



**TekSmartLab™**  
**TBX3000A and TSL3000B**  
**User Manual**



077-1110-02





**TekSmartLab™**  
**TBX3000A and TSL3000B**  
**User Manual**

**Revision A**

**Register now!**

Click the following link to protect your product.

► [www.tek.com/register](http://www.tek.com/register)

**[www.tek.com](http://www.tek.com)**

**077-1110-02**

Copyright © Tektronix. All rights reserved. Licensed software products are owned by Tektronix or its subsidiaries or suppliers, and are protected by national copyright laws and international treaty provisions.

Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specifications and price change privileges reserved.

TEKTRONIX and TEK are registered trademarks of Tektronix, Inc.

## **Contacting Tektronix**

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

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

- In North America, call 1-800-833-9200.
- Worldwide, visit [www.tek.com](http://www.tek.com) to find contacts in your area.



This is the hardware warranty.

### **Warranty**

Tektronix warrants that the product will be free from defects in materials and workmanship for a period of three (3) years from the date of original purchase from an authorized Tektronix distributor. If the product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Batteries are excluded from this warranty. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, shipping charges prepaid, and with a copy of customer proof of purchase. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

THIS WARRANTY IS GIVEN BY TEKTRONIX WITH RESPECT TO THE PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

[W16 – 15AUG04]

This is the software warranty.

### **Warranty**

Tektronix warrants that the media on which this software product is furnished and the encoding of the programs on the media will be free from defects in materials and workmanship for a period of three (3) months from the date of shipment. If any such medium or encoding proves defective during the warranty period, Tektronix will provide a replacement in exchange for the defective medium. Except as to the media on which this software product is furnished, this software product is provided "as is" without warranty of any kind, either express or implied. Tektronix does not warrant that the functions contained in this software product will meet Customer's requirements or that the operation of the programs will be uninterrupted or error-free.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period. If Tektronix is unable to provide a replacement that is free from defects in materials and workmanship within a reasonable time thereafter, Customer may terminate the license for this software product and return this software product and any associated materials for credit or refund.

THIS WARRANTY IS GIVEN BY TEKTRONIX WITH RESPECT TO THE PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. TEKTRONIX AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TEKTRONIX' RESPONSIBILITY TO REPLACE DEFECTIVE MEDIA OR REFUND CUSTOMER'S PAYMENT IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. TEKTRONIX AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER TEKTRONIX OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

[W9b – 15AUG04]

# Table of Contents

Important safety information .....	viii
General safety summary .....	viii
Service safety summary .....	x
Terms in this manual .....	x
Symbols and terms on the product .....	xi
Compliance information .....	xii
EMC compliance .....	xii
Safety compliance .....	xiii
Environmental considerations .....	xiv
TBX3000A .....	1
Overview .....	1
Packing list .....	1
Get acquainted with the TBX3000A .....	1
Configure the TBX3000A .....	4
TSL3000B installation .....	8
Hardware and software requirements for the server .....	8
Installing TSL3000B .....	8
Installing SQL server 2014 express .....	9
IIS installation and configuration .....	27
TSL3000B .....	49
General information .....	49
Lab instrument management .....	56
Lab teaching flow management .....	70
Case Study .....	80
Set up a TekSmartLab network system .....	80
Install TekSmartLab on the lab server .....	82
Configure the TBX3000A .....	82
Arrange the bench and lab layout .....	91
Monitoring a bench .....	96
Asset management .....	99
Create a new exercise .....	100
Instrument configuration saving/recalling .....	101
Student access .....	103
Sharing exercise material .....	104
Test report editing .....	106
Campus Level TekSmartLab .....	110
Troubleshooting .....	115
Previous software version installed .....	115
Software can't be displayed properly .....	115

TBX3000A configuration page can't be logged in.....	117
Benches disconnected .....	117
Unstable connection in a 15-bench or above WIFI network .....	119
Unstable connection in a 20-bench LAN network .....	120
Instruments are displayed disconnected .....	121
Instrument parameters are not displayed .....	122
Students can't log in the bench webpage.....	122

# List of Figures

Figure 1: Side view 1 of TBX3000A.....	2
Figure 2: Side view 2 of TBX3000A.....	2
Figure 3: Top view of TBX3000A .....	3
Figure 4: Bottom view of TBX3000A .....	4
Figure 5: Welcome page for TBX3000A configuration.....	4
Figure 6: LAN Configuration .....	5
Figure 7: TBX3000A WIFI Configuration .....	6
Figure 8: Set Password .....	7
Figure 9: Extracting files .....	10
Figure 10: Installation center.....	10
Figure 11: License terms .....	11
Figure 12: Setup files check.....	12
Figure 13: Feature selection.....	13
Figure 14: Instance configuration.....	13
Figure 15: Server configuration.....	14
Figure 16: Database engine configuration .....	14
Figure 17: Installation progress.....	15
Figure 18: Installation complete .....	16
Figure 19: Select configuration manager .....	17
Figure 20: Enable TCP/IP protocol.....	17
Figure 21: TCP/IP protocol enabled.....	18
Figure 22: SQL server services .....	18
Figure 23: Select SQL server management studio.....	18
Figure 24: Connect to server .....	19
Figure 25: Main screen .....	19
Figure 26: Restore database .....	20
Figure 27: Specify backup.....	20
Figure 28: Change file type.....	21
Figure 29: Backup file found.....	21
Figure 30: Select the most recent database .....	22
Figure 31: Database configuration complete .....	22
Figure 32: Overwrite the existing database.....	23
Figure 33: Create new rule .....	24
Figure 34: Select port .....	24
Figure 35: Allow the connection .....	25
Figure 36: Profile .....	25
Figure 37: Input name .....	26
Figure 38: Select internet information services .....	27
Figure 39: Open internet information services manager .....	28

Figure 40: Internet Information Services (IIS) manager .....	29
Figure 41: Add a web site .....	30
Figure 42: Select the SLWeb file.....	31
Figure 43: IIS manager .....	32
Figure 44: Allow ASP .NET 4.0.....	33
Figure 45: ASP .NET 4.0 allowed.....	33
Figure 46: ASP .NET v4.0 not found .....	34
Figure 47: Paste command by right key .....	35
Figure 48: Command window after entering the command .....	35
Figure 49: Result of the command running.....	36
Figure 50: Computer management .....	37
Figure 51: Configure ASP .Net State Service .....	38
Figure 52: Add inbound rules .....	39
Figure 53: New inbound rule wizard .....	40
Figure 54: Protocol and ports .....	41
Figure 55: Action.....	42
Figure 56: Profile.....	43
Figure 57: Name.....	44
Figure 58: Inbound rules added.....	44
Figure 59: Outbound rules added.....	45
Figure 60: Application pools.....	46
Figure 61: SLWeb home .....	47
Figure 62: TekSmartLab web page.....	48
Figure 63: Home page .....	49
Figure 64: Change language .....	50
Figure 65: General information.....	50
Figure 66: Edit general information.....	51
Figure 67: Change password .....	51
Figure 68: Input new password .....	52
Figure 69: Install license.....	53
Figure 70: License install finished.....	54
Figure 71: Select a license to remove .....	54
Figure 72: Export the license file .....	55
Figure 73: Software information.....	55
Figure 74: Bench/Lab layout configuration .....	56
Figure 75: Bench layout configuration tab .....	57
Figure 76: Choose the instrument type.....	57
Figure 77: Instrument chosen .....	58
Figure 78: Lab layout configuration tab .....	58
Figure 79: Arranging benches.....	59
Figure 80: Number the benches manually .....	60

Figure 81: Two benches numbered the same .....	60
Figure 82: Configure instruments.....	61
Figure 83: Instrument selected .....	61
Figure 84: Select bench .....	62
Figure 85: Bench configured .....	63
Figure 86: Firmware upgrade .....	64
Figure 87: Lab overview.....	65
Figure 88: Bench page .....	65
Figure 89: Oscilloscope page .....	66
Figure 90: Vertical and horizontal settings .....	67
Figure 91: Cursors.....	68
Figure 92: Asset management.....	69
Figure 93: Create a new course .....	70
Figure 94: Create new exercise .....	70
Figure 95: Select an existing exercise.....	71
Figure 96: Configure the instruments .....	71
Figure 97: Configure the instruments .....	72
Figure 98: Generating QR code.....	73
Figure 99: Log in to the bench webpage.....	74
Figure 100: Edit exercise material.....	75
Figure 101: Add or delete exercise material.....	75
Figure 102: Download exercise material .....	76
Figure 103: Importing test report template .....	76
Figure 104: Create a new test report .....	77
Figure 105: Create a new test report .....	77
Figure 106: Scope snapshot inserted .....	78
Figure 107: Query test report .....	79
Figure 108: TekSmartLab .....	80
Figure 109: Connecting TBX3000A .....	82
Figure 110: Connect the TBX3000A directly to a computer .....	83
Figure 111: LAN configuration .....	83
Figure 112: Connect TBX3000A to a router .....	84
Figure 113: Computer connected to 'school_lab_1' network .....	84
Figure 114: TBX3000A welcome page.....	85
Figure 115: LAN configuration .....	85
Figure 116: Modify LAN configuration .....	85
Figure 117: WIFI configuration.....	86
Figure 118: Scan AP .....	86
Figure 119: Input password .....	87
Figure 120: WIFI configuration.....	87
Figure 121: Modify WIFI configuration .....	88

Figure 122: WIFI configuration finished.....	88
Figure 123: Two TBX3000As with the same host name.....	89
Figure 124: LAN configuration.....	90
Figure 125: Modify LAN configuration .....	90
Figure 126: Four-instrument bench layout .....	91
Figure 127: Choosing instruments.....	91
Figure 128: Lab layout.....	92
Figure 129: Arrange lab layout .....	93
Figure 130: Configure instrument .....	94
Figure 131: Configure oscilloscope .....	94
Figure 132: Bench selection.....	95
Figure 133: Instrument status .....	96
Figure 134: Scope not online.....	96
Figure 135: Monitoring a bench .....	97
Figure 136: Monitoring an oscilloscope .....	97
Figure 137: Monitoring an oscilloscope .....	98
Figure 138: V-position changed .....	98
Figure 139: Query the instruments .....	99
Figure 140: Create an exercise.....	100
Figure 141: Selecting an instructor.....	100
Figure 142: Select Scope and AFG.....	101
Figure 143: Configure Scope and AFG .....	102
Figure 144: Apply to other benches .....	102
Figure 145: Generate bench webpage.....	103
Figure 146: Visiting bench webpage .....	104
Figure 147: Share exercise material.....	104
Figure 148: Add exercise material.....	105
Figure 149: Access exercise material .....	105
Figure 150: Edit report template.....	106
Figure 151: Create a new report .....	107
Figure 152: Edit new report .....	107
Figure 153: Scope snapshot inserted .....	108
Figure 154: Open the test report on the computer .....	108
Figure 155: Query and check test report.....	109
Figure 156: Campus level TekSmartLab network diagram.....	110
Figure 157: Remote lab configuration interface on the lab server .....	111
Figure 158: Pinging lab server IP from lab manager computer .....	111
Figure 159: Remote lab configuration interface on lab manager computer.....	112
Figure 160: Connect to lab server from lab manager computer.....	112
Figure 161: Main interface on lab manager computer .....	113
Figure 162: Connecting to a lab server remotely .....	113



Figure 163: Screen page not displayed properly .....	115
Figure 164: Set the screen resolution.....	116
Figure 165: Set the font size .....	116
Figure 166: All the benches not connected.....	117
Figure 167: Ping TBX3000A IP address .....	118
Figure 168: Instruments on bench 1 displayed disconnected.....	121
Figure 169: Localhost webpage.....	123
Figure 170: 80 port conflict .....	123
Figure 171: Window task manager .....	124
Figure 172: Command prompt.....	125
Figure 173: Changing port for Skype .....	125

## 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 page x, *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 disconnect 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.<sup>1 2 3</sup>

- 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

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

### European contact.

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

<sup>1</sup> This product is intended for use in nonresidential areas only. Use in residential areas may cause electromagnetic interference.

<sup>2</sup> Emissions which exceed the levels required by this standard may occur when this equipment is connected to a test object.

<sup>3</sup> For compliance with the EMC standards listed here, high quality shielded interface cables should be used.

### **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 the Tektronix Web site ([www.tek.com](http://www.tek.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 TBX300A
- 4 USB cables
- 1 power cable
- 1 DC power adaptor

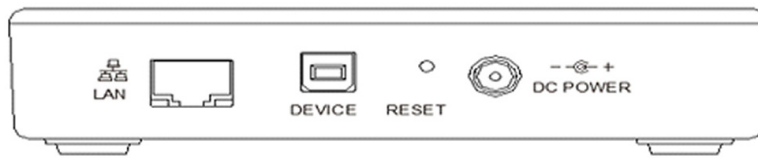
## Get acquainted with the TBX3000A

### 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 (eg. TEK-USB-WIFI)
- It is powered by a DC power adaptor (5V/3A)

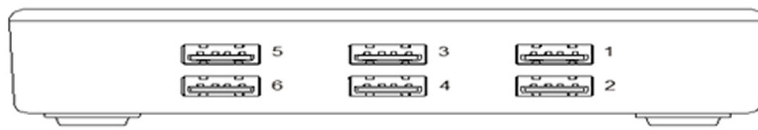
## Appearance



**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 the 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.

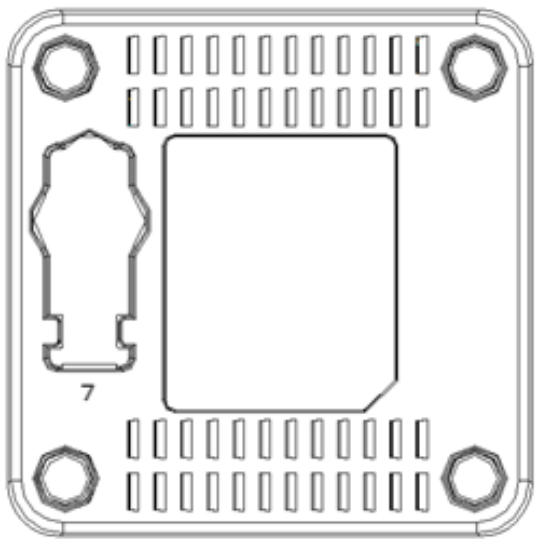


Figure 4: Bottom view of TBX3000A

The part illustrated as 7 is a socket for USB WIFI dongle like TEK-USB-WIFI.

## 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 below is displayed.

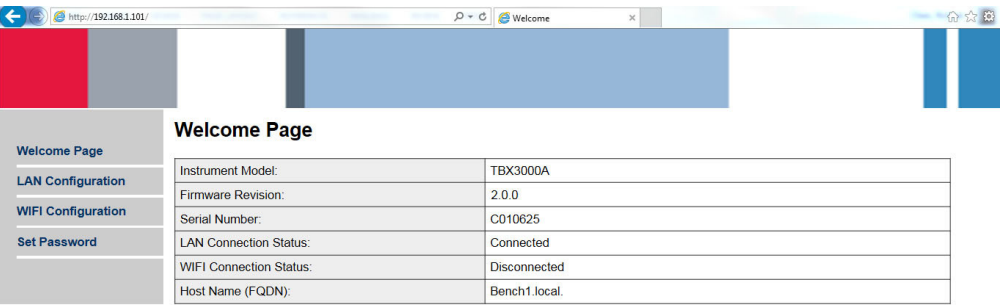
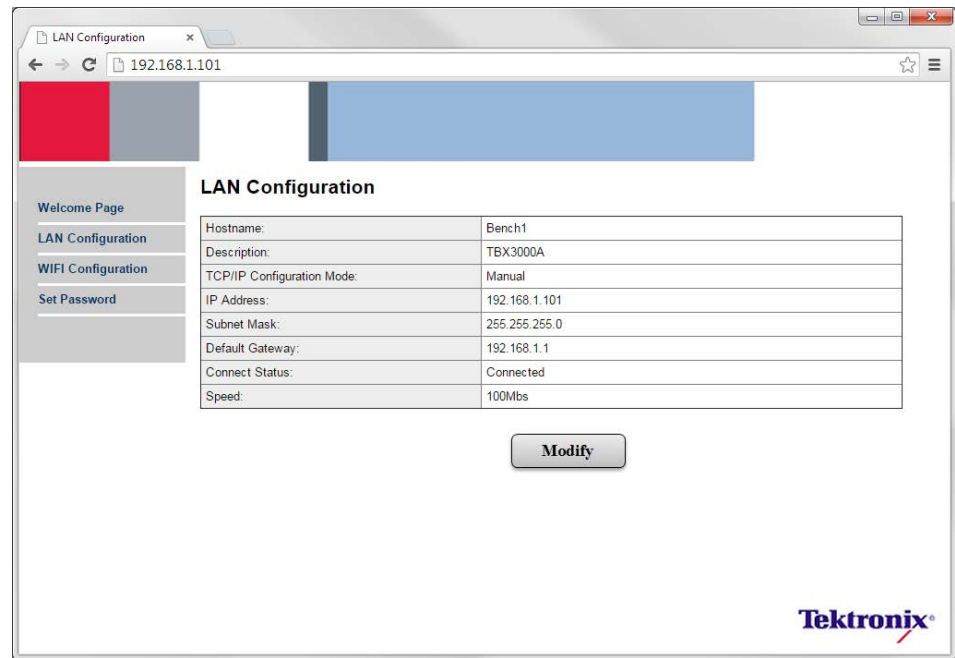


Figure 5: Welcome page for TBX3000A configuration

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	Bench 1
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.

WIFI Configuration	
Hostname:	Bench1
Description:	TBX3000A
TCP/IP Configuration Mode:	Auto
IP Address:	169.254.73.87
Subnet Mask:	255.255.0.0
Default Gateway:	192.168.1.1
SSID:	
Connect Status:	Disconnected
Signal Intensity:	

**Modify** **Scan AP**

**Tektronix**

**Figure 7: TBX3000A WIFI Configuration**

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

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

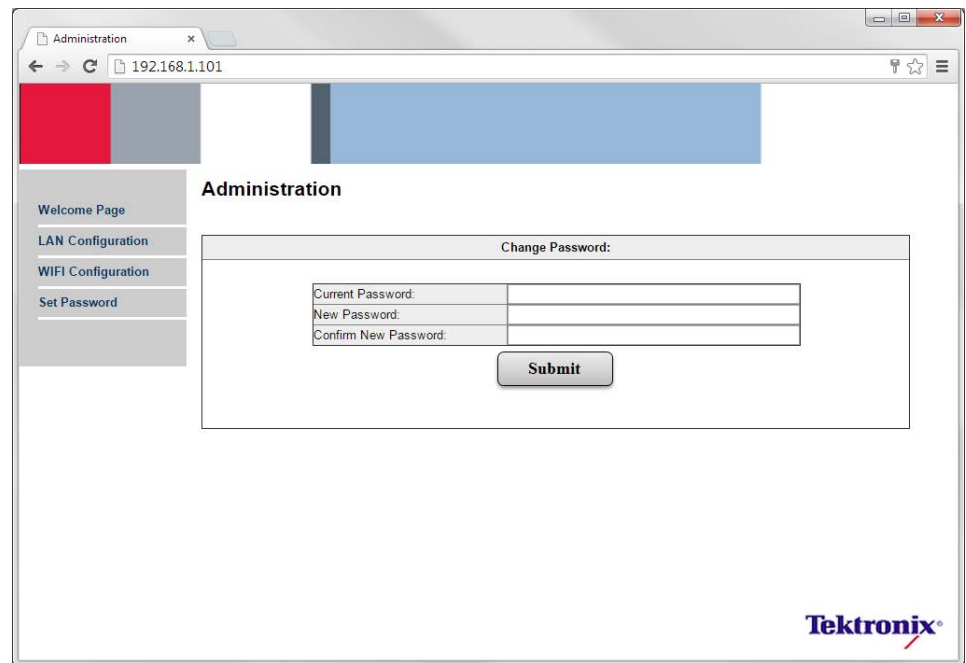
---

**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.



The screenshot shows a web browser window with the address bar displaying "192.168.1.101". The page title is "Administration". On the left, there is a navigation bar with the following links: "Welcome Page", "LAN Configuration", "WIFI Configuration", and "Set Password". The "Set Password" link is highlighted. The main content area is titled "Administration" and contains a "Change Password:" form. The form has three input fields: "Current Password:", "New Password:", and "Confirm New Password:". Below the input fields is a "Submit" button. The Tektronix logo is visible in the bottom right corner of the page.

