TekSmartLab™
TBX3000A and TSL3000B

User Manual

077-1110-00

Tektronix

TekSmartLab™
TBX3000A and TSL3000B

User Manual

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Contacting Tektronix

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USA

For product information, sales, service, and technical support:

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[W16 – 15AUG04]

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[W9b – 15AUG04]

Table of Contents

Important safety information iii
General safety summary iii
Service safety summary v
Compliance information vi
EMC compliance vi
Safety compliance vii
Environmental considerations viii
TBX3000A 1
Overview 1
Packing list 1
Get Acquainted with TBX3000A 1
Main features 1
Appearance 2
Configure the TBX3000A 5
LAN Configuration 6
WIFI Configuration 7
Set Password 8
Example Case 9
Preparation 9
Log onto the Configuration Page 9
Configure the TBX3000A 11
Change TBX3000A Hostname 13
TSL3000B Installation 15
Hardware and Software Requirements for the Server 15
Hardware Requirements 15
Software Requirements 15
Installing TSL3000B 15
Installing .Net Framework 15
Installing SQL Server 2008 R2 Express 16
Downloading the Installation Pack 16
Installing the Software 16

Configuring the Database 24
IIS Installation and Configuration 32
Installing IIS in Win7 32
Installing IIS for Web Server 33
Configuring ASP.NET 4.0 37
Configuring ASP.Net State Server 42
Windows Firewall Configuration 44
Testing the Web Server 51
TSL3000B 54
Home Screens 54
Software Activation 55
Centralized Instrument Configuration 55
Configuring Courses 55
Configuring Instruments 59
Configuring Benches 61
Bench Monitoring Screen 61
Bench Configuration Screen 62
Monitoring and Controlling Instruments on a Bench 64
Test Results 66
Instrument Asset Information 68
Settings 69
Setting Screen 70
QR Code Screen 71
Courseware Upgrade Screen 72
Instrument Firmware Upgrade Screen 73
TBX3000A Upgrade Screen 73
Example Cases 75
Setup a TekSmartLab system 75
Arranging the Benches 77
Customizing Courses and Configuring Instruments 80
Saving the Test Result 82
Saving test results by Students 82

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

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

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[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.

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
- TekSmartLab™ TBX3000A Installation and Safety Instructions

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

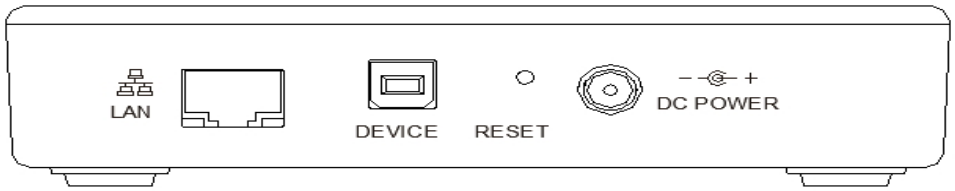

Figure 1: Side view 1 of TBX3000A

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.

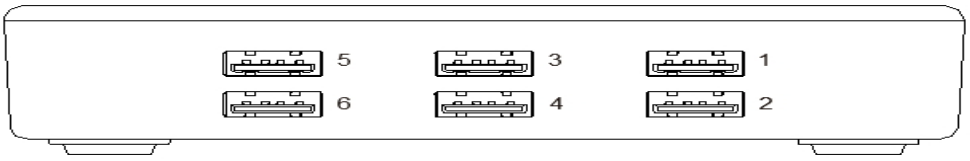

Figure 2: Side view 2 of TBX3000A

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.
  - 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 un-rhythmically, it means the firmware is upgrading.

The figure below shows the bottom of the TBX3000A.

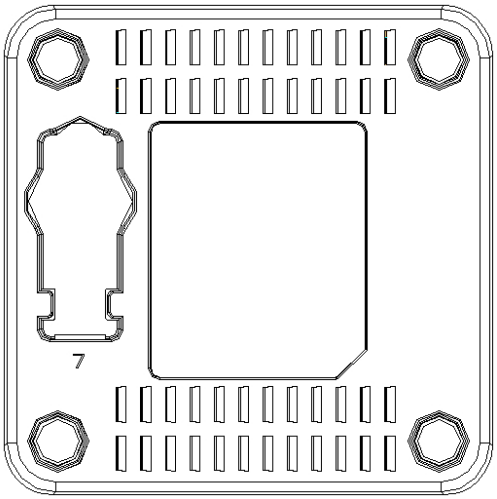

Figure 4: Bottom view of TBX3000A

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.

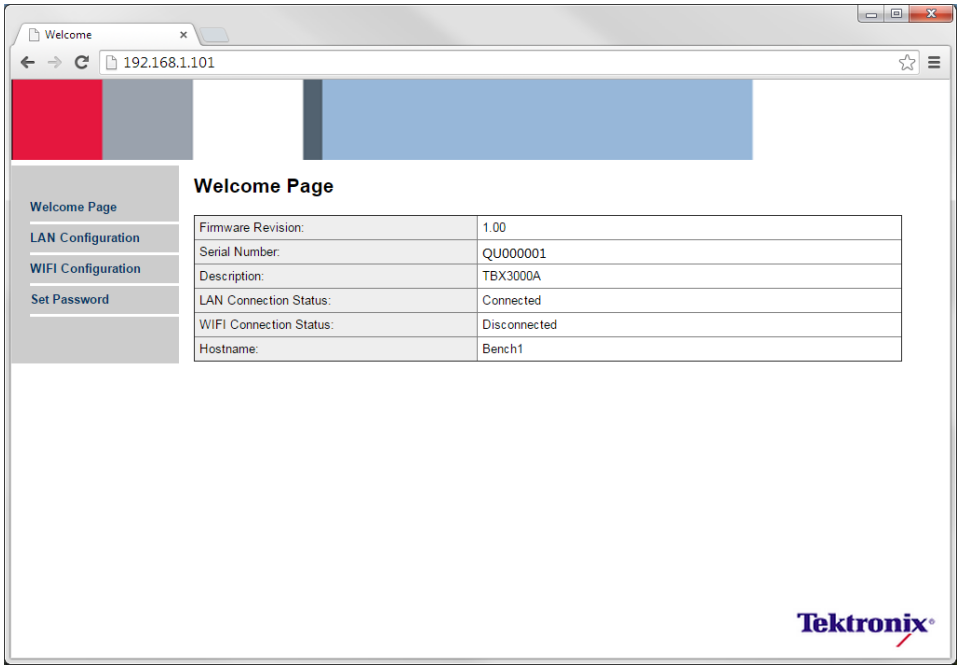

Figure 5: Welcome page for TBX3000A configuration

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.

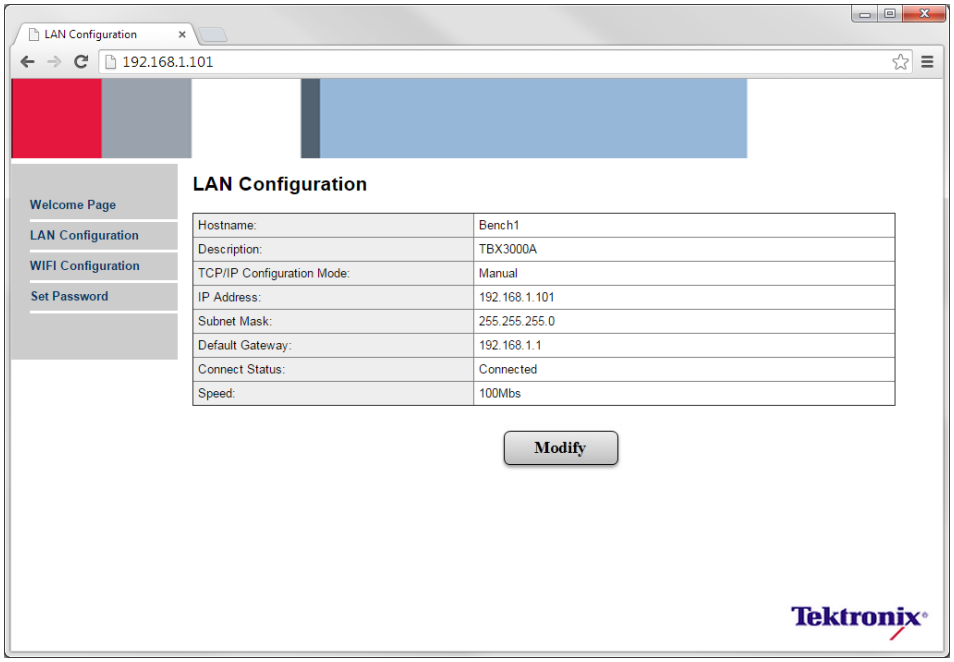

Figure 6: LAN configuration

Click **Modify** to configure the LAN parameters.

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.

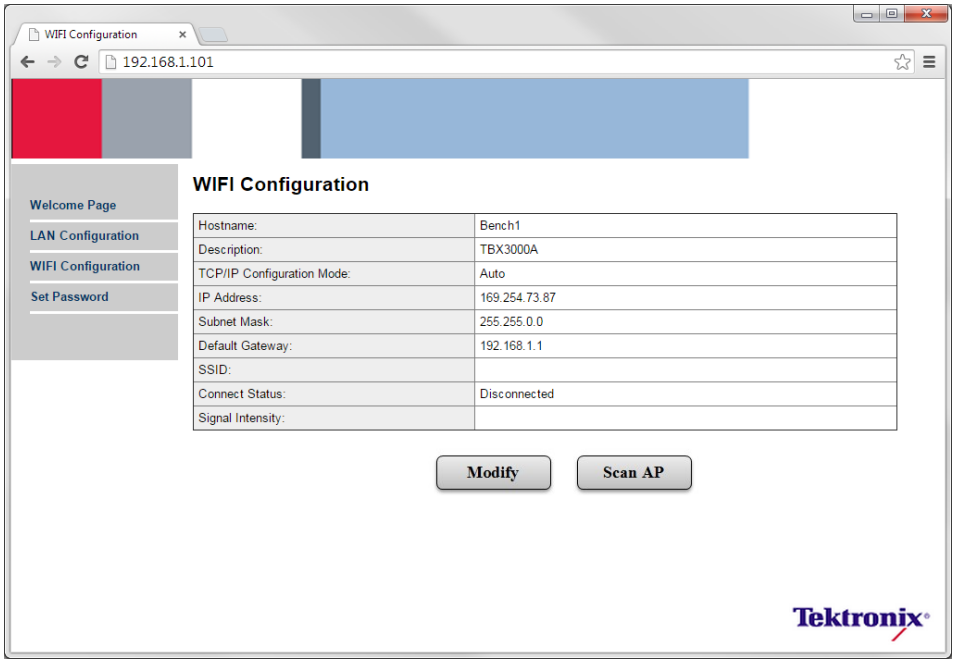

Figure 7: WIFI configuration

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 and the LAN cable has been disconnected.

Set Password

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

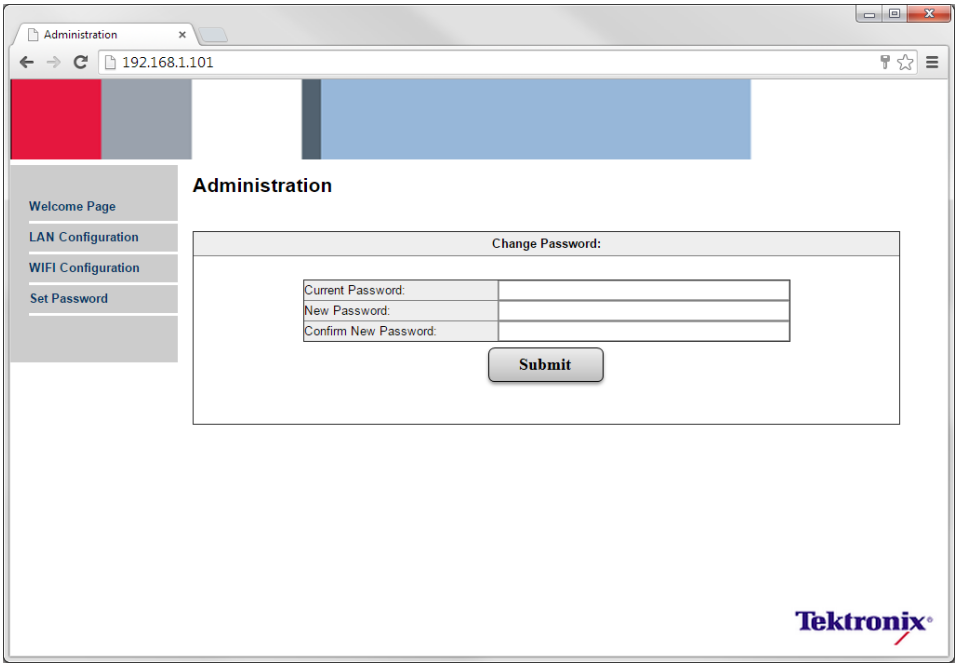

Figure 8: Set password

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

Example Case

The scenario of the sample case is:

- Two TBX3000As are going to be connected to a WIFI network.
- The two TBX3000A instruments are located at bench 1 and bench 2.
- The name of the WIFI network is 'school_lab_1'.

Preparation

Install the USB-WIFI dongle from the down facet of TBX3000A and turn the power on.

Log onto the Configuration Page

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

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

Connecting TBX3000A directly to a computer

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

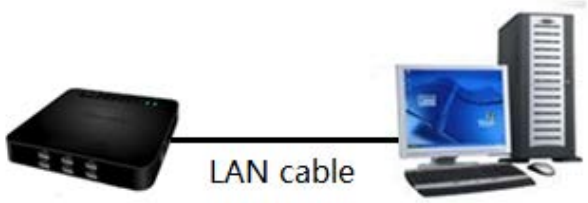

Figure 9: Connect the TBX3000A directly to a computer

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:

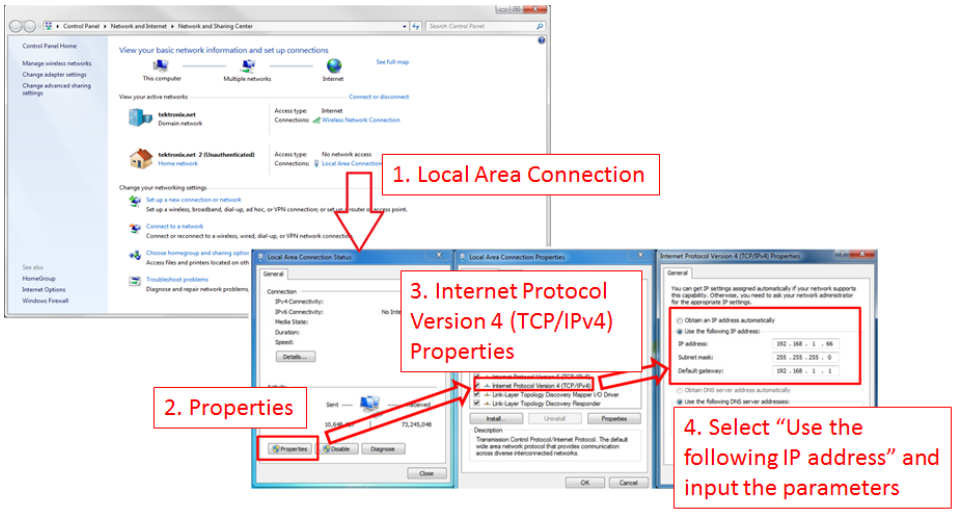

Figure 10: LAN configuration

The parameters are 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.

Connecting the TBX3000A to a router

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

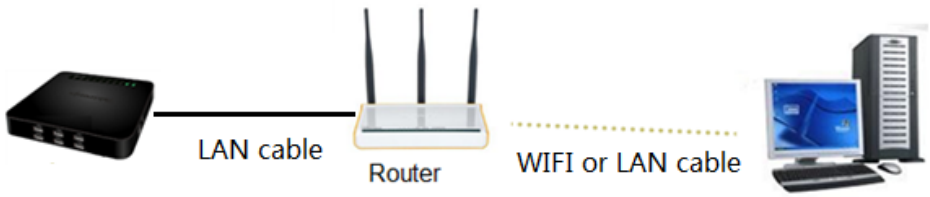

Figure 11: Connect the TBX3000A to a router

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

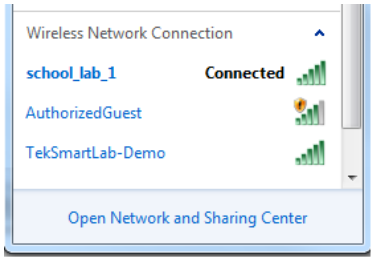

Figure 12: Computer is connected to 'school_lab_1' network

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

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

Configure the TBX3000A

The Welcome Page is displayed as follows:

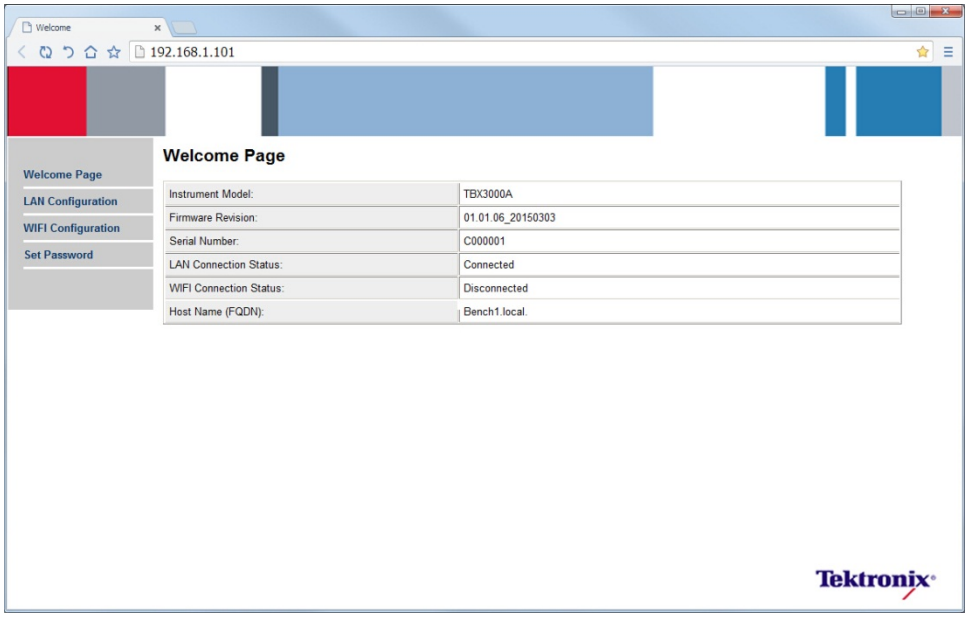

Figure 13: Welcome page

In the WIFI Configuration page, click Scan AP to search for the WIFI network.

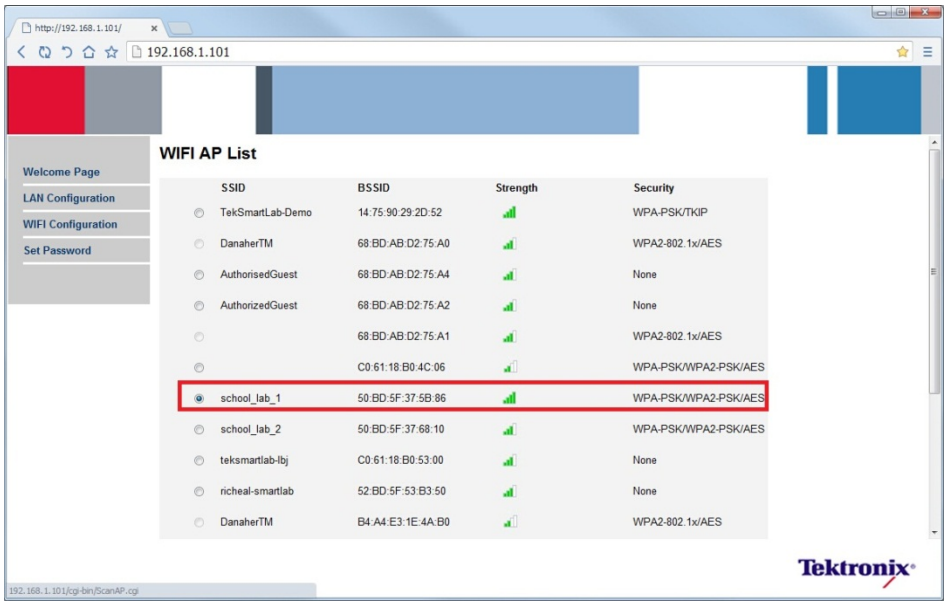

Figure 14: Scan AP

Choose school_lab_1, and then click Apply.

If the 'school_lab_1' network can only be accessed by a password, a prompt will pop up as shown in the figure below. Enter the password and click Connect.

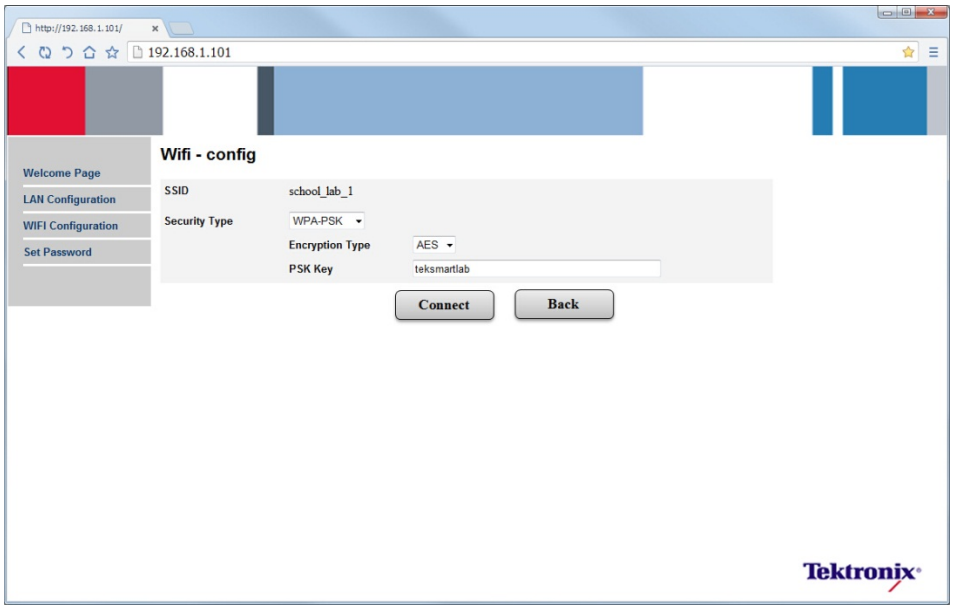

Figure 15: Input password

Change TBX3000A Hostname

Click **Modify** next to **Host Name**, and then enter "admin" as the password if required. Change the name into **Bench1**, as shown in the following figure. Note that the TCP/IP configuration Mode is on **Automatic** as default.

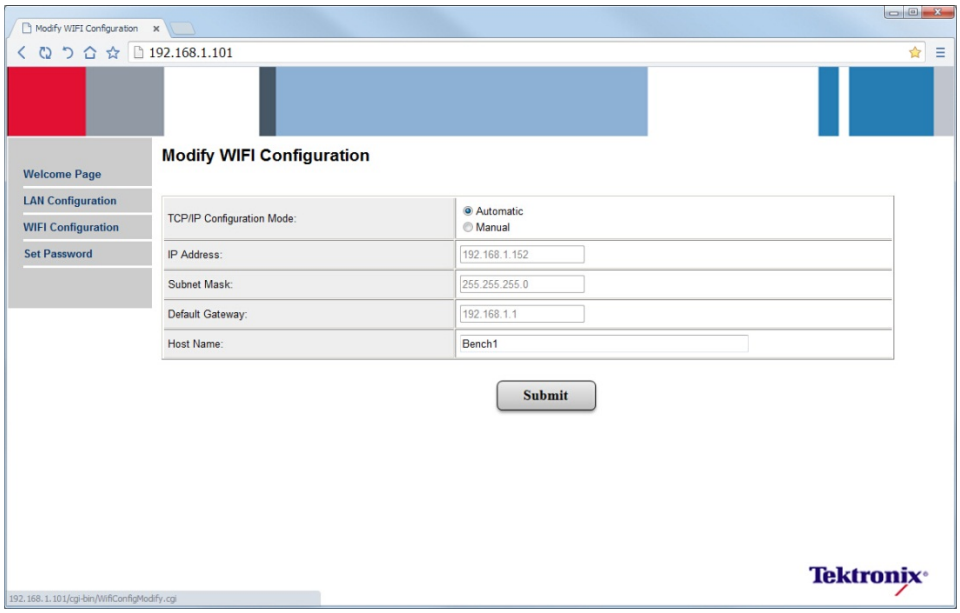

Figure 16: Change host name

Click **Submit**. The configuration is done as shown in the figure below.

