE: *The WIFI coverage will vary by cases. Please consult with your IT department or the router manufacturer for more information.*

If you are going to set up a wired network, make sure that every bench has an IP address. TBX3000A supports both dynamic IP and static IP.

Install TekSmartLab on the lab server

Refer to Installing TSL3000B to install TSL3000B properly on the lab server.

Note that the lab server should be set with a static IP address, and the software should be started only after the lab server is connected to the TekSmartLab network.

Configure the TBX3000A

Connect the TBX3000A

1. Install the USB-WIFI dongle on each TBX3000A
2. Connect the instruments on each bench to the TBX3000A using USB cables, and then power the instruments on, as shown in the following figure. The figure is an example of only two instruments connected to the TBX3000A on the bench.

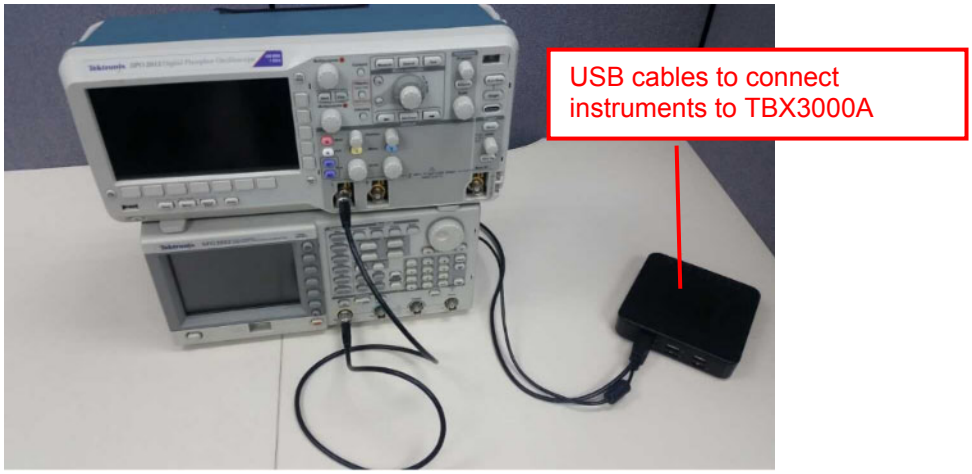


Figure 102: Connecting TBX3000A

Log onto the TBX3000A Configuration Page

There are two ways to log onto the TBX3000A configuration page on a computer:

- Connecting the TBX3000A directly to a computer
- Connecting the TBX3000A to a router

Connect the TBX3000A directly to a computer

Connect the TBX3000A to a computer as shown in the following figure:

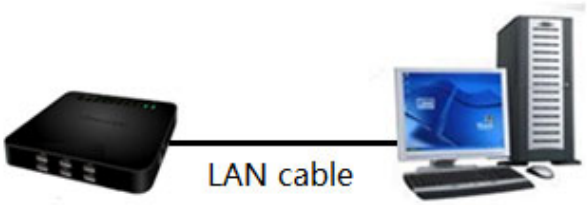


Figure 103: Connect the TBX3000A directly to a computer

Set the LAN connection parameters of the computer (with path *Control Panel - > Network and Internet -> Network and Sharing Center* for Win7 operation system) according to the figure in the below:

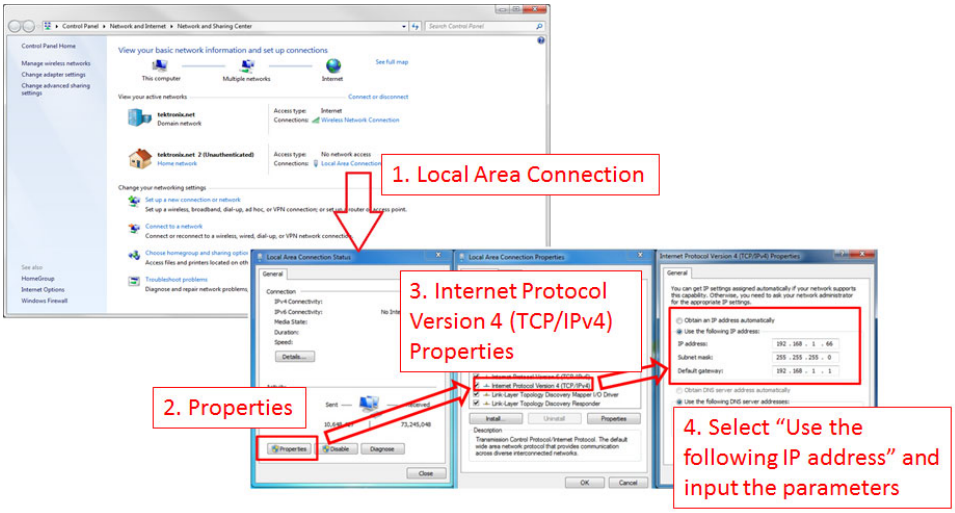


Figure 104: LAN configuration

The LAN parameters are set as follows:

IP address :192.168.1.66

Subnet mask: 255.255.255.0

Default gateway: 192.168.1.1

Enter the IP address 192.168.1.101 in your browser, and then configure the TBX3000A.

Connect the TBX3000A to a router

Connect TBX3000A to a router as shown in the following figure:

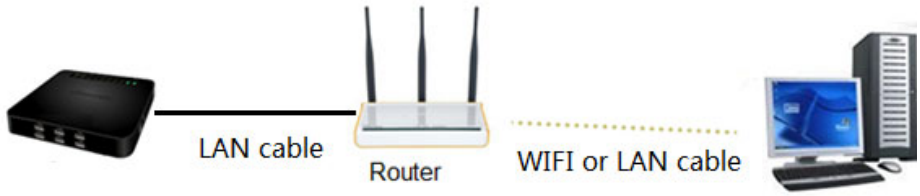


Figure 105: Connect TBX3000A to a router

Make sure the computer is connected to the 'school_lab_1' network. If the computer is successfully connected via WIFI, you will see the network as shown in the following figure.

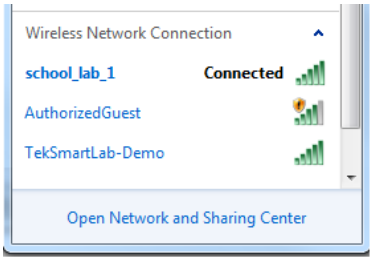


Figure 106: Computer connected to 'school_lab_1' network

NOTE: *The 'school_lab_1' network is generated by the router.*

Enter the IP address 192.168.1.101 into your browser, and the welcome page is displayed as shown in the following figure. Then configure the TBX3000A.

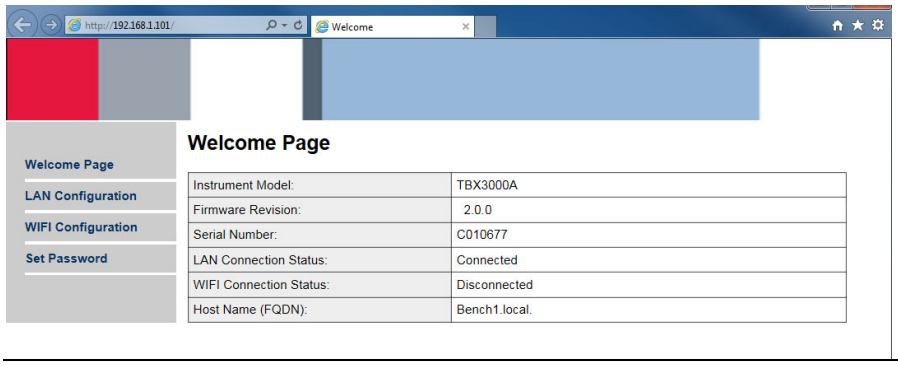


Figure 107: Welcome page

Configure the TBX3000A for the wireless network

1. On the welcome page of TBX3000A, Select **LAN configuration** on the left side to enter into LAN configuration page

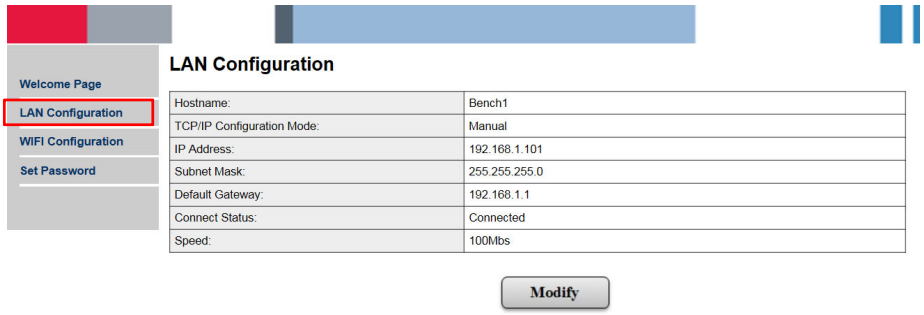


Figure 108: LAN configuration

2. Click **Modify** to enter into Modify LAN Configuration page. Input “admin” if password is required.

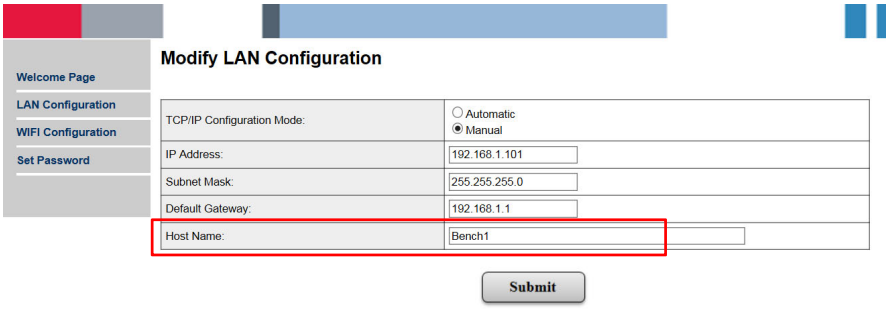


Figure 109: Modify LAN Configuration

3. Change the host name into **BenchX**, in which X represents the number of the bench on which the TBX3000A is placed. The above figure uses Bench1 as an example. Click **Submit** to finish. Note that the TCP/IP configuration Mode and other settings should not be changed.
4. Click **WIFI Configuration** on the left side to enter into WIFI configuration page