**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 requirments

- 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 4.5.2 and Visual C++ 2015 redistributable will be installed automatically if they are not available on the computer.
- Internet Information Service: IIS 6.0 or higher. For installation instructions, please refer to IIS installation and configuration(See page 27, *IIS installation and configuration.*)
- Database system: SQL Server 2014 Express or SQL Server 2014 Enterprise. For installation instructions, please refer to Installing SQL server 2014 espress (See page 9, *Installing SQL server 2014 express.*)

## Installing TSL3000B

Visit [www.tek.com](http://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 SQL server 2014 express

### Downloading the installation pack

Visit [http://www.microsoft.com/enin/download/details.aspx?id=42299=rss\\_alldownloads\\_devresources](http://www.microsoft.com/enin/download/details.aspx?id=42299=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\SQLEXPRT\_x64\_ENU.exe
- For 32-bit Win7, choose ExpressAndTools  
32BIT\SQLEXPRT\_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 **SQLEXPRTW\_x64\_ENU.exe**, and choose the directory for extracted files. The following figure is displayed.

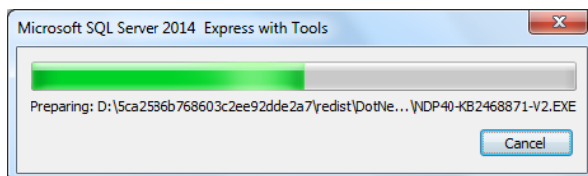


Figure 9: Extracting files

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

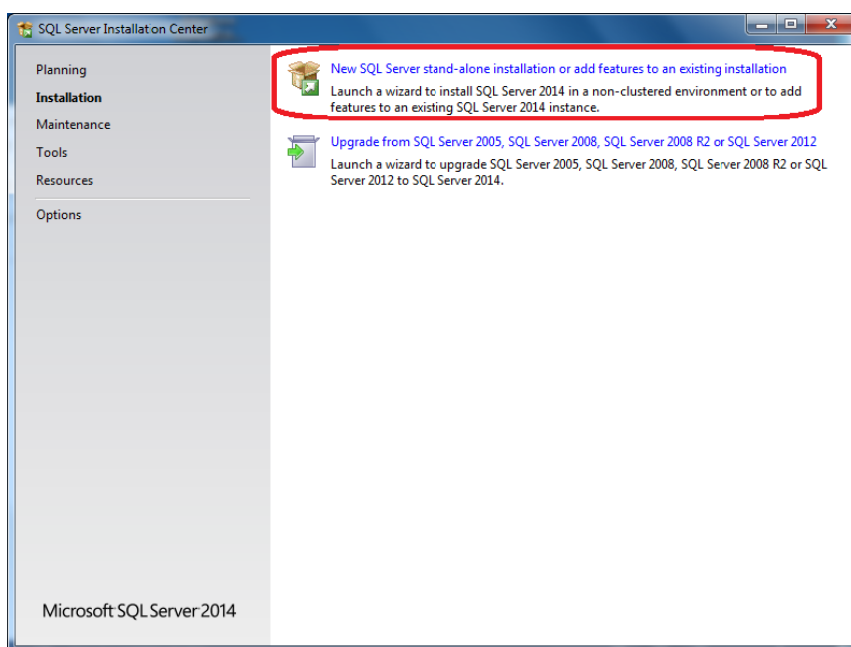


Figure 10: Installation center

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

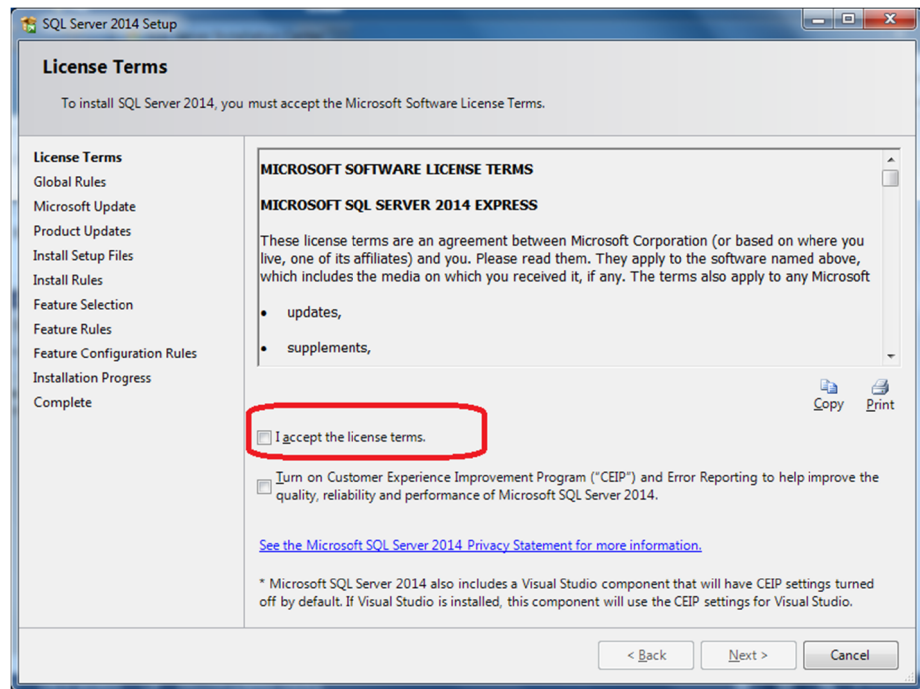


Figure 11: License terms

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

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

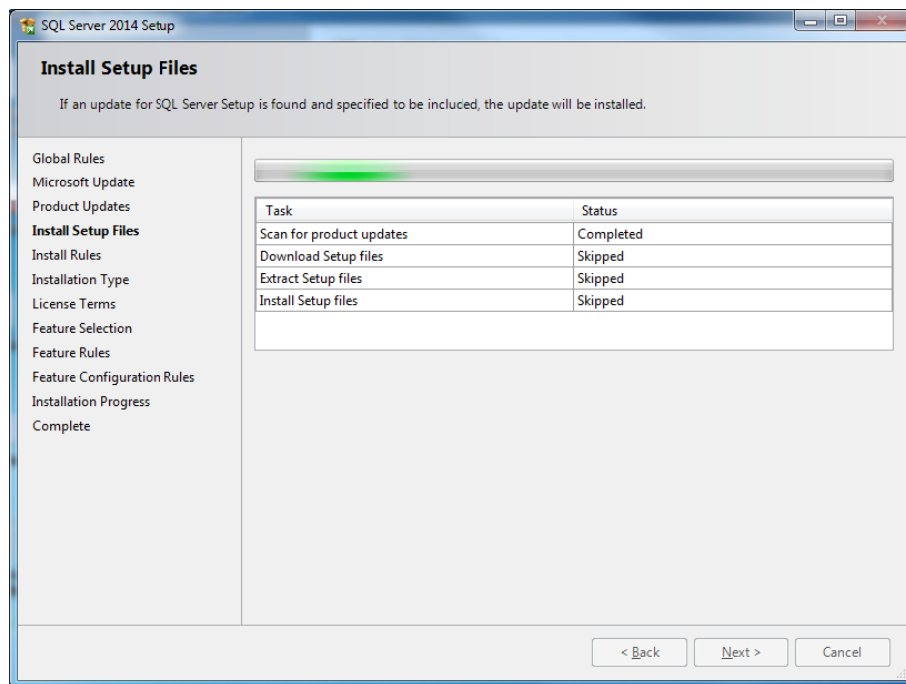


Figure 12: Setup files check

After verifying the files, the following figure is displayed.

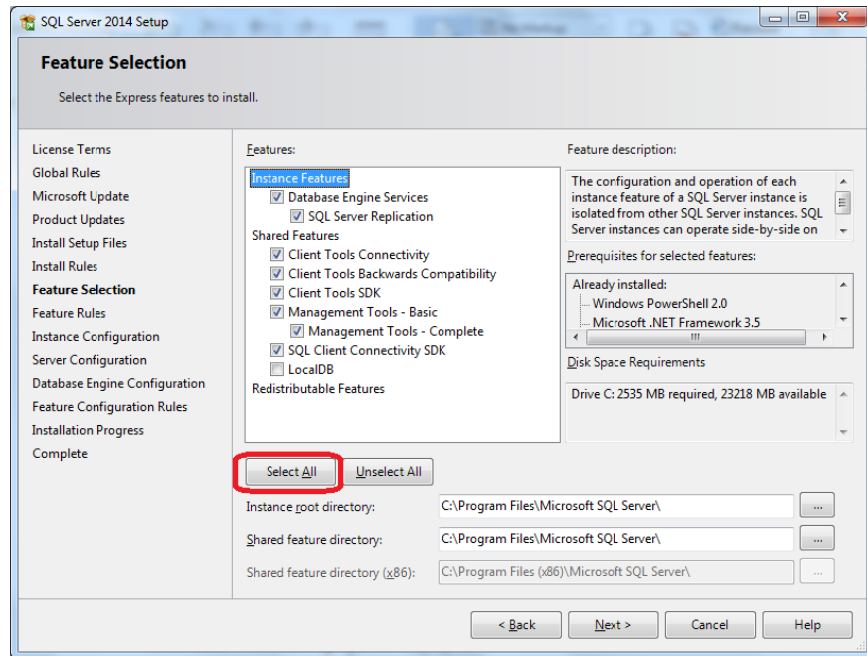


Figure 13: Feature selection

5. Click **Select All**.
6. Click **Next**. The following figure is displayed.

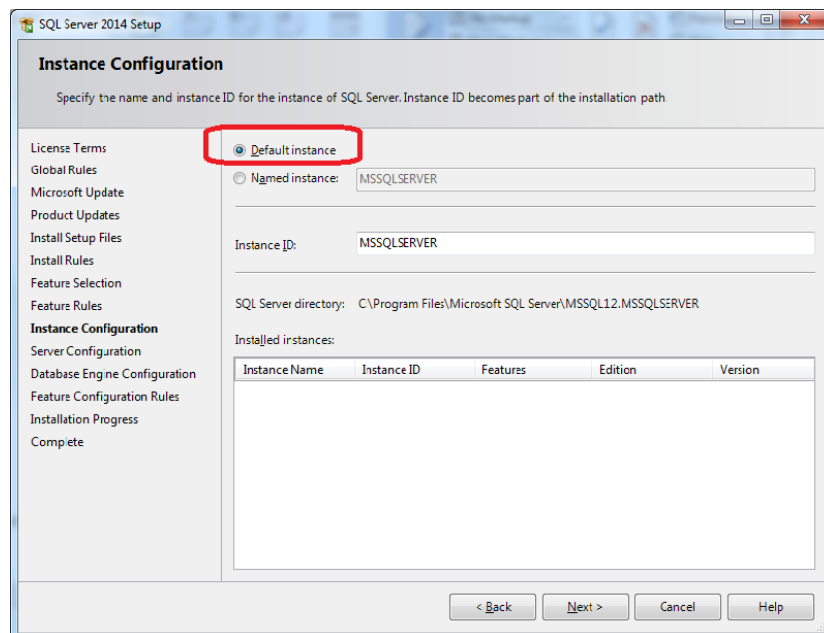


Figure 14: Instance configuration

7. Select **Default Instance**.
8. Click **Next**. The following figure is displayed.

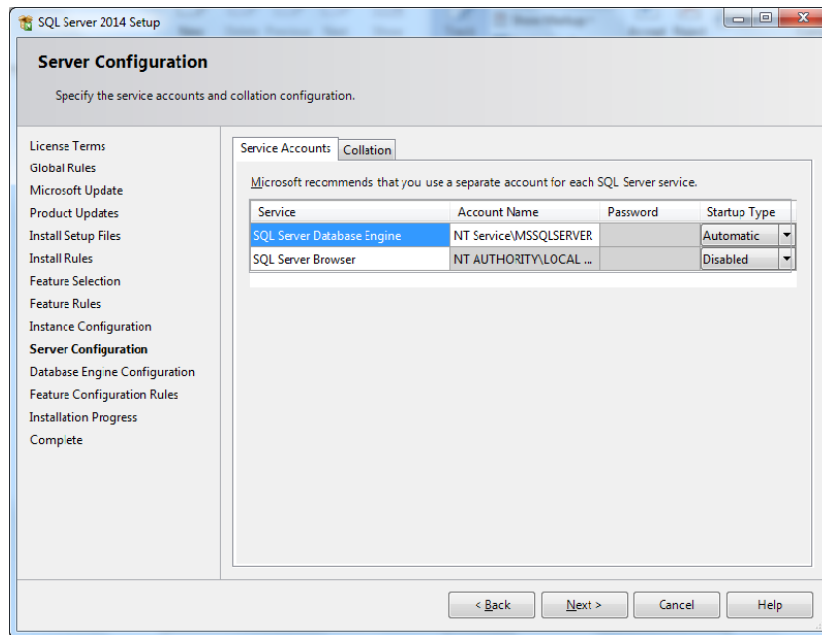


Figure 15: Server configuration

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

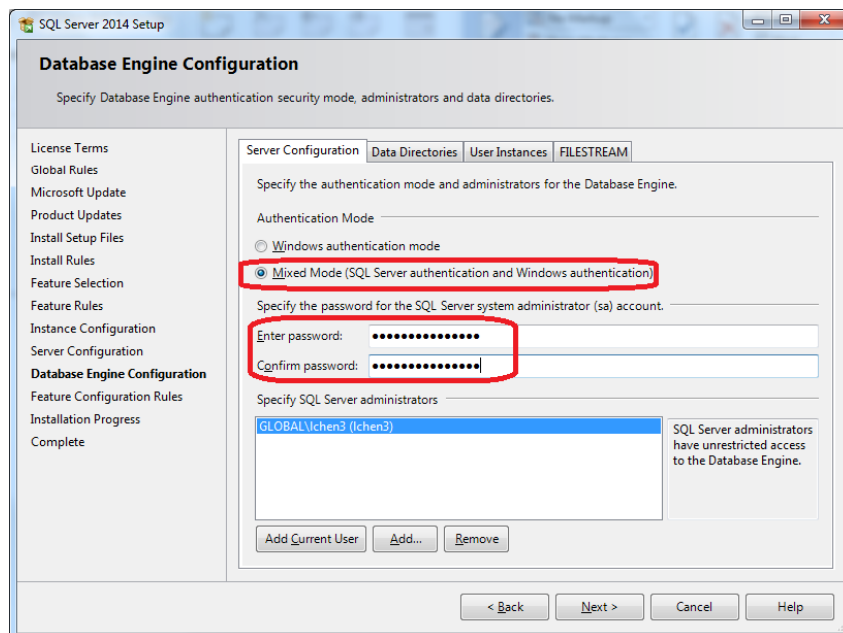
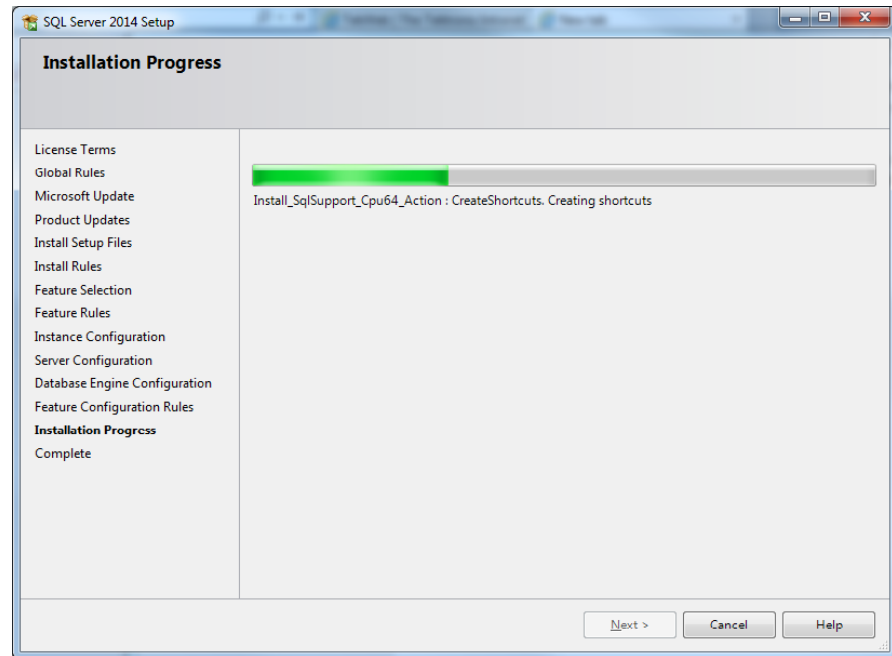


Figure 16: Database engine configuration

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.

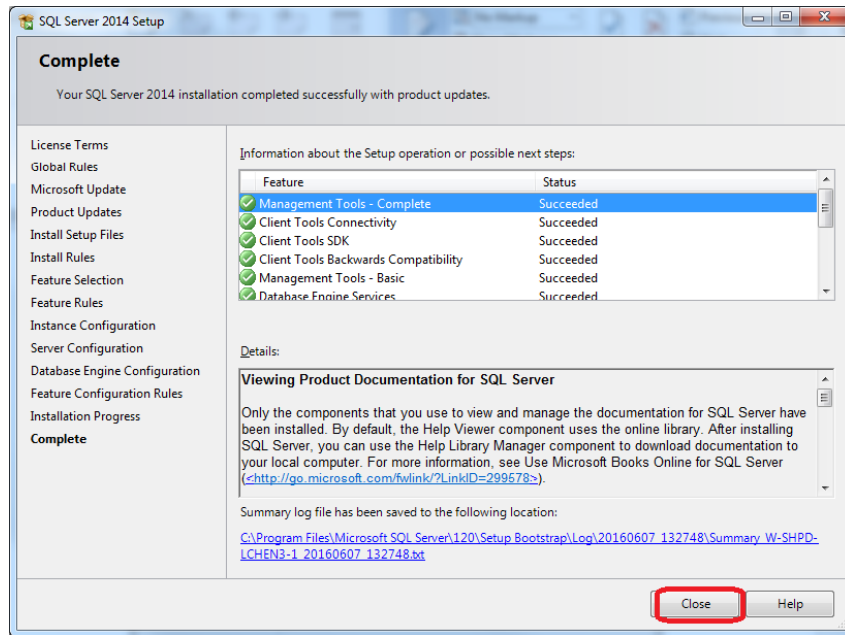


Figure 18: Installation complete

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.