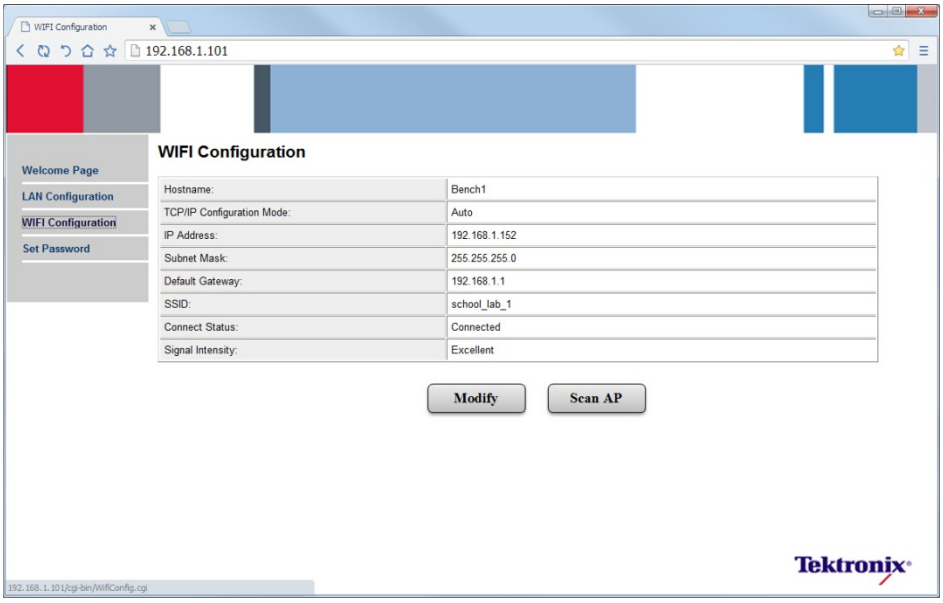

Figure 17: Configuration is done

Repeat the procedure to configure the TBX3000A in the second bench and change its host name as Bench2.

After the configuring both TBX3000A instruments, the two are connected to 'school_lab_1' network automatically, and will be automatically recognized as bench1 and bench2 by the TSL3000B software, which is running on lab server.

NOTE: The WIFI connection on the TBX3000A will start to work only after the cable has been removed from the LAN port.

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 4.0 or higher (for installation instructions, please refer to Installing .Net Framework)
- Web explorer: IIS 6.0 or higher (for installation instructions, please refer to IIS Installation and Configuration)
- Database system: SQL Server 2008 R2 Express or SQL Server 2008 R2 Enterprise (for installation instructions, please refer to Installing SQL Server 2008 R2 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=17718, and choose the language consistent with your operating system. Then download and install .Net Framework 4.0. 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 2008 R2 Express

Downloading the Installation Pack

Visit http://www.microsoft.com/en-us/download/details.aspx?id=30438, and choose the language consistent with your operating system and also choose the installation pack consistent with the bit number of your operation system. For example;

- For 64-bit Win7 (English), choose SQLEXPRWT_x64_ENU.exe
- For 32-bit Win7 (English), choose SQLEXPRWT_x86_ENU.exe

NOTE:

The size of the installation pack is around 300～400MB.

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

Installing the Software

In this procedure, we use the 32-bit Win7 installation package as the example. This section explains how to install the database system.

1. Double-click SQLEXPRWT_x86_ENU.exe. The following figure is displayed.

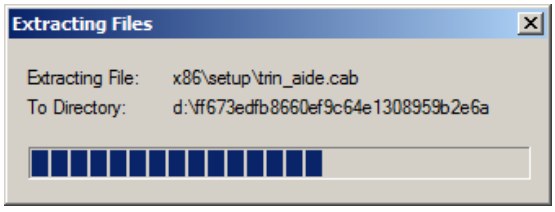

Figure 18: Extracting files

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

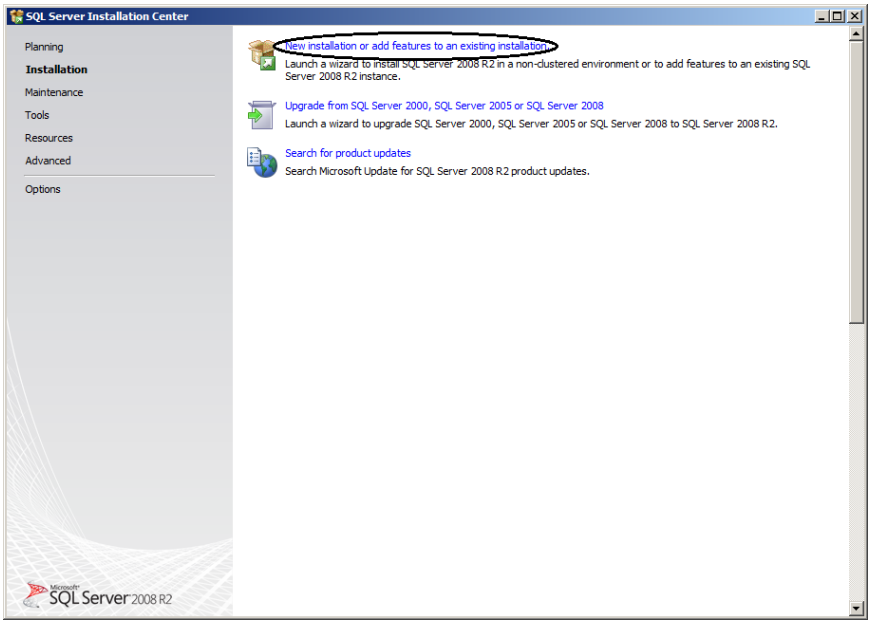

Figure 19: Installation center

2. Click New installation or add features to an existing installation. The following figure is displayed.

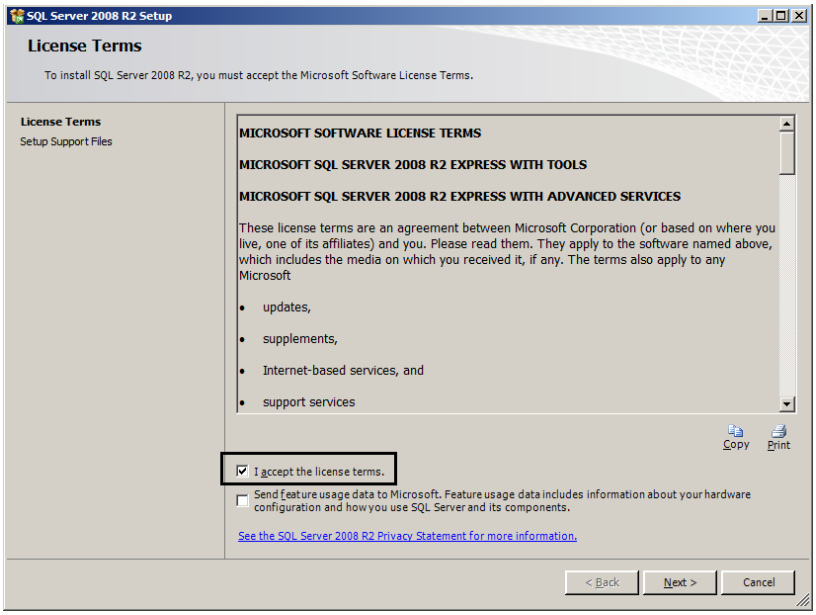

Figure 20: License terms

3. Select I accept the license terms.

4. Click Next. The following figure is displayed. The program will check whether the files for installation are correct.

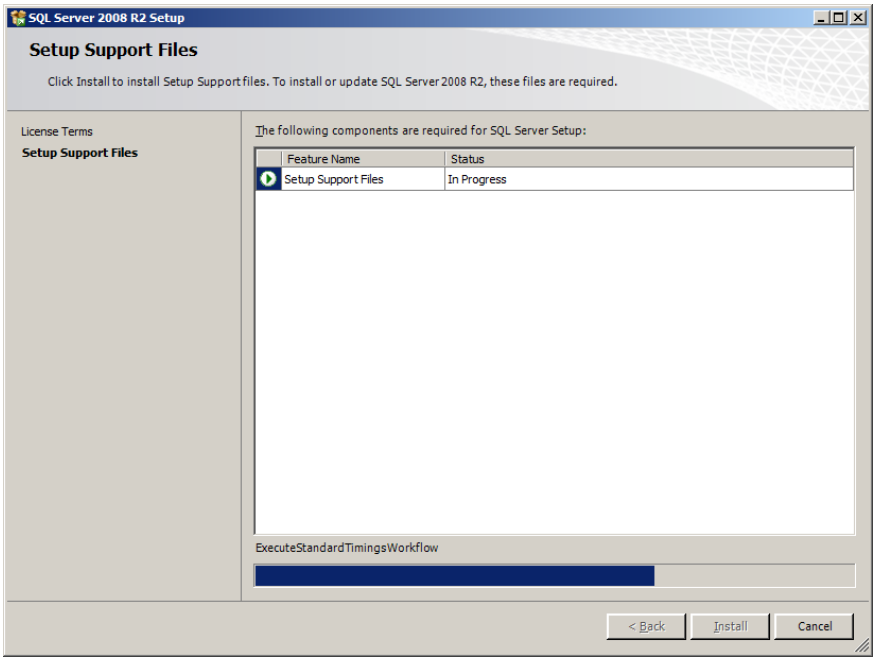

Figure 21: Setup files check

After verifying the files, the following figure is displayed.

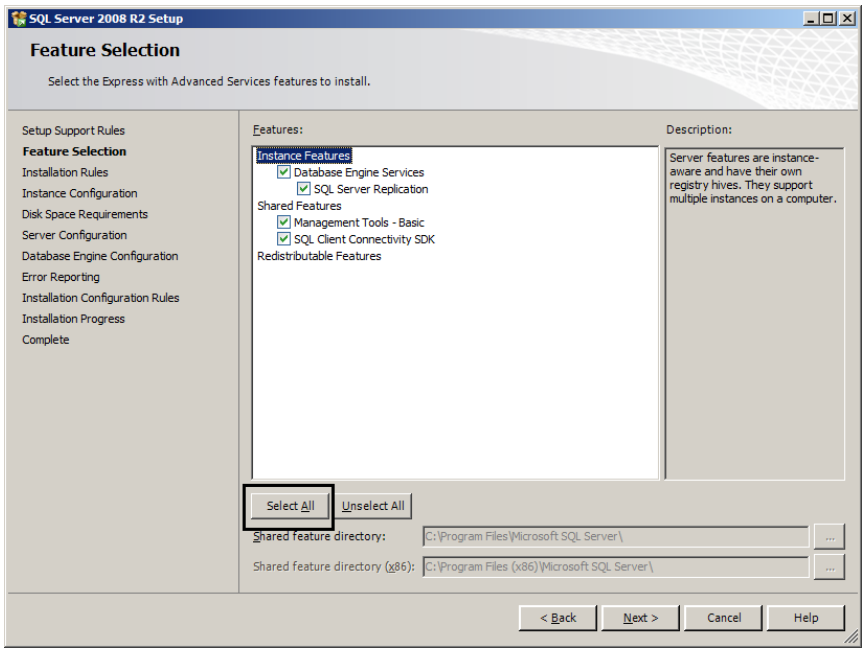

Figure 22: Feature selection

5. Click Select All.

6. Click Next. The following figure is displayed.

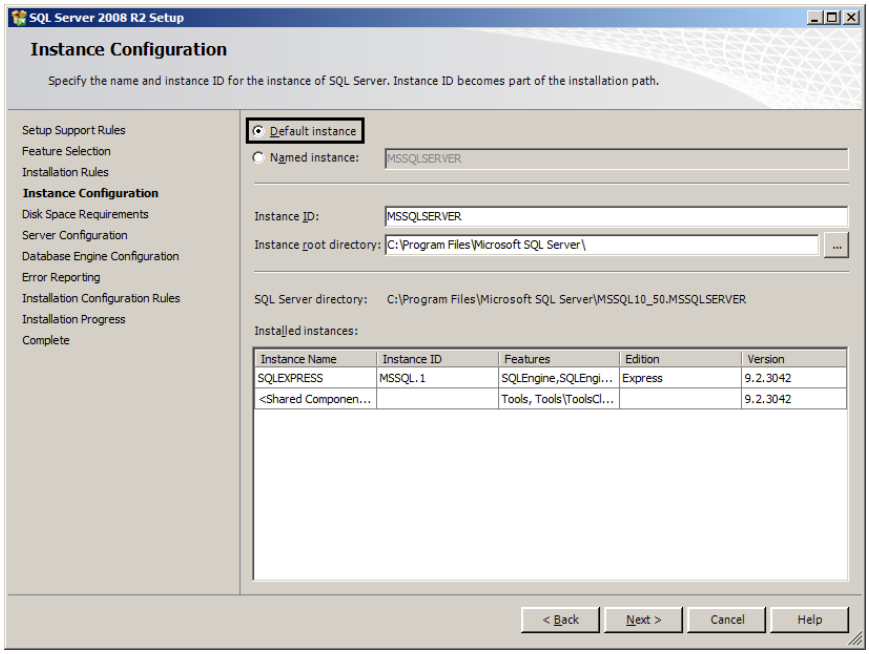

Figure 23: Instance configuration

7. Select **Default Instance**.

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

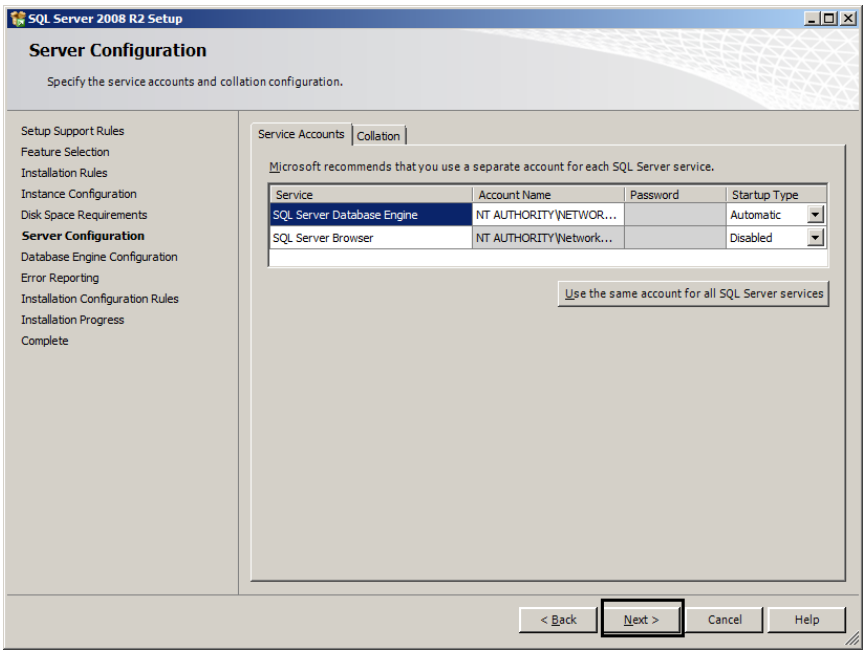

Figure 24: Server configuration

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

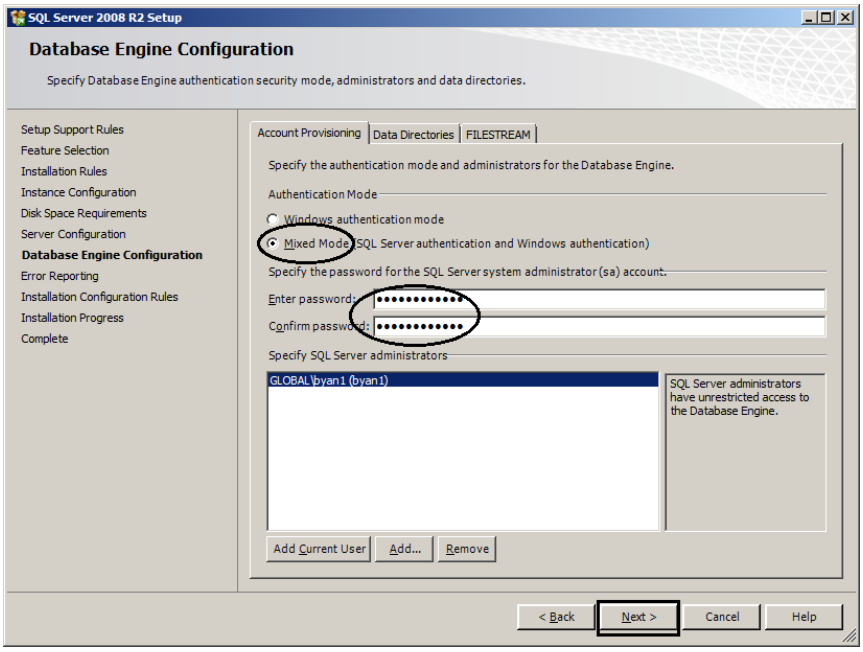

Figure 25: Database engine configuration

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 in uppercase.

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

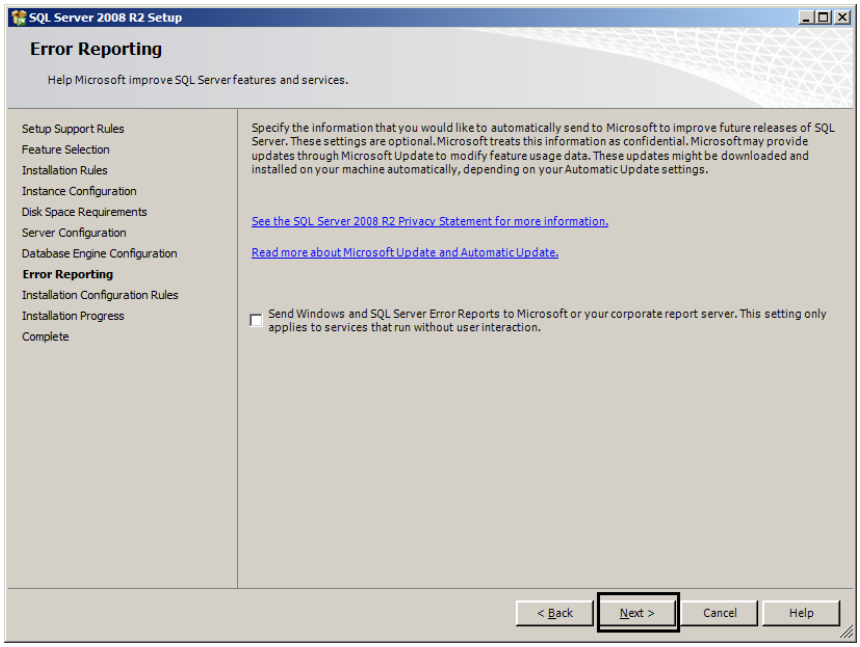

Figure 26: Error reporting

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

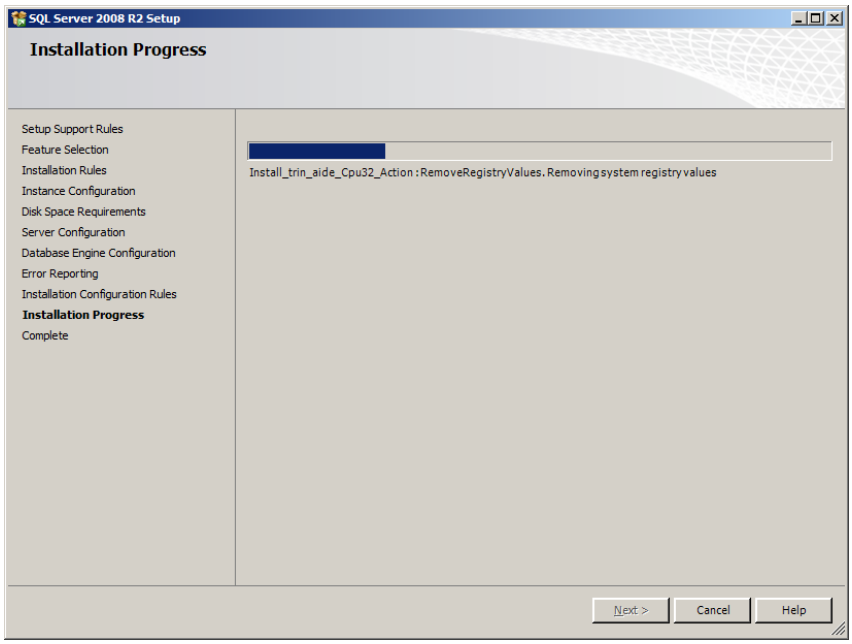

Figure 27: Installation progress

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.

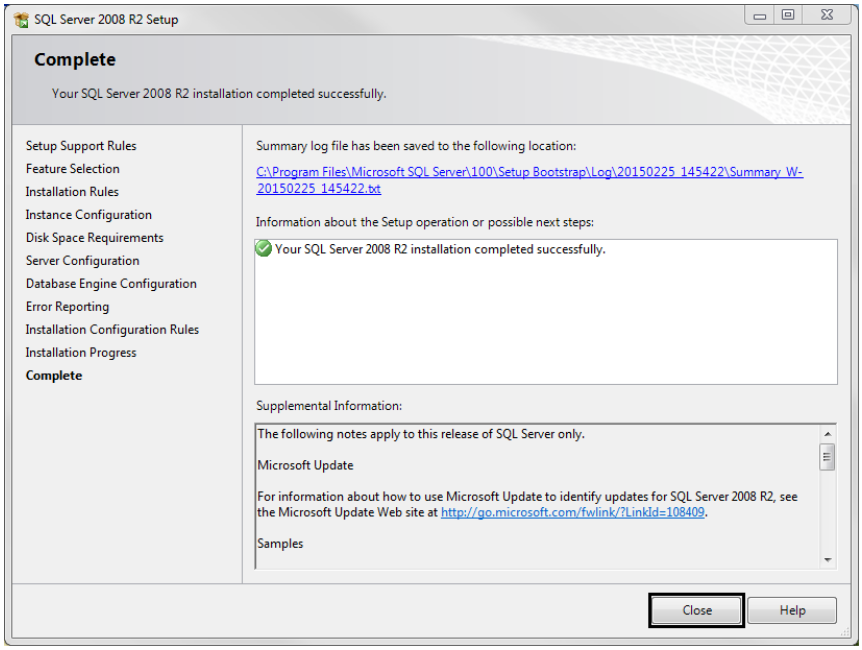

Figure 28: Installation complete

14. Click **Close**.

The installation of the database system is complete.

Configuring the Database

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

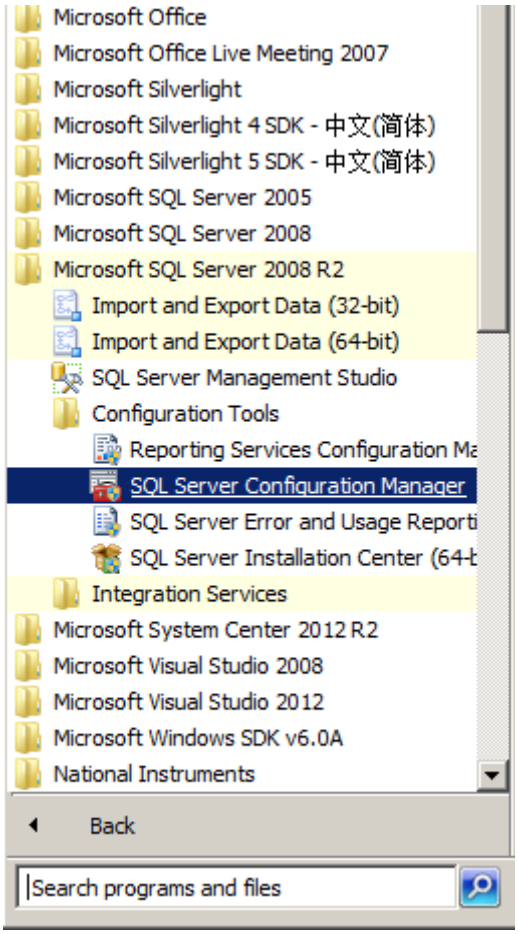

Figure 29: Select configuration manager

The path to this link is:

Start >> All Program >> Microsoft SQL Server 2008 R2 >> Configuration Tools >> SQL Server 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).

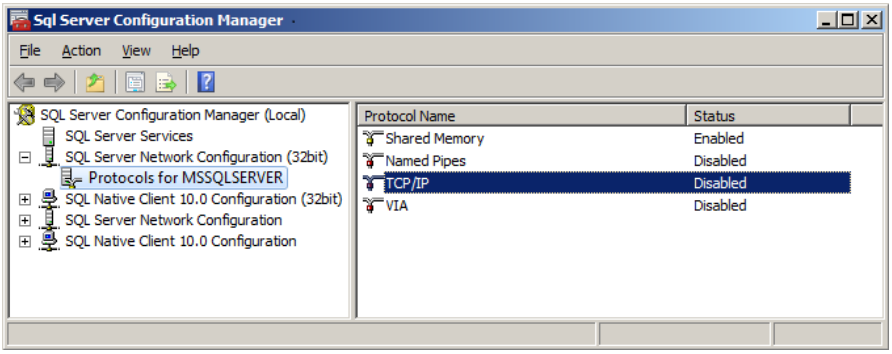

Figure 30: Enable TCP/IP protocol

3. Select Enable in the pop-up menu.

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

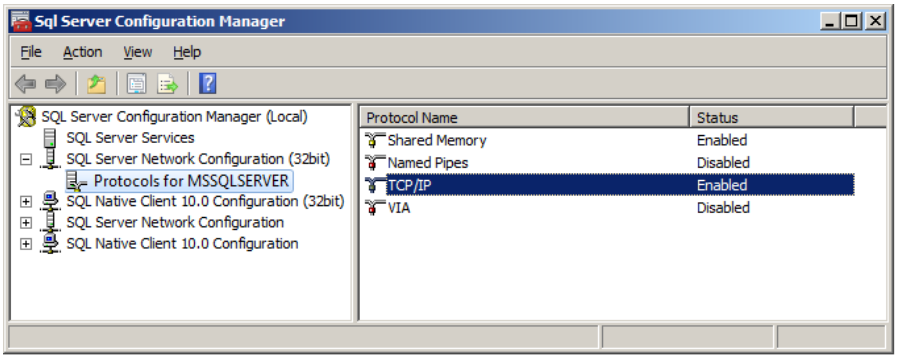

Figure 31: TCP/IP protocol enabled

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

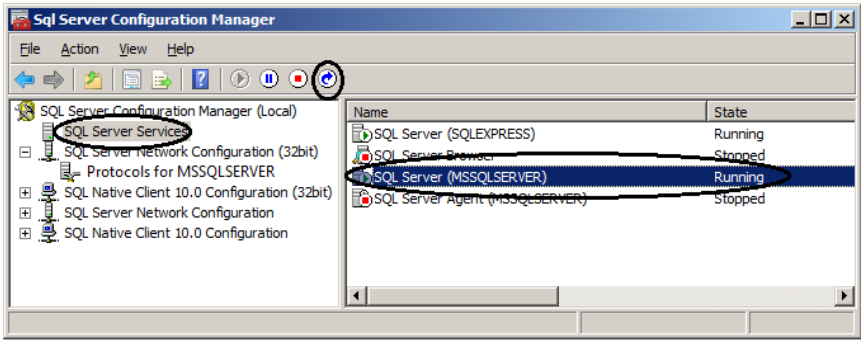

Figure 32: SQL server services

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 2008 R2 >> SQL Server Management Studio, as shown in the following figure.