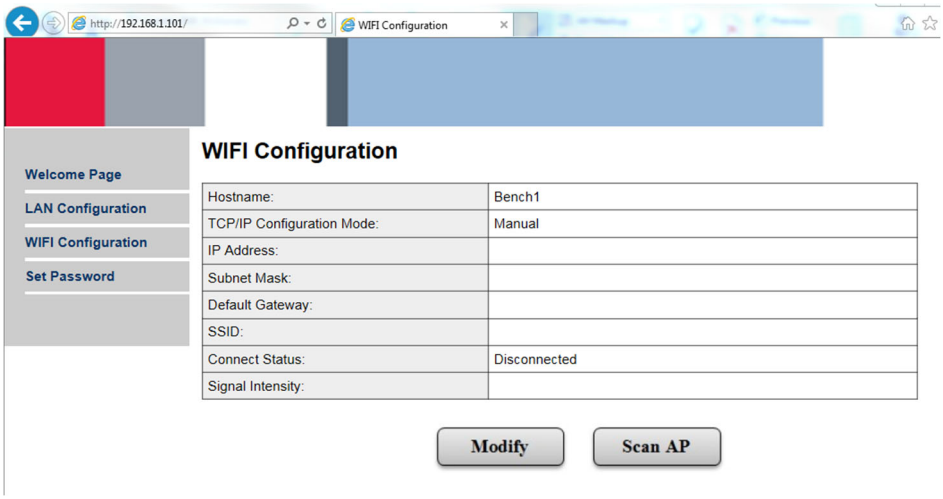


Figure 110: WIFI configuration

5. Click **Scan AP** to search for the WIFI network, as shown in the following figure.

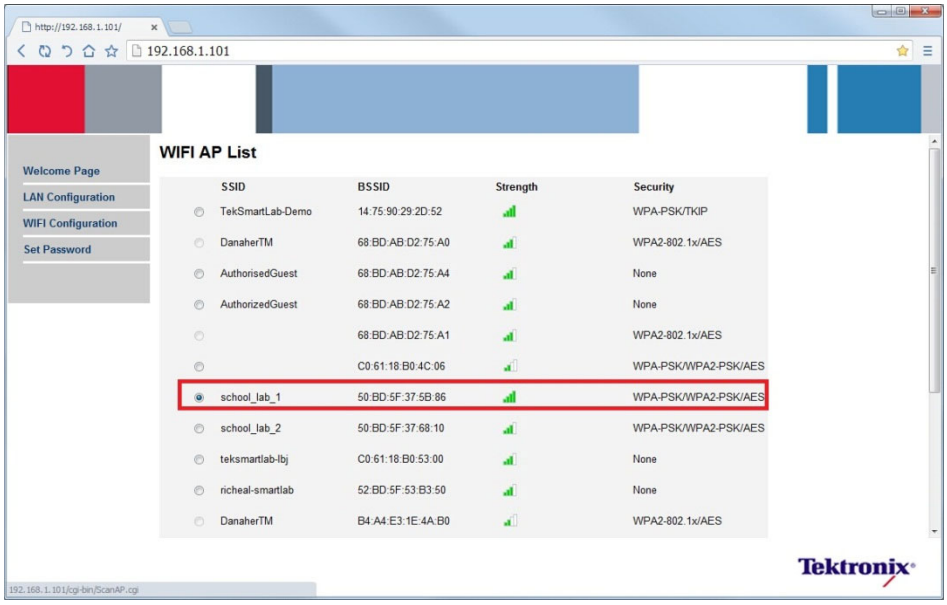


Figure 111: Scan AP

6. Choose **school_lab_1**, and then click **Apply**.

7. If the 'school_lab_1' network can only be accessed by a password, a prompt pops up as shown in the figure below. Enter the password and click **Connect**. Once connected, the WIFI indicator on TBX3000A will blink twice a time.

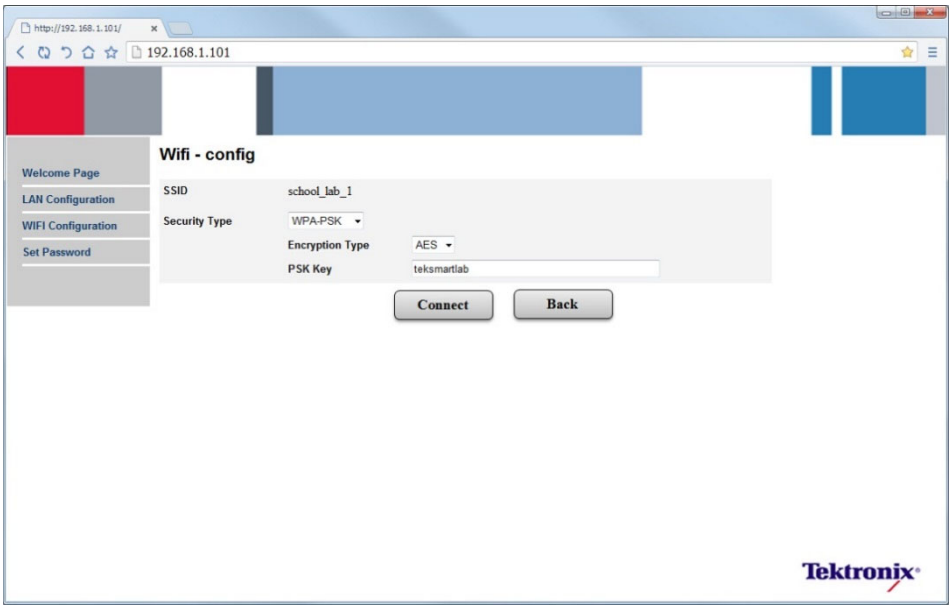


Figure 112: Input password

8. Check the Host Name, SSID and Connect Status, and TCP/IP configuration Mode is Auto as default.

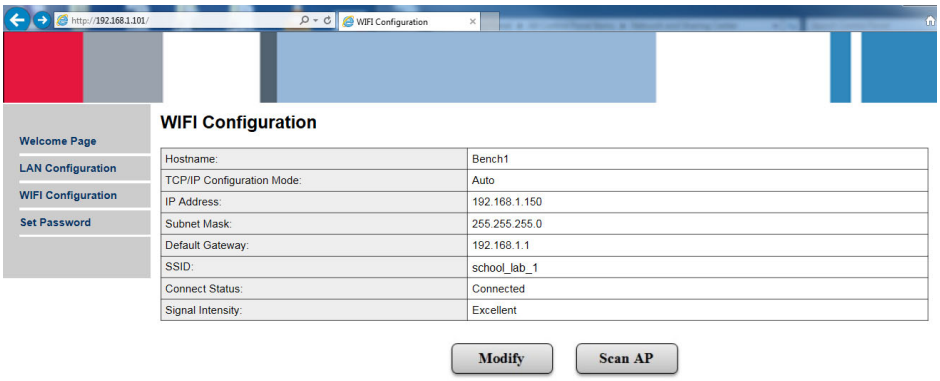


Figure 113: WIFI configuration

9. If need to set the static IP address, click **Modify**. Enter "admin" if password is required. Select TCP/IP Configuration Mode to be Manual, and set the IP address, Subnet mask and Default gateway manually. Click **Submit** to finish. Note host name should not be changed.

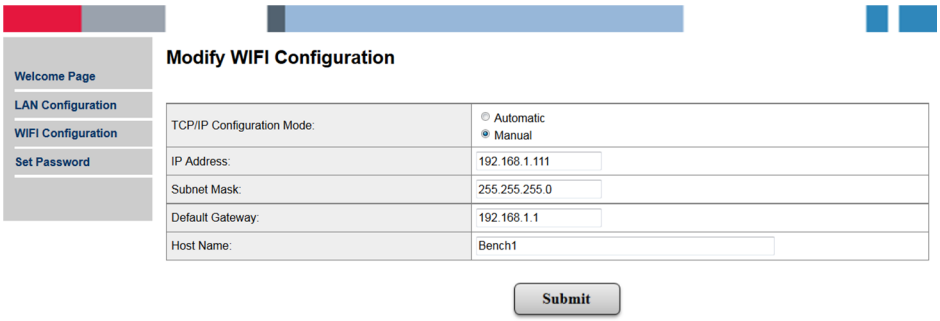


Figure 114: Modify WIFI configuration

10. Click **Welcome Page**, and the configuration is done as shown in the figure below.

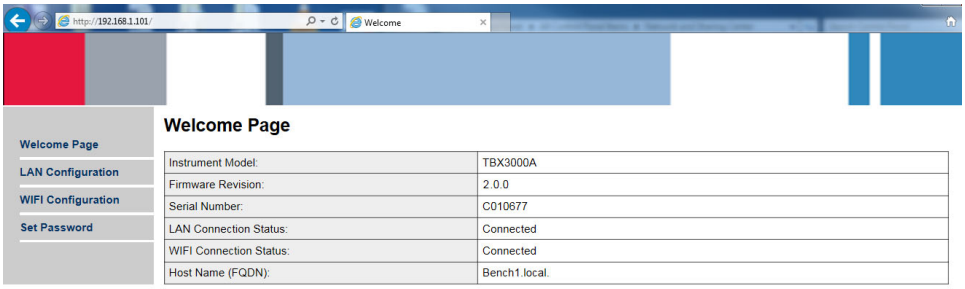


Figure 115: WIFI configuration finished

11. Disconnect the LAN connection of TBX3000A to finish the configuraiton.
12. Repeat the procedure to configure the TBX3000A on the bench and change its host name as BenchX, in which X represents the number of the bench that TBX3000A is placed.
13. After configuring the TBX3000As, they will be connected to 'school_lab_1' network automatically, and will be automatically recognized as the bench configured by the TSL3000B software running on the lab server.

NOTE: *The host name of TBX3000A must be changed on the LAN configuration page.*

Two TBX3000As cannot have the same host name, otherwise the later host name will be displayed as "BenchX-2.local", as shown on the welcome page below, and cannot be recognized by the TSL3000B software.

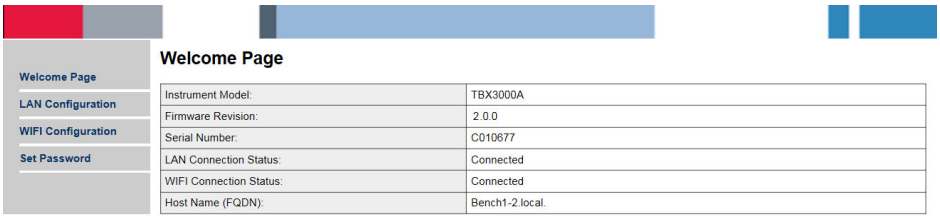


Figure 116: Two TBX3000As with the same host name

Configure the TBX3000A for the LAN network

1. Select **LAN Configuration** on the left side and click **Modify**, as shown in the following figure. Input “admin” if password is required.