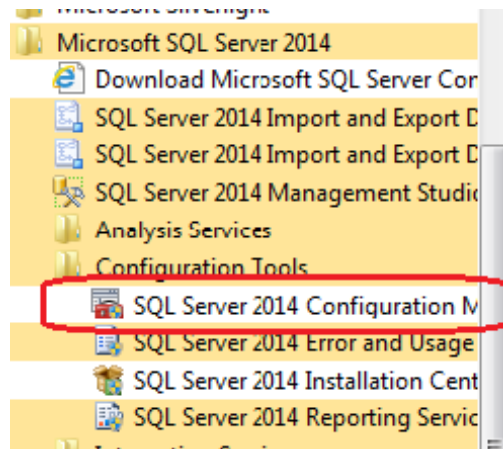


Figure 19: Select configuration manager

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).

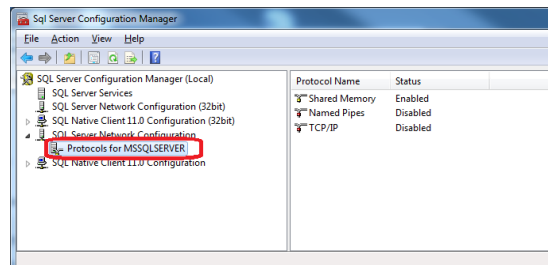


Figure 20: Enable TCP/IP protocol

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

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

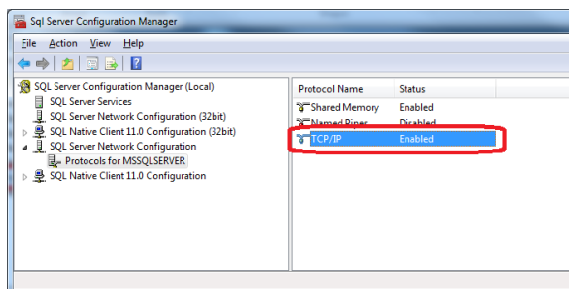


Figure 21: TCP/IP protocol enabled

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

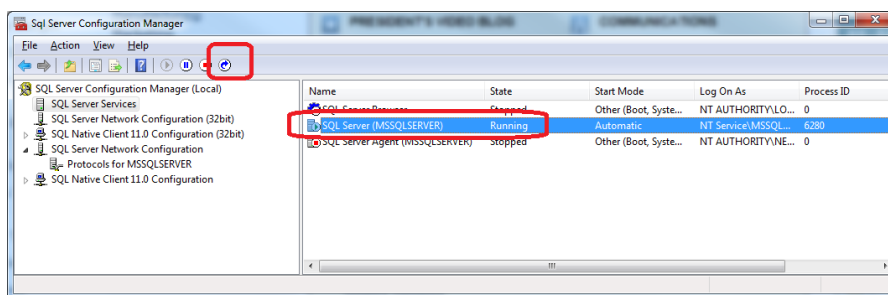


Figure 22: SQL server services


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

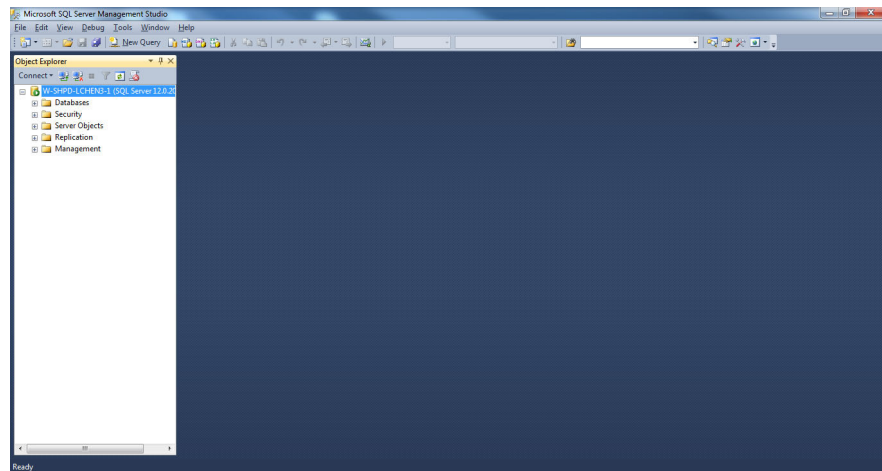


Figure 25: Main screen

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

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

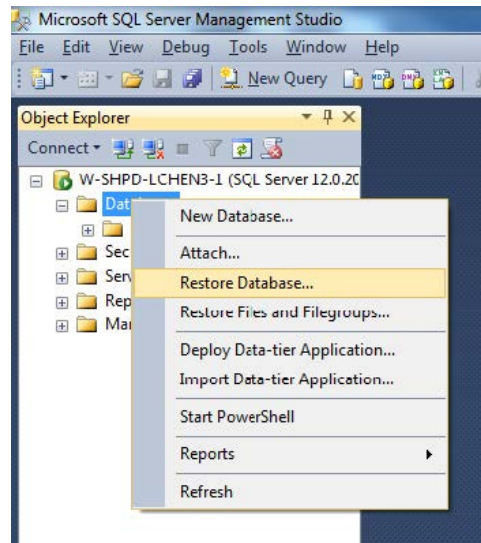


Figure 26: Restore database

17. Enter **TSLDatabase** next to **Database**.
18. Select **Device**.
19. Select '...'.
20. Click **Add**, as shown in the following figure.

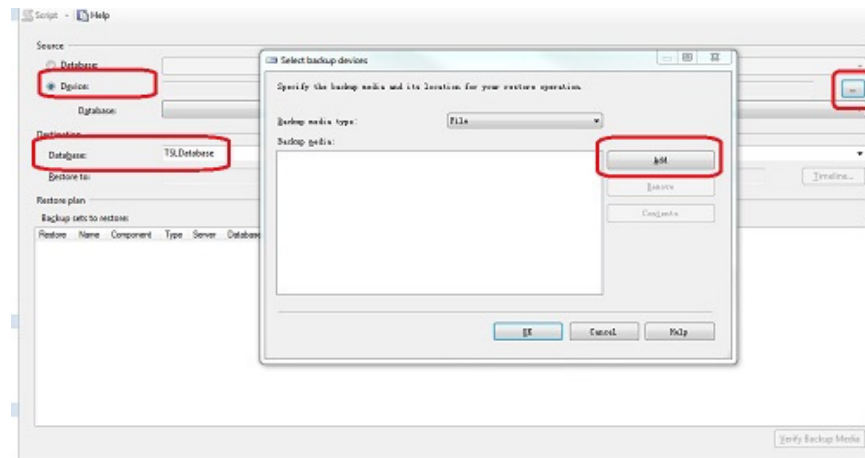


Figure 27: Specify backup

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

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

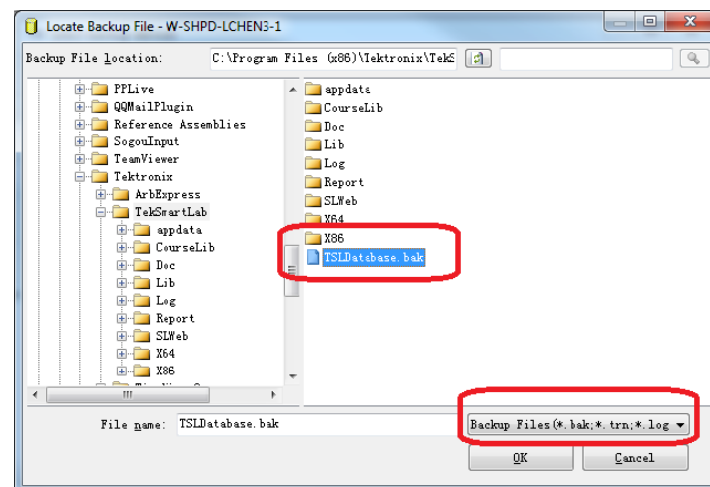


Figure 28: Change file type

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

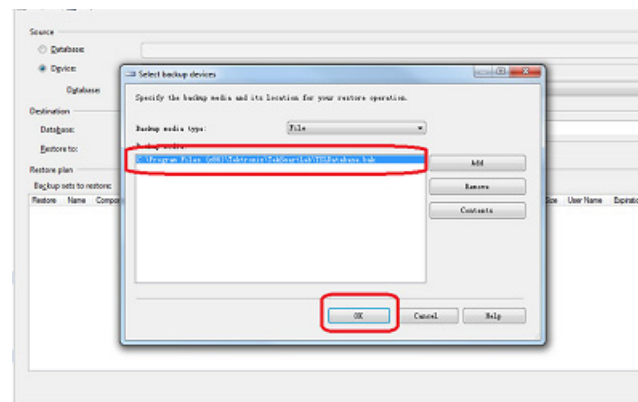


Figure 29: Backup file found

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

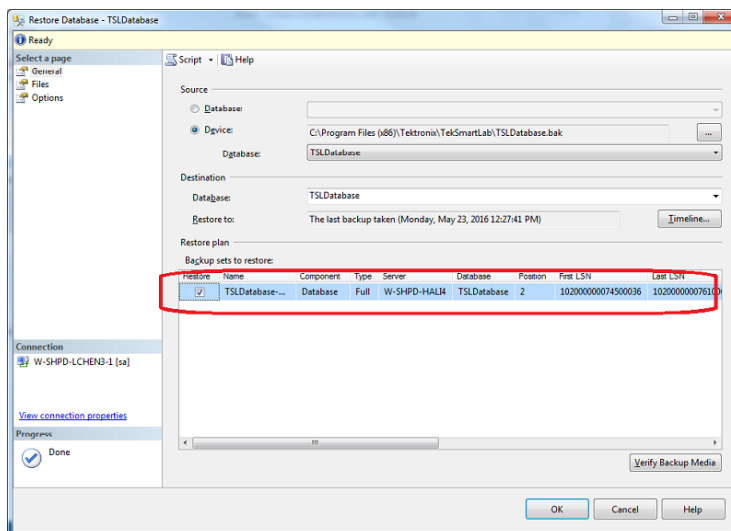


Figure 30: Select the most recent database

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

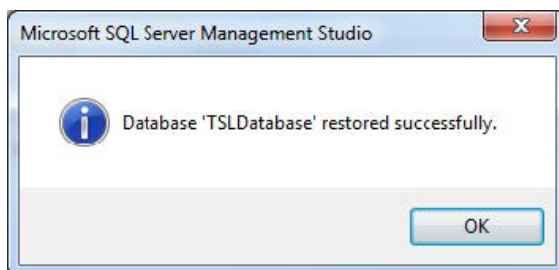


Figure 31: Database configuration complete

---

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

---

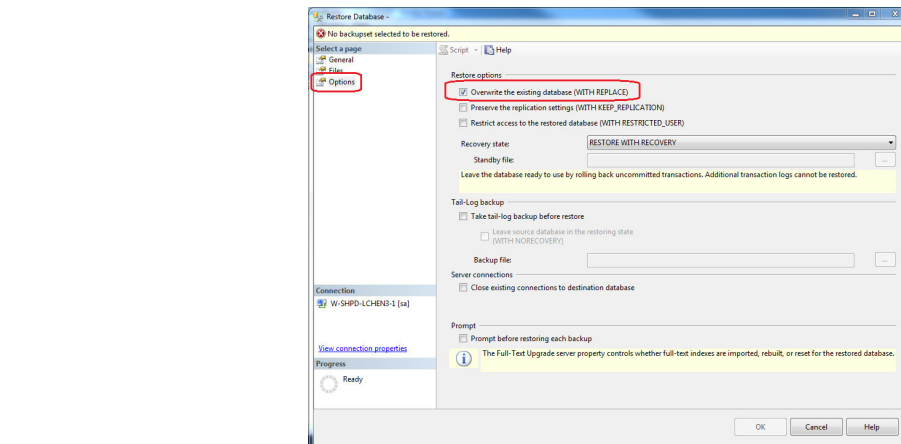


Figure 32: Overwrite the existing database

## Adding Inbound Rules

1. Open the firewall setting screen by navigating to Start >> Control Panel >> System and Security >> Windows Firewall >> Advanced Setting'.
2. Double click **Inbound Rules** and then right-click it to display the pop-up menu.
3. Select **New Rule...**, as shown in the following figure.

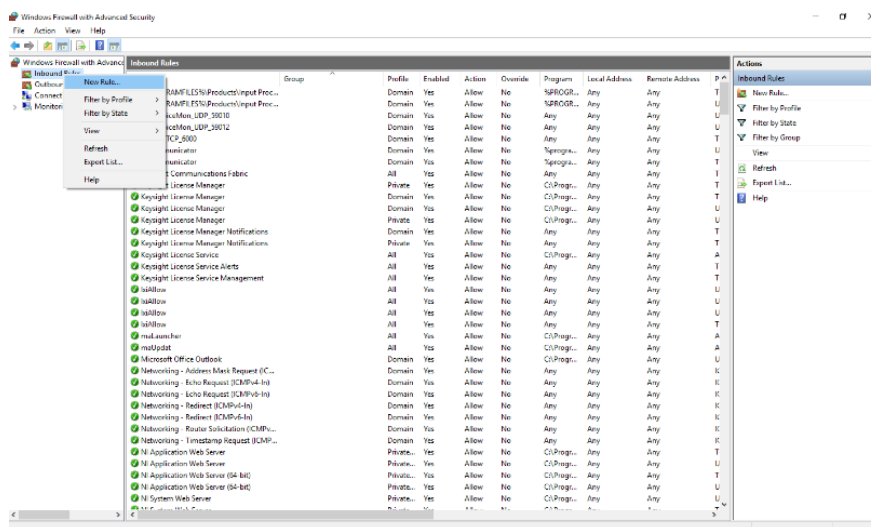


Figure 33: Create new rule

4. Select **Port**, and click **Next**.

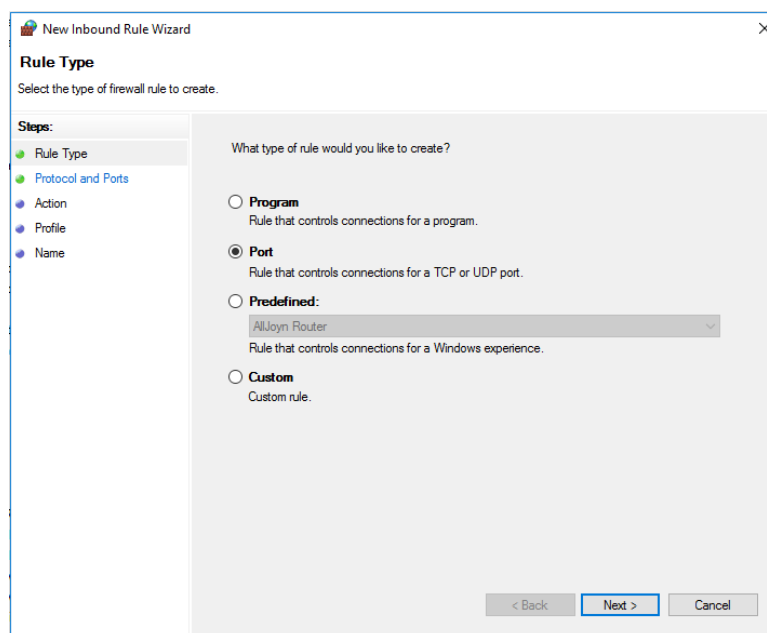
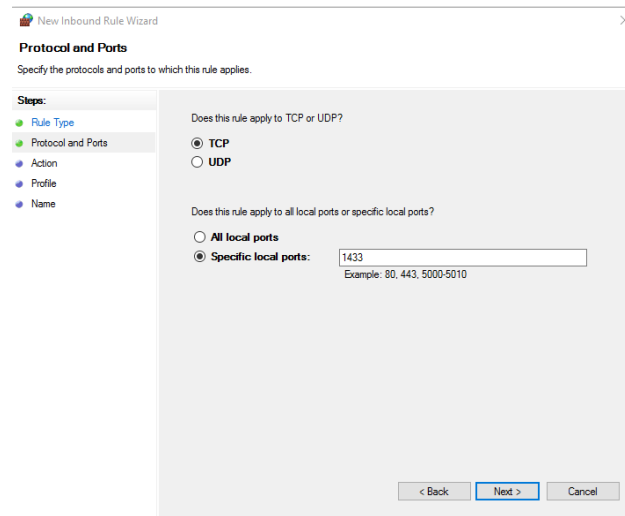


Figure 34: Select port



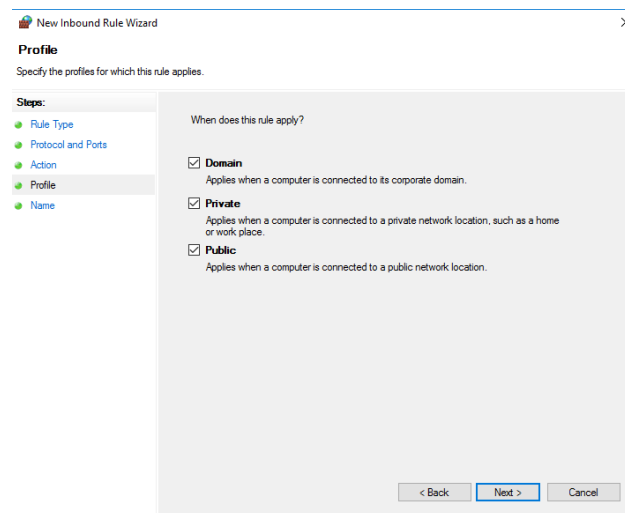
5. Select **TCP**, select **special local ports** and input **1433**, then click **Next..**



The image shows the 'New Inbound Rule Wizard' window, specifically the 'Protocol and Ports' step. The 'Steps' list on the left includes Rule Type, Protocol and Ports (selected), Action, Profile, and Name. The main area contains two questions: 'Does this rule apply to TCP or UDP?' with 'TCP' selected, and 'Does this rule apply to all local ports or specific local ports?' with 'Specific local ports' selected. A text box next to 'Specific local ports' contains the value '1433'. At the bottom, there are '< Back', 'Next >', and 'Cancel' buttons.

Figure 35: Allow the connection

6. Select all the options and click **Next**.



The image shows the 'New Inbound Rule Wizard' window, specifically the 'Profile' step. The 'Steps' list on the left includes Rule Type, Protocol and Ports, Action, Profile (selected), and Name. The main area contains the question 'When does this rule apply?' with three checked options: 'Domain' (Applies when a computer is connected to its corporate domain.), 'Private' (Applies when a computer is connected to a private network location, such as a home or work place.), and 'Public' (Applies when a computer is connected to a public network location.). At the bottom, there are '< Back', 'Next >', and 'Cancel' buttons.