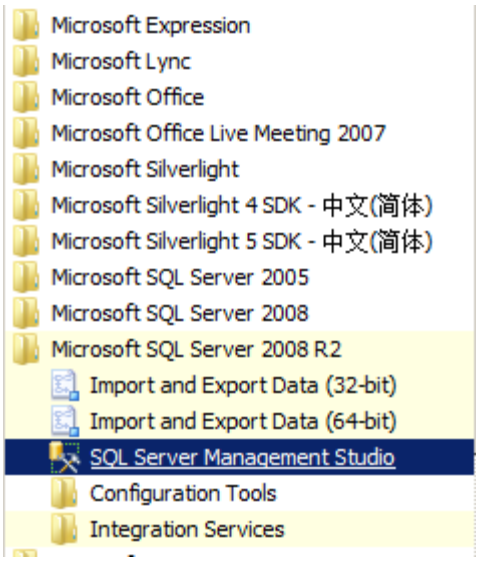

Figure 33: Select SQL Server Management Studio

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.

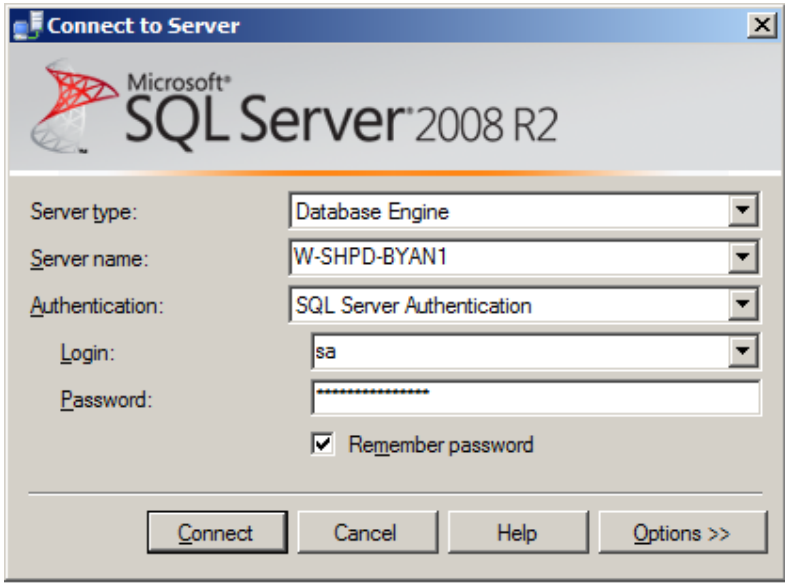

Figure 34: Connect to server

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

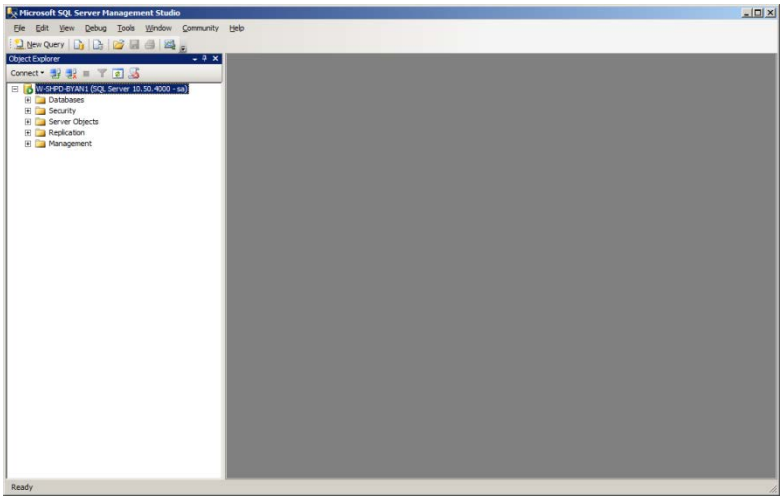

Figure 35: Main screen

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

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

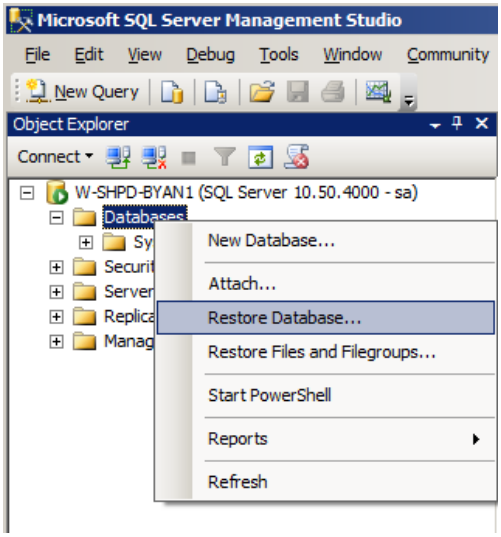

Figure 36: Restore database

17. Enter **TSLDatabase** next to **To database**.

18. Select **From device**.

19. Select '…'.

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

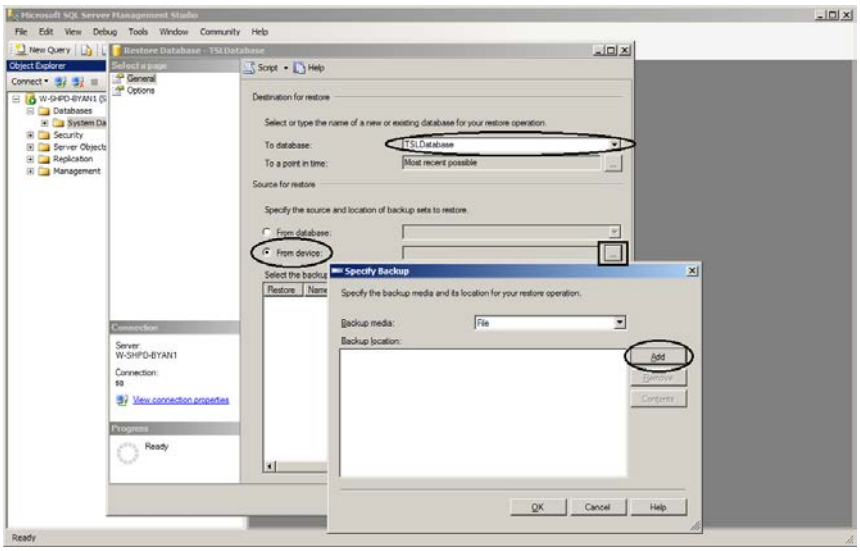

Figure 37: Specify backup

21. Find the file TSLDatabase.bak under the directory:

    - 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.*

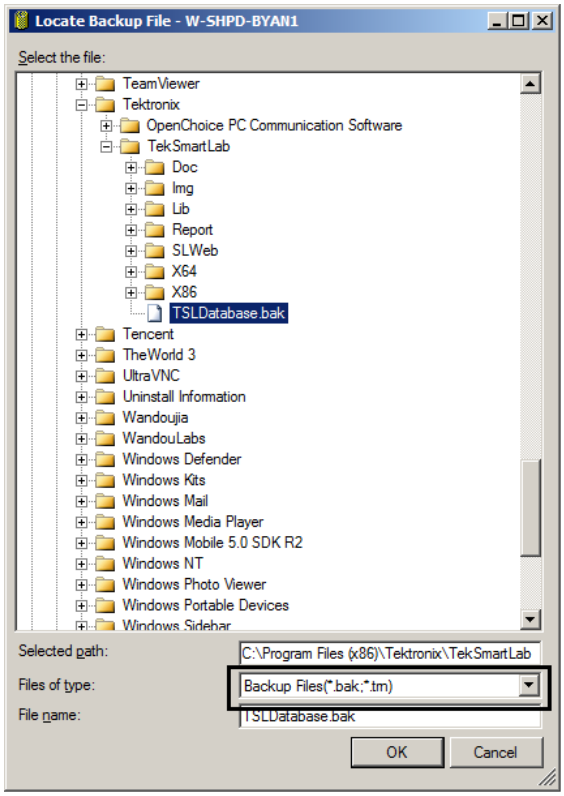

Figure 38: Change file type

22. Click OK after you find the file, as shown in the following figure.

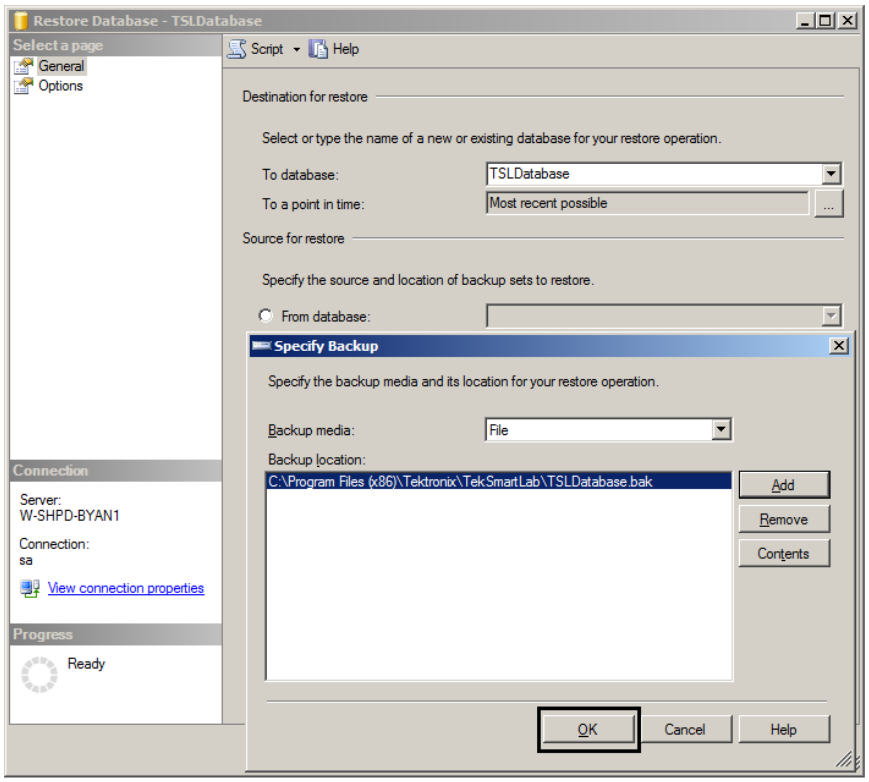

Figure 39: Backup file found

23. Select the file using the checkbox in the **Restore** column, and then click **OK**, as shown in the following figure.

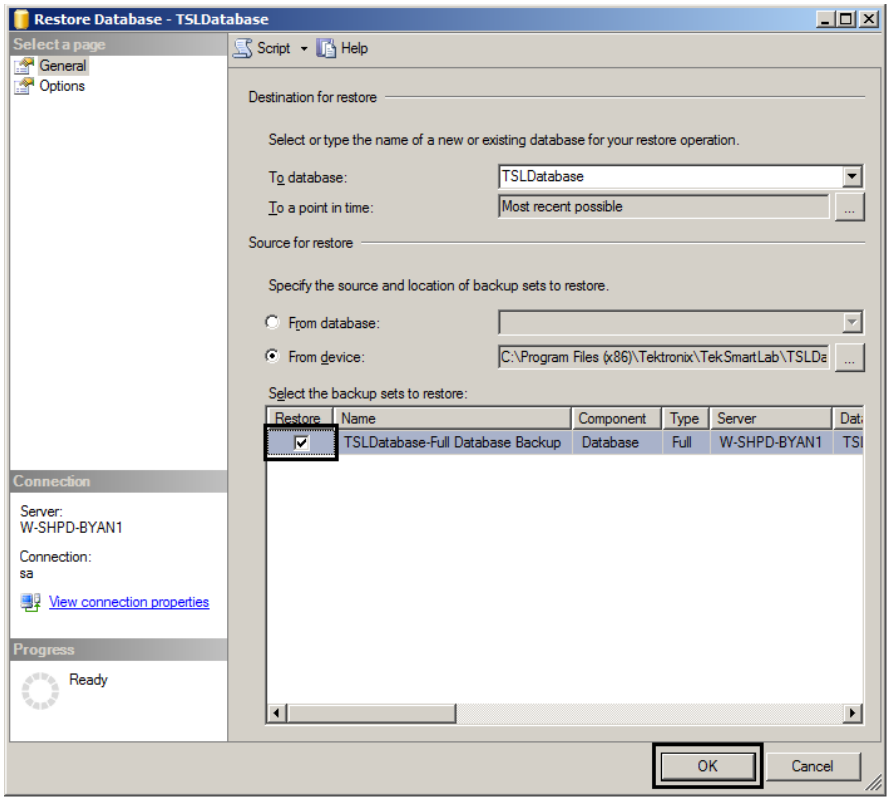

Figure 40: Select the most recent database

24. Click **OK** to complete the configuration, as shown in the following figure.

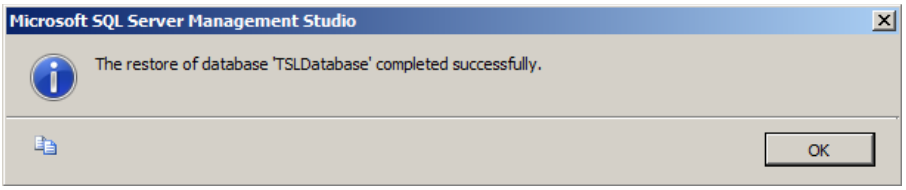

Figure 41: Database configuration complete

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.

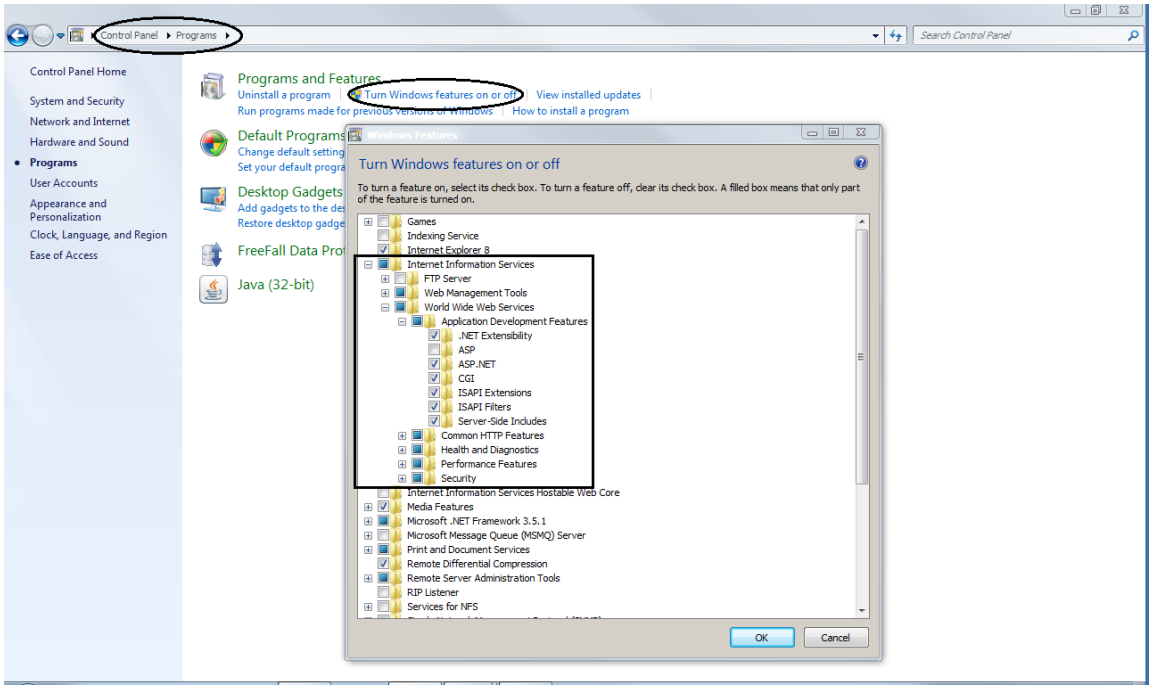

Figure 42: Select Internet information services

NOTE:

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

2. As shown in the figure above, 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

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**, as shown in the following figure. You can find **Internet Information Services (IIS) Manager** under **Services and Applications**.

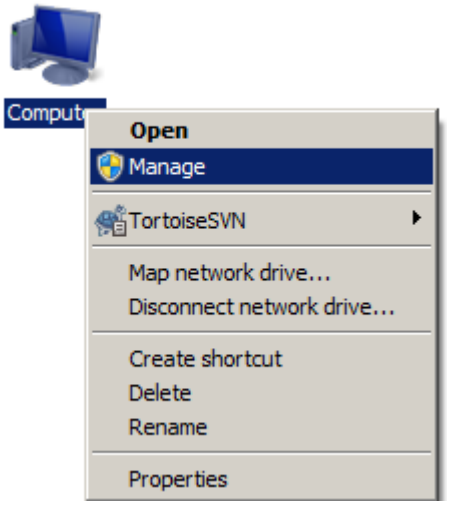

Figure 43: Open Internet Information Service Manager

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.

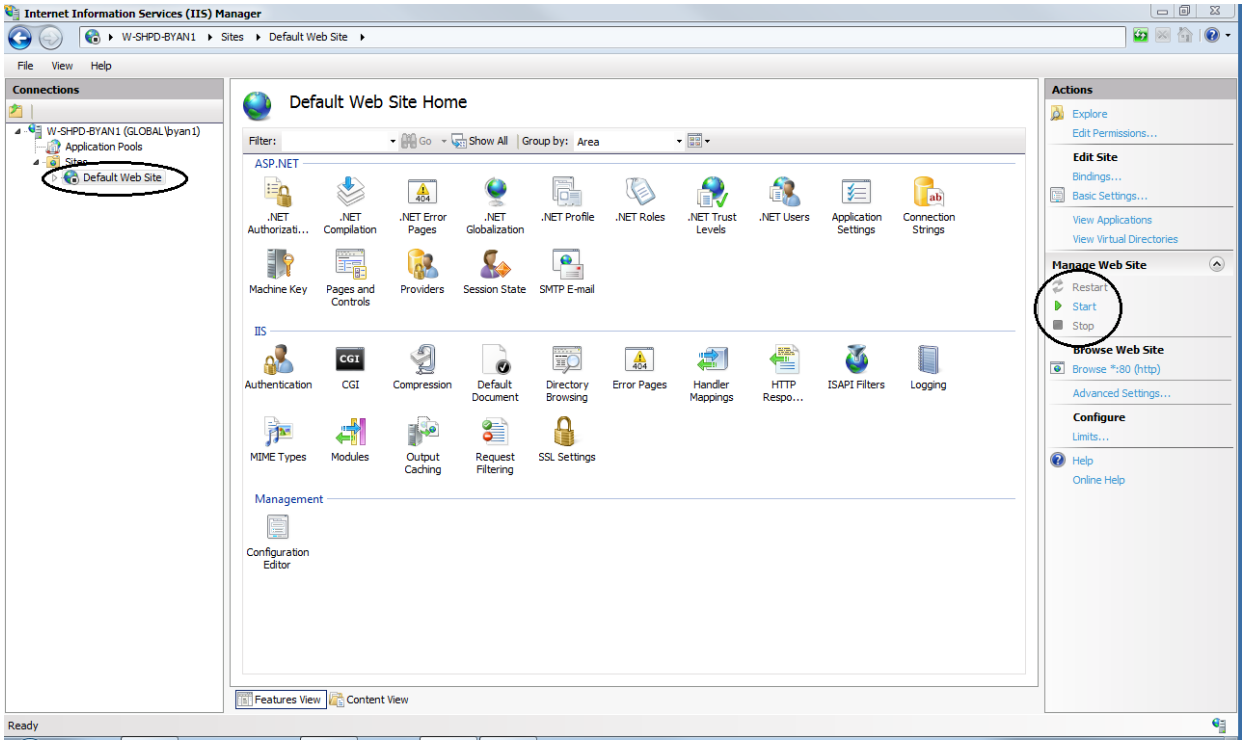

Figure 44: Internet Information Services (IIS) manager

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

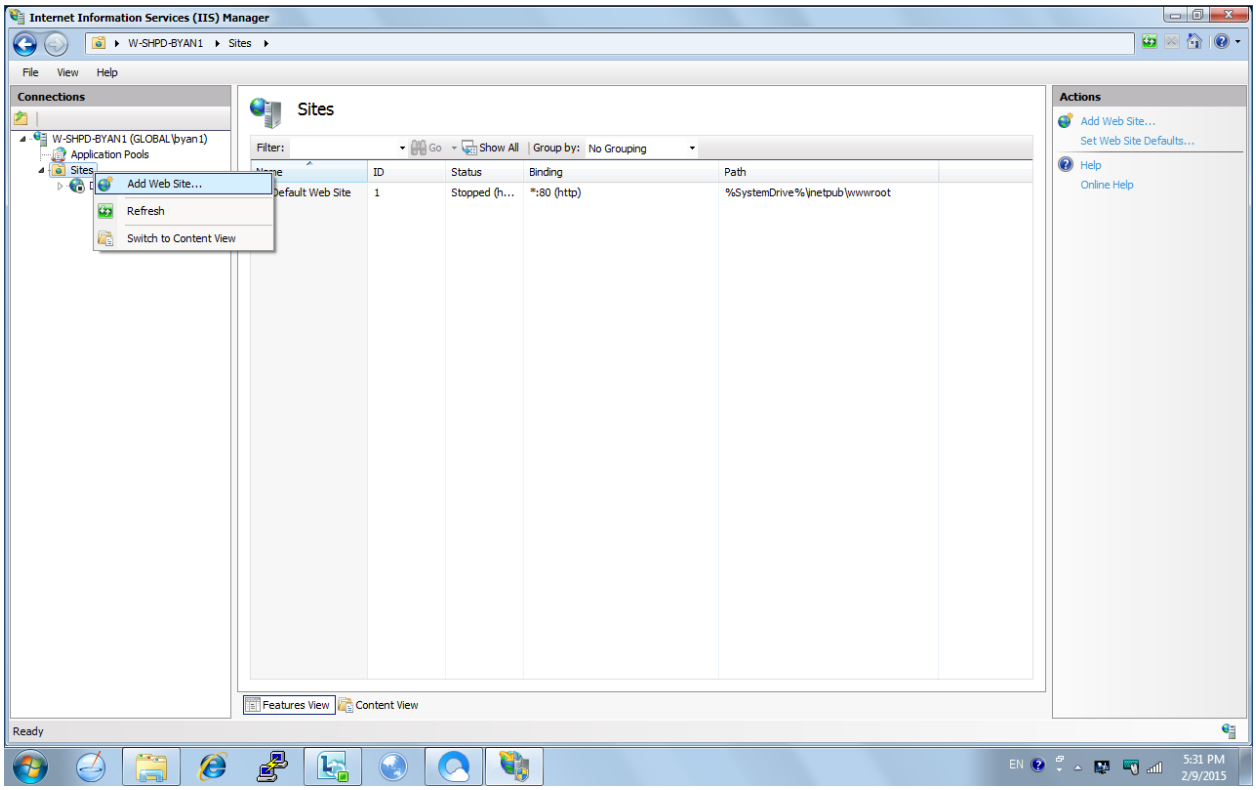

Figure 45: Add a web site

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.

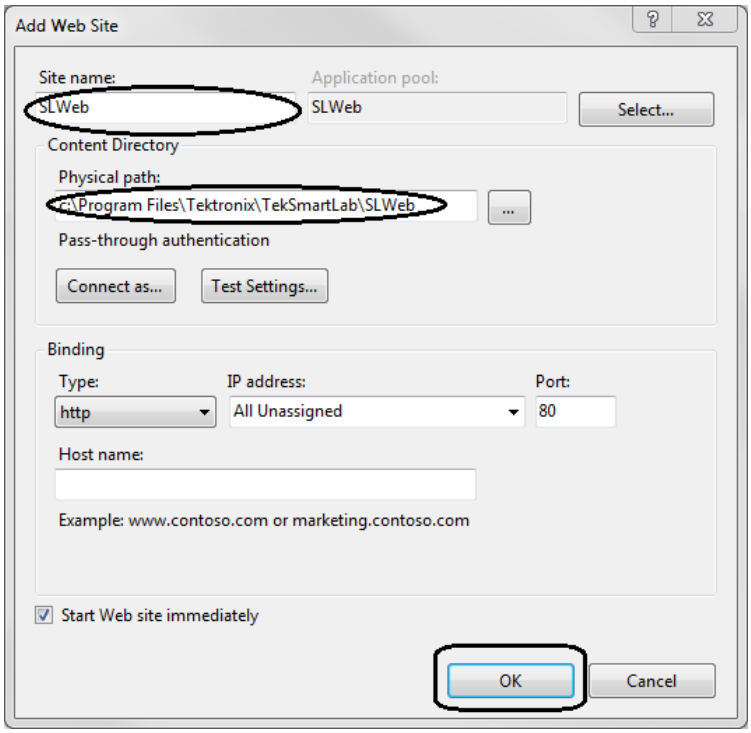

Figure 46: Select the SLWeb file

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).