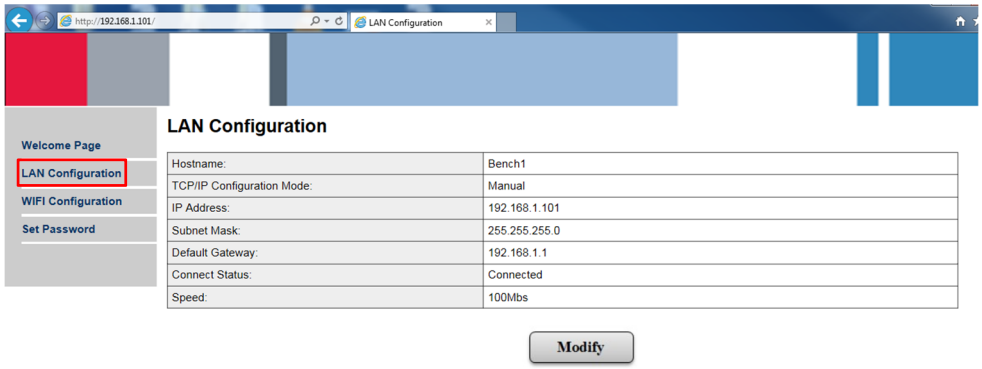


Figure 117: LAN configuration

2. Change the host name of the bench to which the TBX3000A is connected, as shown in the following figure.

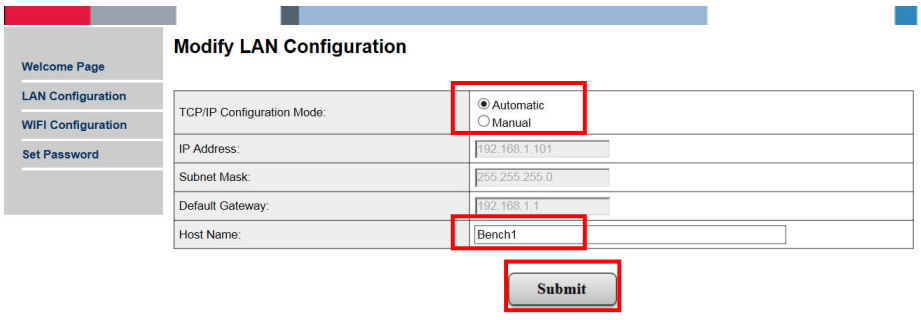


Figure 118: Modify LAN configuration

3. Select **Automatic** next to **TCP/IP Configuration Mode**. Or you can select **Manual**, then input the IP address, subnet mask, and default gateway.
4. Click **Submit** to complete the configuration.

NOTE: *After clicking Submit, the TBX3000A could be disconnected to the computer that is used to configure the TBX3000A because the default IP address of the TBX3000A is modified. To check the IP address and host name, you need to log in the router configuration page.*

Arrange the Bench and Lab Layout

This case supposes that there are four instruments placed in one bench: an oscilloscope, an arbitrary function generator, a digital multimeter, and a power supply.

Arrange the bench layout

Take the following steps to arrange the bench layout:

1. Click **Setting** -> **Bench/Lab Layout Config** and choose the **Bench Layout Configuration** tab.
2. Choose the four-instrument layout, as shown in the following figure.

Figure 119: Four-instrument bench layout

3. Choose the four instruments, as shown in the following figure.

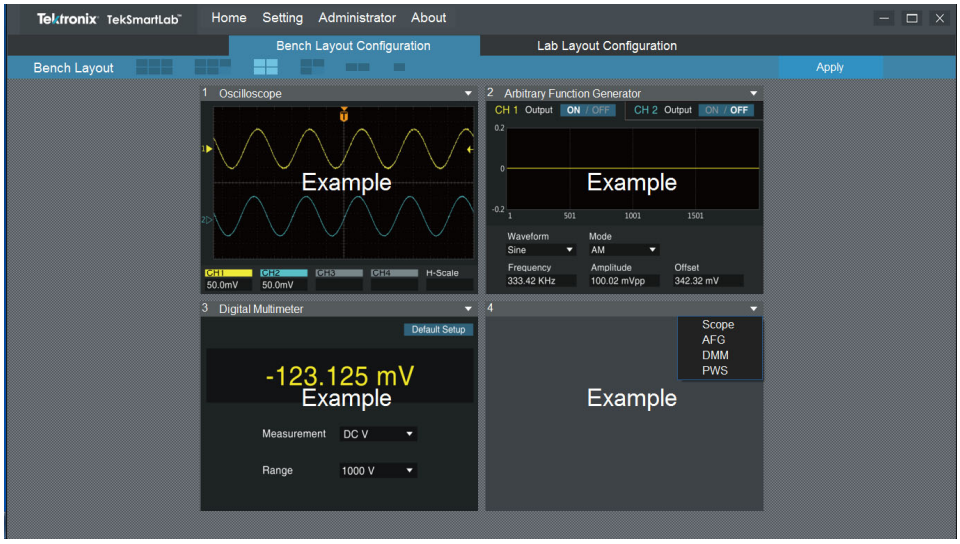


Figure 120: Choosing instruments

4. Click **Apply**.
5. Click **Yes** to confirm the setting.

Arrange the Lab Layout

In this case, there are 16 benches in 4 rows. The benches are numbered from left to right, as shown in the following figure.

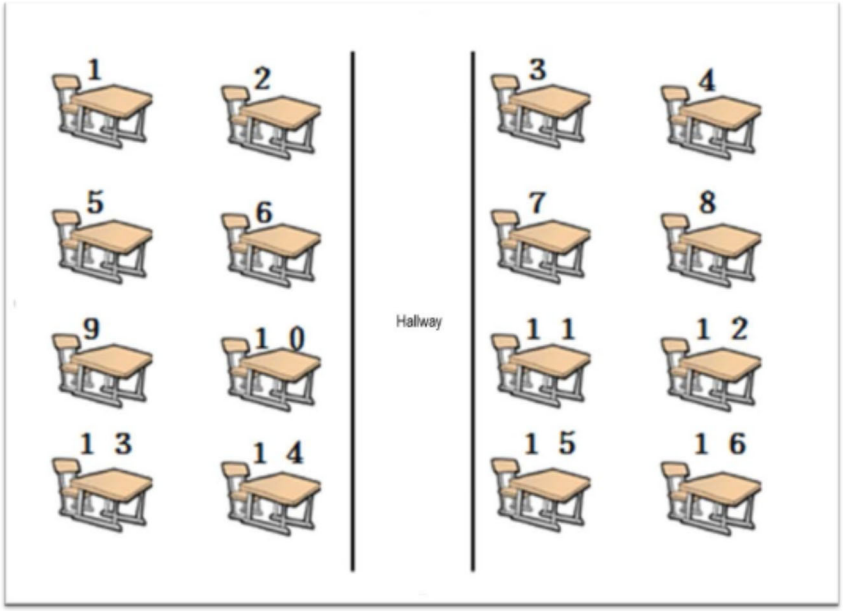


Figure 121: Lab layout

Take the following steps to arrange the lab layout:

1. Click **Setting** -> **Bench/Lab Layout Config** and choose the **Lab Layout Configuration** tab.
2. Choose **By Row** next to **Number**.
3. Input 4 next to **Row**.
4. Input 5 next to **Column**.
5. Clear the middle column by double-clicking the benches, as shown in the following figure.

Figure 122: Arrange lab layout

6. Click **Apply** to complete the setting.

Centralized Instrument Configuration

1. Click **Configure Instrument** on the home page, the following page is displayed.

Figure 123: Configure instrument

2. Choose **Scope** in the left pane, the oscilloscope configuration page is displayed on the right.
3. Click the white arrow to hide the icons of the instruments.
4. Tick **Default Setup**.
5. Click on **CH2** to disable it, and its color will turn grey.
6. Choose **Disable** next to **Autoset**, as shown in the following figure.

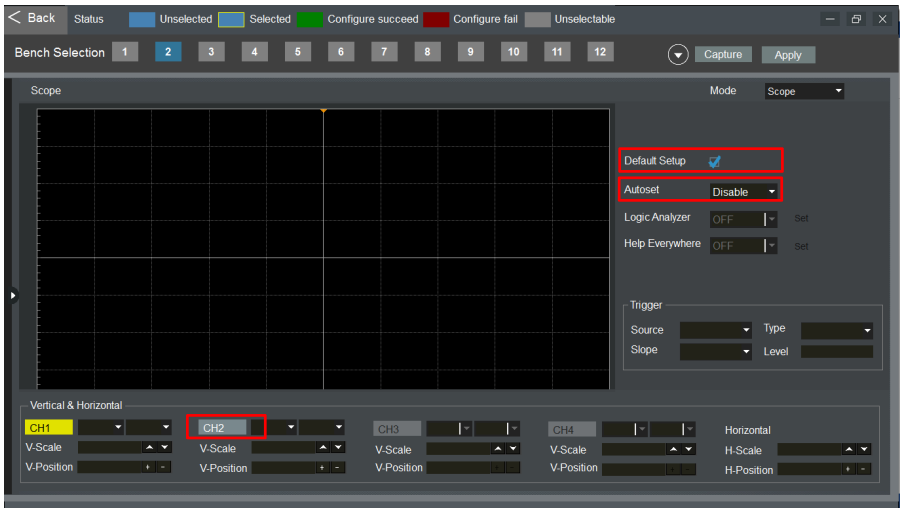


Figure 124: Configure oscilloscope

8. Click the white arrow to see all the benches, as shown in the following figure.

Figure 125: Bench selection

9. Choose all the benches displayed in blue, or click **All** to choose.
10. Click **Apply** to distribute the configuration to the chosen benches. The configured benches will be displayed in green.
11. Press the **Autoset** button on the oscilloscope, and you will get a message that "Autoset is disabled." on its screen.

Monitoring a Bench

Click the lab information area on the main page. You will have an overview of the lab.

Checking the Status of an Instrument

Using bench 1 as an example in the following figure, all the four instruments are connected and online.

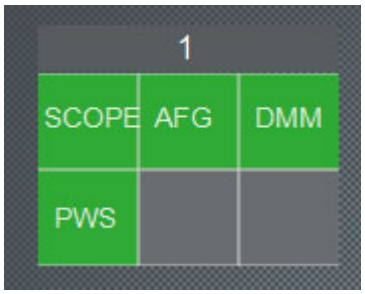


Figure 126: Instrument status

If you disconnect the oscilloscope from TBX3000A on bench 1, or turn its power off, the scope will be displayed in grey.