Figure 36: Profile

7. . Input a Name, for example TSLSQL, and click **Finish**.

The screenshot shows a 'New Inbound Rule Wizard' window. On the left, a 'Steps' list includes 'Rule Type', 'Protocol and Ports', 'Action', 'Profile', and 'Name', with 'Name' selected. The main area is titled 'Name' and contains the instruction 'Specify the name and description of this rule.' Below this, there is a 'Name:' label followed by a text box containing 'TSLSQL'. Underneath is a 'Description (optional):' label followed by a larger empty text box. At the bottom right, there are three buttons: '< Back', 'Finish' (which is highlighted with a blue border), and 'Cancel'.

Figure 37: Input name

## 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.

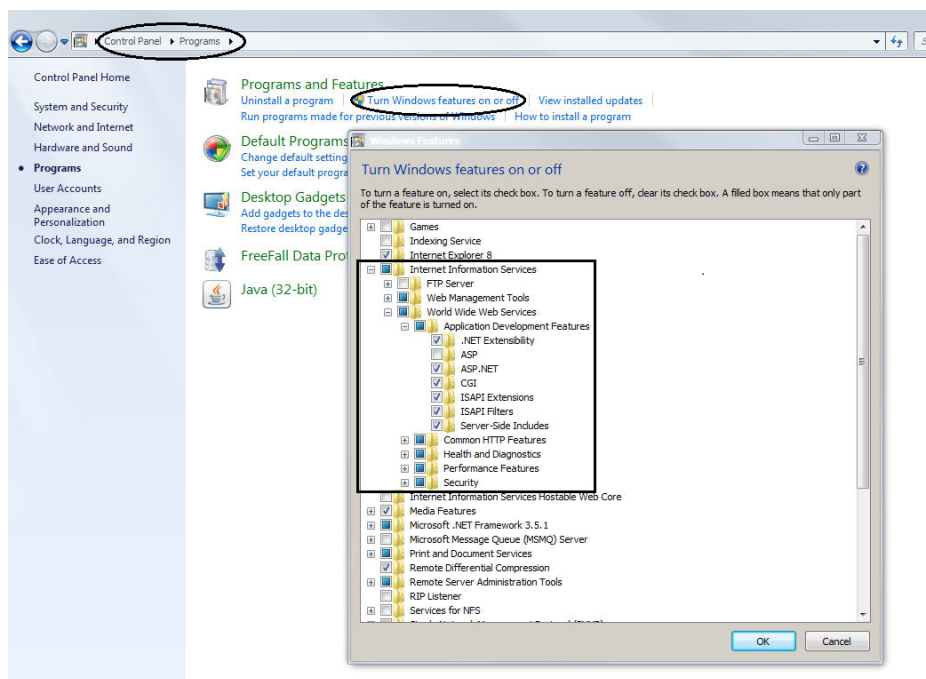


Figure 38: Select internet information services

**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

3. Browse to World Wide Web Services >> Common HTTP Features, and select the following
  - Default Document
  - Directory Browsing
  - HTTP Errors
  - HTTP Redirection
  - Static Content
4. 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.

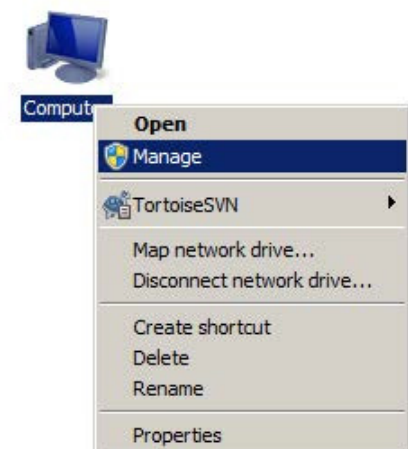


Figure 39: Open internet information services manager

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.

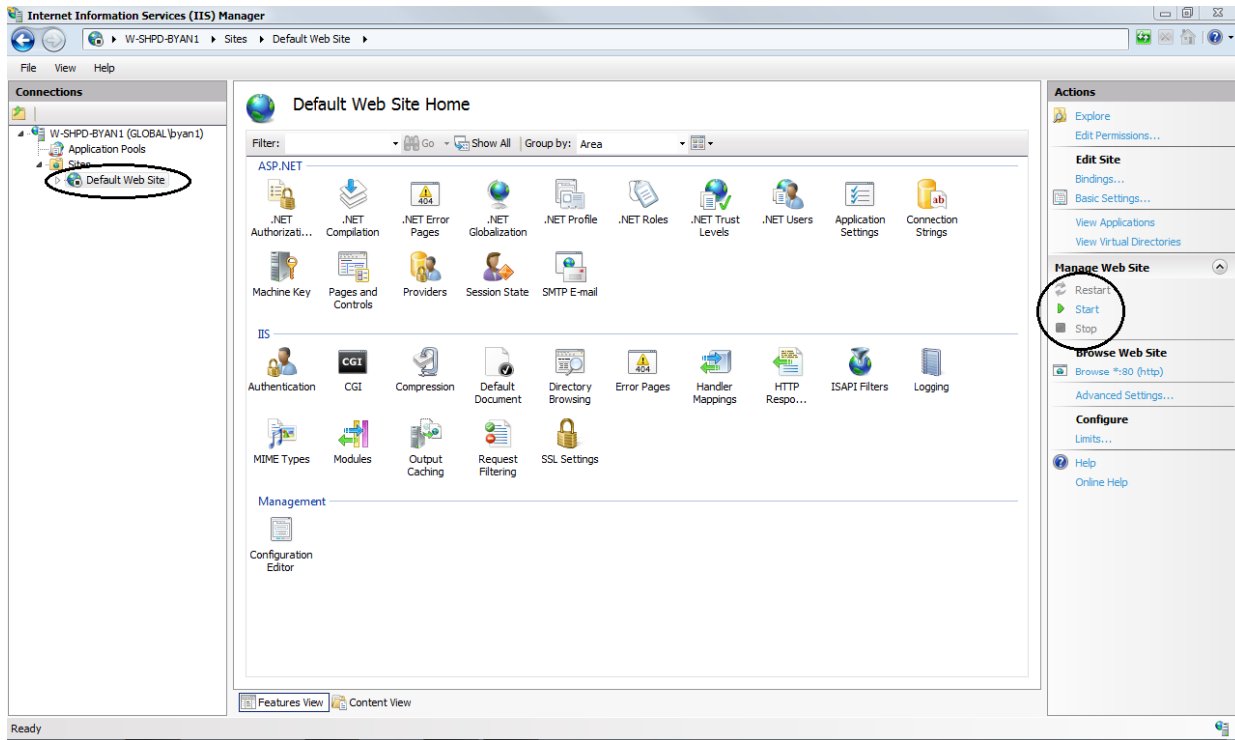


Figure 40: Internet Information Services (IIS) manager

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

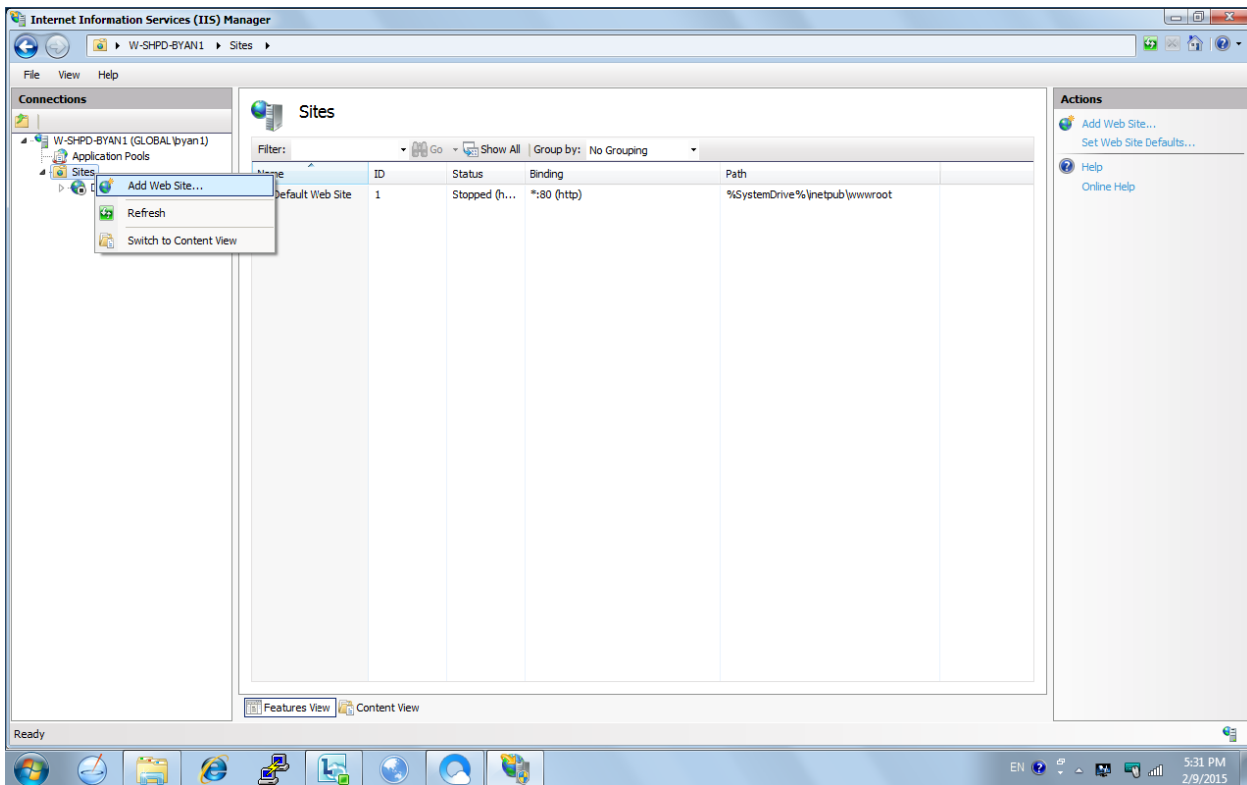


Figure 41: Add a web site

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.