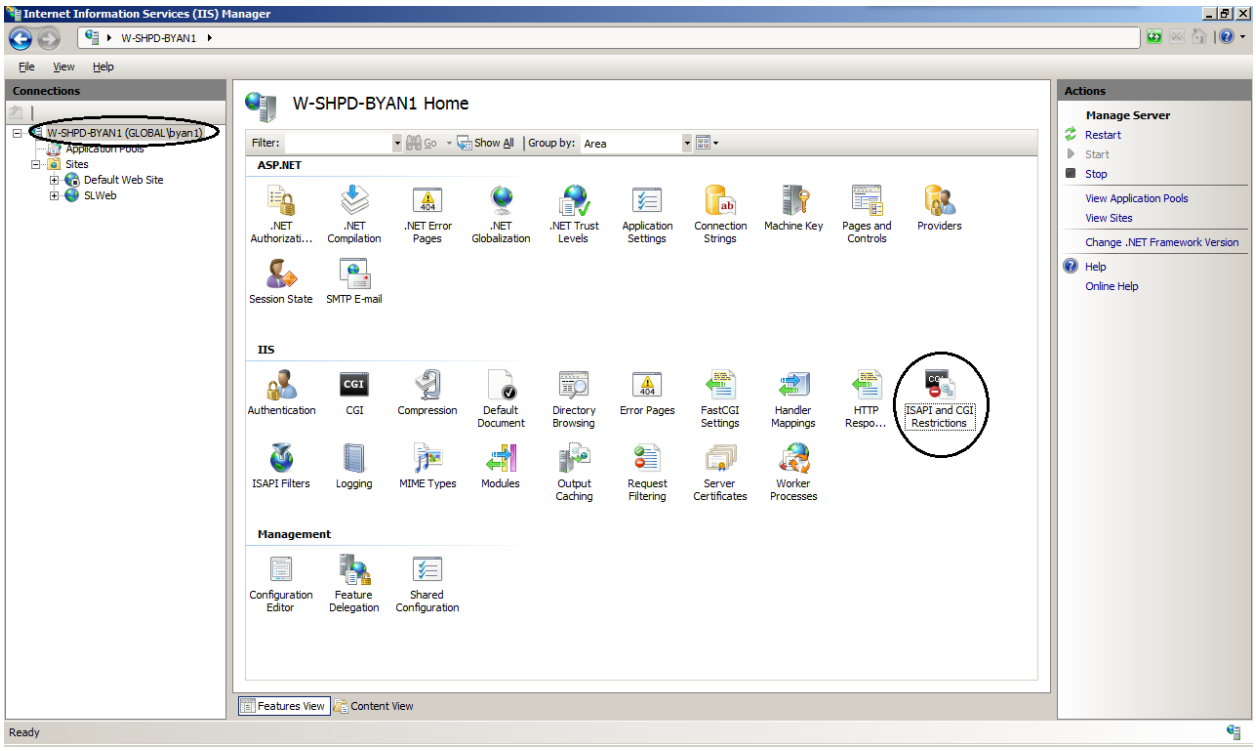

Figure 47: IIS manager

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.

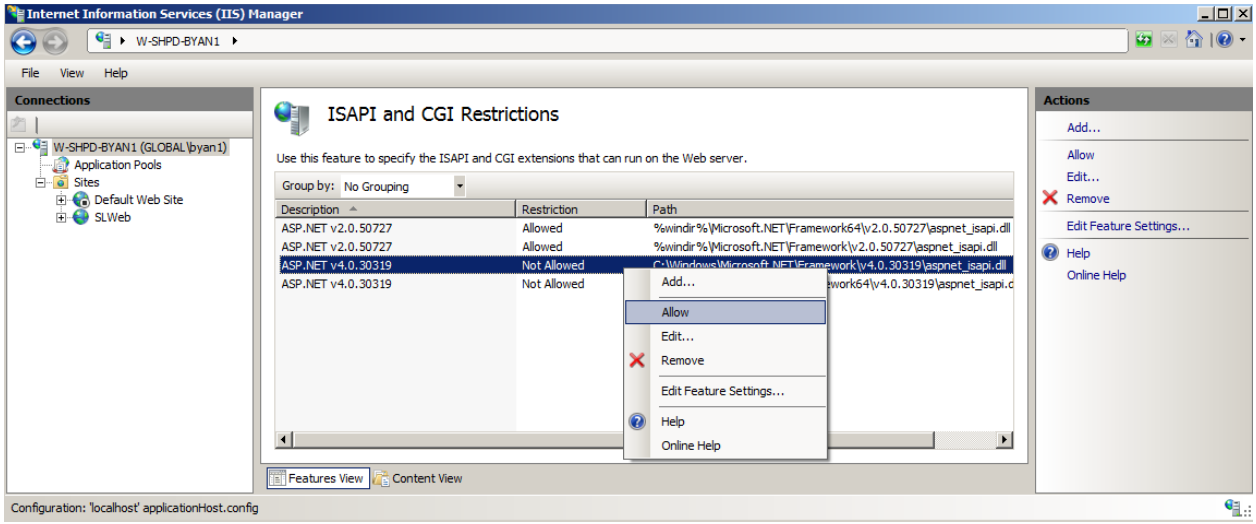

Figure 48: Allow ASP.NET 4.0

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

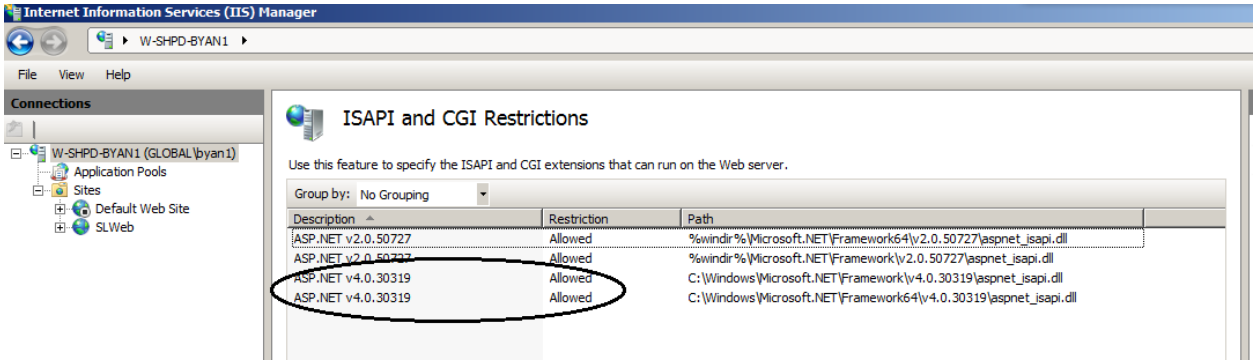

Figure 49: ASP.NET 4.0 allowed

NOTE:

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

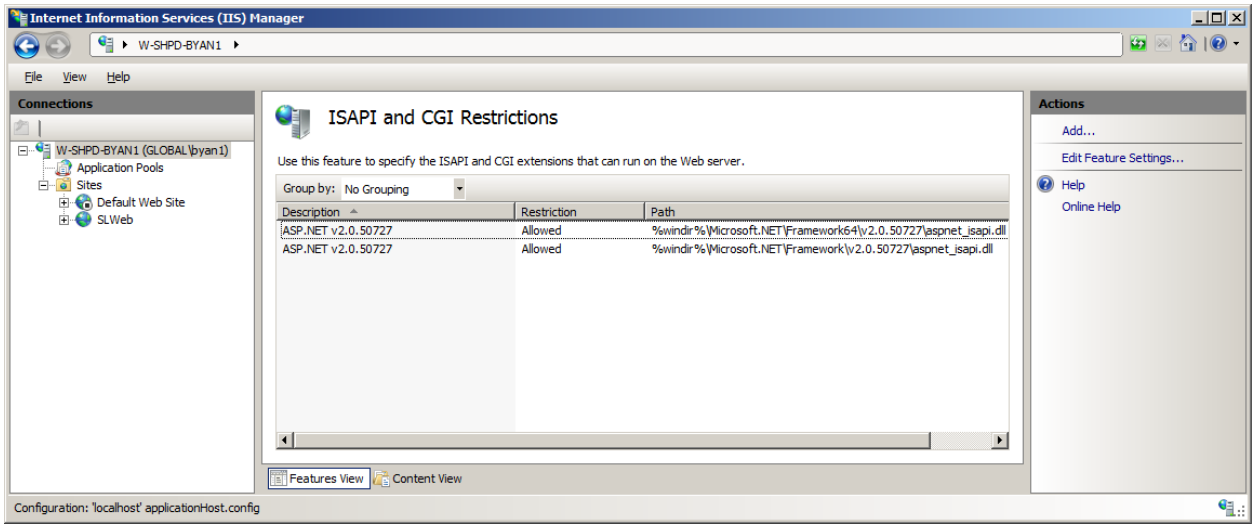

Figure 50: ASP.NET v4.0 not found

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.

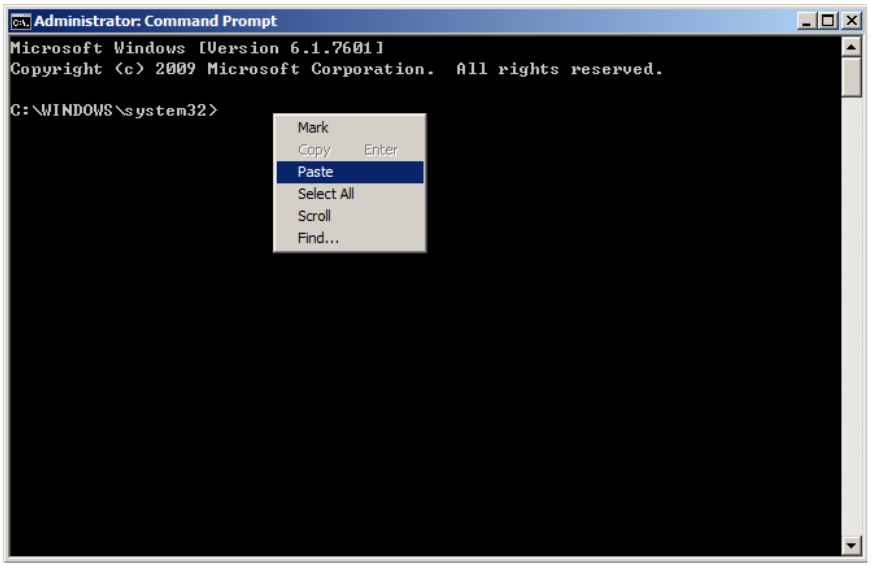

Figure 51: Paste command by right key

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

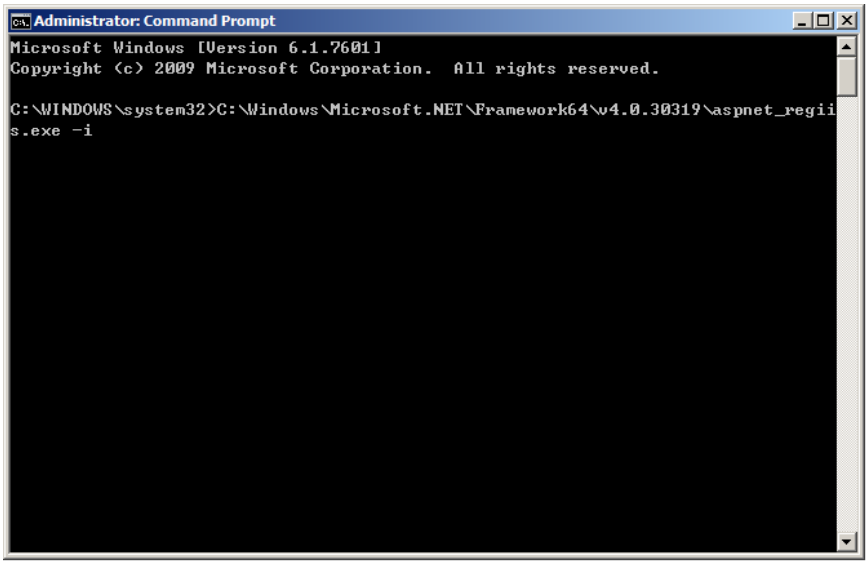

Figure 52: Command window after entering the command

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

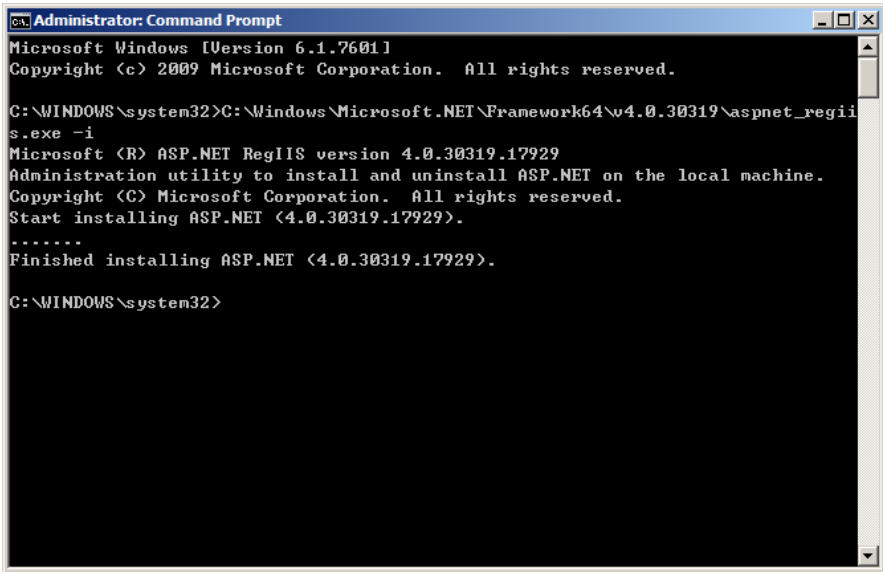

Figure 53: Result of the command running

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.

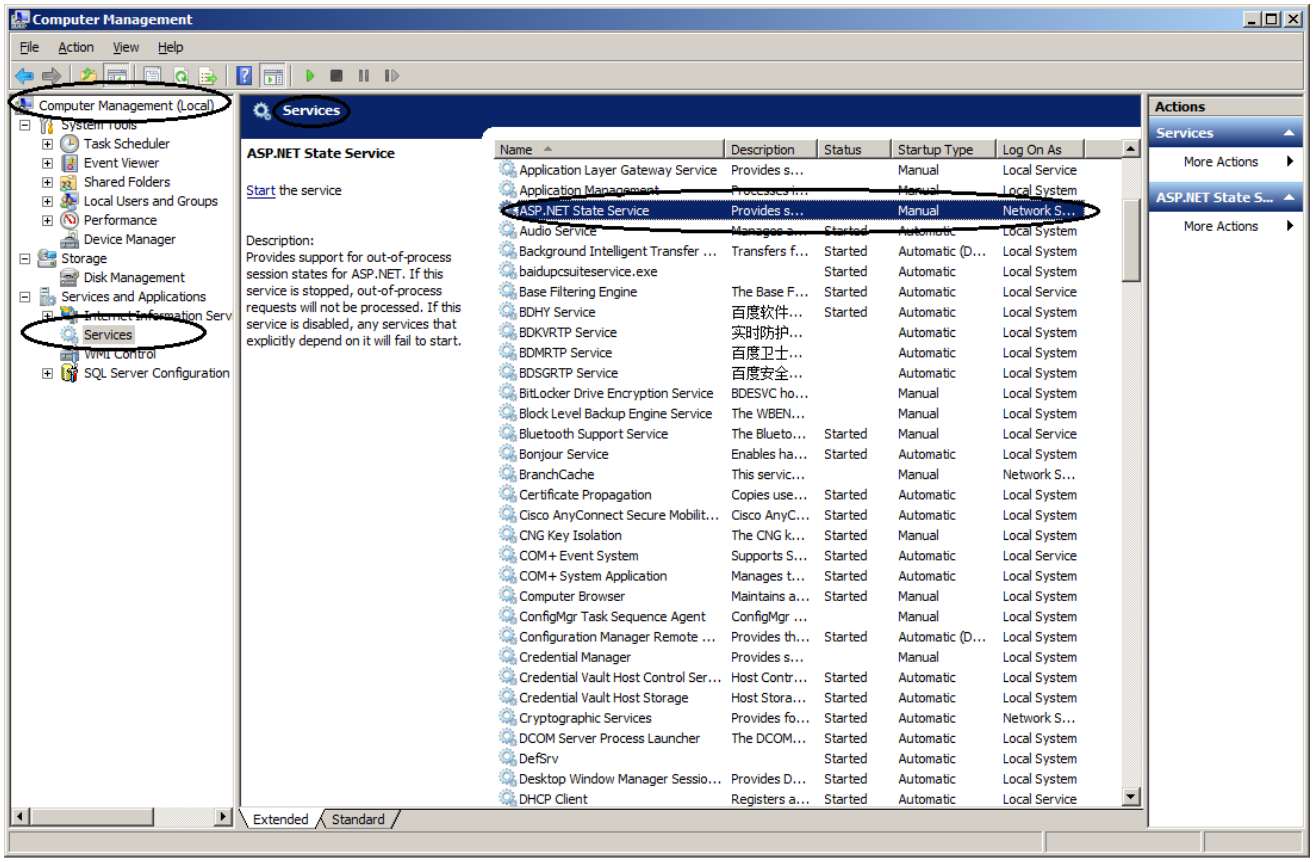

Figure 54: Computer management

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.

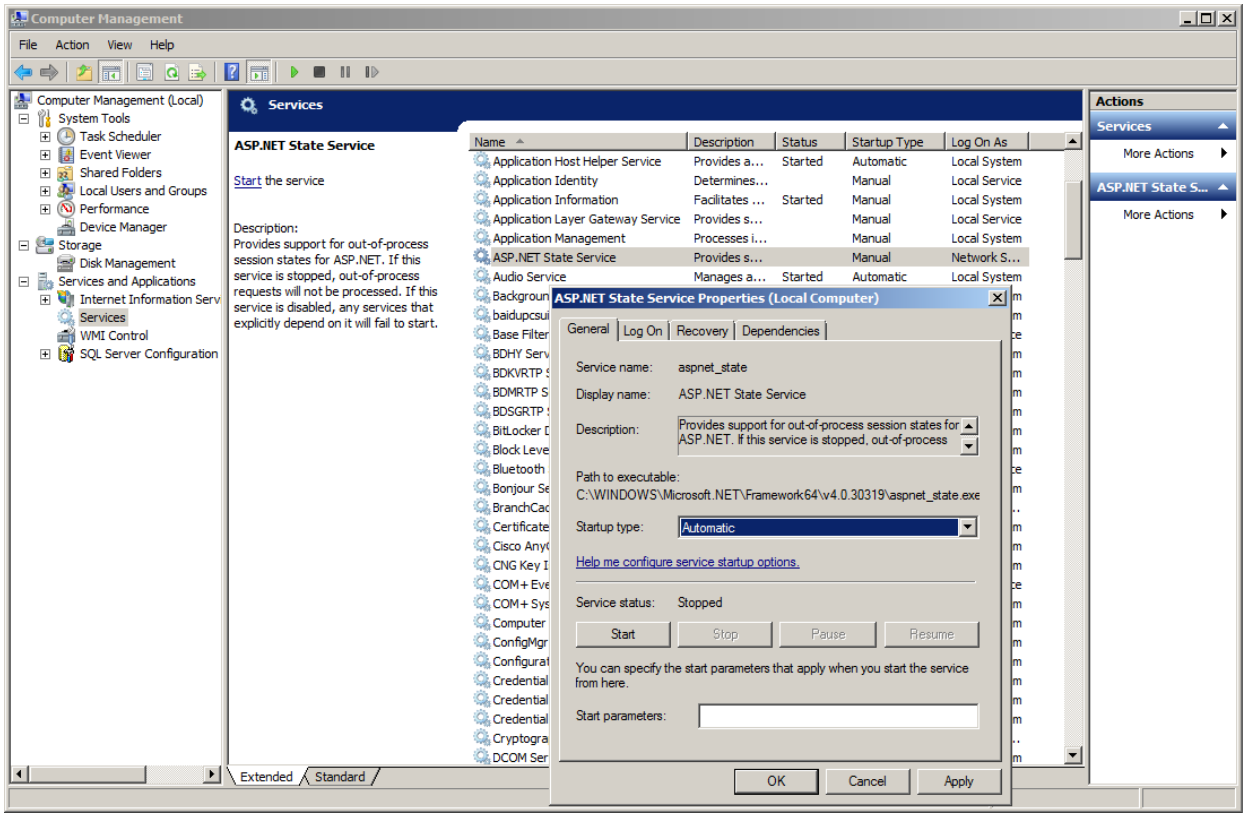

Figure 55: Configure ASP.Net State Service

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.