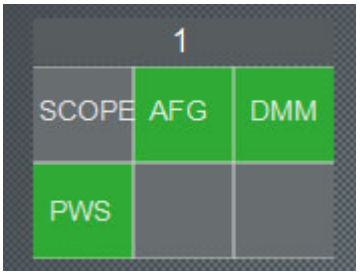


Figure 127: Scope not online

If you connect the oscilloscope to TBX3000A or turn its power on, the scope will be displayed in green again.

Monitoring a Bench

You can click the bench to enter the bench page and monitor the instruments, the following figure is displayed.

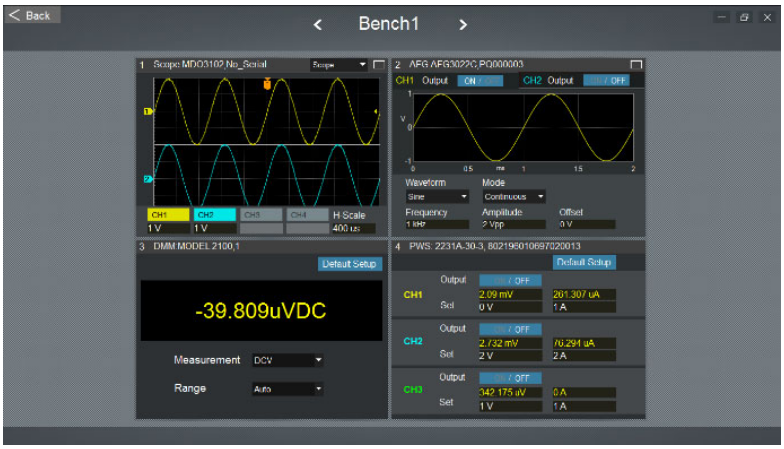


Figure 128: Monitoring a bench

If you turn the horizontal scale knob of the oscilloscope on bench 1, you will see that the waveform is also changed here.

You can monitor and control an instrument in detail by clicking the white box in the upper right corner on the instrument pane. Using the oscilloscope as an example, the following page is displayed after you click the white box.

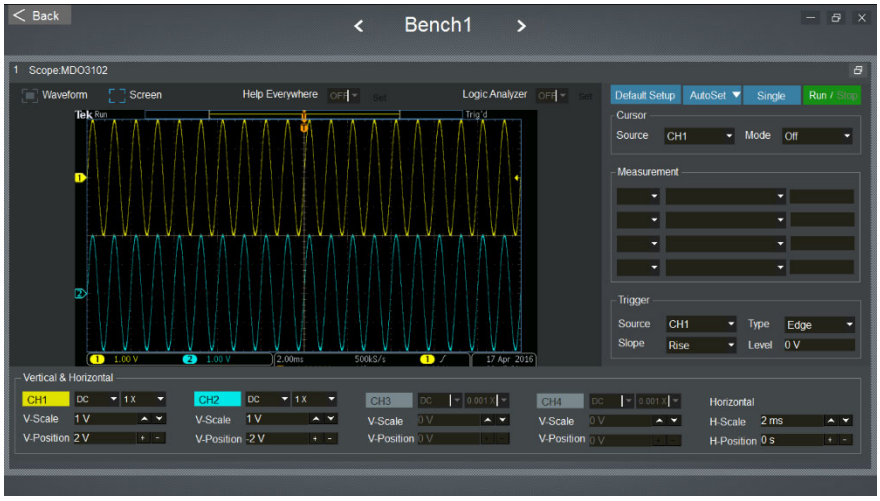


Figure 129: Monitoring an oscilloscope

If you select **Screen**, a snapshot of the waveform on the actual instrument is displayed here. You can right-click on the waveform to save it. You can click **Screen** again to take another snapshot.

Controlling an Instrument from the Server

In the lab, if a student requires some assistance from the instructor, the instructor is able to access the instrument from the server to help the student.

Select **Waveform**, the waveform is displayed in real-time on this page, as shown in the following figure.

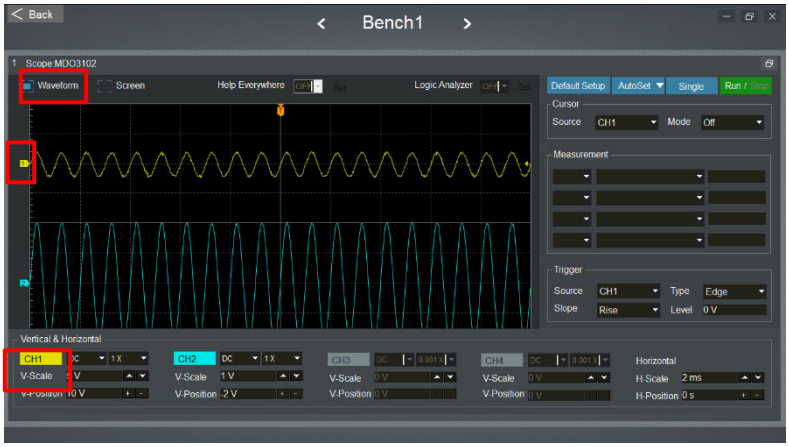


Figure 130: Monitoring an oscilloscope

Modify **V-scale** of **CH1** on this page, the V-scale parameter is changed on the oscilloscope accordingly. The waveform on this page and on the monitor of the instrument are both changed.

If you place the mouse on top of the yellow arrow 1, an upward arrow and a downward arrow are displayed. Right-click to select them and move them. The V-position parameter on the oscilloscope is changed, as well as the waveform, as shown in the following figure.

Figure 131: V-position changed

Asset Management

On the home page, you can select **Administrator** -> **Asset Management** on the menu bar to manage the instruments.

You can set the parameters by inputting time next to **Start** and **Stop**, and then click **Query** to acquire the information about the instruments, the following figure is displayed.

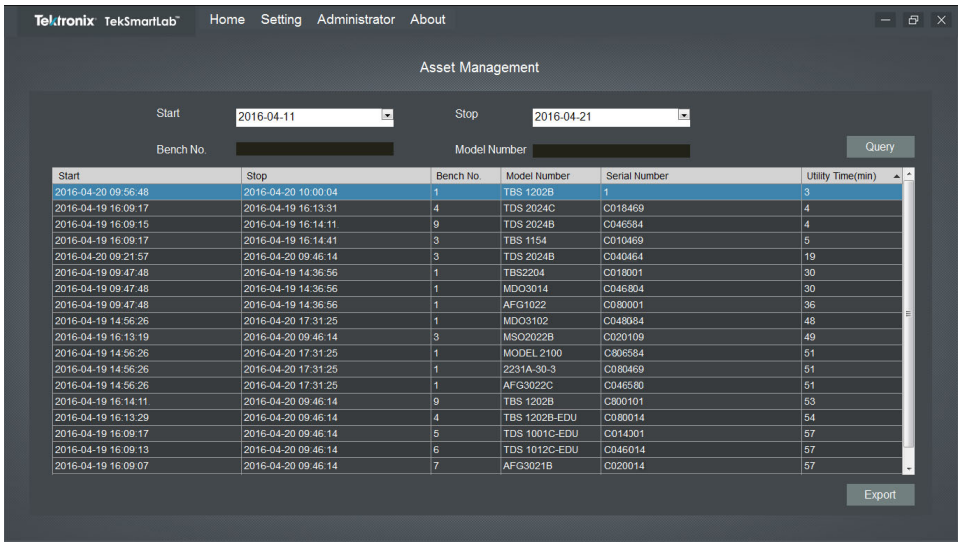


Figure 132: Query the instruments

All the instruments that are connected to the TekSmartLab server are displayed, including their bench number, serial number, models, and working duration.

Then you can click **Export** to export the result in the format of Excel.

Create a New Exercise

On the home page, you can click the plus symbol on the left upper corner of the course information area to create a new exercise. The following figure is displayed.

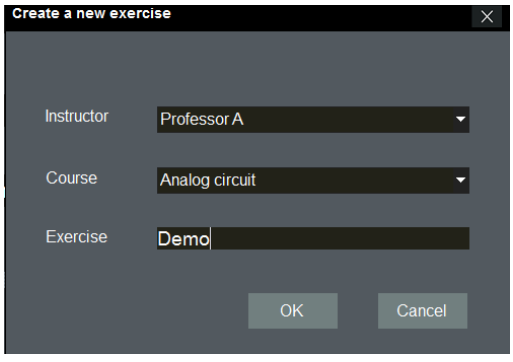


Figure 133: Create an exercise

You can input all the information and then click **OK**.

Now you can go to the exercise by selecting the instructor, as shown in the following figure.

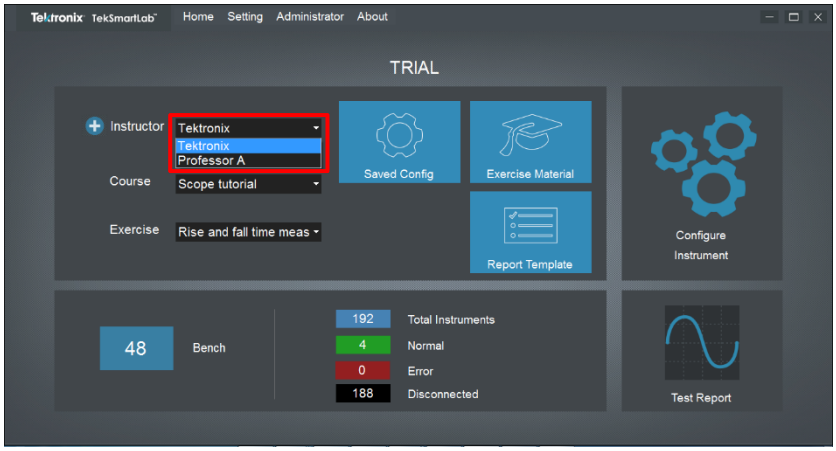


Figure 134: Selecting an instructor

Instrument Configuration Saving/Recalling

Take the following steps:

1. Select **Tektronix** next to **Instructor**.
2. Select **Scope Tutorial** next to **Course**.
3. Select **Rise and fall time measurement** next to **Exercise**.
4. Click the **Save Config** area.