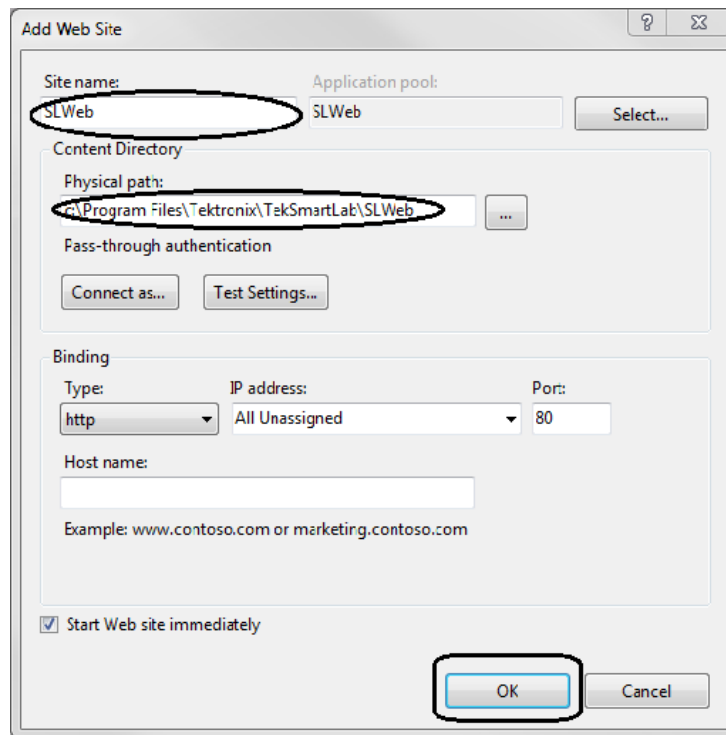


Figure 42: Select the SLWeb file

## 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).

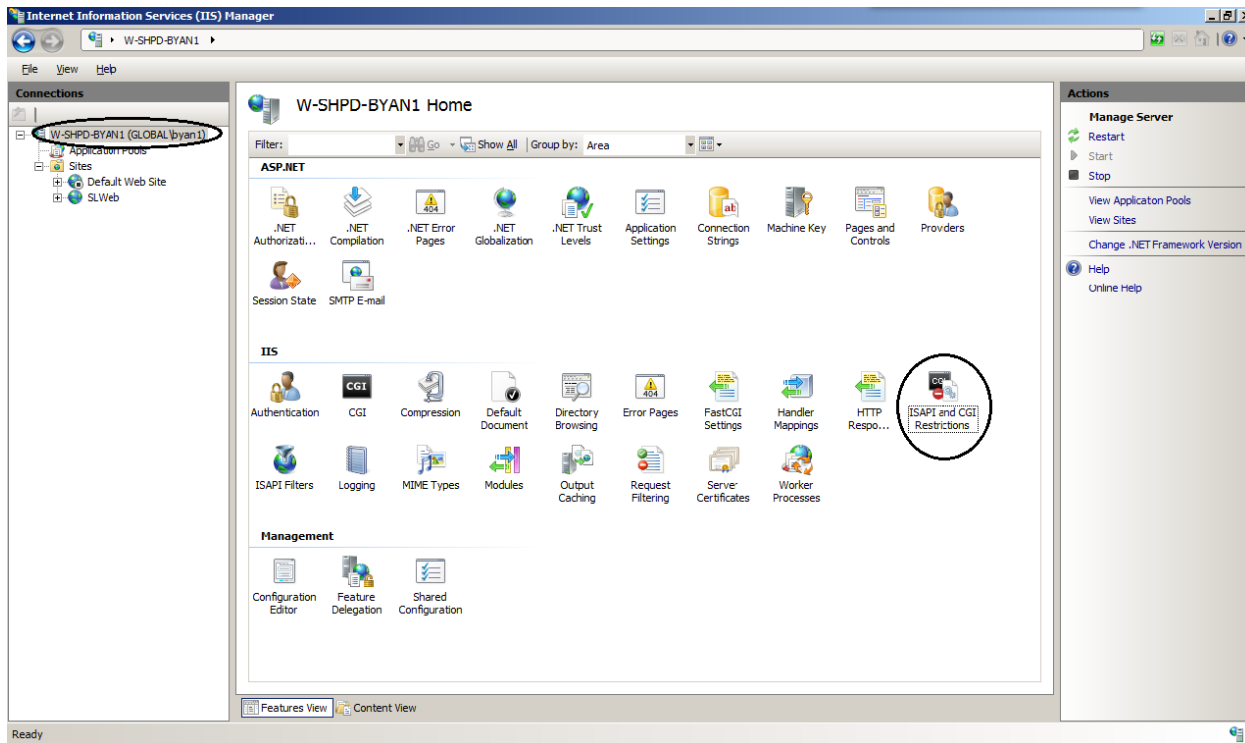


Figure 43: IIS manager

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



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

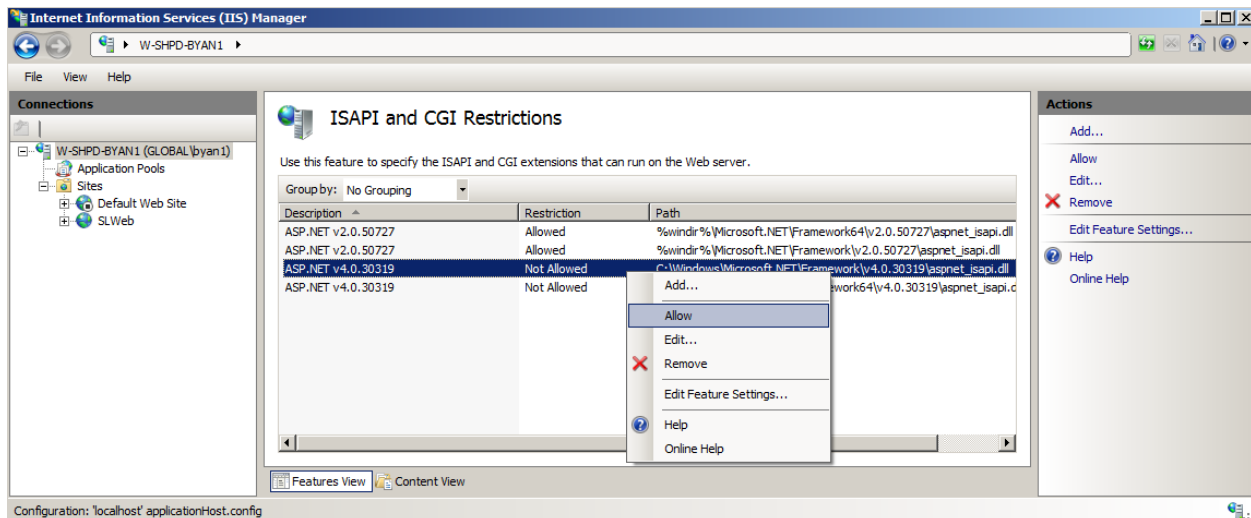


Figure 44: Allow ASP .NET 4.0

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

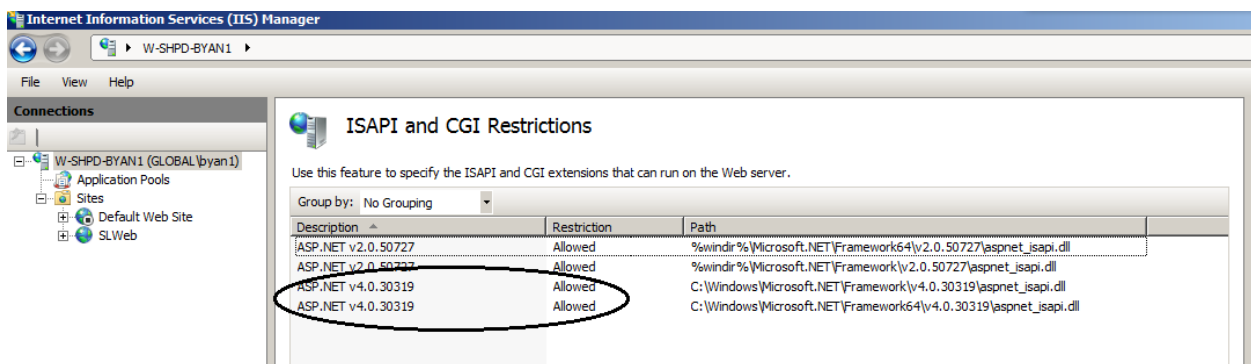


Figure 45: ASP .NET 4.0 allowed

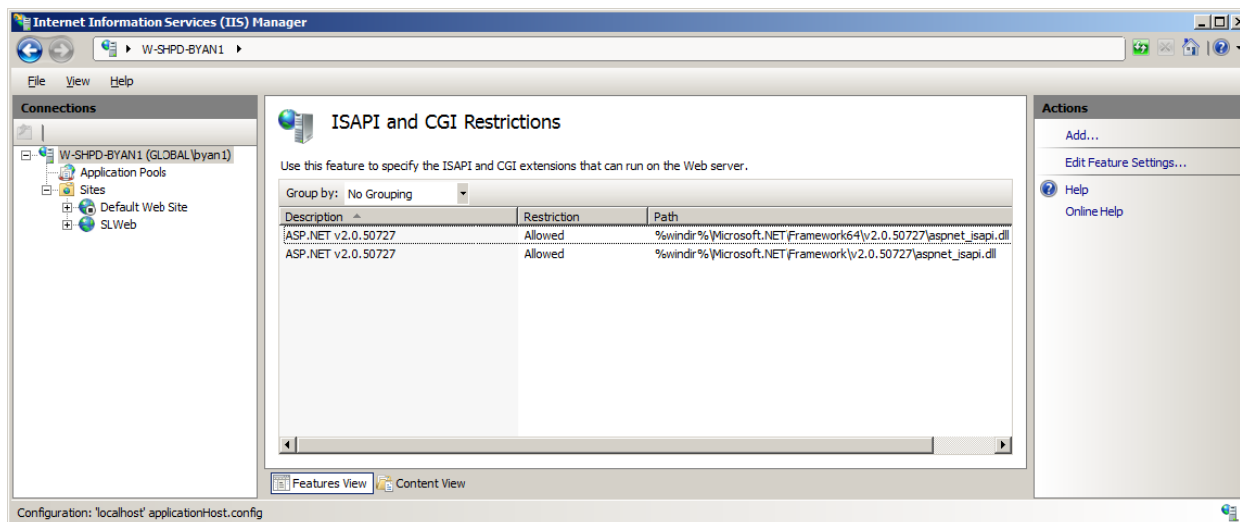


Figure 46: ASP .NET v4.0 not found

---

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

---

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

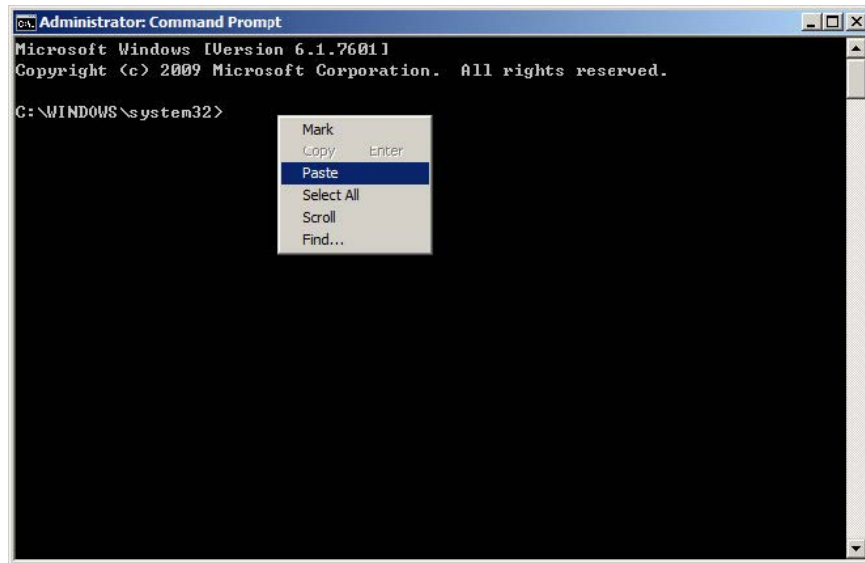


Figure 47: Paste command by right key

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

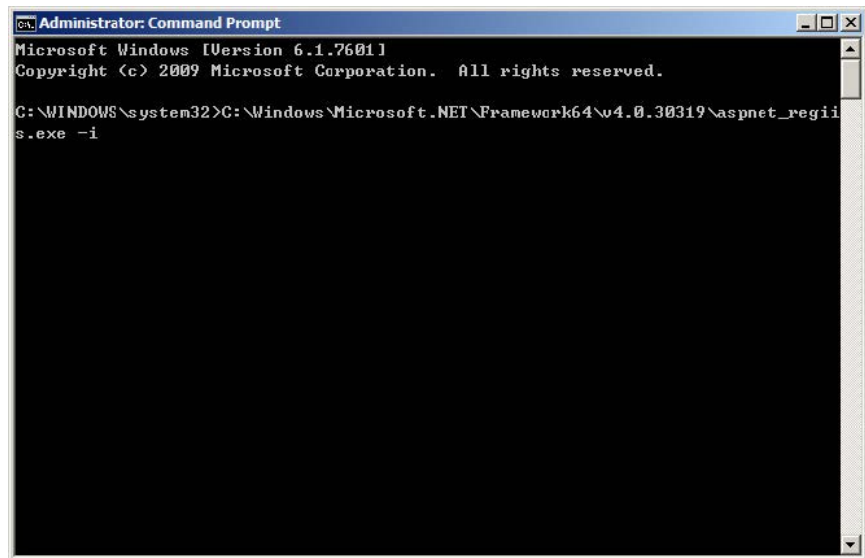
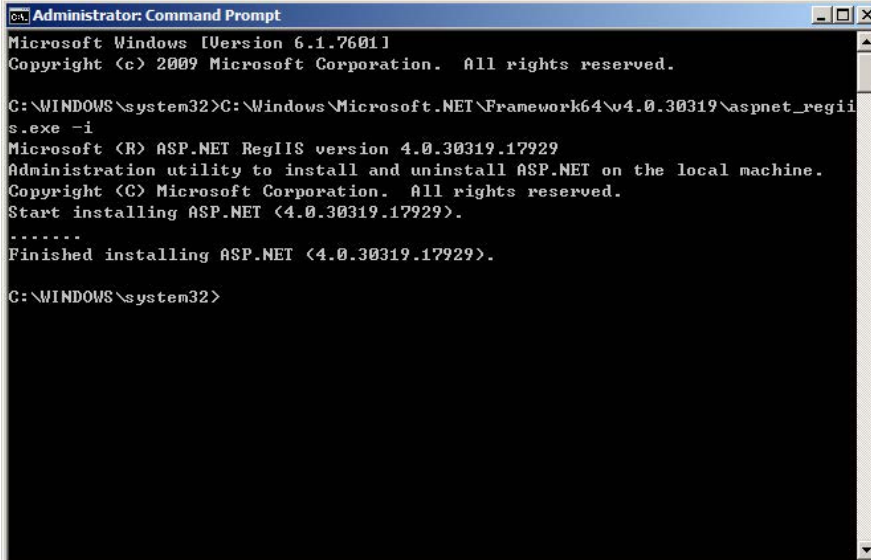


Figure 48: Command window after entering the command

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



```
Administrator: Command Prompt
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>C:\Windows\Microsoft.NET\Framework64\v4.0.30319\aspnet_regiis.exe -i
Microsoft (R) ASP.NET RegIIS version 4.0.30319.17929
Administration utility to install and uninstall ASP.NET on the local machine.
Copyright (C) Microsoft Corporation. All rights reserved.
Start installing ASP.NET <4.0.30319.17929>.
.....
Finished installing ASP.NET <4.0.30319.17929>.

C:\WINDOWS\system32>
```

Figure 49: 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.

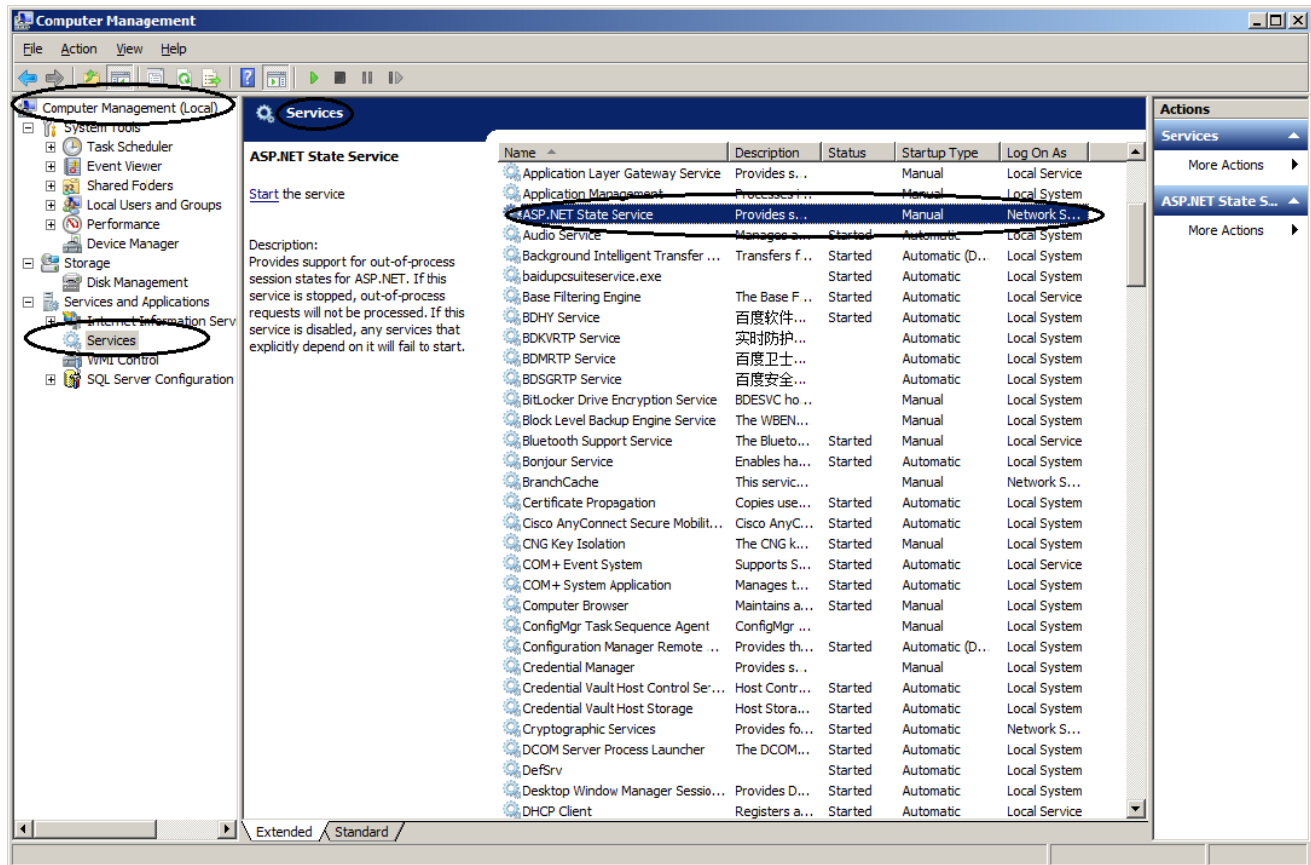


Figure 50: Computer management

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 these 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.

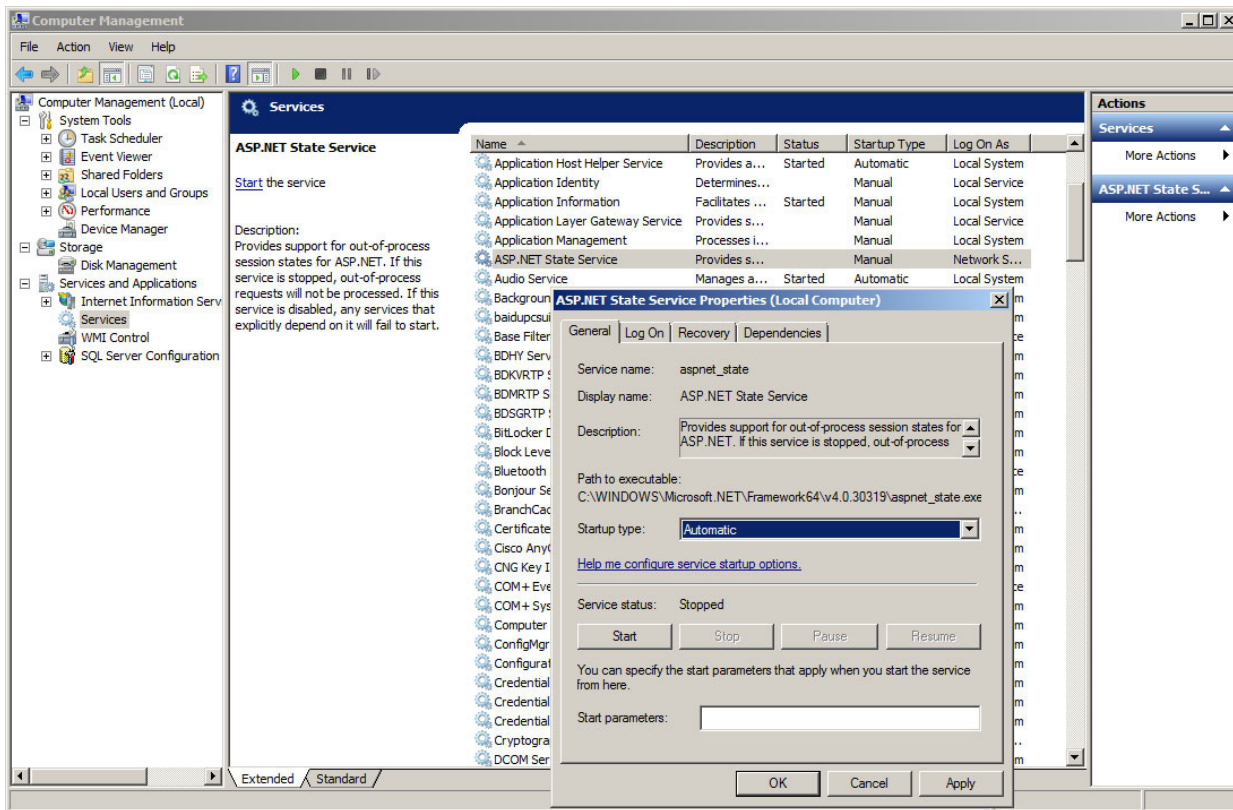


Figure 51: Configure ASP .Net State Service

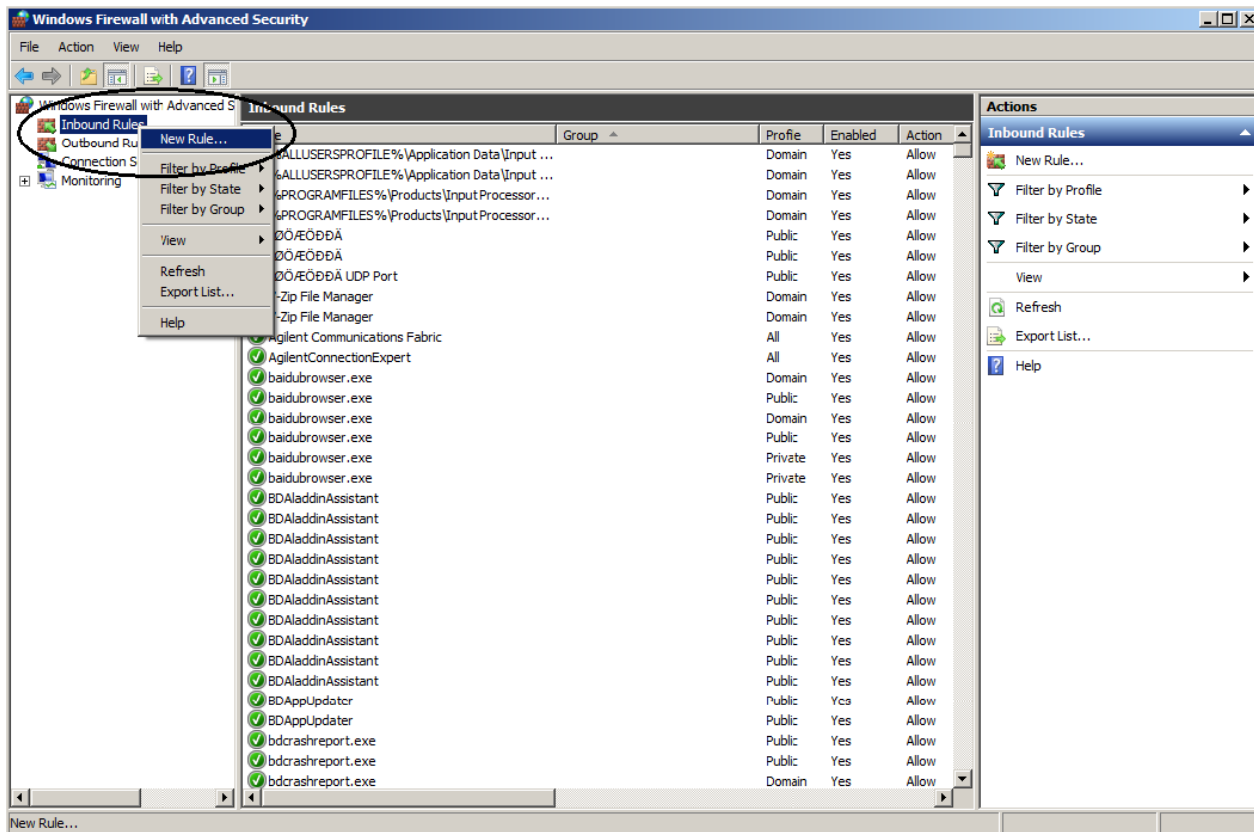
5. Click **OK** to complete the setting.
6. Close the Computer Management screen.