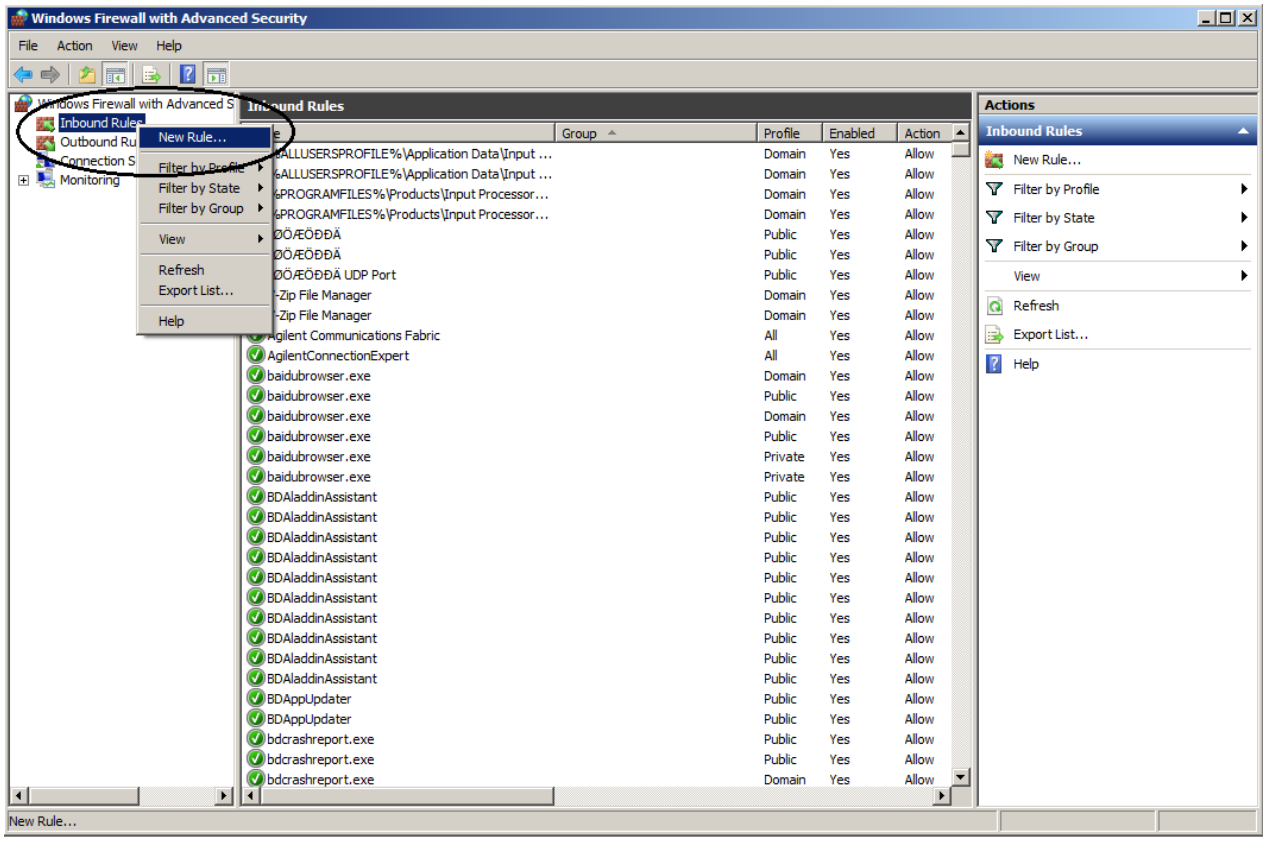

Figure 56: Add inbound rules

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

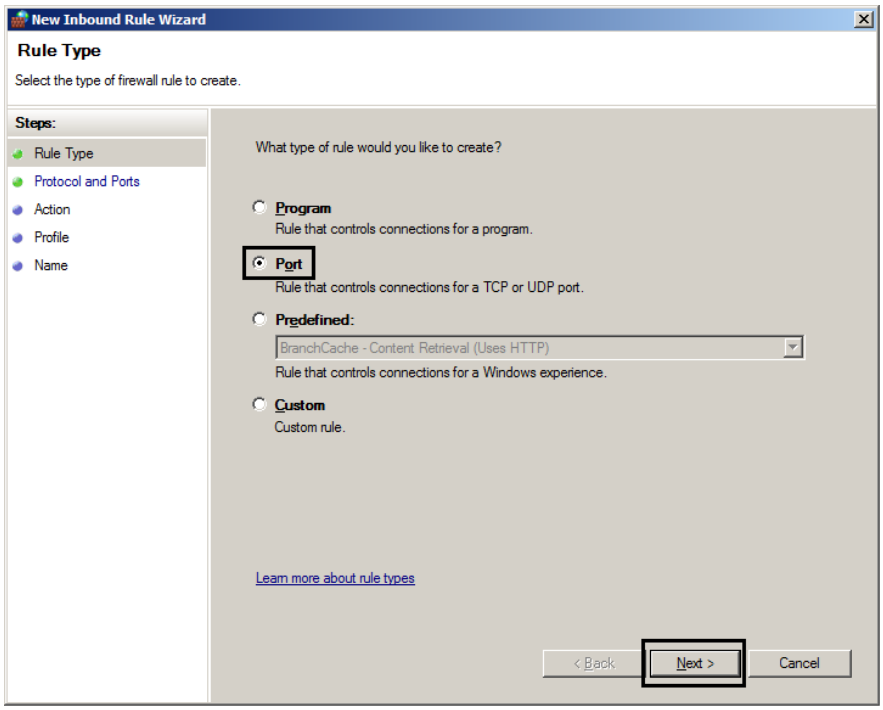

Figure 57: New inbound rule wizard

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

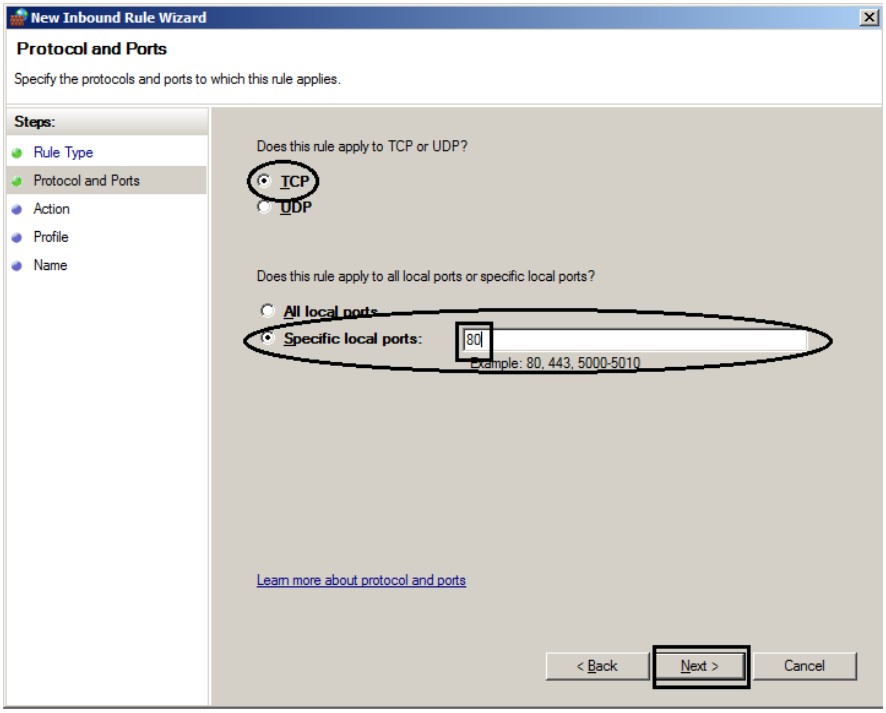

Figure 58: Protocol and ports

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

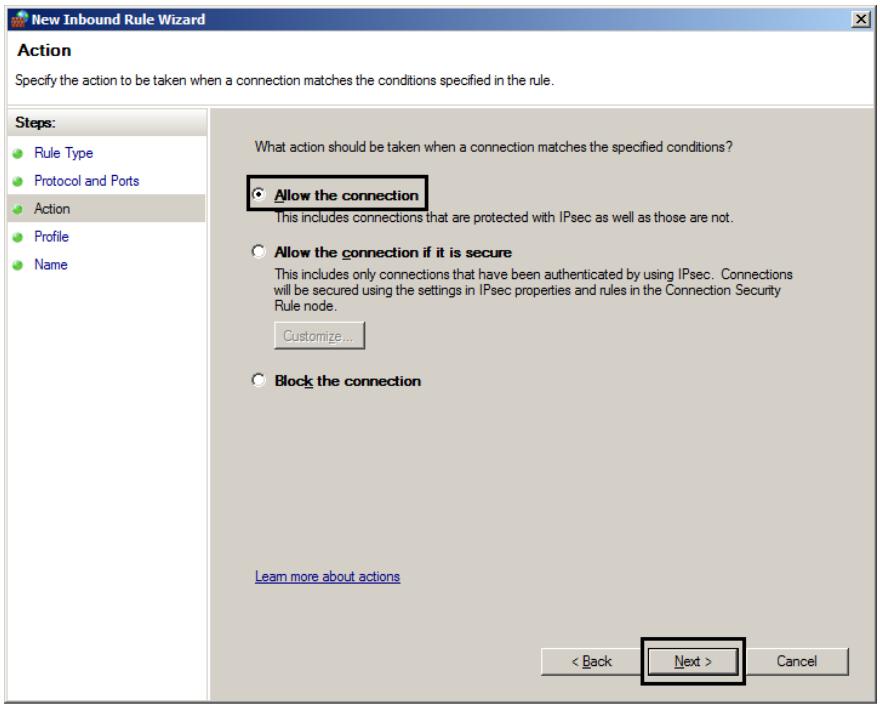

Figure 59: Action

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

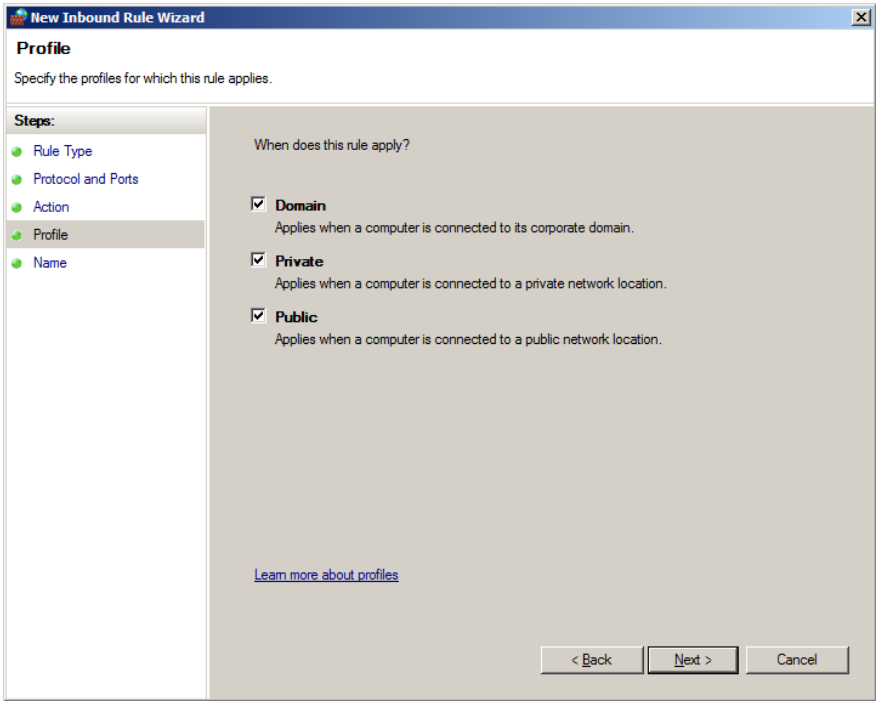

Figure 60: Profile

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

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

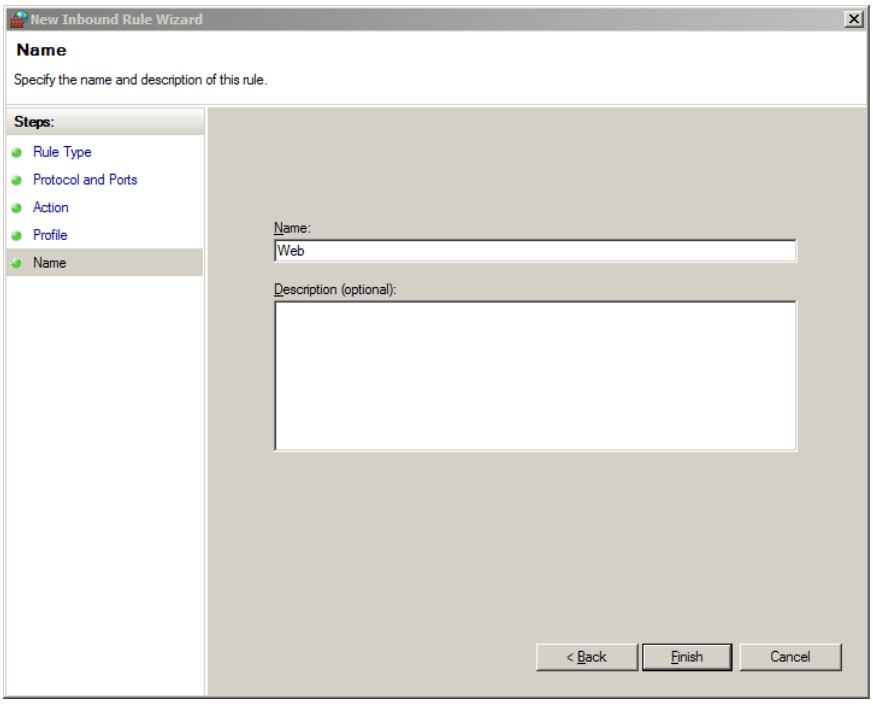

Figure 61: Name

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

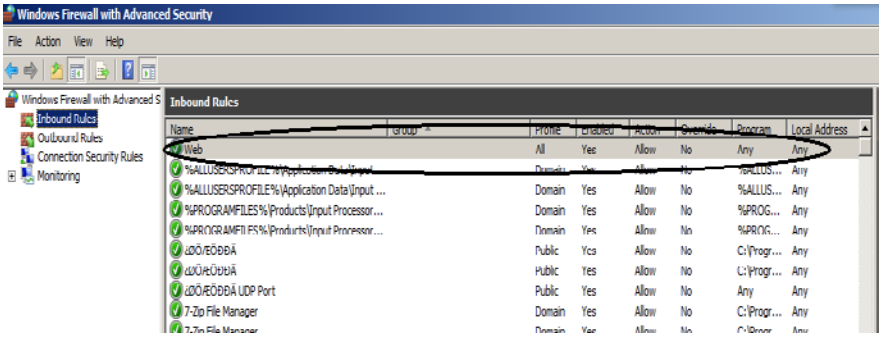

Figure 62: Inbound rules added

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.

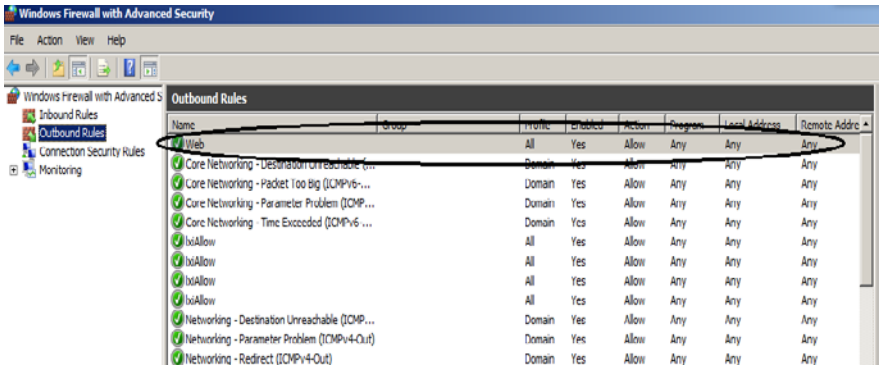

Figure 63: Outbound rules added

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.

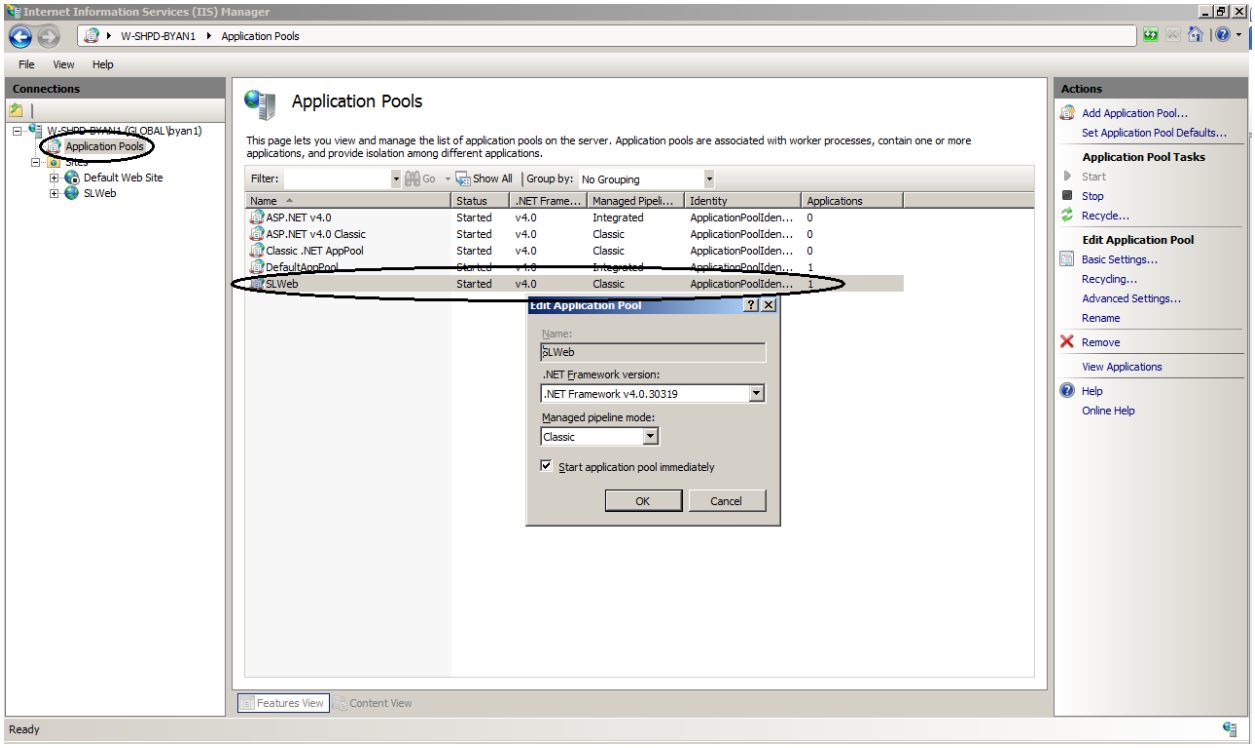

Figure 64: Application pools

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.

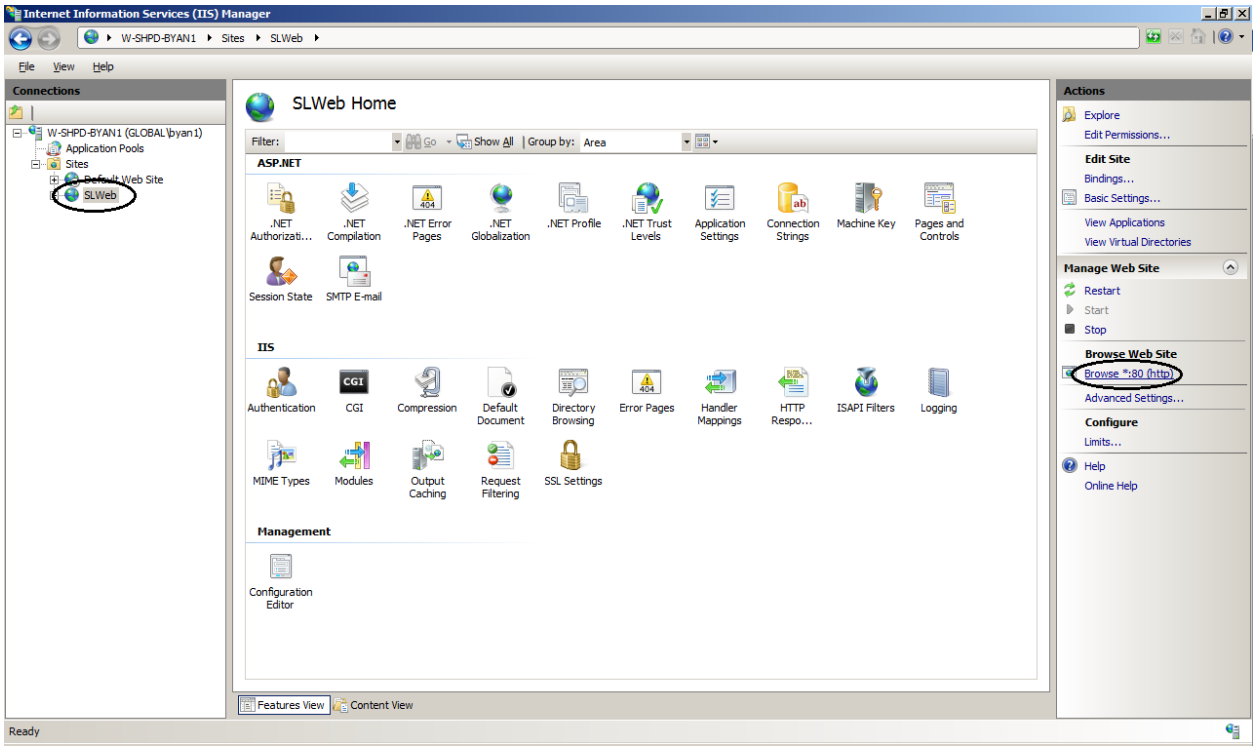

Figure 65: SLWeb home

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

The following figure is the web page displayed.

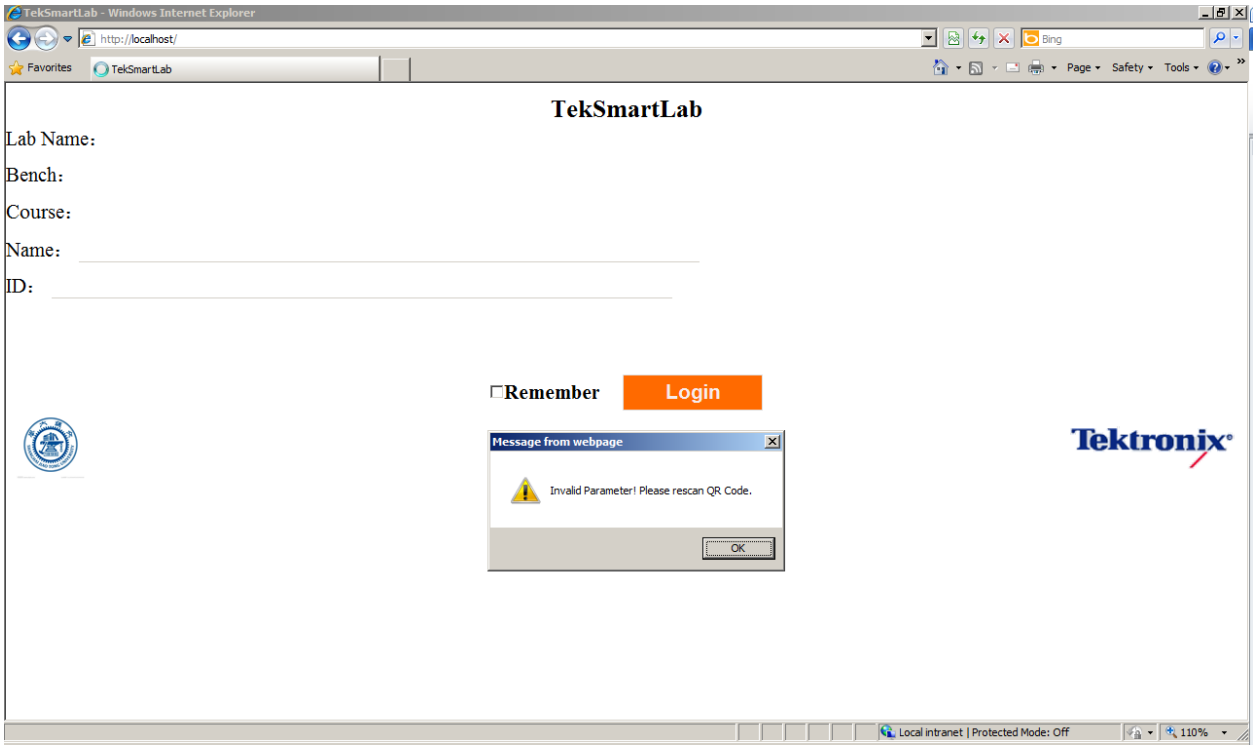

Figure 66: TekSmartLab web page

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

Home Screens

The TSL3000B has two home screens. The default screen (see below) shows courses that can be chosen, allowing you to configure the parameters of instruments.

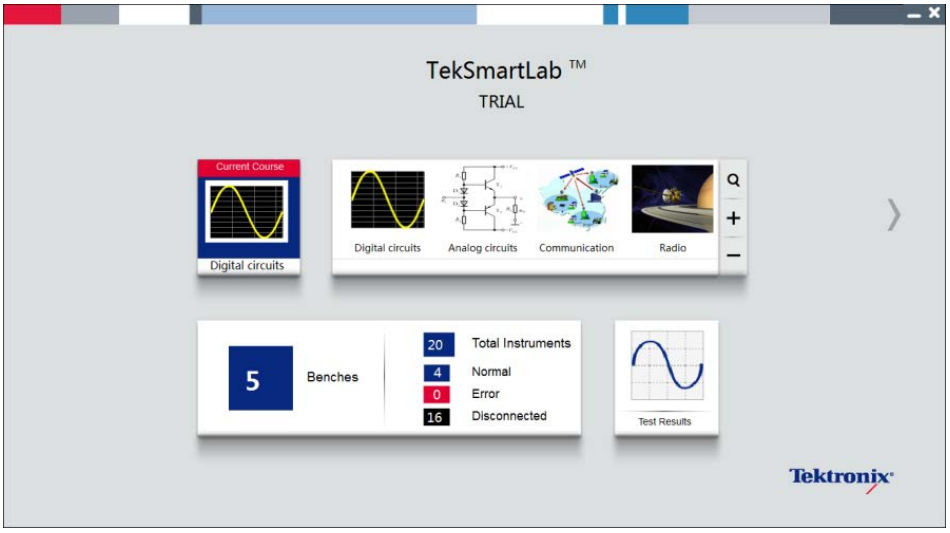

Figure 67: Default (courses) home screen

Click the arrow pointing right. You will see the other home screen (see below), which shows instruments that can be configured.

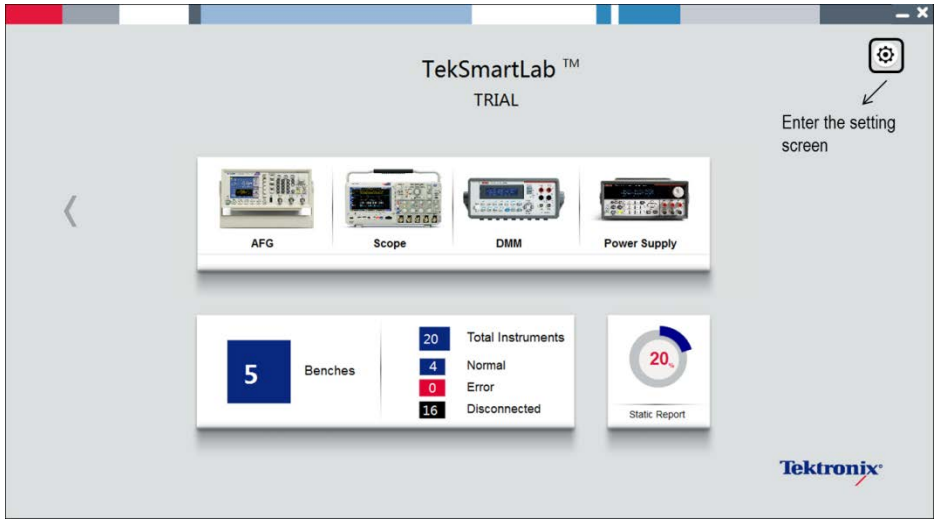

Figure 68: Second (instruments) home screen

Software Activation

1. Enter the setting screen from the instruments home screen by clicking the gear icon in the upper-right of the screen. The following figure is displayed.

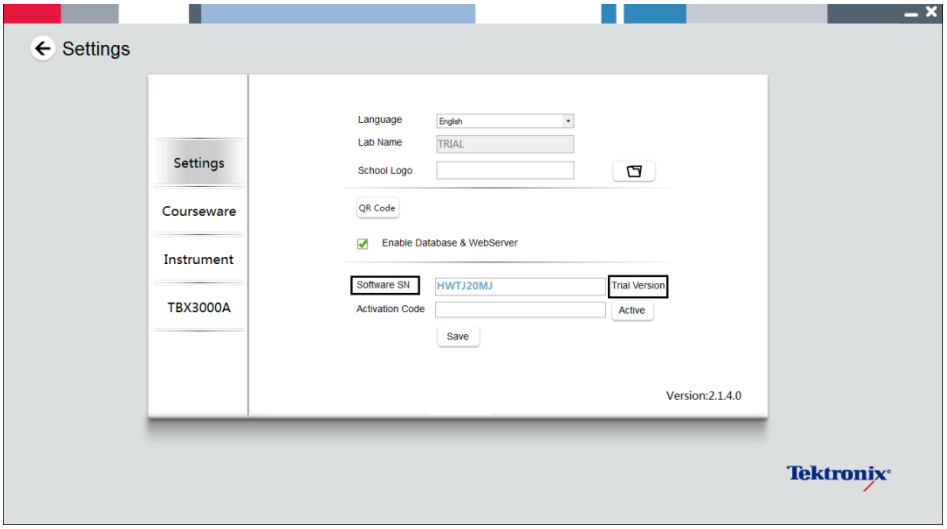

Figure 69: Setting screen

2. Enter the activation code you received from Tektronix next to **Activation Code**.

3. 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 of trial version and only supports 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.