NOTE: *You may find that AFG and Scope are already selected with some parameters configured. You can directly apply these parameters or configure them by the following steps.*

5. Select the AFG and Scope by ticking the white box in the left upper corner of each area, as shown in the following figure.

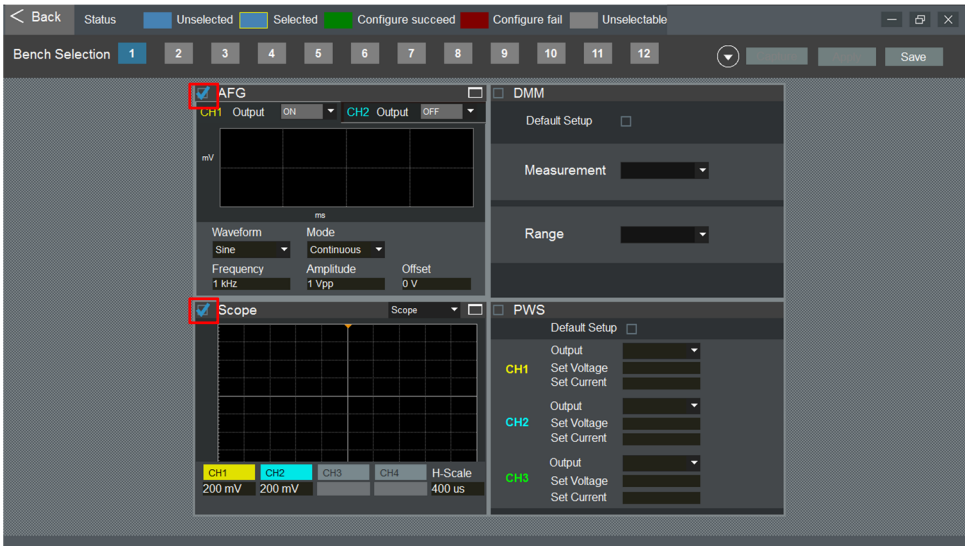


Figure 135: Select Scope and AFG

6. Configure the AFG and Scope, as shown in the following figure.

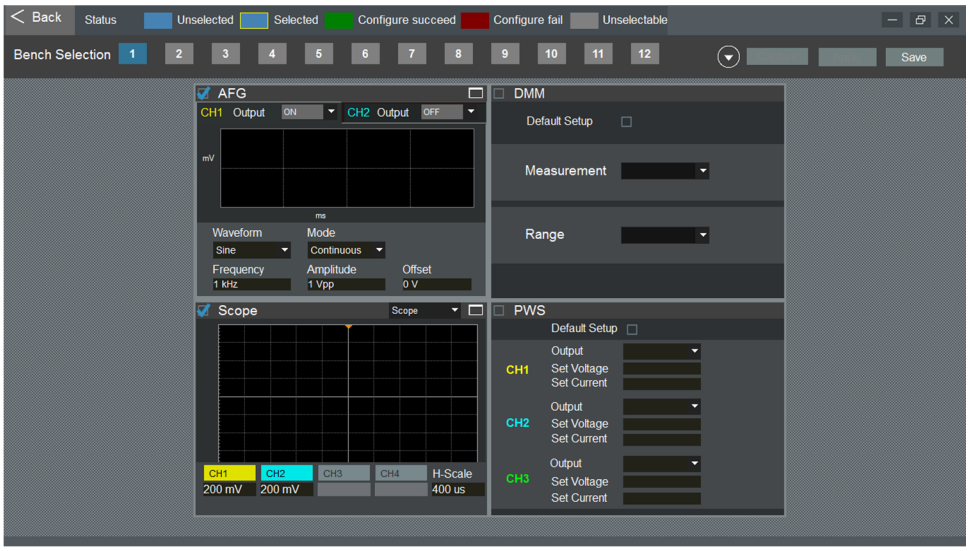


Figure 136: Configure Scope and AFG

7. Click **Save** after the configuration. This configuration is saved under this exercise.

8. Click the white arrow to see all the benches, as shown in the following figure.

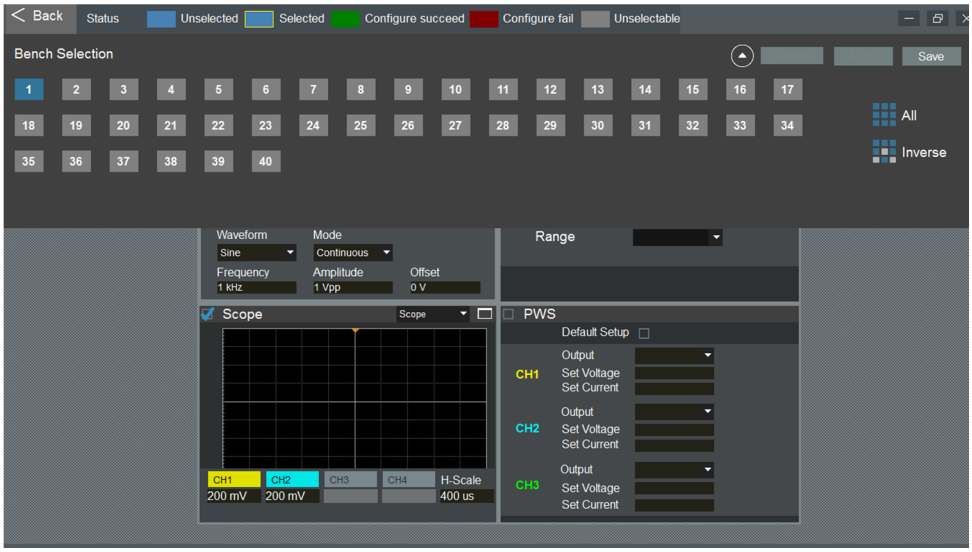


Figure 137: Apply to other benches

9. Select the benches to be configured
10. Click **Apply** to apply the configuration to all the selected benches.

Student Access

This case uses bench 1 as an example. The student visits the webpage of bench 1 through the computer on bench 1 or his or her own smart device.

Bench webpage

For the instructor to create access for the bench webpage, take the following steps:

1. Select **Setting** -> **General Information** on the menu bar, as shown in the following figure.

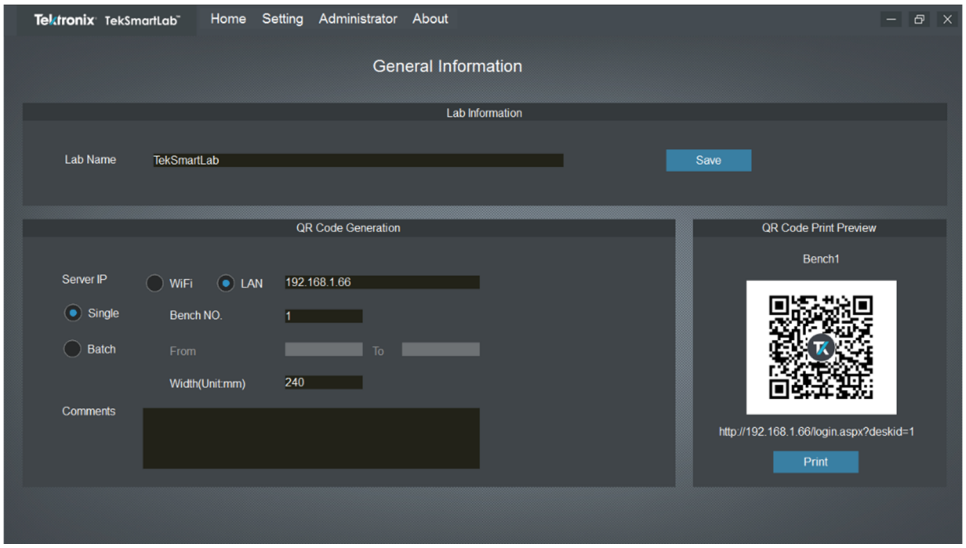


Figure 138: Generate bench webpage

2. Input the server IP:
   - If the server and the student computer on the bench are connected to the same campus network, input the server IP address in the campus network.
   - If the server and student's smart device are both connected to the TekSmartLab network, input the server IP address in the TekSmartLab network.
3. Select **Single**. The QR code and web address for the bench are shown in the **QR Code Print Preview** area.

For the student to access the webpage, you can:

- Type in the address in the computer web browser.
- Scan the QR code with the smart device.
- Type in the address in the web browser of the smart device.

The following figure is displayed after you type in the address in the computer web browser. You may bookmark this page.

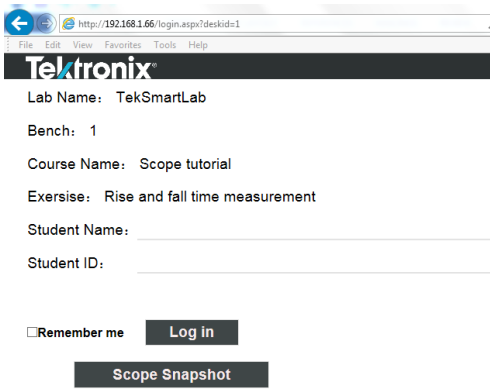


Figure 139: Visiting bench webpage

Sharing Exercise Material

In the course information area, you can click **Exercise Material** button to share the exercise material with students. The following figure is displayed.

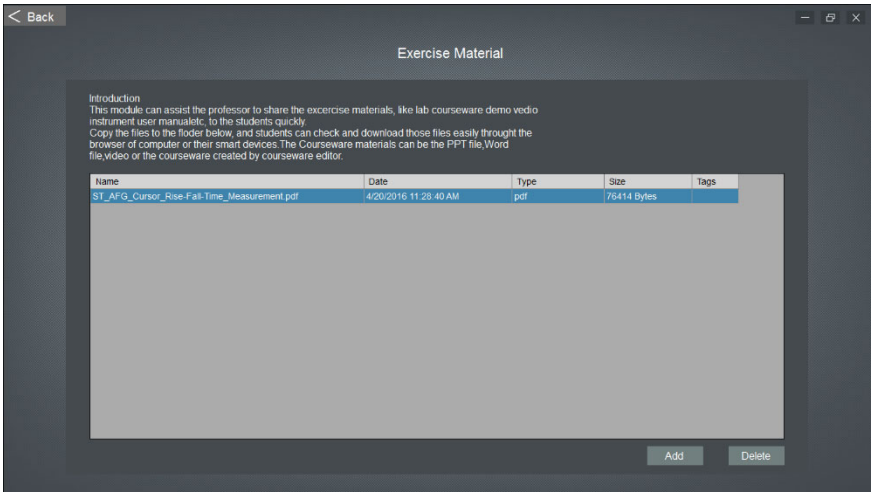


Figure 140: Share exercise material

You can click **Add** to add one or more files to share with the students, like instrument reference manual or exercise videos, as shown in the following figure.