## 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 52: Add inbound rules

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

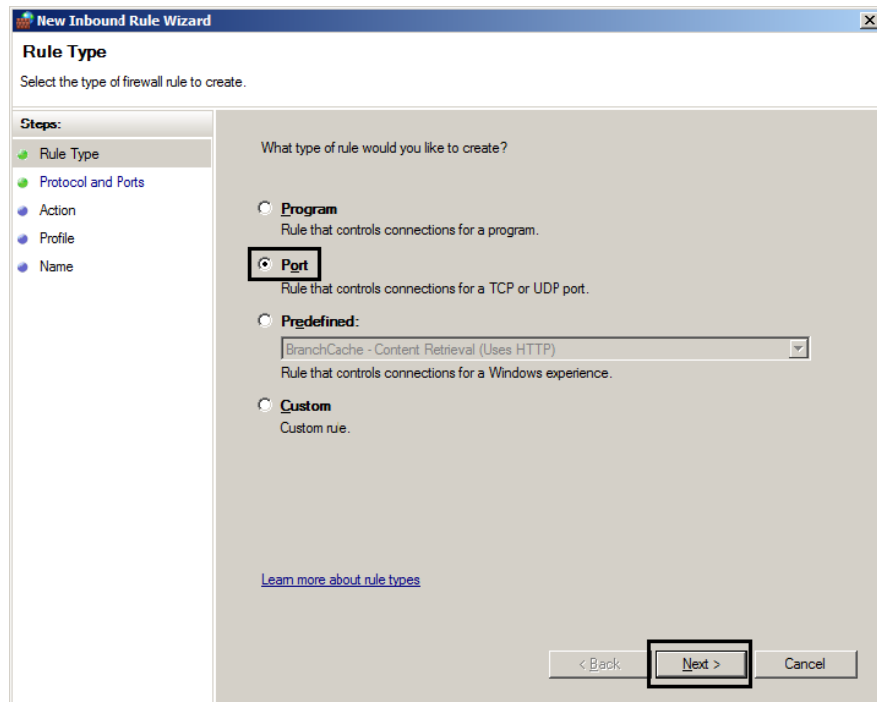


Figure 53: New inbound rule wizard



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

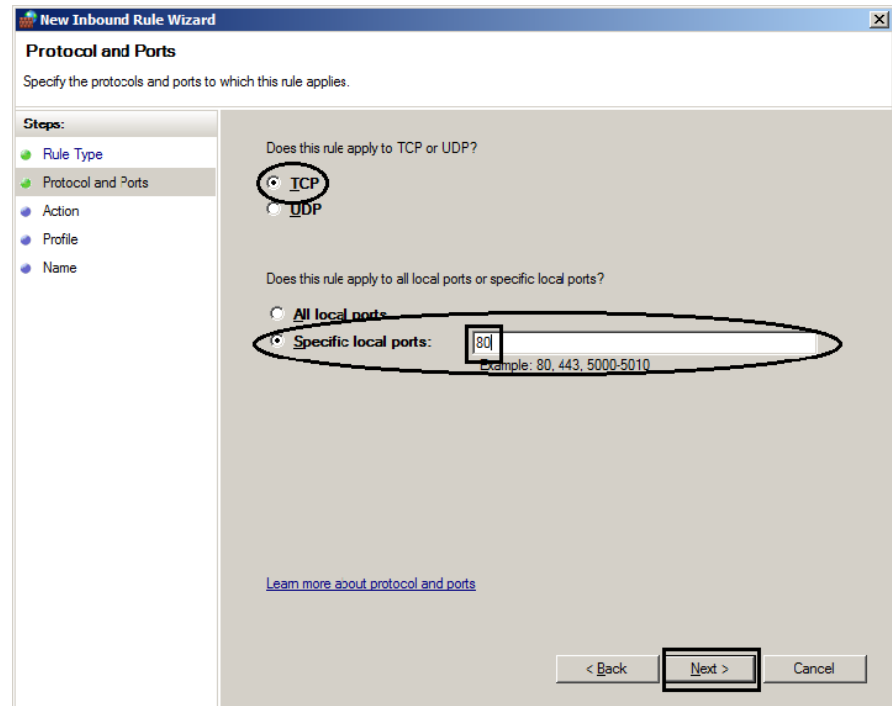


Figure 54: Protocol and ports

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

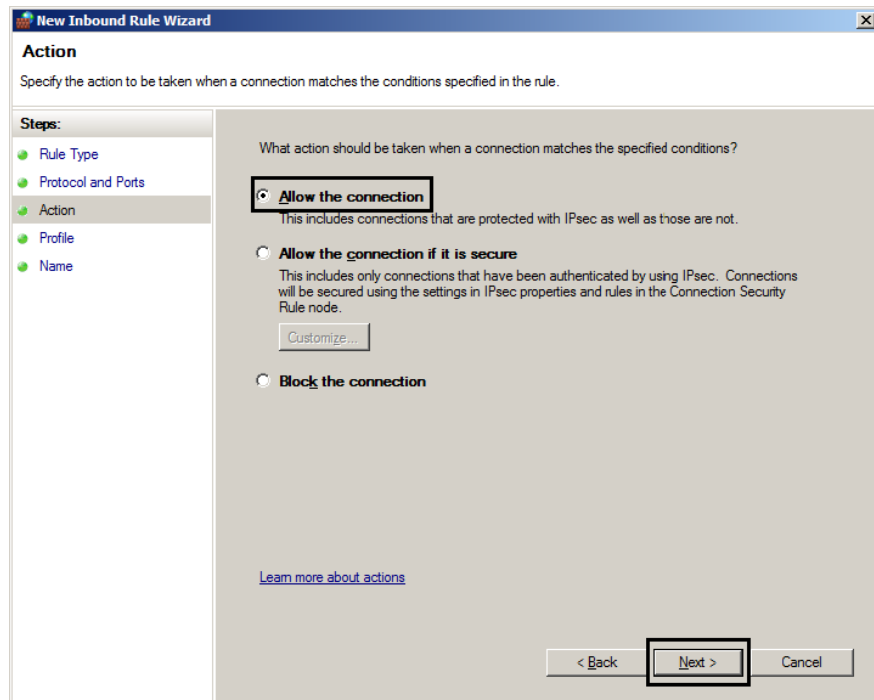


Figure 55: Action

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

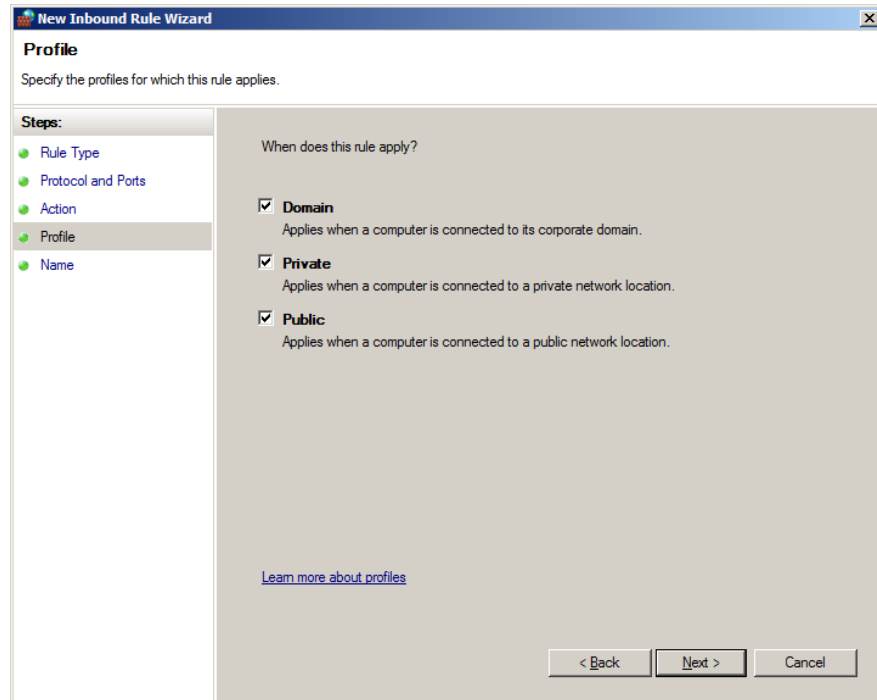


Figure 56: Profile

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

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

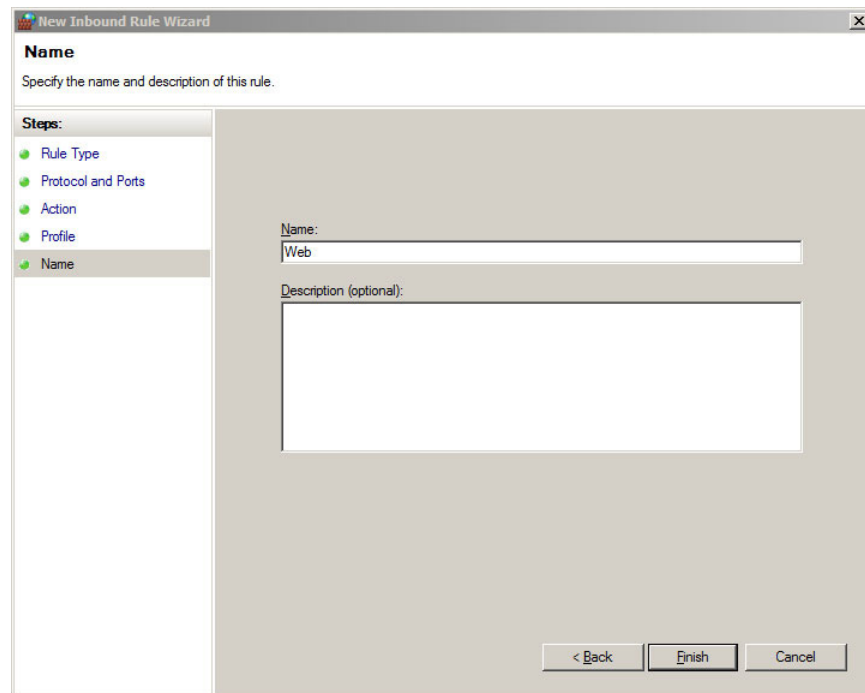


Figure 57: Name

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

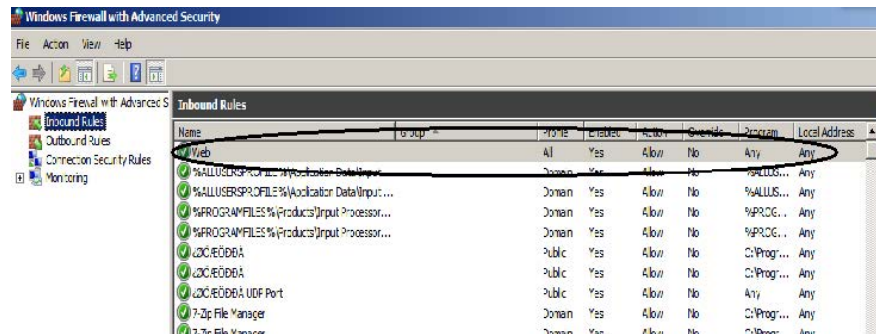
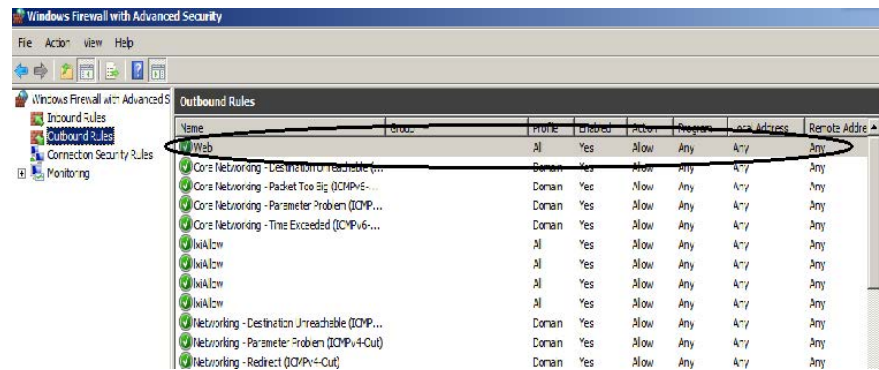


Figure 58: Inbound rules added

**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 59: 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.

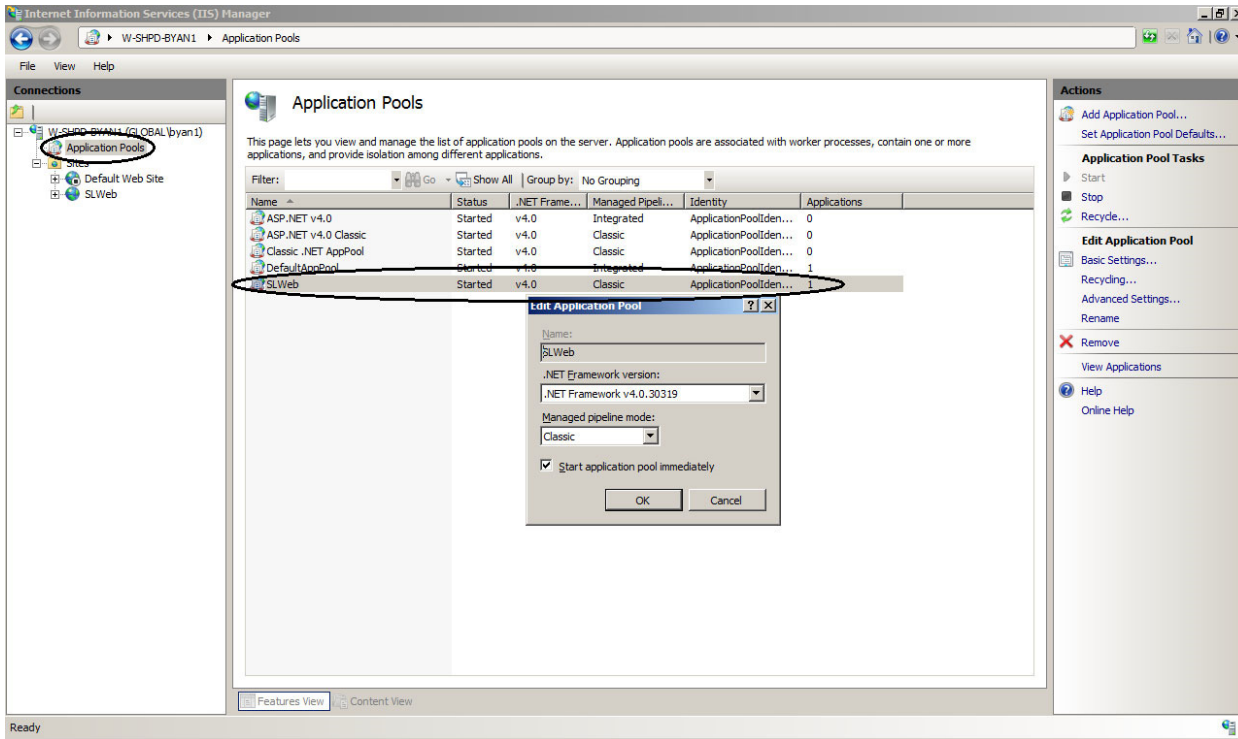


Figure 60: Application pools

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.

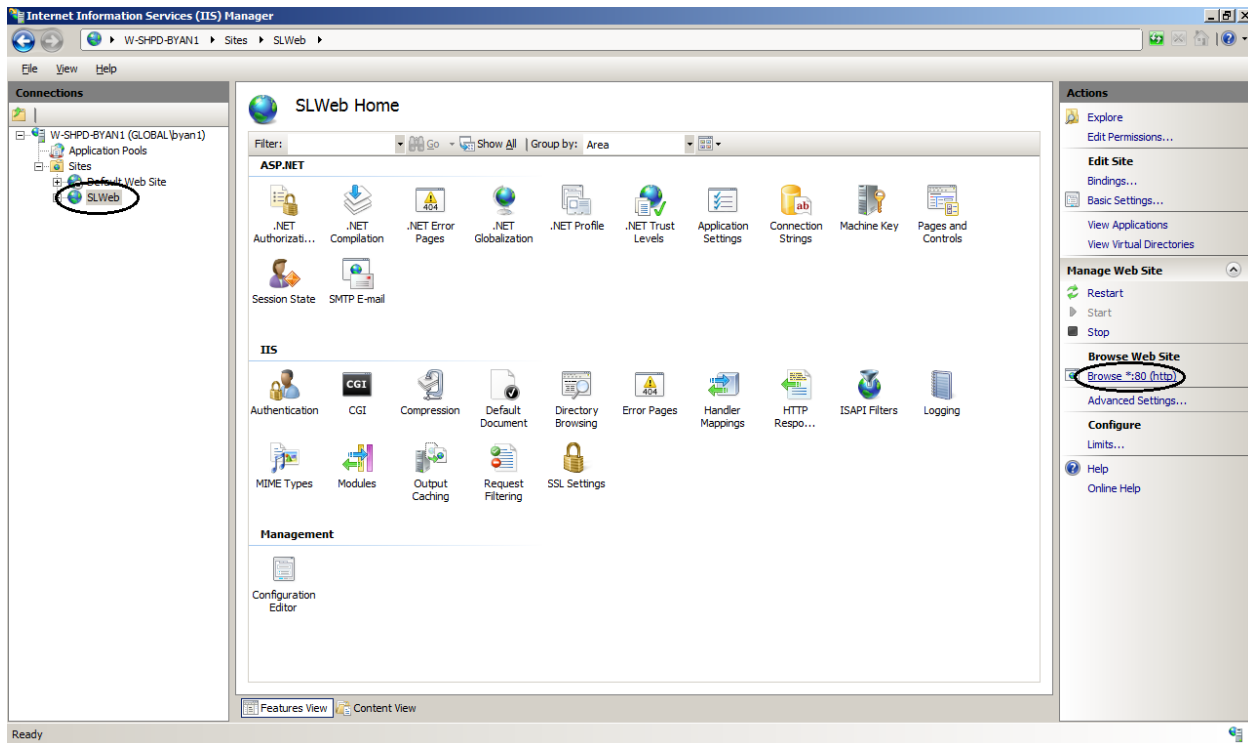
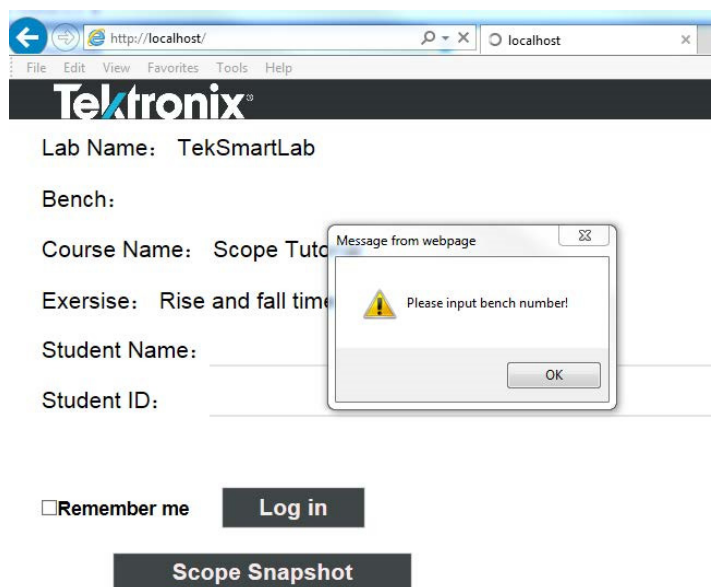


Figure 61: SLWeb home

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 62: 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 (See page 27, *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.

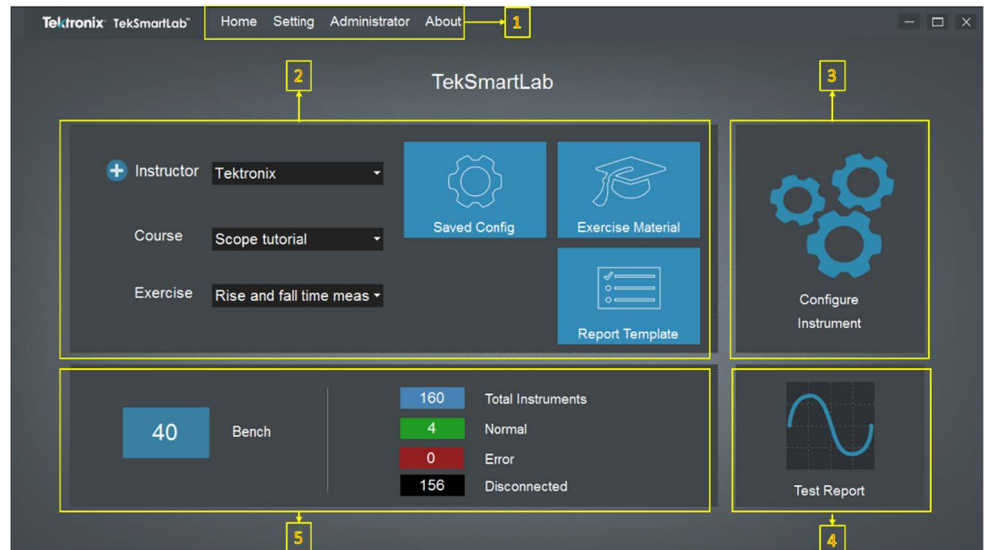


Figure 63: Home page

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.