Centralized Instrument Configuration

You can set the instrument configurations based on the courses and then distribute those configurations to up to 400 instruments, or you can set the configurations based on instruments and then distribute them to up to 100 benches.

Configuring Courses

You can customize your courses and configure the instruments in a batch based on courses.

Choosing and Editing Courses

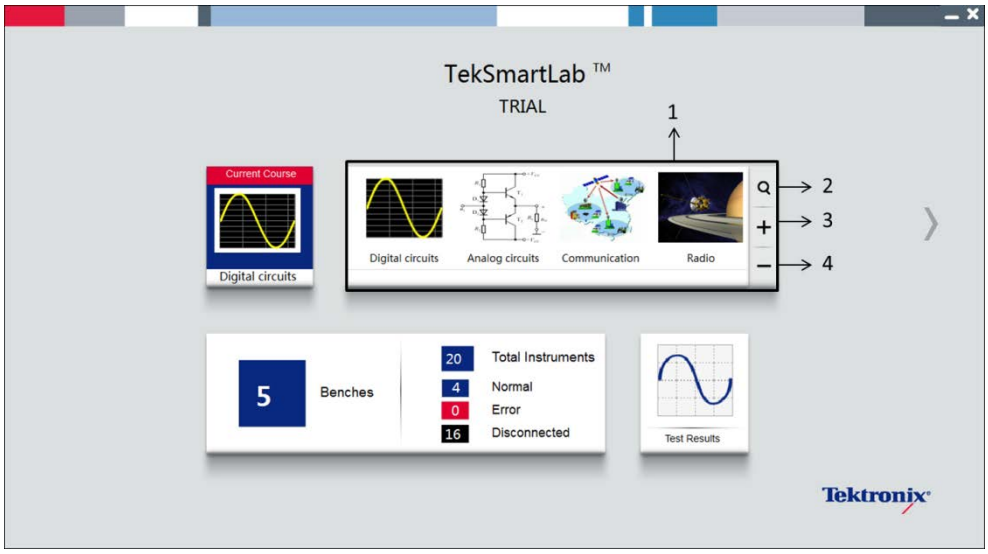

Figure 70: Home screen based on courses

1. On the Course home screen, you can choose different courses. The left arrow and right arrow that appear when you hover the cursor over the courses allow you to move between courses.
2. Click the magnifying glass icon to search the courses.
3. Click + to add a new course.
4. Click - to delete the selected course.

Configuring Courses

Double click a course to enter the course configuration screen as shown below:

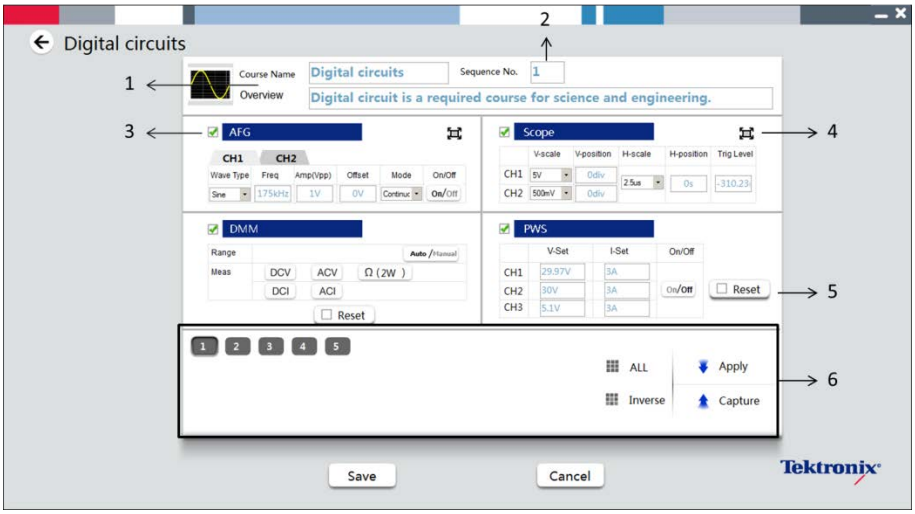

Figure 71: Course configuration screen

5. Click image to change the image of this course. Enter information about this course in the Course Name and Overview boxes.

6. Set the sequence order of this course by entering a number in the Sequence No. box.

7. Select the box beside the name of the instruments to use for this course.

8. Click ⌗ for more detailed configurations.

NOTE:

After you input any information, you should press Enter on your keyboard to finish

9. If you select Reset, when you click Apply to distribute the configurations to the instruments, the instruments will be reset to the previously saved configurations. If you only want to reset the instruments, make sure you leave all the parameters un-configured.

10. Select the benches to be configured before you click Apply.

    You can select or deselect one bench, multiple benches, or all benches. The shadow underneath the number icon means that the bench is selected.

Figure 72: Benches selection

Click Apply to distribute the configurations to the chosen benches. You can also click Capture to capture the current configuration of a selected bench (only one bench can be chosen). You can then copy the configuration of this bench to other benches.

When the number icon of a bench turns green, the configuration is successful. 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 the TBX3000A. If the fault is still not cleared, please perform a self-check of the instrument by referring to product user manual.

Configuring Instruments

You can configure instruments in a batch on the Instruments home screen based on instruments.

Home Screen based on Instruments

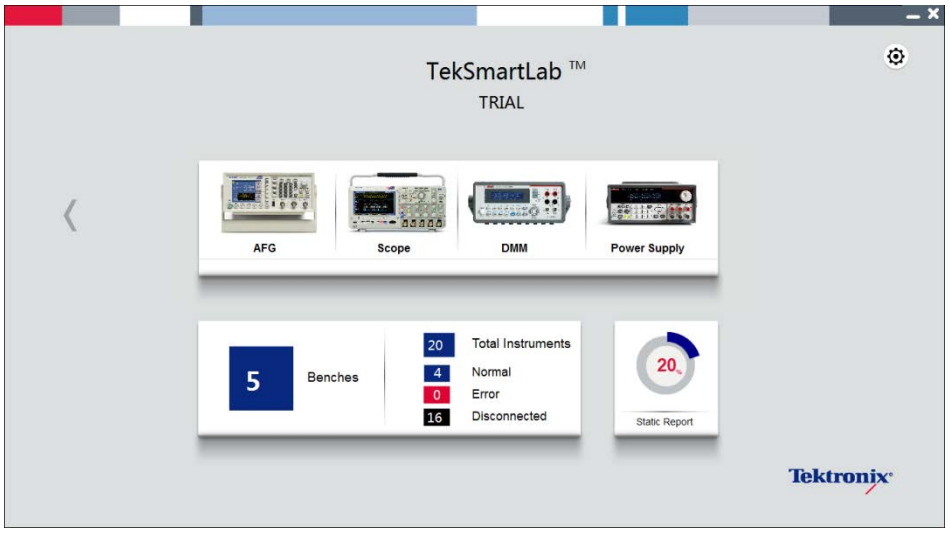

Figure 73: Home screen based on instruments

You can double-click the icon of an instrument to select it, and then configure the parameters in a batch.

Configuring instruments

The process of instrument configuration is demonstrated by the following oscilloscope configuration screen.

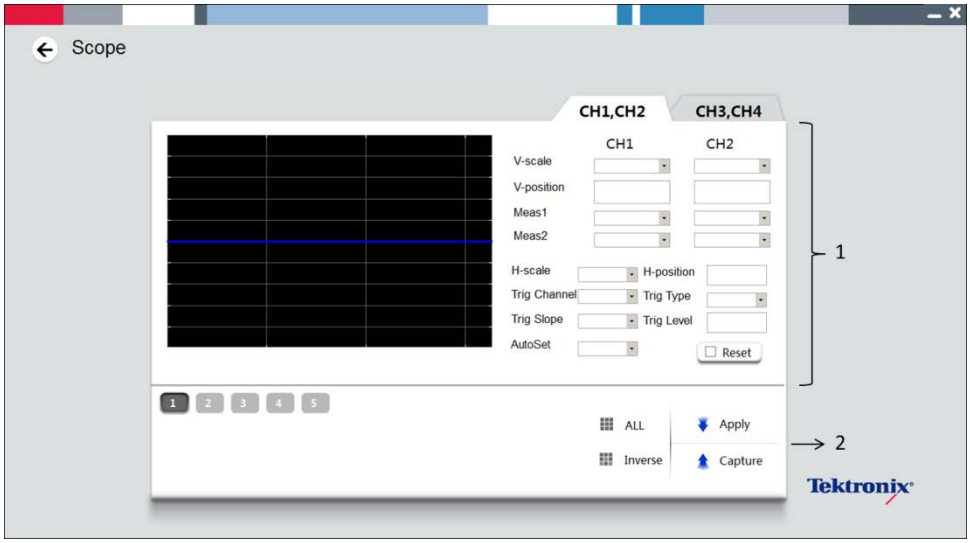

Figure 74: Oscilloscope configuration screen

1. On the oscilloscope configuration screen, a waveform is displayed only after the instrument configuration of a bench is captured (see Figure 75).

2. Choose a bench that has the instrument you wish to configure by selecting the appropriate icon. If a bench is chosen, the icon will be displayed as dark grey. (refer to Configuring Benches)

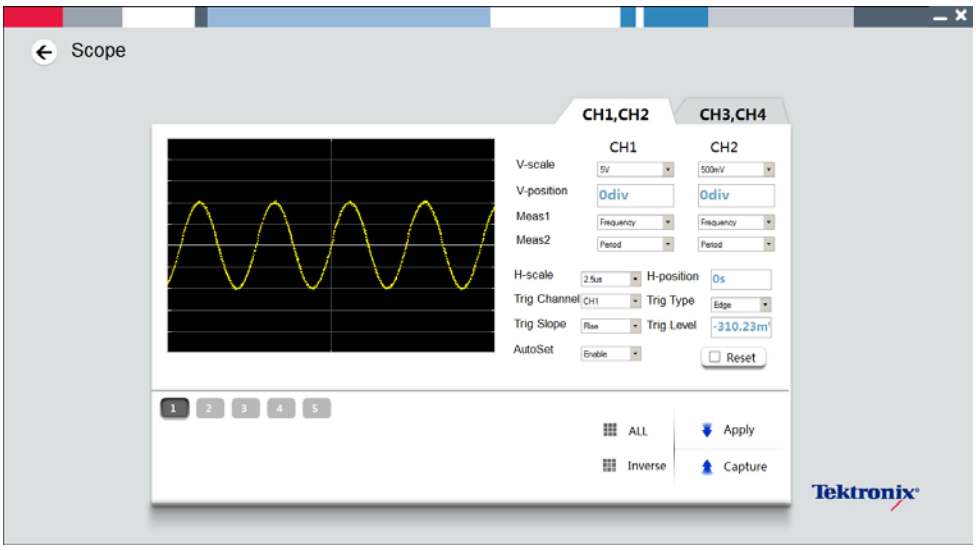

Figure 75: Oscilloscope configuration screen (configuration captured)

Configuring Benches

Bench Monitoring Screen

Enter the bench-monitoring screen from the Instruments home screen by clicking the Benches area on the home screen.

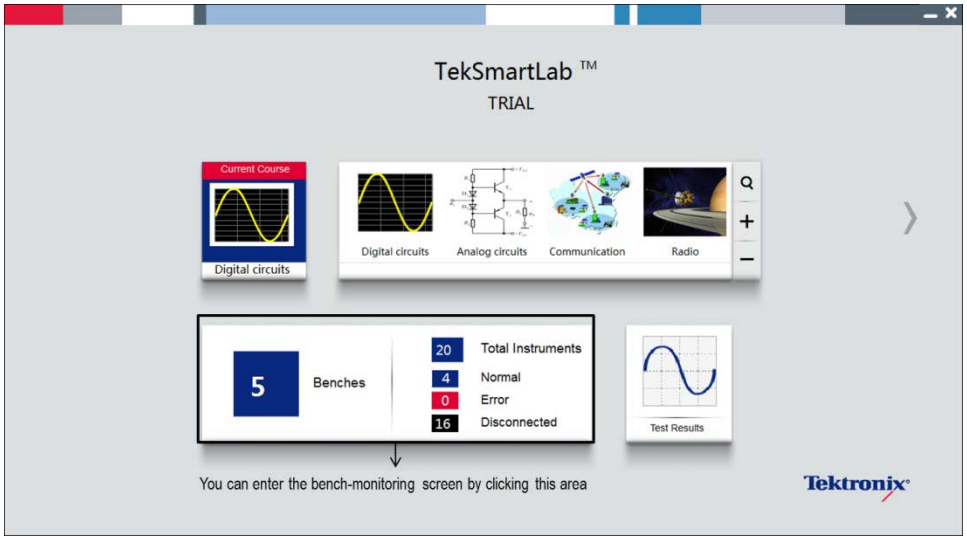

Figure 76: Home screen based on courses

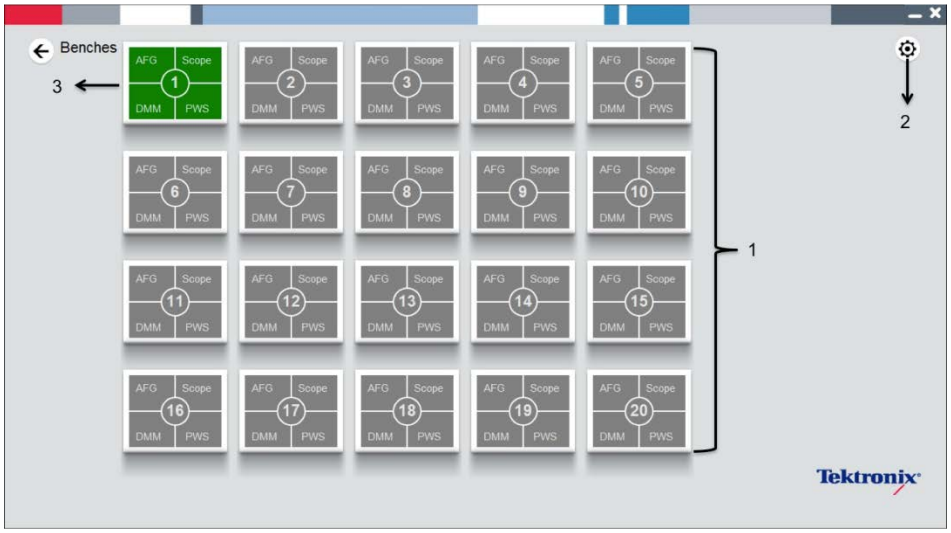

Figure 77: Bench monitoring screen

In the figure above, the benches are displayed as numbered icons.

1. Click a bench icon, and you will be able to configure the instruments on that bench. (Refer to Monitoring and Controlling Instruments on a Bench).
2. Click to enter the bench configuring screen.
3. Each bench has four instruments as shown in Figure 77. Status is displayed using three colors:
   a. Green indicates that the instrument is connected and functioning.
   b. Grey indicates that the instrument is not connected. Please check that the instrument is turned on, properly connected, or whether the TBX3000A is functioning.
   c. Red indicates that the instrument is not communicating properly with the monitoring computer. You may restart the instrument and TBX3000A. If the fault is still not cleared, please run a self-check of the instruments. Refer to the instrument user manual to determine whether the instrument is malfunctioning.

Bench Configuration Screen

The Bench Configuring screen is displayed when you clicked on the Bench Monitoring screen.

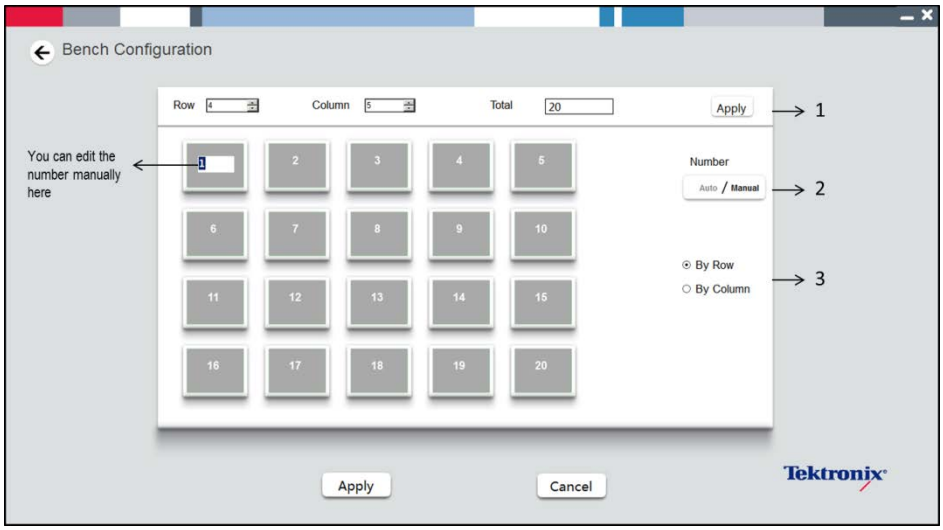

Figure 78: Bench configuring screen

1. Using this screen, you can arrange the layout of the benches by entering numbers in the Row and Column boxes. The number in the Total box is automatically computed. Click Apply to save the setting.
2. You can choose Auto or Manual to arrange the numbers automatically or manually.
3. If you choose Auto, you can choose By Row or By Column to decide how the numbers are arranged.

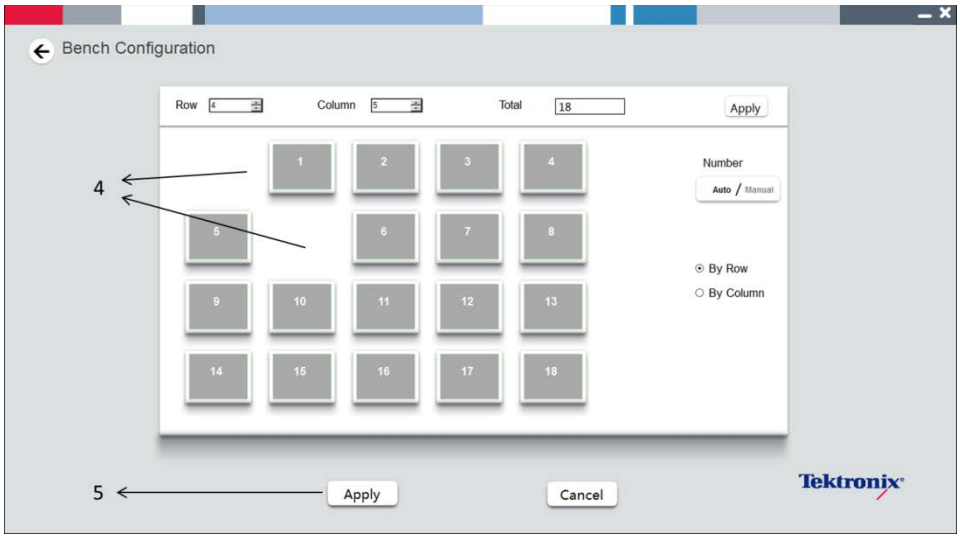

Figure 79: Editing benches

4. Double-click the icon of a bench to delete a bench; if you double-click the blank again, the bench will reappear on the screen.

5. Click **Apply** to save the bench configuration.

NOTE:

For the trial version, the bench number is limited to 5.

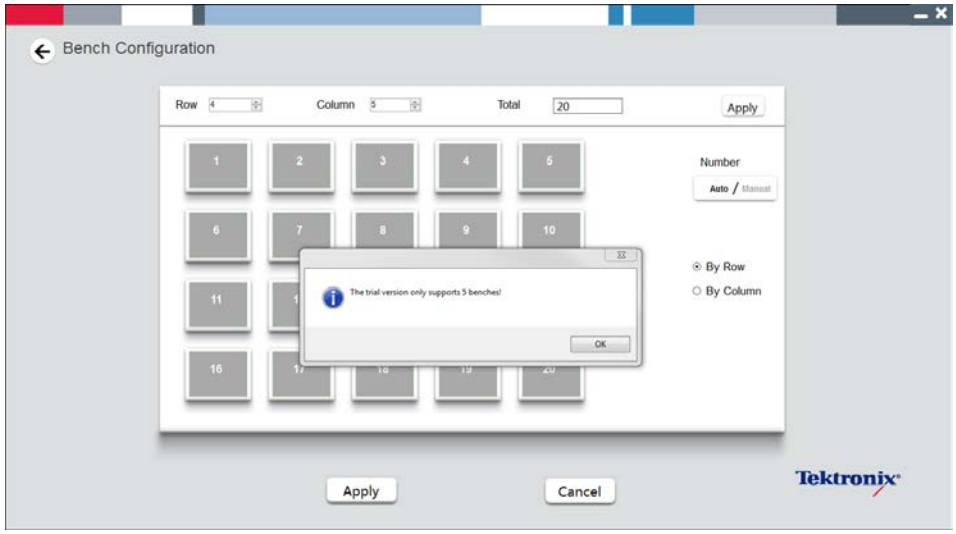

Figure 80: Limited benches for trial version

Monitoring and Controlling Instruments on a Bench

Click one of the benches, and you will enter the instrument monitoring/controlling screen as shown below.

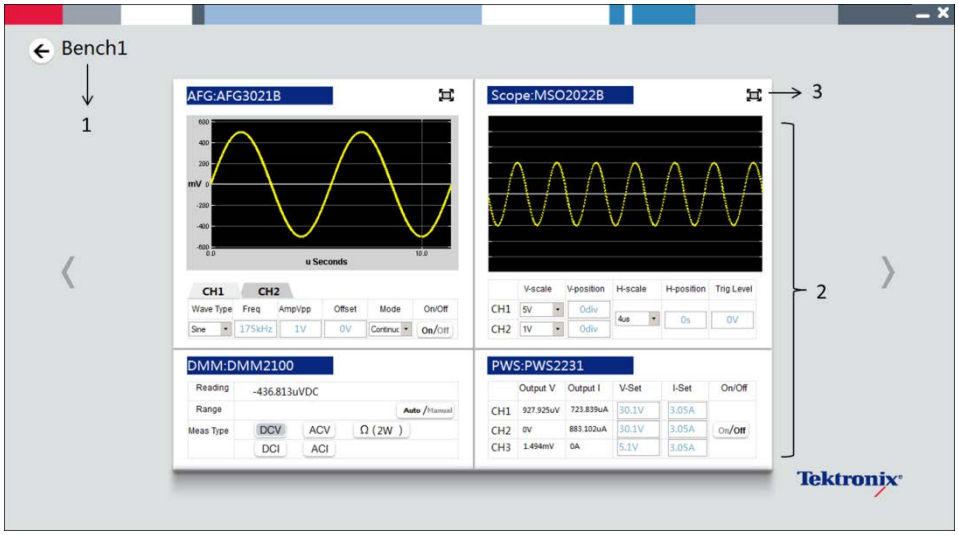

Figure 81: Instrument monitoring/controlling screen

The parameters and waveform of the instruments on the bench are displayed automatically on this screen, and you can change the parameters manually.

1. Click , to return to the bench configuration screen for that bench.

2. The parameters of the instruments that you can configure are displayed on this screen. You can move to the previous bench and the next bench by clicking the left and right arrows.