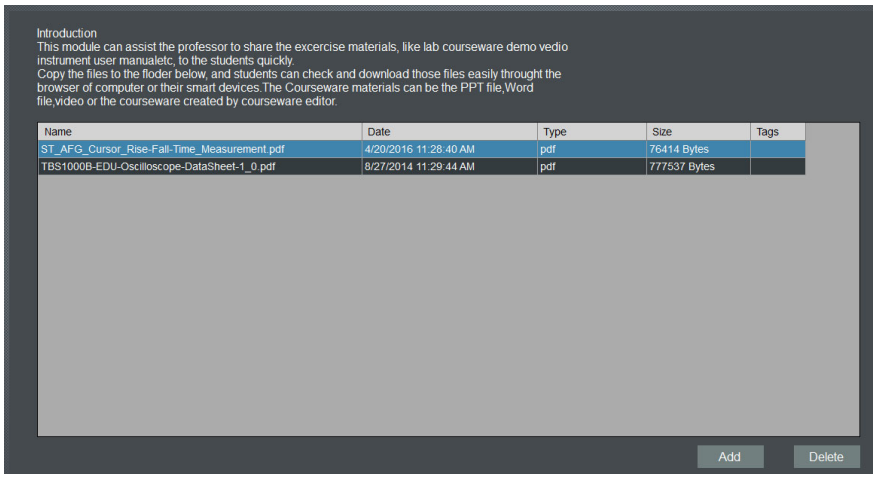


Figure 141: Add exercise material

For the student to access the exercise material:

1. On the bench webpage, input your name and ID.

NOTE: *Your student ID should be unique, whereas the student name does not need to be unique.*

2. Select the **Material** tab, the exercise materials are displayed as shown in the following figure.

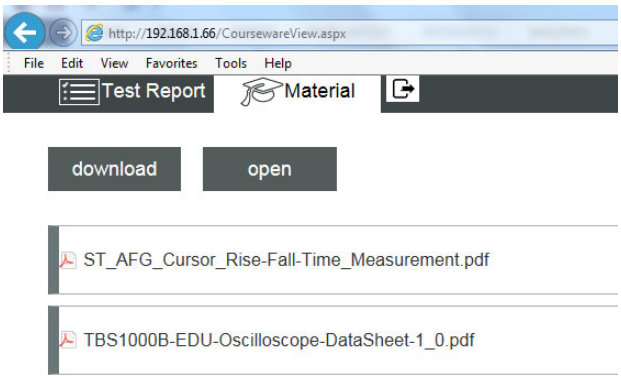


Figure 142: Access exercise material

3. Select the file and click **Download**.

Test Report Editing

For an instructor to edit the test report template:

1. In the course information area, click **Report Template** button. The following figure is displayed.

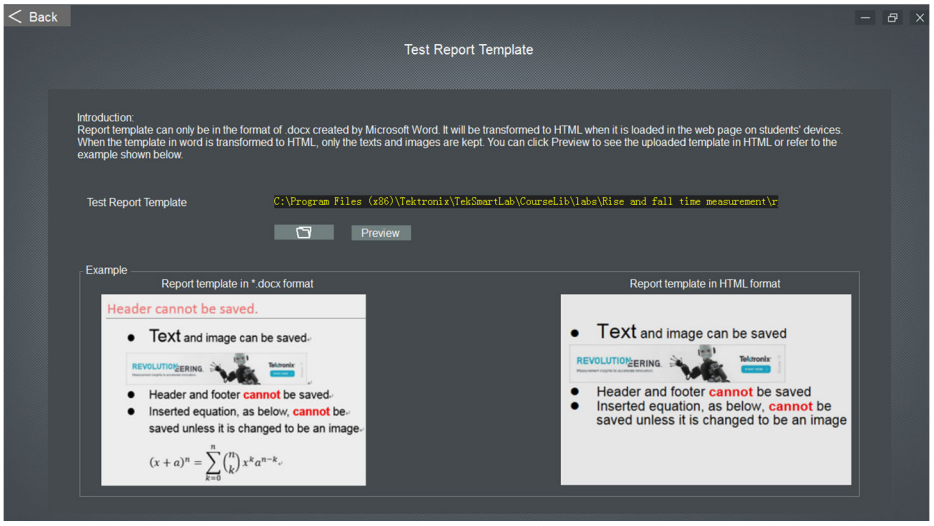


Figure 143: Edit report template

2. Click **Preview** to check the existing template.
3. You can also create your own template and click to import it to the server. Only the *.docx file format is supported.

For the student to edit and submit the test report:

1. Select **Test Report** tab on the webpage.
2. Click **New Report**, the following figure is displayed.

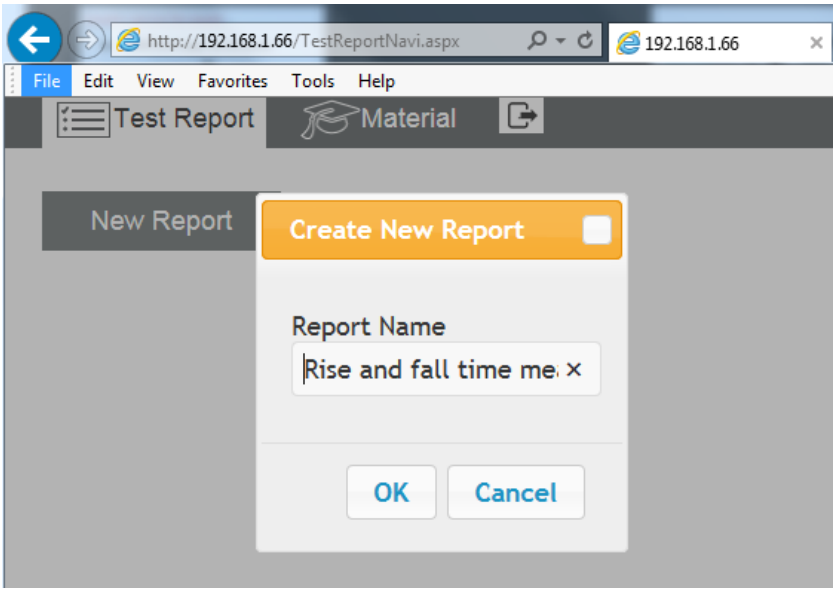


Figure 144: Create a new report

3. Click **OK**, the following figure is displayed. The report template created by the instructor is loaded automatically.

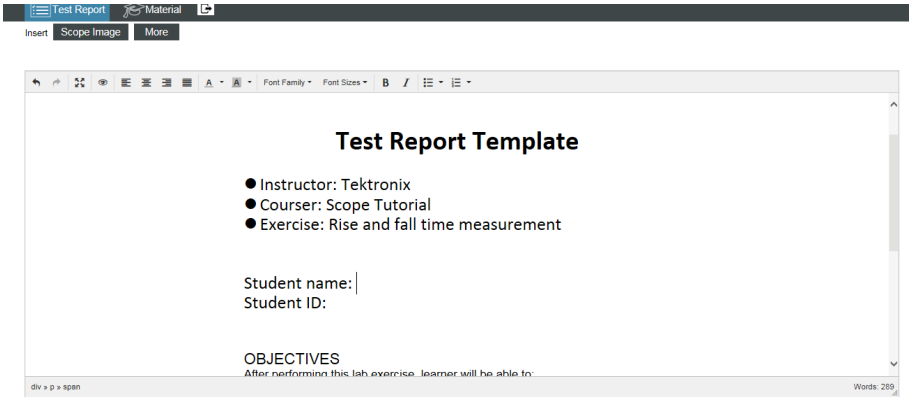


Figure 145: Edit a new report

4. Edit the report by entering the name and ID, along with other content.

5. Under **Test Result**, click **Scope Image** button to insert scope snapshot, and the following figure is displayed. The student ID is watermarked on the oscilloscope snapshot.

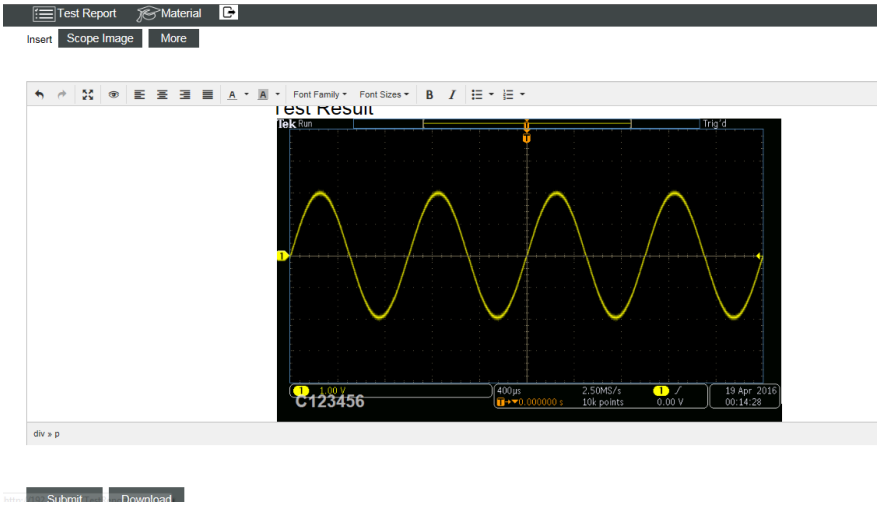


Figure 146: Scope snapshot inserted

6. Click **Submit**.

7. Click **Download** to download the file and unzip it so that you can edit it in a word document, as shown in the following figure.

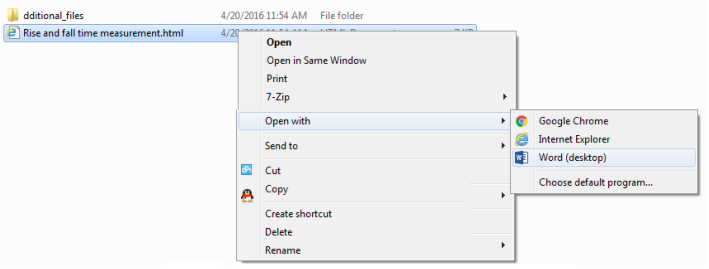


Figure 147: Open the test report on the computer

For the instructor to query and check the test report:

1. Click **Test Report** on lower right side of the home page to check student's test reports.
2. Input the time next to **Start** and **Stop** and click **Query** to get the students' report, the following figure is displayed.