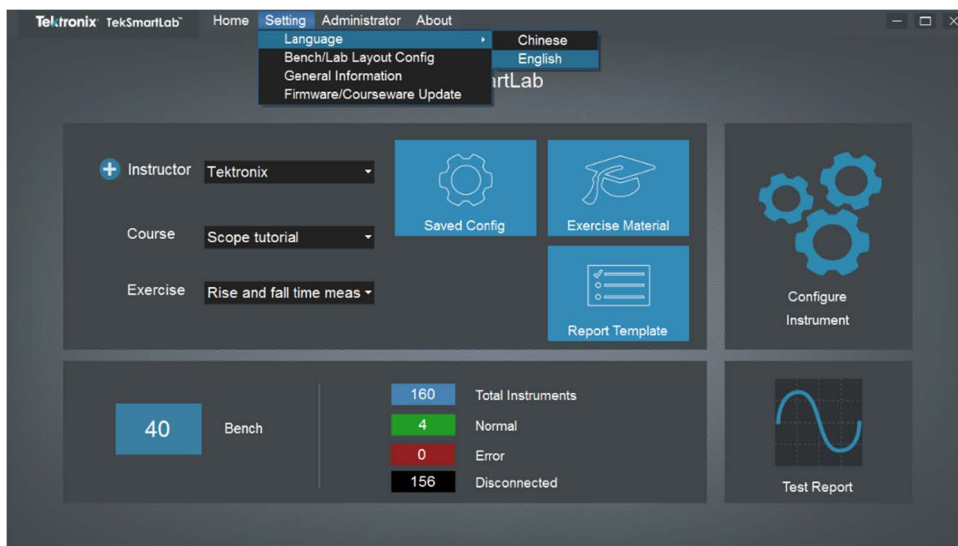


Figure 64: Change language

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

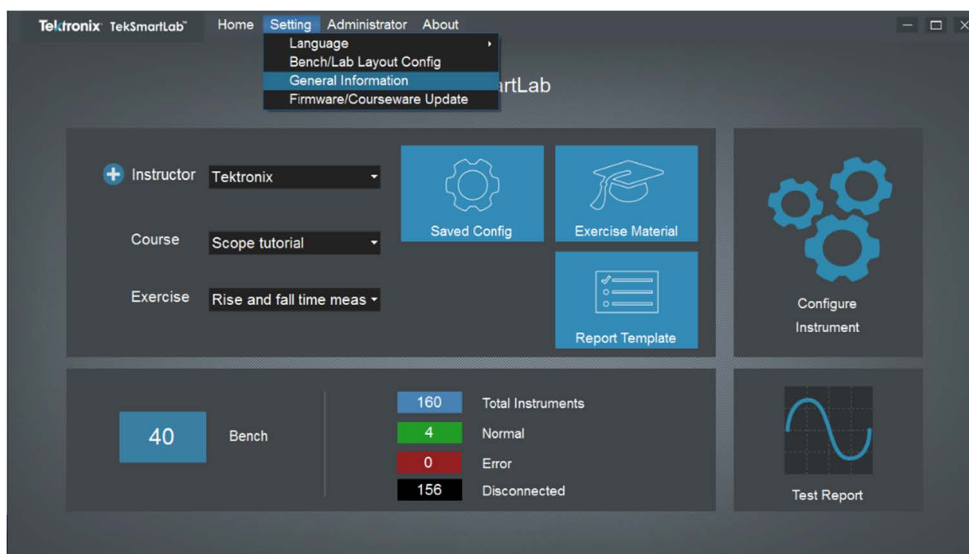


Figure 65: General information

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

Figure 66: 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.

Status	Count
Total Instruments	160
Normal	4
Error	0
Disconnected	156

Figure 67: Change password

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

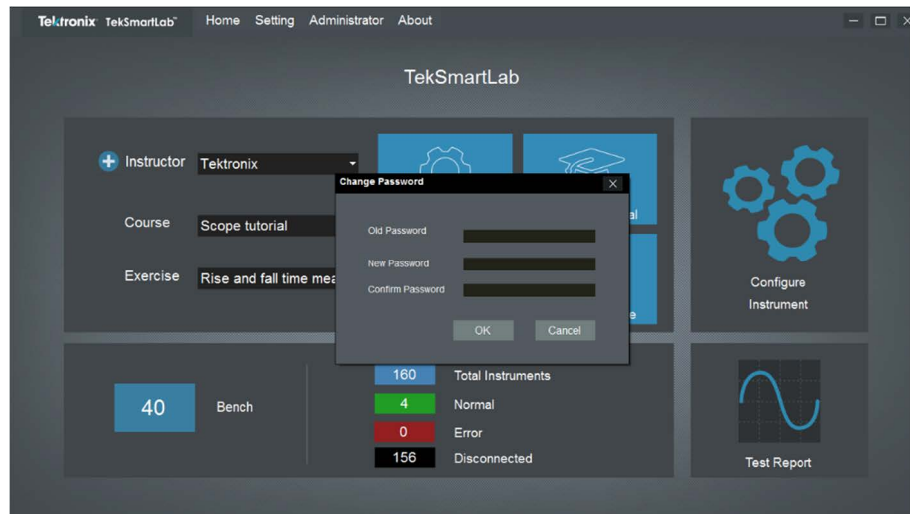


Figure 68: Input new password

## License Management

**NOTE.** In July 2017, the license policy and nomenclature was changed for TekSmartLab™ software.

The legacy system, with TSL3000B, will continue to be supported in the software, so you can use your current activation code when upgrading to the latest version software.

The new application license, with TSL3000B-FL, offer floating licenses (FL) that can be checked in and out of the Tektronix Asset Management System on the Tektronix.com Web site.

**How to purchase.** Contact your local Tektronix Account Manager to purchase TSL3000B-FL. After purchasing, you will receive an email listing the options purchased with the URL to the Tektronix Asset Management system that will enable you to manage your licenses.

You can manage your licenses using the Tektronix Asset Management System found at <http://www.tek.com/products/product-license>.

The Tektronix Asset Management system provides an inventory of the license(s) in your account. It enables you Check-out or Check-in a license and view the history of licenses.

**How to install.** Click **About -> License Management** on the menu bar and the following figure is displayed.

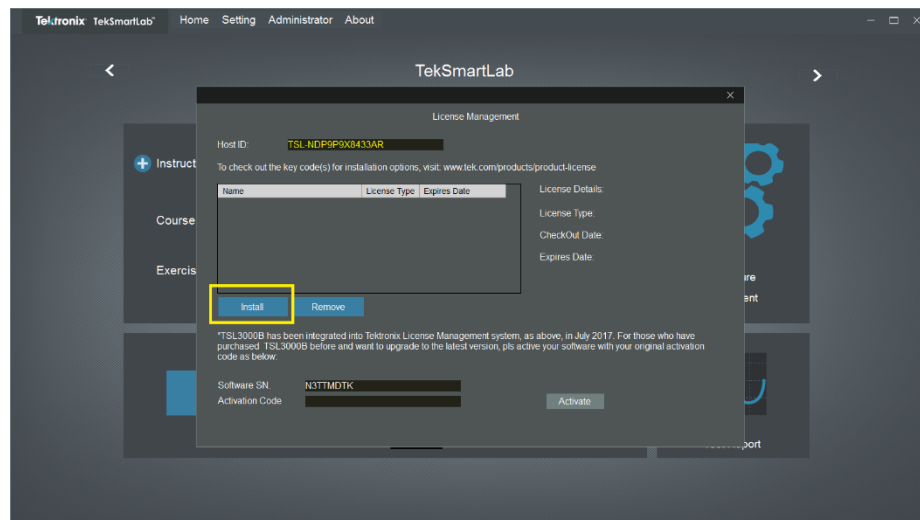


Figure 69: Install license

Click the **Install** License button and browse to the location where the license file is located. Select the license file and click **Open**. After the successful installation is finished, the software is listed in the table.

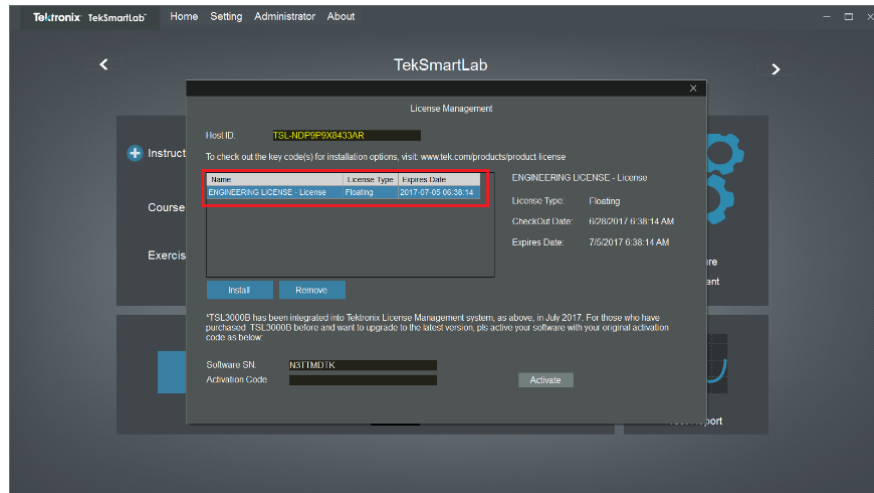


Figure 70: License install finished

**How to move the license to a different host.** You can return the license purchased and assign it to a different host on the other computer. TSL3000B-FL is a floating license, and it can be returned unlimited number of times and assigned to a different host.

In order to move the license to a different host, follow these steps:

Click **About > License Management** and select the license to return and click **Remove**.

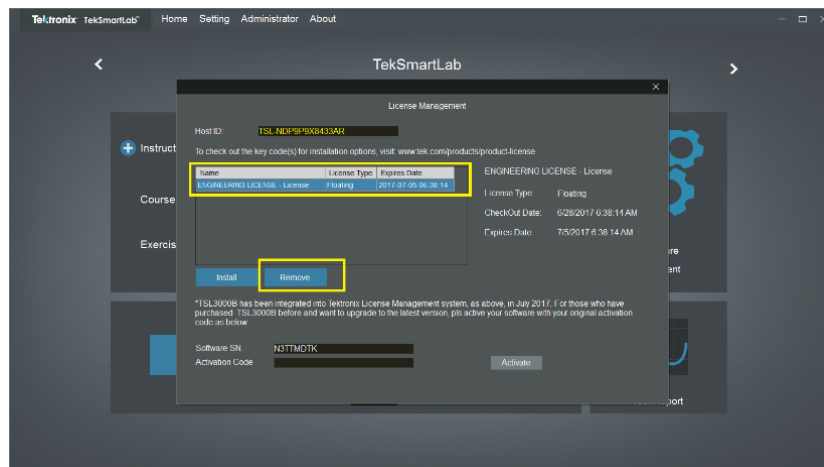


Figure 71: Select a license to remove

Browse to the location where you would like to place the exit file (for example, a network drive or a USB memory stick), and click **Save** to generate the exit file.

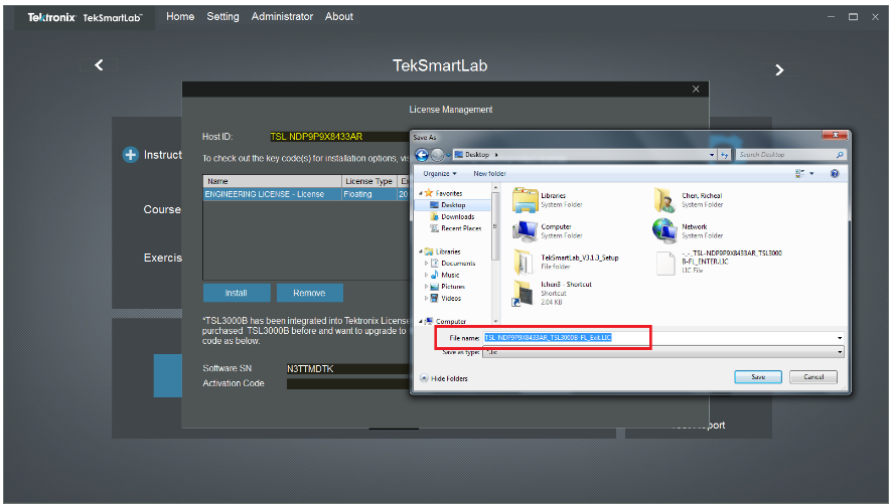


Figure 72: Export the license file

Login to your account on TekAMS (Tektronix Asset Management system) and upload the exit file. Once the license is returned successfully, it can be re-assigned to a computer with different host.

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

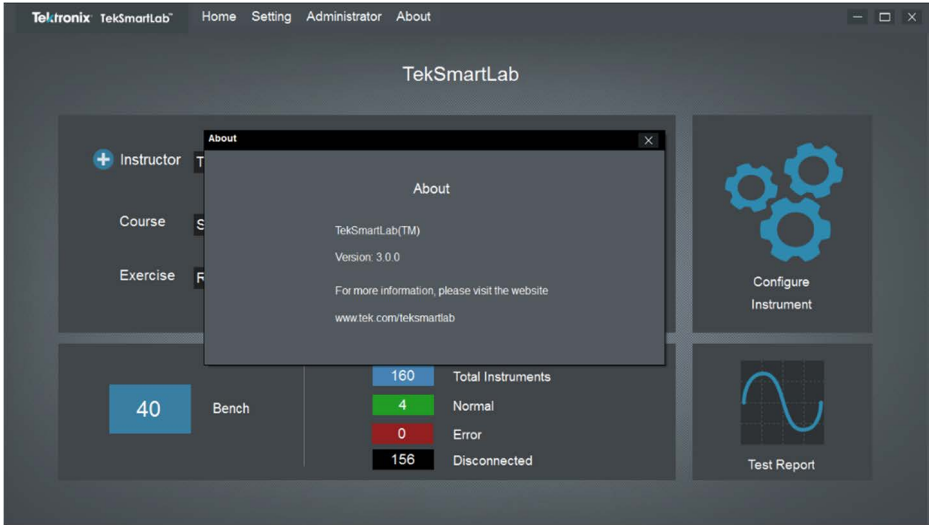


Figure 73: Software information



# 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.

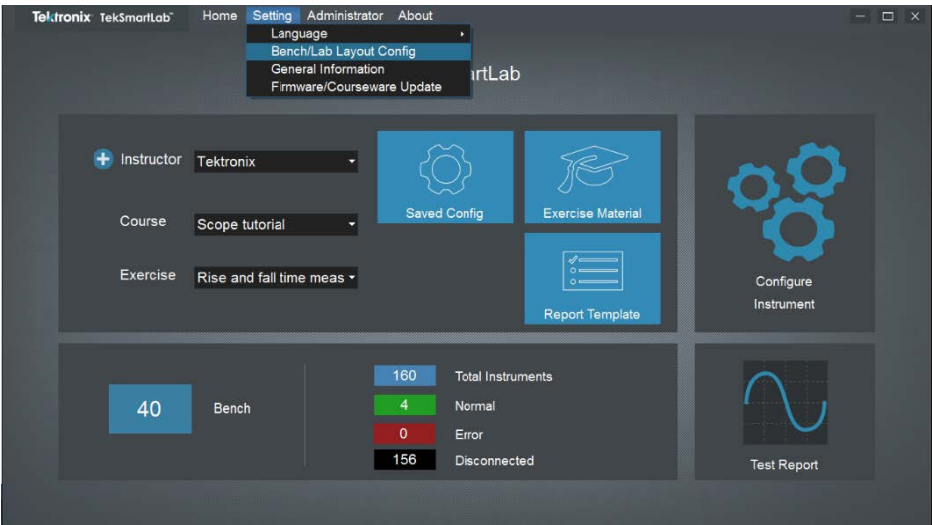


Figure 74: Bench/Lab layout configuration



### Bench layout setting

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

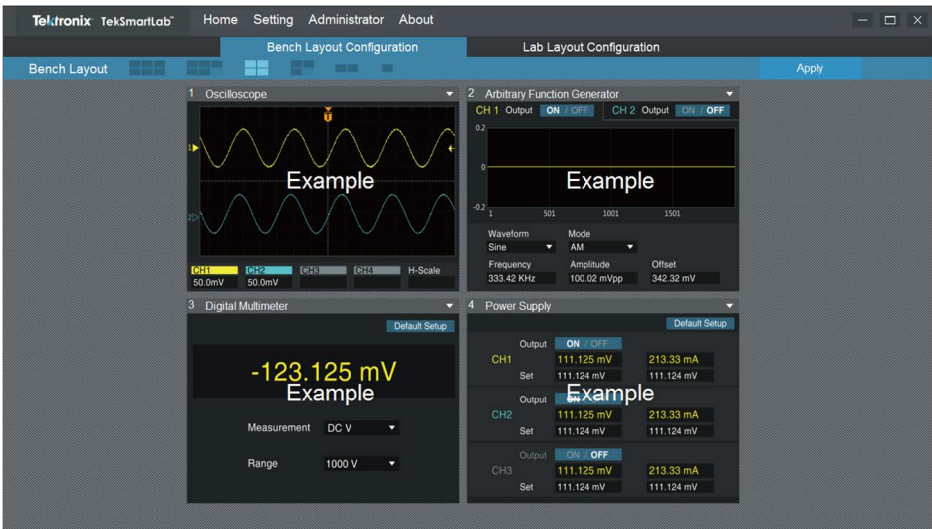


Figure 75: Bench layout configuration tab

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.