NOTE:

After you modify instrument parameters, you should press **Enter** *on your keyboard to save the modification. If the input parameters exceed the predefined value range, an error message will pop up.*

3. Click to set more parameters of the instrument on the bench (in this example, the oscilloscope).

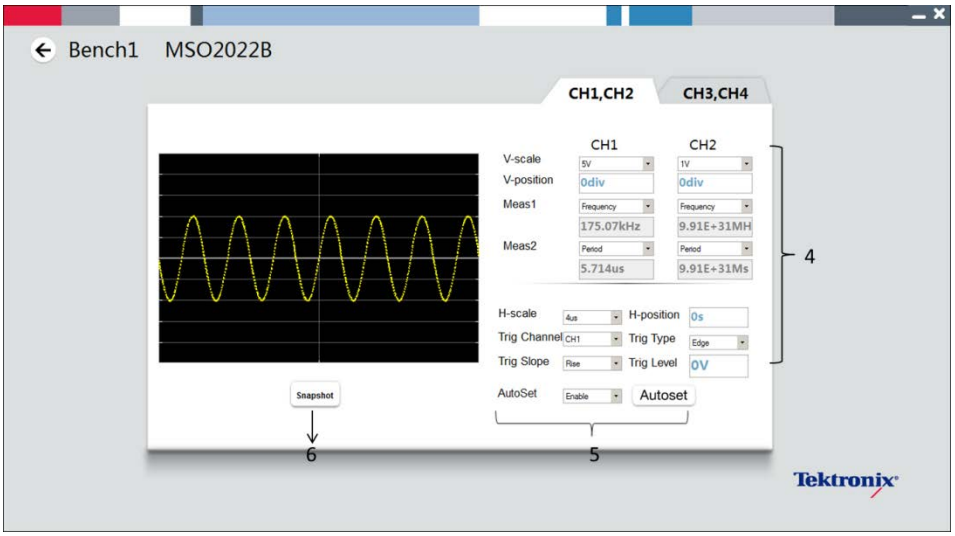

Figure 82: Oscilloscope configuration screen

4. You can set the parameters of the oscilloscope in this area.

5. You can enable, disable, and execute **Autoset** in this area.

6. Click **Snapshot** to capture the waveform of the oscilloscope.

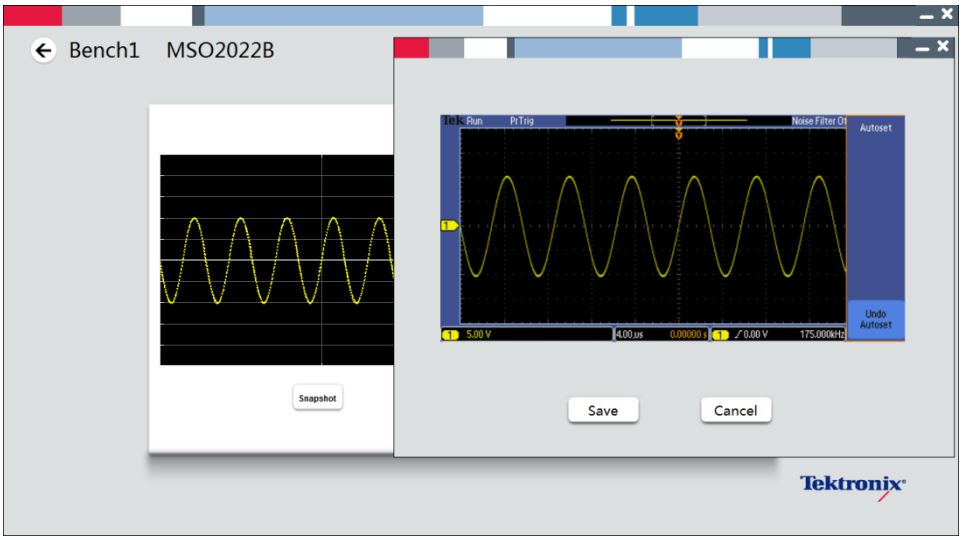

Figure 83: Snapshot of the oscilloscope waveform

Test Results

Students can use their mobile phone or computer to retrieve and save test results and oscilloscope image wirelessly. Refer to Saving test results by Students for more details. All the test results saved by students after their login will be saved on the lab server automatically. Follow the steps below to check the results of the test performed by students:

1. Click the Test Results button on the Course Home page, as shown in the following figure.

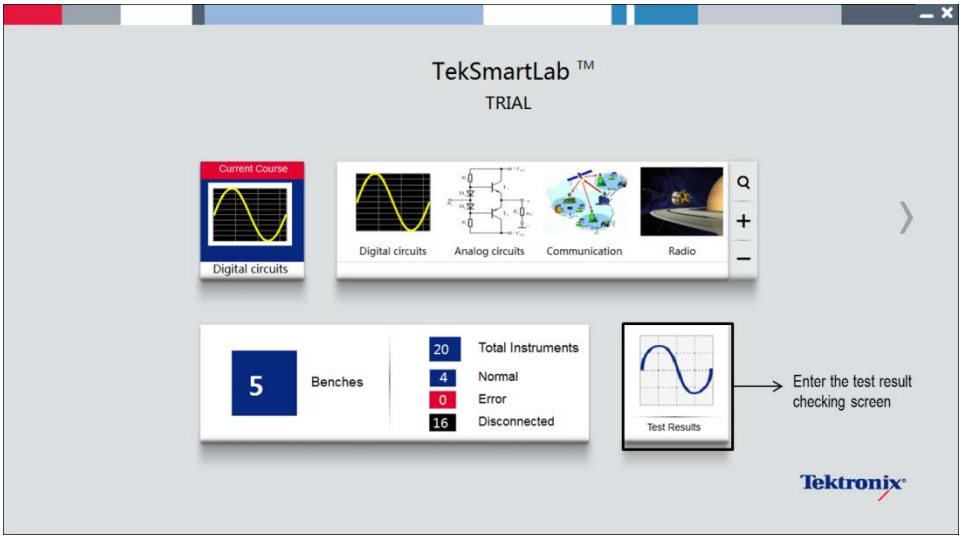

Figure 84: Home screen based on courses

As shown in the following figure, the Test Results query screen is displayed.

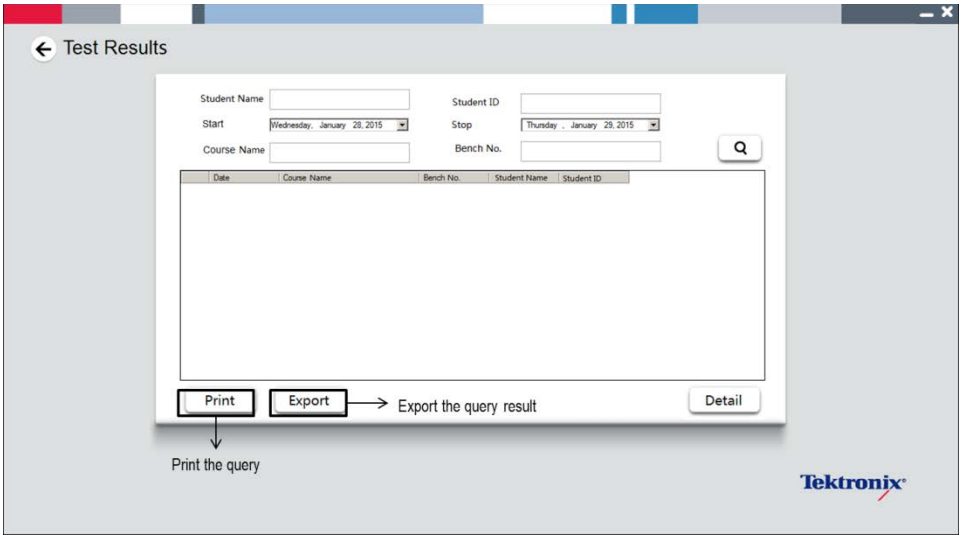

Figure 85: Test results query

2. Enter the name of the student next to **Student Name**.
3. Enter the ID of the student next to **Student ID**.
4. Enter the start time of the period you want to query next to **Start**.
5. Enter the end time of the period you want to query next to **Stop**.
6. Click to see the list of results.

To check the details of the test result:

7. Select an entry in the results.
8. Double-click the entry or click **Detail**, and you will see the snapshot of the oscilloscope the student saved, as shown in the following figure.

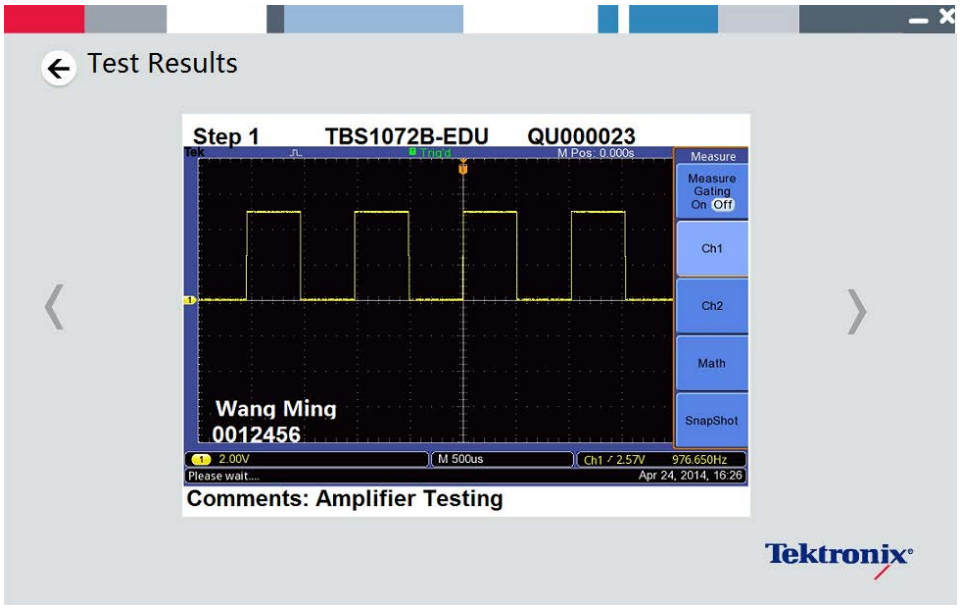

Figure 86: Test results

In test results, except for the image of the oscilloscope, information like instrument model number, serial number, student name, ID, and comments are saved. If a student has saved several results for one course, you can easily navigate the results by clicking the arrows.

Instrument Asset Information

On the Instrument Home screen shown in the following figure, click the Asset Info. button to check the instrument asset information.

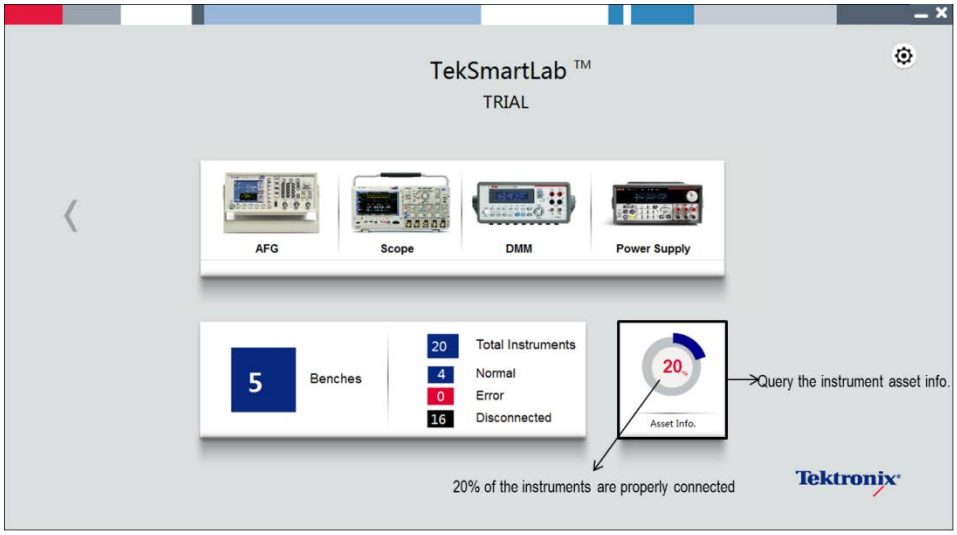

Figure 87: Home screen based on instruments

The following figure is displayed.

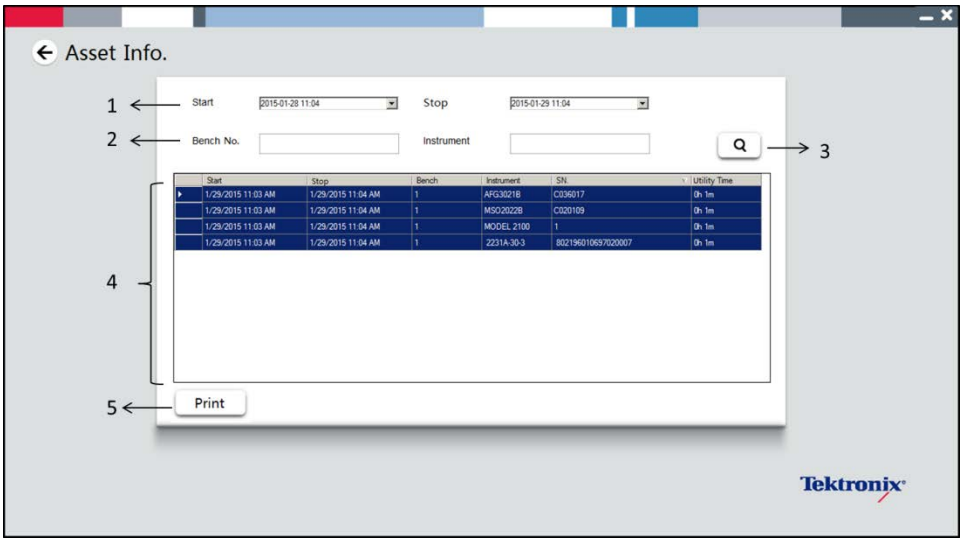

Figure 88: Instrument asset information report

In the figure:

1. Enter the start time and end time of the period you want to query.
2. Enter the number of the bench and the model of the instrument you want to check.

3. Click the button to start the search.

4. Asset information of the manufacturer, model, serial number, utility time etc. for the instruments is listed here.

5. Click the **Print** button to print the asset information, as shown in the following figure.

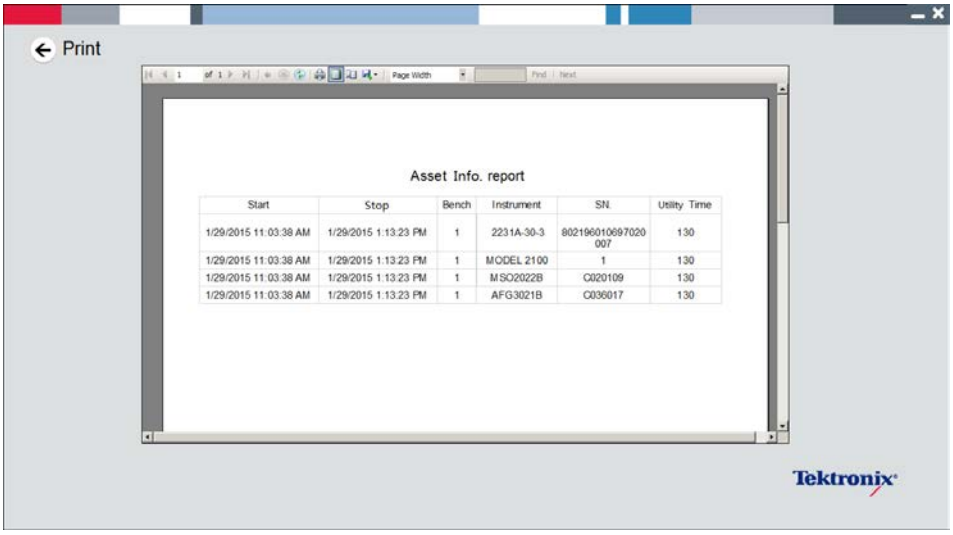

Figure 89: Print preview

Settings

Click the setting icon in the upper-right corner of the Instrument home screen, and you will enter the software setting screen, as shown in the following figure.

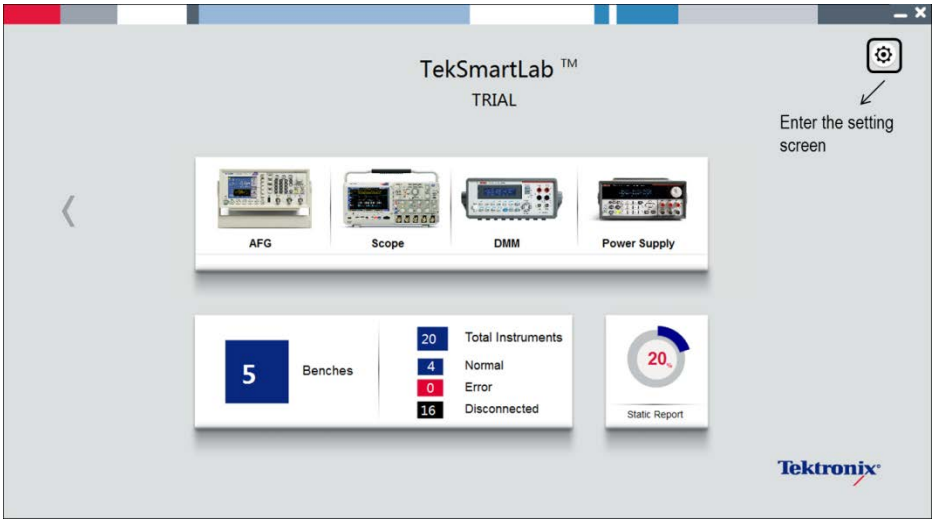

Figure 90: Second (instruments) home screen

Setting Screen

The following figure is the setting screen.

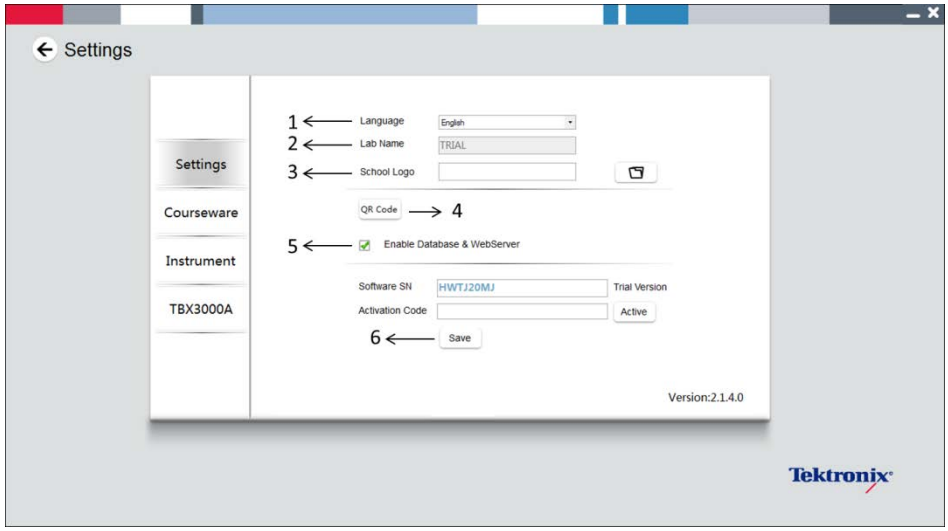

Figure 91: Setting screen

In the screen:

1. Select the language. You may select English or Chinese.
2. Enter the lab name in this box. After you enter the name, it will appear on the main screen.
3. Select the school logo. The selected logo will appear on the web page where students save the test result.
4. Click QR Code, to enter the screen where the QR code is created.
5. Select Enable Database & Webserver to enable database and webserver functions. If you have not installed Web Service (IIS6.0 or higher) and SQL Server 2008 R2, an error will be reported (you must first install the appropriate software).
6. Click Save to save the settings.

QR Code Screen

Since the TSL3000B creates a web page for every bench, professors can turn the web page address assigned to each bench into a QR code, and paste the printed code on the bench. Thus students can easily access the web page by scanning the QR code. The following image shows the screen for creating the QR code. You can access this page by clicking the QR Code button on the Settings screen.

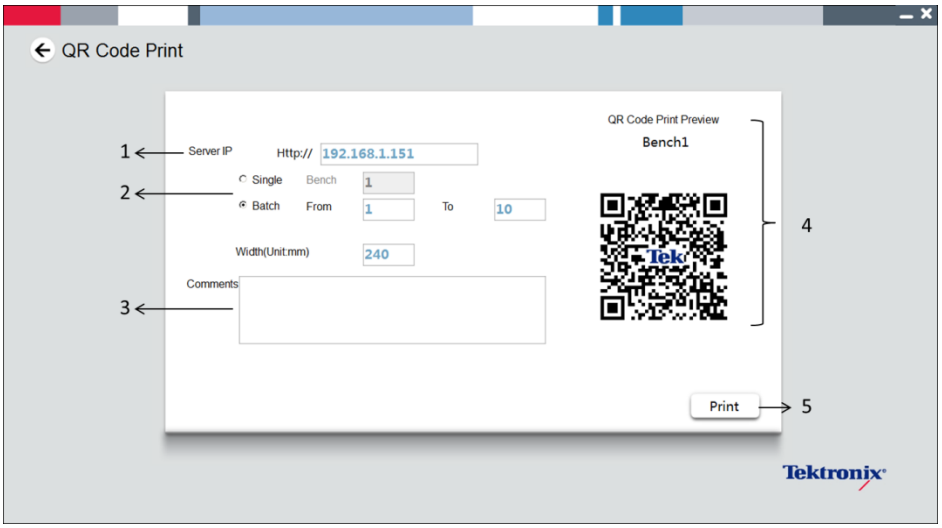

Figure 92: QR code print screen

Use these steps to create a QR code for the bench:

1. The IP address of the TSL3000B-installed server in the TekSmartLab™ network is displayed here. The default address is the WI-FI IP address. If the server is connected to the TekSmartLab network through a LAN, you need to modify the IP address manually.
2. Select Single if you want to print only one QR code. Select Batch if you want to print multiple QR codes at once, entering the appropriate bench numbers.
3. The comments entered here will be displayed under the created QR code.
4. You can preview the QR code in this area.
5. Click Print, and you will enter the print preview screen, as shown in the following figure.

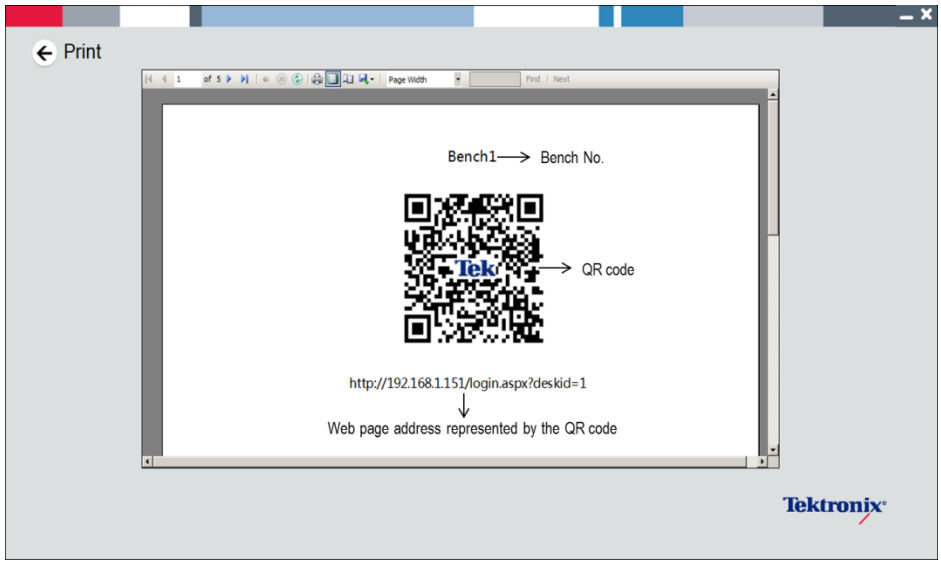

Figure 93: QR code print preview screen

Courseware Upgrade Screen

In the Settings screen click the Courseware link to see the courseware upgrade screen, as shown in the following figure.

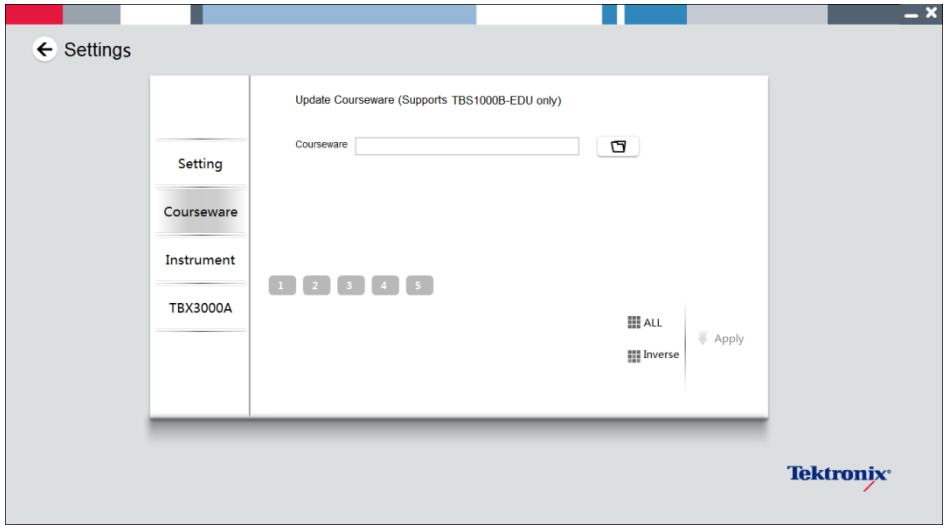

Figure 94: Courseware upgrade screen

Instrument Firmware Upgrade Screen

Click Instrument in the Settings screen to see the instrument firmware upgrade screen, as shown in the following figure. Instrument firmware can be updated remotely using this screen. Only the TBS1000B-EDU instruments support this function.

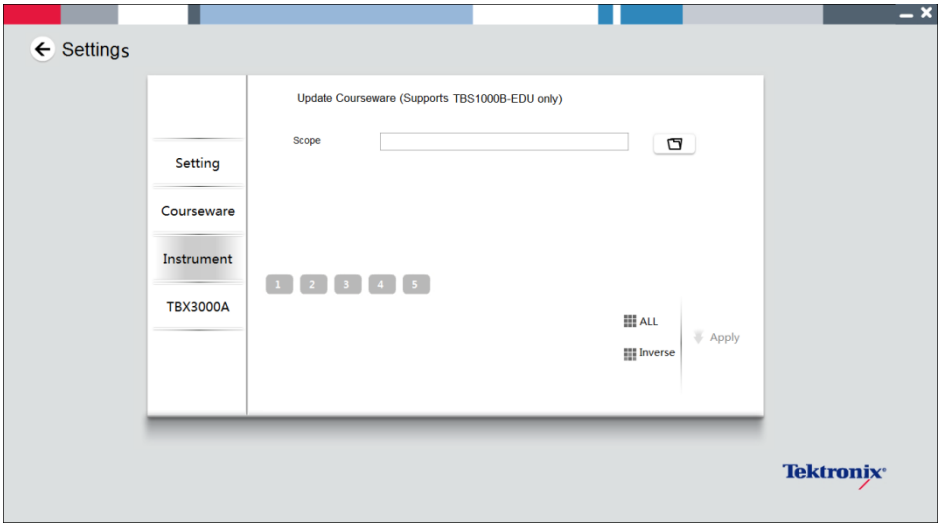

Figure 95: Instrument firmware upgrade screen

TBX3000A Upgrade Screen

Click TBX3000A on the Settings screen to see the TBX3000A upgrade screen, as shown in the following figure. TBX3000A firmware, as well as library, can be updated remotely using this screen.