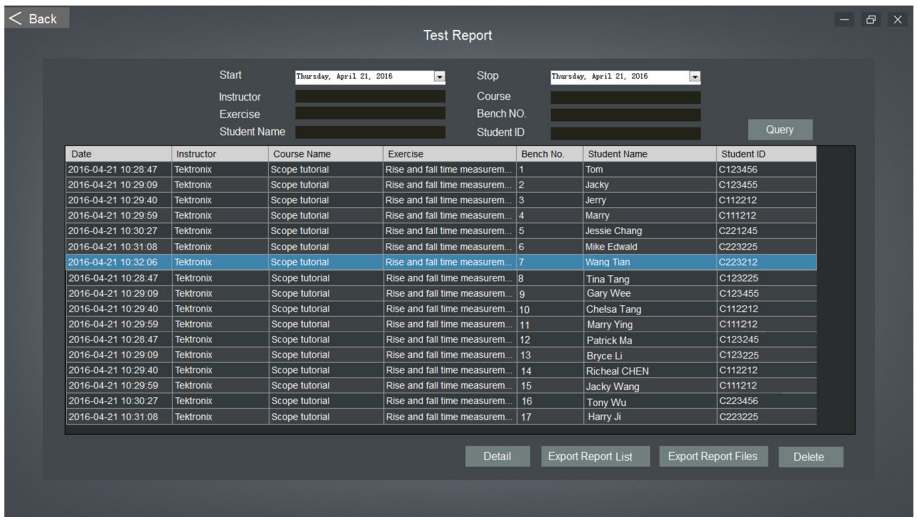


Figure 148: Query and check test report

3. Double-click a report created by the student, or choose a report and click **Detail** to check it.
4. Click **Export Report List** to export the query result to an Excel document.
5. Click **Export Report Files** to export all the text reports.
6. Select the report and click **Delete** to delete the report.

Troubleshooting

Previous Software Version Installed

If the previous version of TSL3000B is uninstalled, but you can't install the new one, take the following steps:

1. Uninstall the previous version and restart the computer.
2. Find the TekSmartLab folder in C drive.
   - For 64 bit, the directory is C:\Program Files (x86)\Tektronix\TekSmartLab
   - For 32 bit, the directory is C:\Program Files\Tektronix\TekSmartLab\
3. Copy the folder to another directory, and then delete the folder.
4. Install the latest version of TekSmartLab software.

NOTE: *Make sure that you copy and back up the data before you delete the folder.*

If you need to restore the data of previous version, please contact your dealer or Tektronix sales representative. They will contact engineers from the production line to assist you to restore your previous data.

Software Can't be Displayed Properly

After you open the software, the screen page can't be displayed properly, as shown in the following figure.

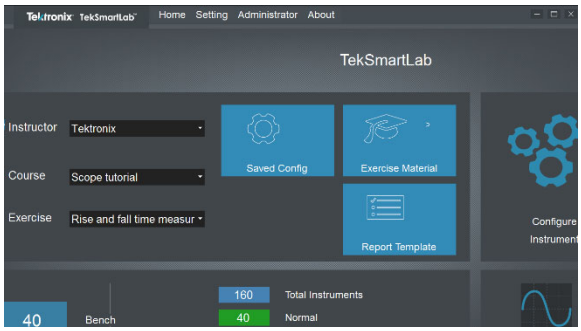


Figure 149: Screen page not displayed properly

There could be two reasons for this problem:

- Screen resolution: If the screen resolution is lower than 1366*768, the software screen page can't be displayed properly.
- Font is not the right size.

To modify the screen resolution:

1. Right-click on desktop and select **Screen resolution**.
2. Set the resolution to 1366*768, as shown in the following figure.

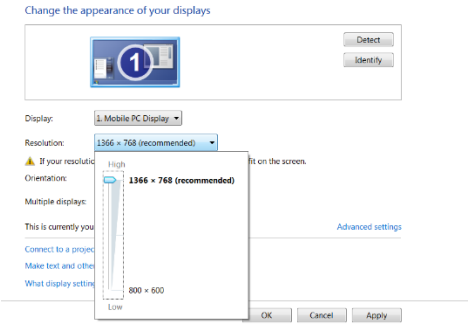


Figure 150: Set the screen resolution

3. Click **Apply**.

To modify the font size:

1. Right-click on desktop and select **Personalize**.
2. Select **Display**, the following figure is displayed.

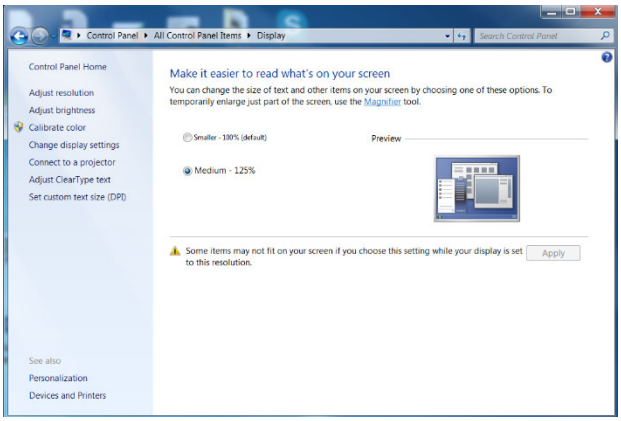


Figure 151: Set the font size

3. Choose **Small-100% (default)**.
4. Click **Apply**.
5. Log off to complete the modification.

TBX3000A Configuration Page can't be Logged in

Take the following steps to solve this problem:

1. Restart the TBX3000A and the computer used to configure TBX3000A.
2. Check the LAN configuration of the computer to see whether it has the correct IP address and gateway.
3. Check whether the TBX3000A is properly connected to the computer by the LAN cable.
4. Check the LAN indicator of the TBX3000A to see whether it works properly.

For steps 2 to 4, please refer to *Log onto the TBX3000A Configuration* Page for more information.

5. If all above steps fail, try a different web browser or change the computer.
6. You can also try press the RESET button for 5 seconds on the TBX3000A to reset it to factory default, and then configure it again.

Benches Disconnected

In the TekSmartLab WIFI network, the TBX3000A is configured, but all the benches are displayed as disconnected on the screen page of TekSmartLab software. Below is an example showing that all benches are disconnected.

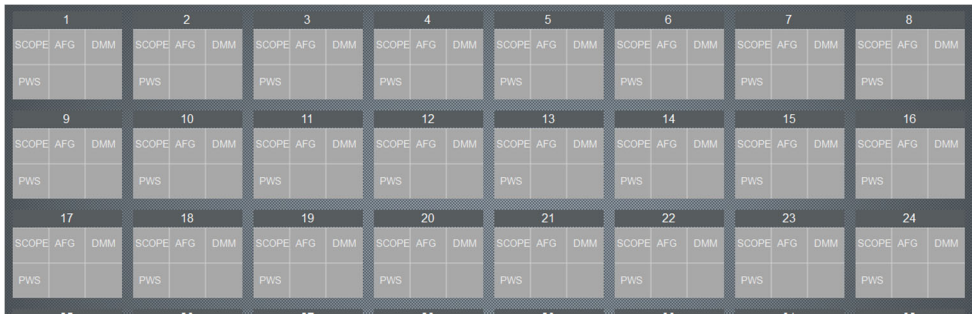


Figure 152: All the benches not connected

Take the following steps:

1. Host Name of TBX3000A must be changed on LAN configuration page. If it is changed on the WIFI configuration page, press Reset button on the TBX3000A 5 seconds to load its default setup and configure it again.
2. Check whether the **Host Name** of the TBX3000A connected to a certain bench, such as Bench1 is correct. The host name must be in the form of BenchX, in which X means number of the bench.
3. Check whether the WIFI indicator of the TBX3000A blinks twice at a time to see whether it is connected to the WIFI network. If the TBX3000A is not correctly configured, please refer to *Configure the* TBX3000A to configure it again.
4. Check whether the firmware of the TBX3000A is the latest version, which is V2.0.0 or above. If not, please visit www.tek.com and search using the search phrase “TBX3000A firmware”. Then download the latest version and upgrade the firmware.
5. Check whether the server is connected to the network before open the software.

NOTE: *Make sure that the server is connected to the network before you open the software.*

6. Check the TSL3000B version on the lab server. It should be V3.0.0 or above. If not, please search and download the latest version from www.tek.com.

7. On the lab server, ping the IP address of the TBX3000A on a certain bench, as shown in the following figure. You can get the TBX3000A IP address from the router configuration list. If this does not work, check the network configuration.

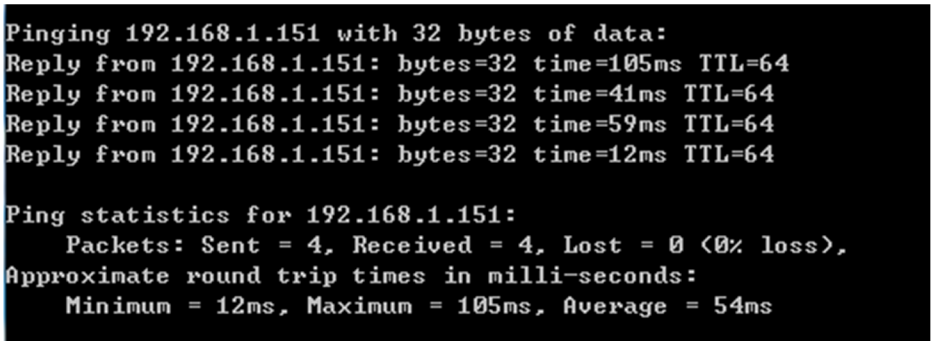


Figure 153: Ping TBX3000A IP address

Unstable Connection in a 15-bench or above WIFI Network

In a WIFI network of 15 benches or above, the connections of the benches are quite unstable, even though all the devices in the network are properly configured with the latest firmware.

This problem is mainly caused by the WIFI network configuration. Take the following steps:

1. Check the network configuration. Using 30 benches in this example, it is highly recommended the network is supported by 1 router + 2 APs. If it's only supported by 1 router, it's possible that not all benches can be distributed with an IP address.
2. Check the router and AP configuration on the router management page to make sure that the router has enough IP resources. Set the number of the Max. Associated clients larger than the number of devices that are connected to the network. For example, if the network is connected to one lab server, 30 benches through TBX3000A, and 30 smart phones, set the number of Max. Associated clients to be greater than 61.
3. Check the IP address of the server to make sure that the server is properly connected to the network. If the IP address of the server says 169.X.X.X, it means it is not assigned with correct IP address. Check the configuration of the router and APs. You can connect the server to another AP and assign a static IP address to it.
4. On the lab server, ping the IP address of a known bench. If this does not work, check the network configuration.

Unstable Connection in a 20-bench LAN Network

In a LAN network of 20 benches, the connections of the benches are quite unstable, even though all the devices in the network are properly configured.

This problem is mainly caused by the router configuration or the MAC address of the TBX3000A.

For router Configuration:

1. Check the IP address of the server. If it's not correctly assigned, configure it again.
2. Check the configuration of the router and make sure that all the benches are properly connected to the router.
3. On the lab server, ping the IP address of a certain bench. If this does not work, check the network configuration.

For MAC address conflict:

4. If your TBX3000A is manufactured before May 2016, there might be an issue of MAC conflict. Please contact Tektronix representative for instructions on how to change the MAC address.

Instruments are Displayed Disconnected

On the screen page of the software, the bench is displayed as connected, but the instruments are displayed as disconnected. However, the instruments are turned on and connected to the TBX3000A through USB cable. Below is an example that TBX3000A on bench 1 is online, but the instruments on bench 1 are displayed as disconnected.

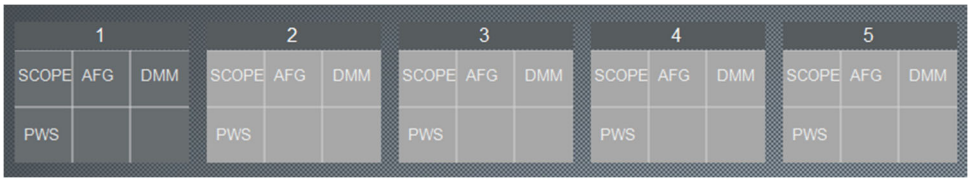


Figure 154: Instruments on bench 1 displayed disconnected

Take the following steps:

1. Visit www.tek.com to check the specifications of TSL3000B to make sure the instruments are supported by TekSmartLab software.
2. Check that the version of TSL3000B is the latest version V3.0.0 or above. If not, please visit www.tek.com and search "TSL3000B". Then download the latest version and update the software.
3. Check that the firmware of TBX3000A is the latest version V2.0.0 or above. If not, please visit www.tek.com and search "TBX3000A firmware". Then download the latest version and upgrade the firmware.

4. For AFG1000 and TBS1000B-EDU instruments, check that the firmware for your instruments are the latest version. If not, visit www.tek.com to download the latest version and upgrade them.
5. For oscilloscopes of the series TBS1000, TDS1000C, TDS2000C etc., check whether their USB ports are set as computer mode, If not, press Utility-> Options –> Rear USB port -> Computer, and then restart the instrument.
6. For DMM4000 series instruments, the RS232 port should be configured as follows:
    - Baud rate: 9600
    - Polarity : None
    - Data bit: 8 data bits
    - Flow control: None
    - End of life character: Carriage Return and Line Feed
    - Computer and terminal Mode: Computer

Instrument Parameters are not Displayed

On the screen page of the software, the bench and instruments are displayed as connected, but the instrument parameters are not displayed or an error message appears when you enter the instrument page.

This problem is mainly caused by the firmware of the TBX3000A or other connected instruments. Or the connected instruments are not supported.

Take the following steps:

1. Check that the firmware of the TBX3000A is the latest version V2.0.0 or above. If not, please visit www.tek.com and search using the seach phrase “TBX3000A firmware”. Then download the latest version and upgrade the firmware.
2. For AFG1000 and TBS1000B-EDU instruments, check the the instrument firmware is the latest version. If not, visit www.tek.com to download the latest version and upgrade the instruments.
3. Upgrade the firmware of the bench instruments to the latest versions, which are available on www.tek.com.
4. Check the TSL3000B datasheet, to see whether the instruments are supported.

Students Can’t Log in Bench Webpage

The students can’t log in the bench webpage either through bench computer or smart device.

This fault can be caused by two reasons:

- IIS configuration on the server.
- Network configuration of the bench computer or smart device

For IIS configuration, take the following steps:

1. On the server with the TSL3000B running, open a web browser and input the address of “localhost”. If the IIS is properly configured, a “please input bench number” dialog box will be popped up and the following figure will be displayed.

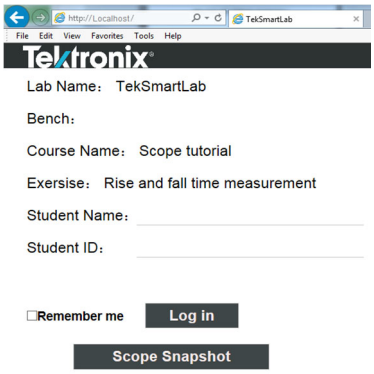


Figure 155: Localhost webpage

2. If the IIS is not properly configured, please refer to *IIS Installation and Configuration* to check every step of the configuration.

If the following error message appears when configuring the IIS, then the 80 port conflict is the fault.

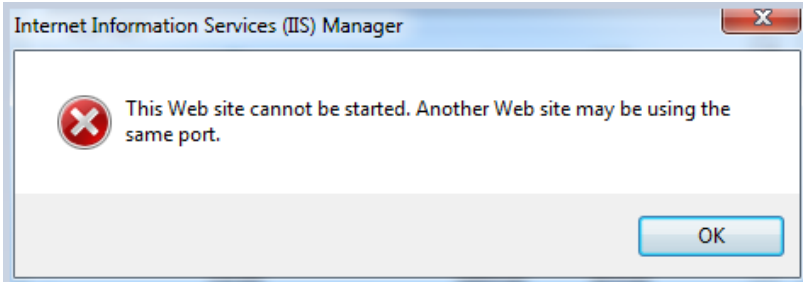


Figure 156: 80 port conflict

Use these steps to clear the fault:

1. Start **Windows Task Manager** (Ctrl+Alt+Del) to find which program is using port 80.

2. Choose **View** -> **Select Columns**. The following figure is displayed.

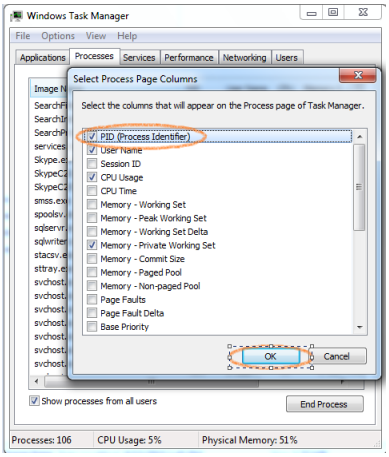


Figure 157: Window task manager

3. Select **PID (process Identifier)**.
4. Click **OK**.
5. Click **Processes** to display the programs with PID information.
6. Under Start >> All Programs >>Accessories, right-click Command Prompt and select Run as administrator.
7. Input command “netstat -nao” and press enter to finish. (Note the space between netstat and -nao)

8. Identify the PID that is using port 80 (refer to Local Address as below) , and find the program name in Task Manager. It is “Skype.exe” in the example below.

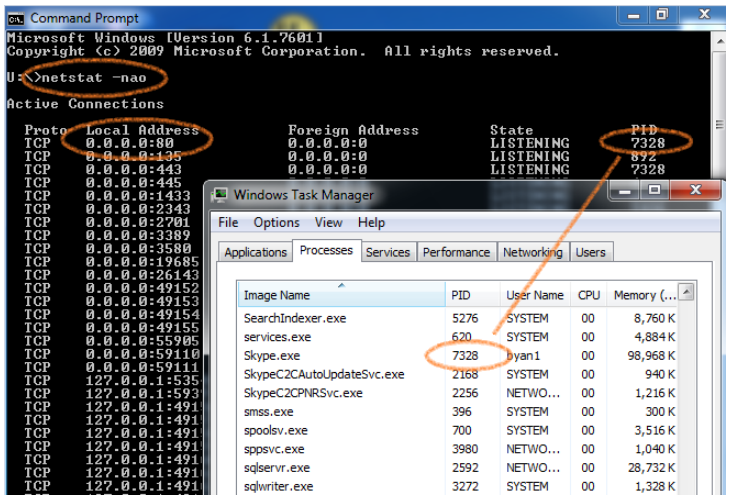
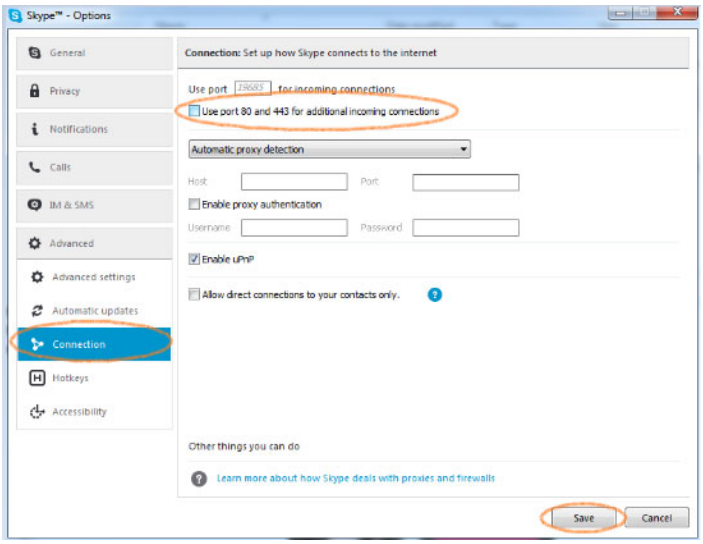


Figure 158: Command prompt

9. Uninstall the program that is using port 80 or change the port the program is using. The following figure shows an example of changing the port that Skype



uses.

Figure 159: Changing port for Skype

10. Choose **Tools** -> **Options**-> **Advanced** -> **Connection**.
11. Unselect “**Use port 80 and 443 for additional incoming connections**”
12. Click **Save** to finish.

For network configuration of the bench computer or smart device, use these steps:

1. Check that the bench computer or smart device is connected to the same network that the lab server is connected to.
2. Make sure that the server IP address is static.
3. Make sure that the IP address input in the TSL3000B general information page is correct, so that the computer and smart device input the correct one to be connected to the server.
4. If it still does not work, switch to another web browser.
5. The student can try to ping the server IP. If it does not work, check the network configuration again.