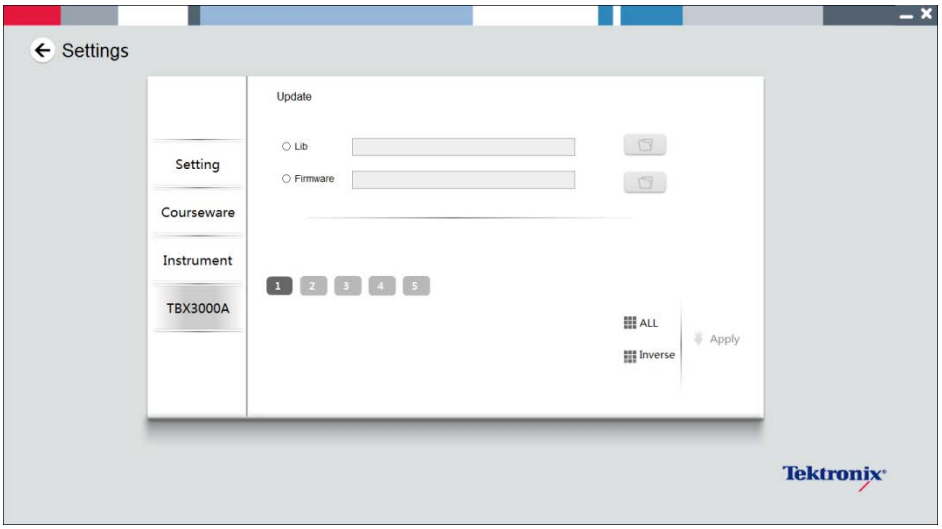

Figure 96: TBX3000A firmware upgrade screen

As an example, to upgrade the firmware version of the TBX3000A instruments in the benches from version 01.01.01 to version 01.01.02:

1. Select Firmware.
2. Select the upgrade file for version 01.01.02.
3. Select the benches need to be upgraded in the lower part of the screen. Click Apply.

It takes about 3 minutes to upgrade each TBX3000A.

Example Cases

A few examples of using the TSL3000B are shown in this section.

Setup a TekSmartLab system

Follows the steps below to setup the TekSmartLab system via WIFI:

1. Configure the WIFI router. To create the TekSmartLab local WIFI network, refer to WIFI router user manual using the following parameters to configure the WIFI network:
   - Wireless Network Mode: 2.4GHz, 802.11n
   - SSID: create the SSID of the TekSmartLab network, for example “TekSmartLab”
   - Security Mode: Disabled or Enabled. If enabled, the password should be included in the printed QR code of each bench for students to connect their mobile or laptop to the TekSmartLab network.
   - Max. Associated clients: Lab server, TBX3000A on each bench and the mobile or laptop of student connecting to the TekSmartLab network is the clients within the network. The Max. Associated clients number must be more than the sum of clients required. For example, if the network needs to support the connection of 1 lab server, 20 benches by TBX3000A, and 20 students by mobile, the requirement of Max. Associated clients is >=41.
   - DHCP pool: TBX3000A and the mobile or laptop of students will work in DHCP mode. Check and setup the DHCP pool to assure that there are enough DHCP addresses. For example, DHCP pool is set as 192.168.1.100 ~ 192.169.1.200
   - WIFI signal level: recommended to be >=-50dBm
   - WIFI signal to noise ratio: recommended to be >=35dB
   - Password: the login password of WIFI router is recommended to be changed to avoid the setting been changed by other users.
2. Configure the TBX3000A on each bench. Use these steps to configure the host name and connect the TBX3000A to the TekSmartLab network. Refer to Configure the TBX3000A for more details.
   a. Install a USB-WIFI dongle on the TBX3000A.

b. Connect the instruments to TBX3000A using USB cables, and power on the TBX3000A and the instruments.

c. Connect the TBX3000A to the TekSmartLab network.

d. Set the host name of the TBX3000A to correspond to the bench on which it is located.

e. You should change the default password of the TBX3000A to avoid the settings being changed by other users.

3. Install and configure the lab server software. Please refer to Installing TSL3000B for more details, including installing and configuring the TSL3000B application software, .net framework, Web Service (IIS6.0 or higher) and SQL Server 2008 R2 on the lab server.

Note: The Enable Database & Webserver should not be selected if Web Service (IIS6.0 or higher) and SQL Server 2008 R2 have not been installed.

4. Connect the lab server to the WIFI network you set up previously, and set the WIFI IP to use a static IP (for example 192.168.1.66). The static IP must not be within the DHCP pool of the WIFI network.

Note: When the lab server is in DHCP mode, the IP address could be changed after recycling, in which case the web page address of each bench will be changed accordingly.

5. Start the TSL3000B and print the QR code for each bench. Paste the QR code to each bench permanently.

Arranging the Benches

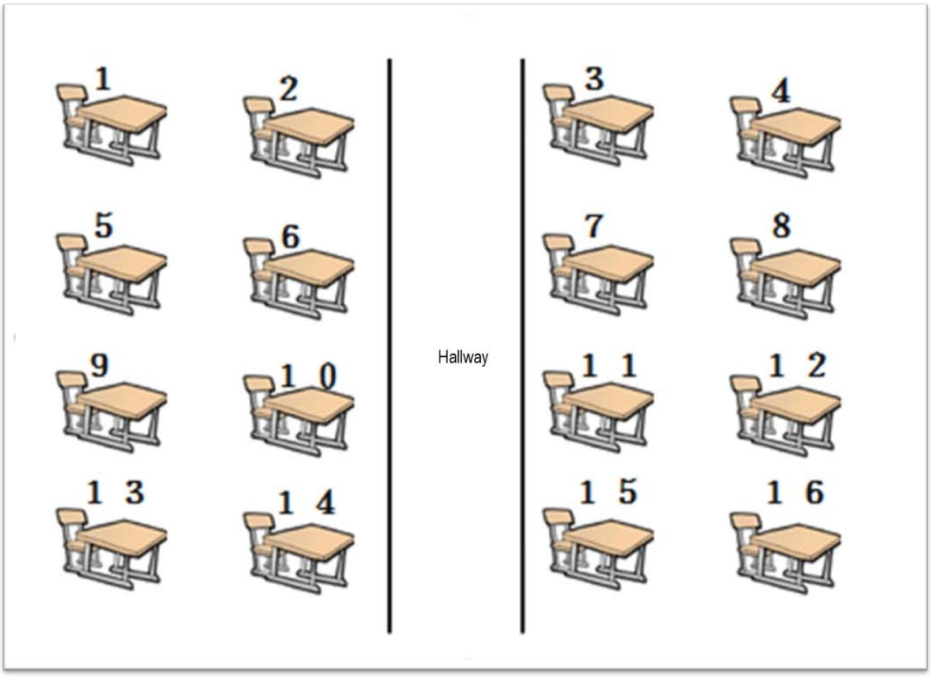

Figure 97: Layout of a lab

The preceding figure showcases the layout of a lab. There are 16 benches in total with a hallway in the middle.

You can represent this layout in TSL3000B using the instructions below:

1. Enter the bench configuration screen (refer to Bench Configuration Screen), as shown in the following figure.

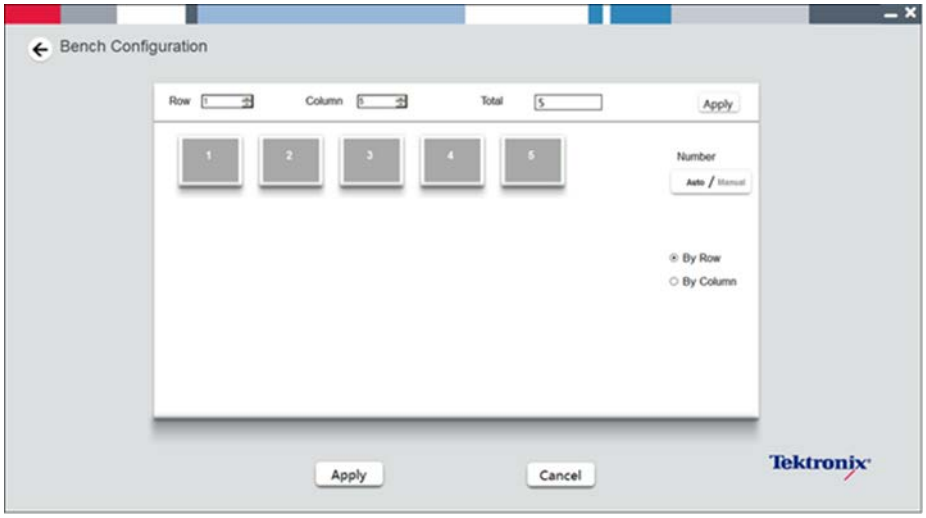

Figure 98: Bench configuration screen

2. Set Row to 4 and Column to 5 (four columns of benches and one hallway).

3. Click Apply. The layout of 20 benches is displayed in the following figure.

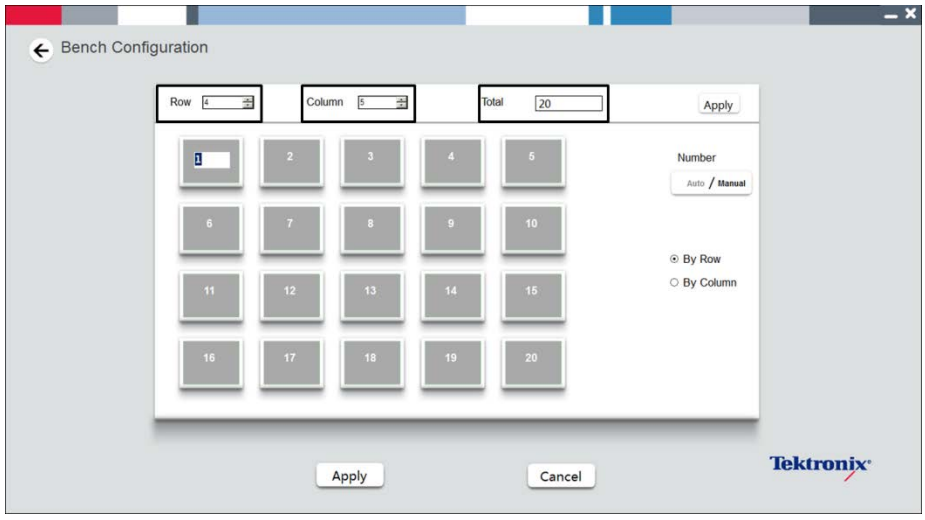

Figure 99: Arranging benches

4. Choose and double-click the column in the middle to delete the column as shown in the following figure.

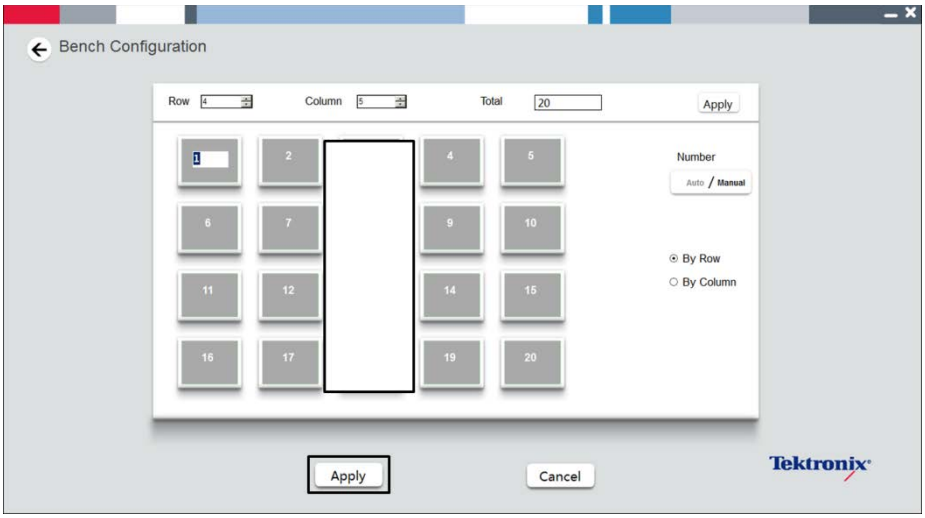

Figure 100: Arranging benches

5. Click **Apply**. An alert that reads **Original setting will be cleaned, continue?** will be displayed.

6. Click **Yes** to finish the setting. Then the bench monitoring screen will appear as follows.

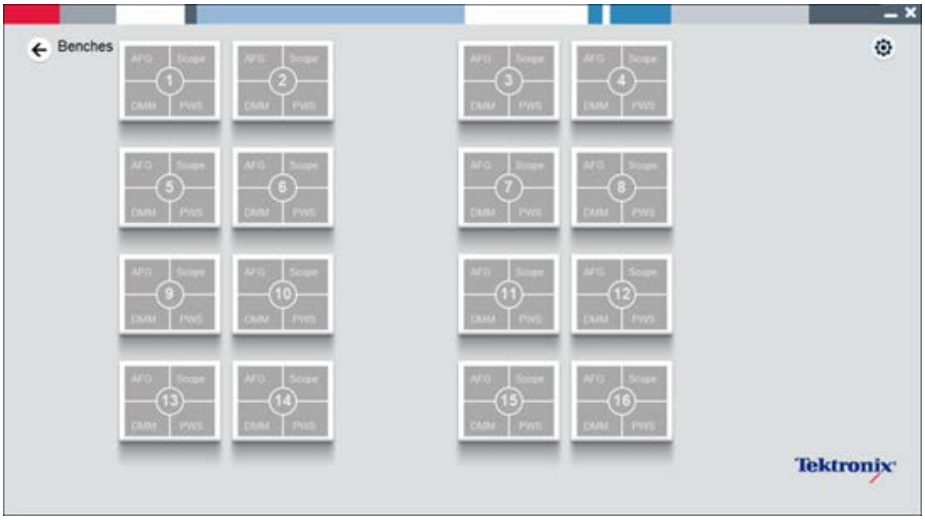

Figure 101: Bench monitoring screen

Customizing Courses and Configuring Instruments

This example explains how to create a new course, and how to configure the instruments for this course.

1. On the Course home screen, click + to create a new course.

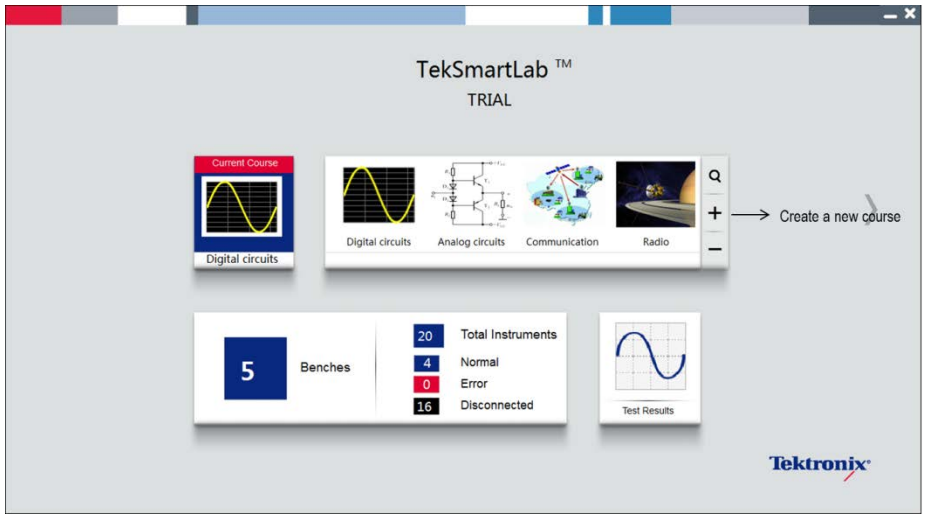

Figure 102: Creating a new course

2. Use the Course Name, Sequence Number, and Course Overview boxes to input appropriate information, as shown in the following figure.

3. Press Enter.

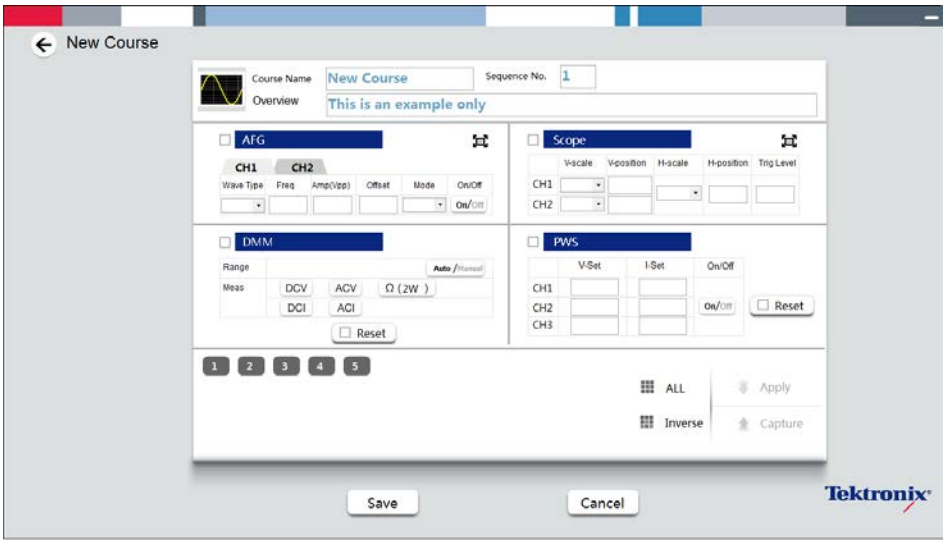

Figure 103: Customizing a course

4. Select an image next to the Course Name.

5. Select the instrument to be configured and set the parameters.

NOTE: Only the instruments properly connected to the server can be configured.

In the following figure, the arbitrary function generator (AFG) and oscilloscope (Scope) are configured. The digital multimeter (DMM) and power supply (PWS) are selected, and their Reset boxes are selected.

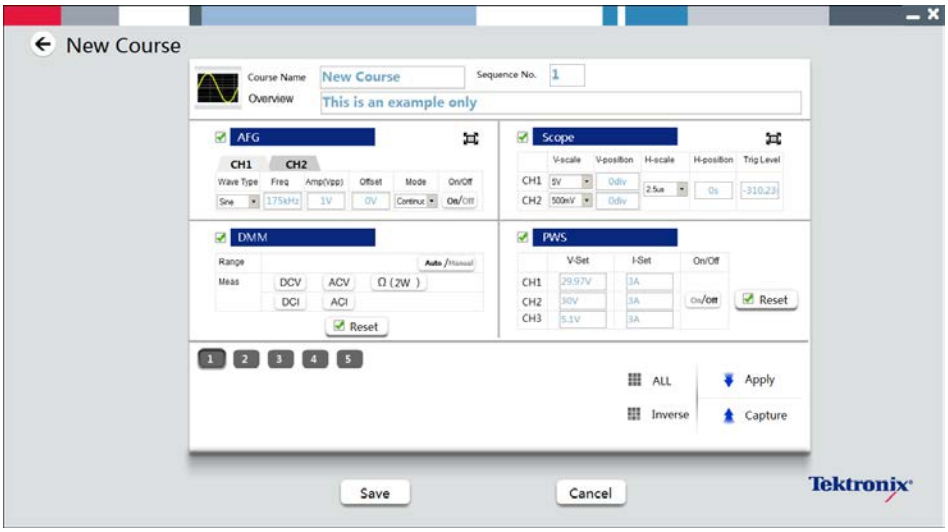

Figure 104: Configuring instruments

6. Choose the bench to be configured, and click Apply.

The configuration is distributed to the chosen bench. If the configuration works, the configured bench is displayed in green.

7. Click Save, and the newly created course along with its configurations is saved as you can see on the home screen based on courses below. The newly configured course now displayed as the Current Course.

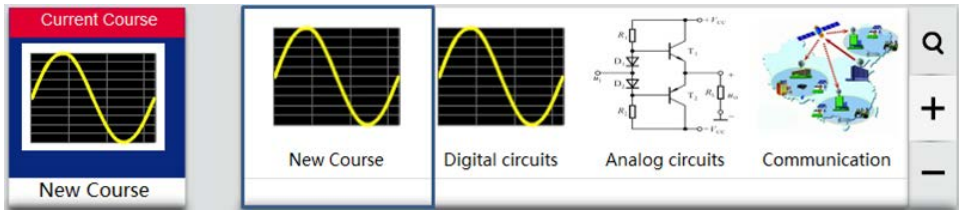

Figure 105: Newly created course on the home screen

Saving the Test Result

Saving test results by Students

1. Connect the cellphone or computer to the TekSmartLab™ network.
2. Scan the QR code a mobile device or enter the web page address of the bench in the Web browser to see the web page of the bench.

The following figure is displayed if you logged in with your mobile phone. The Course Name shows the name of the current (active) course. All saved test results are associated with the current course, so the Course Name must not be blank.

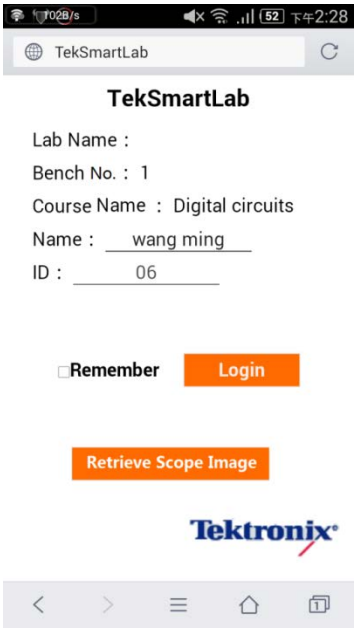

Figure 106: Log in the bench web page

There are two ways to save the results:

- You can click **Retrieve Scope Image** to get the oscilloscope snapshot directly, but the results won't be saved in the server.
- You can log in to the server to save the results in the server by following these steps:

a. Enter **Name** and **ID**.

b. Click **Login** to visit the page, as shown in the following figure.

Figure 107: Bench web page

3. Click 1 to get the oscilloscope snapshot, as shown in the following figure.

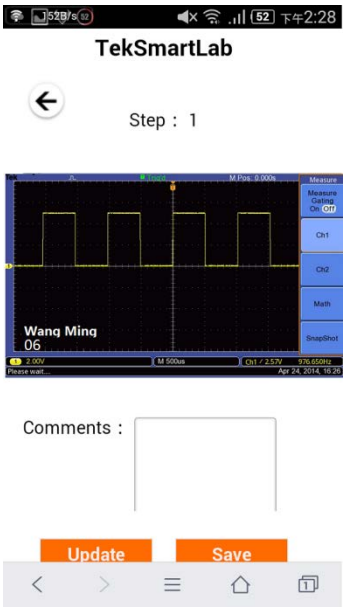

Figure 108: Oscilloscope snapshot

4. Enter comments, like “Amplifier Testing” in the Comments: field.

5. Click Save.

6. Click 2, and repeat the steps above to get the second test result.

The following page is displayed.

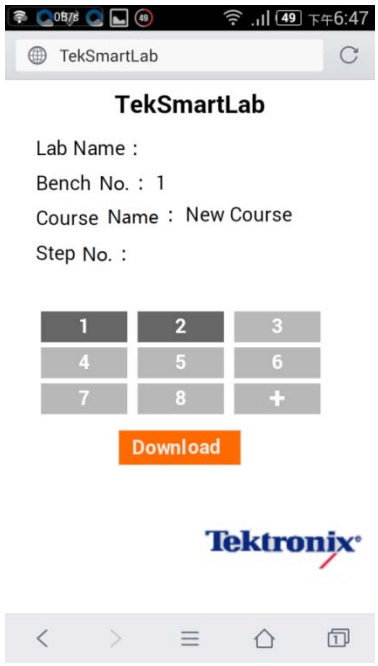

Figure 109: Bench web page

7. Click Download after you finish the test.

All the test results will be downloaded as a zip file. All the results are also saved in the server for the teacher to query.

The following figure is an example of a saved test result.

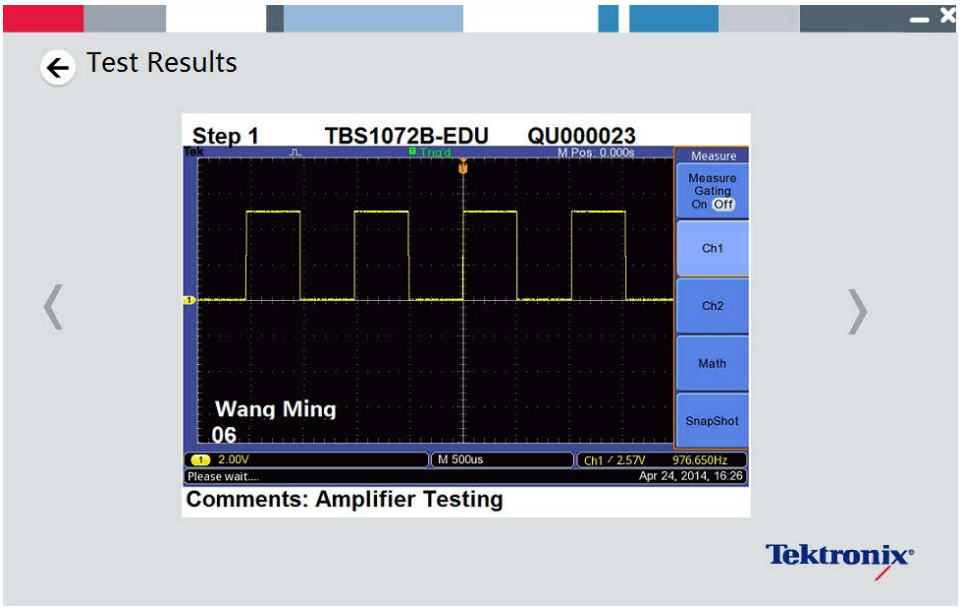

Figure 110: Test result saved