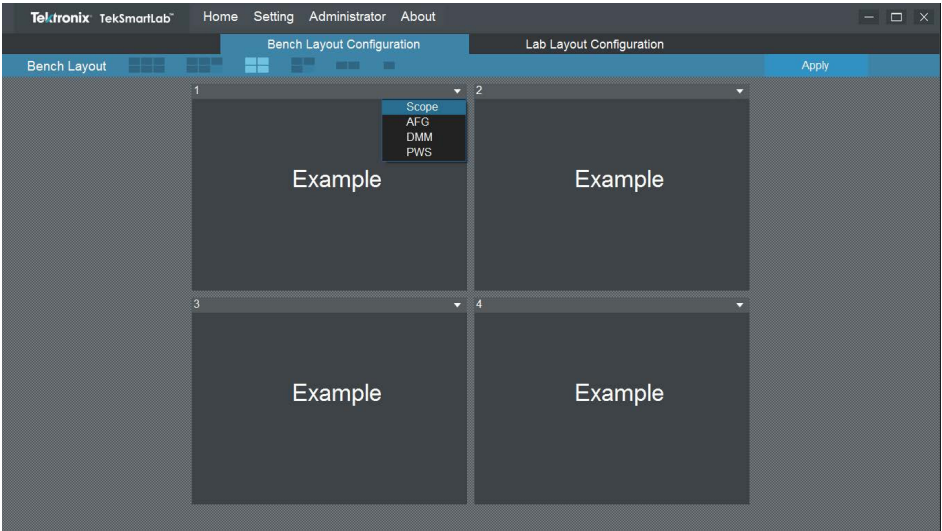


Figure 76: Choose the instrument type

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

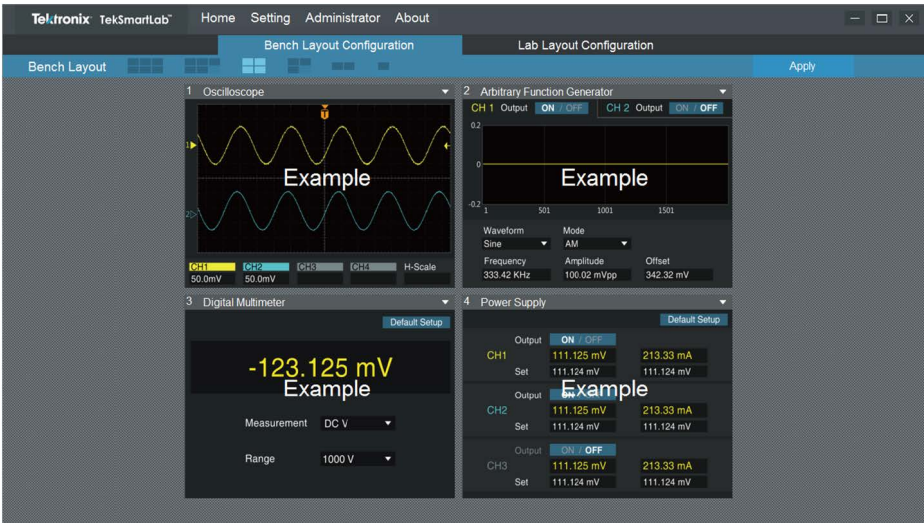


Figure 77: Instrument chosen

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.

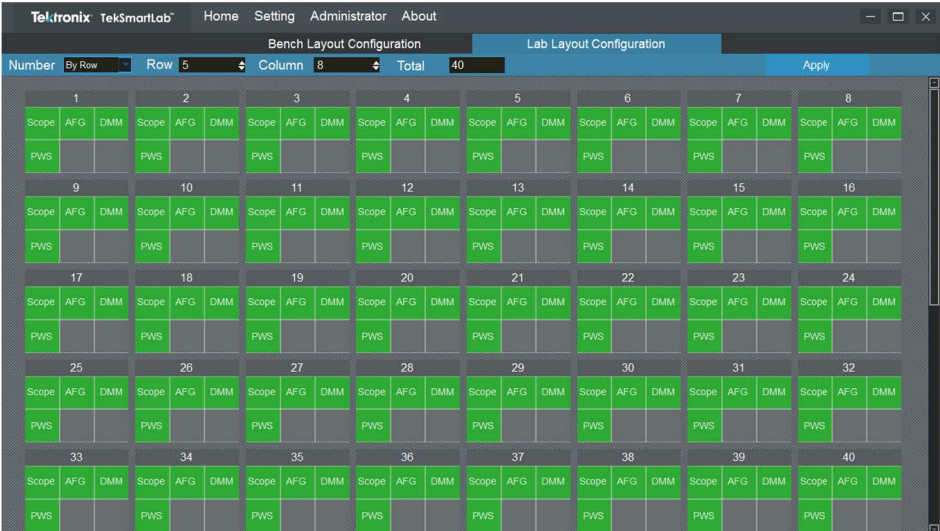


Figure 78: Lab layout configuration tab

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.

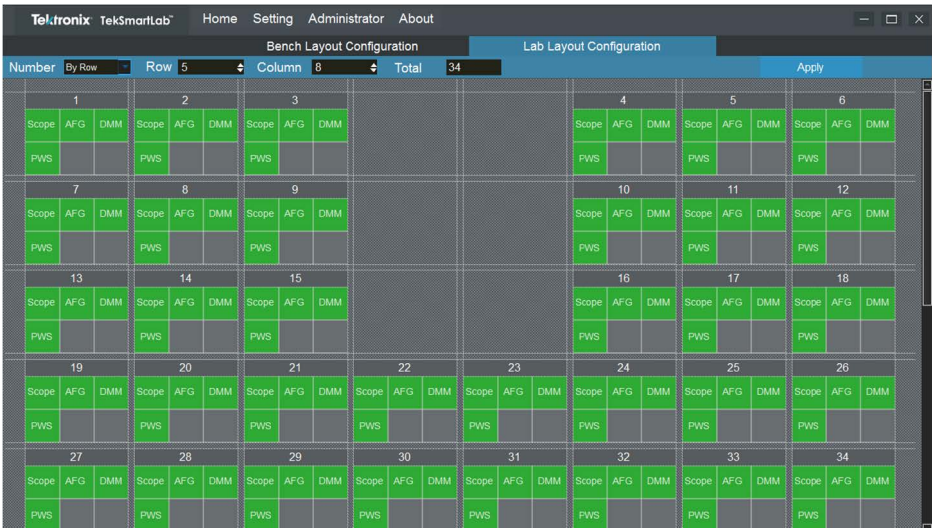


Figure 79: Arranging benches

**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 80: Number the benches manually

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

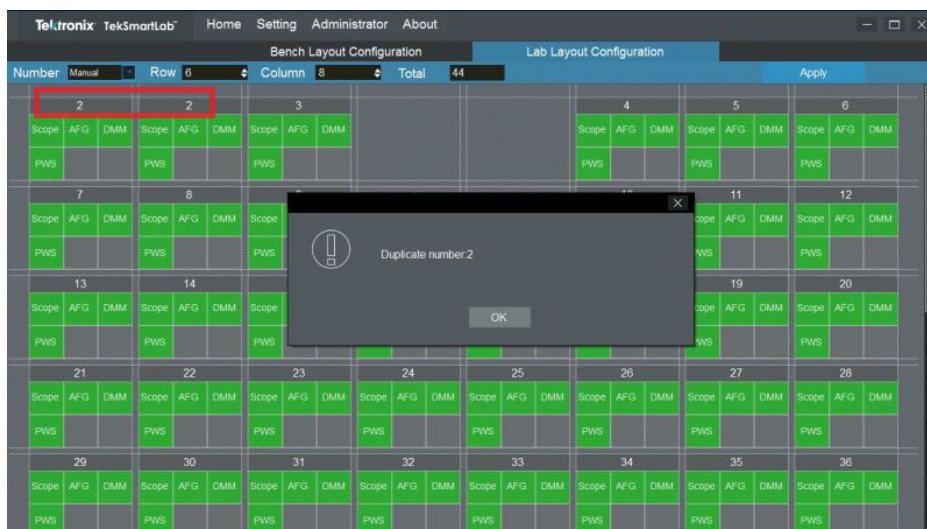


Figure 81: Two benches numbered the same

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.

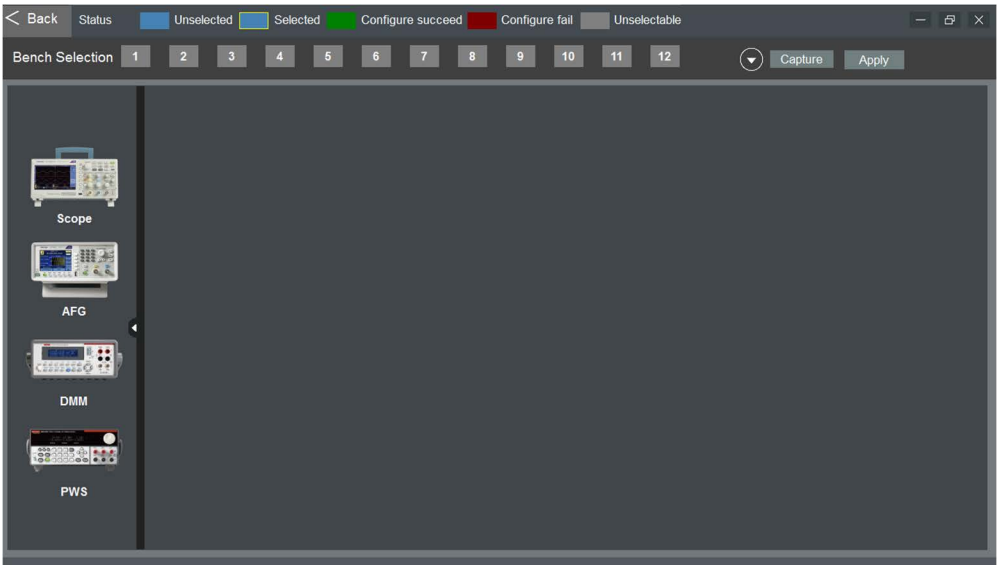


Figure 82: Configure instruments

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

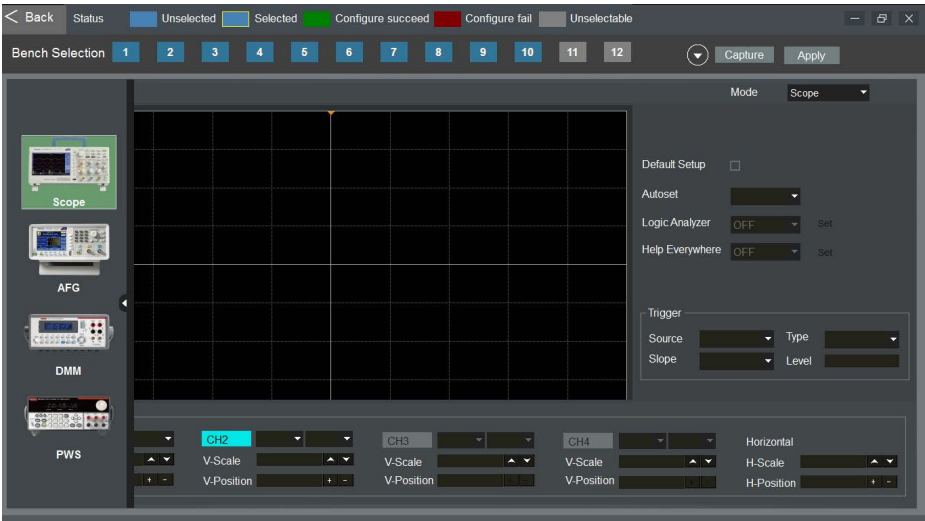


Figure 83: Instrument selected

- 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.

---

- 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.

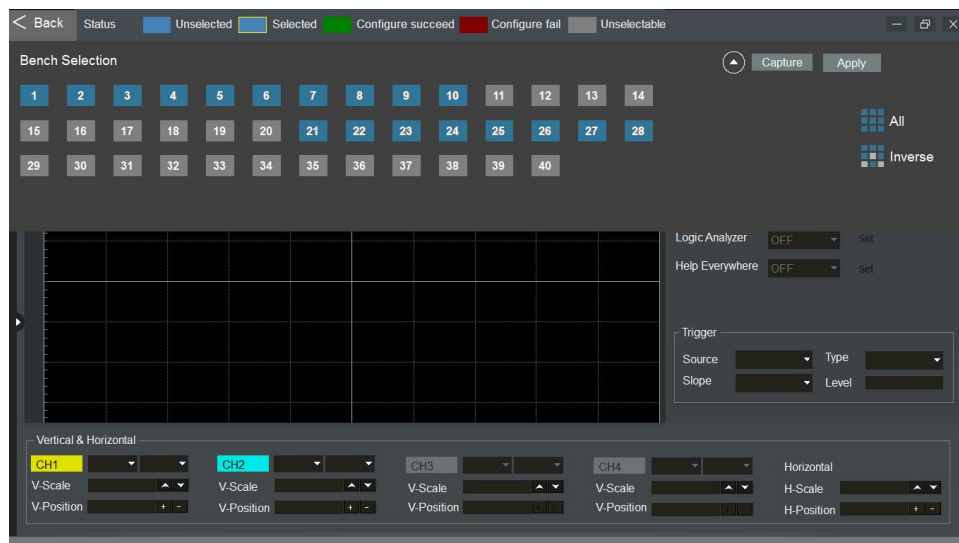


Figure 84: Select bench

- 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 85: Bench configured

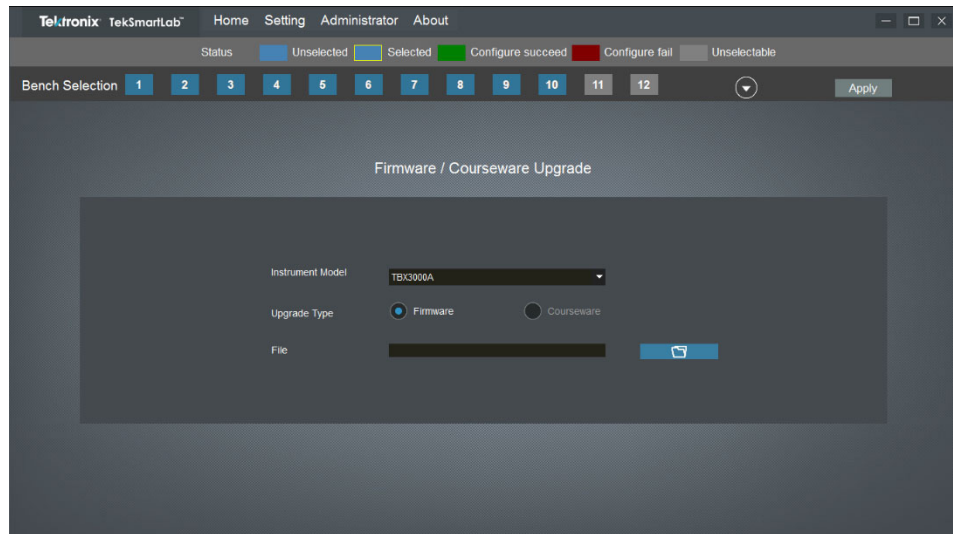
- You can also click **Capture** to get the configurations from a configured bench to distribute to other benches.

**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 has 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 86: 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.

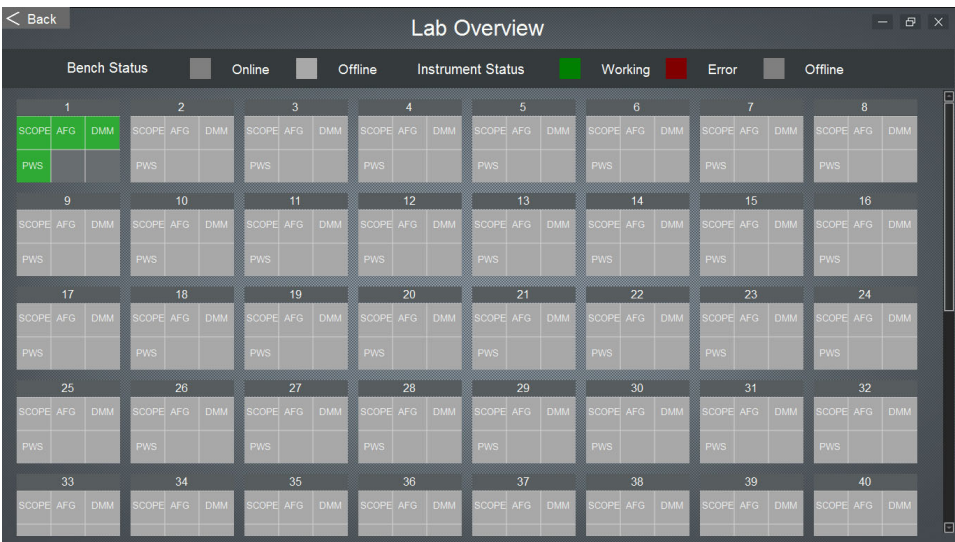


Figure 87: Lab overview

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 88: 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 restore icon in the upper right corner.

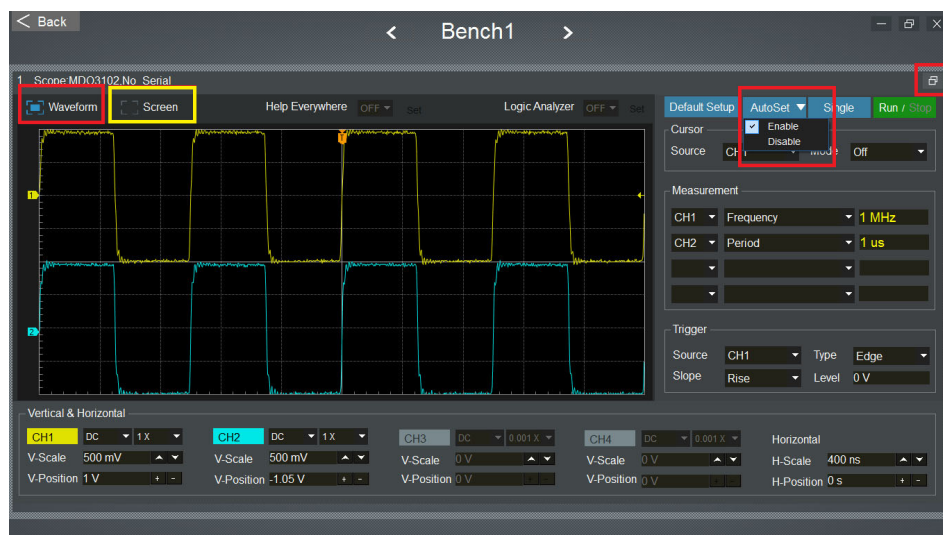


Figure 89: Oscilloscope page

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 90: Vertical and 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.

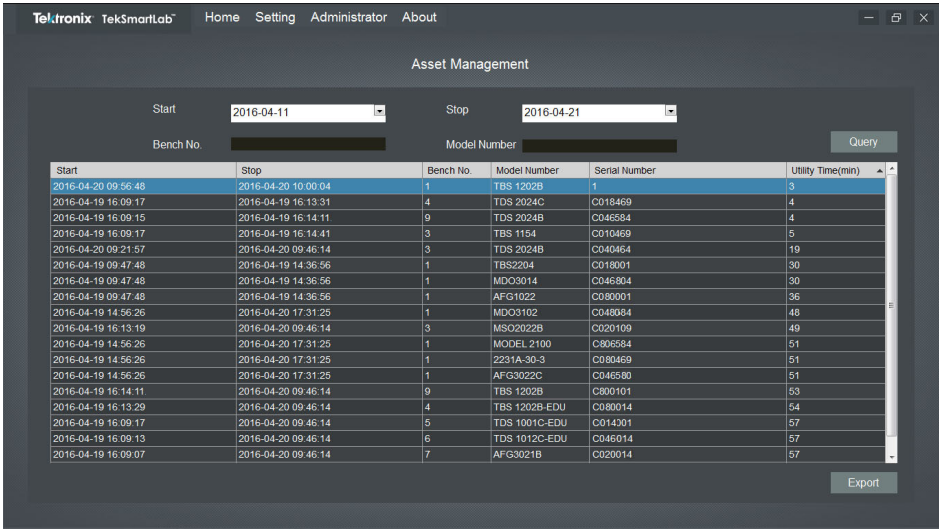


**Figure 91: Cursors**

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 92: 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 the TekSmartLab 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.

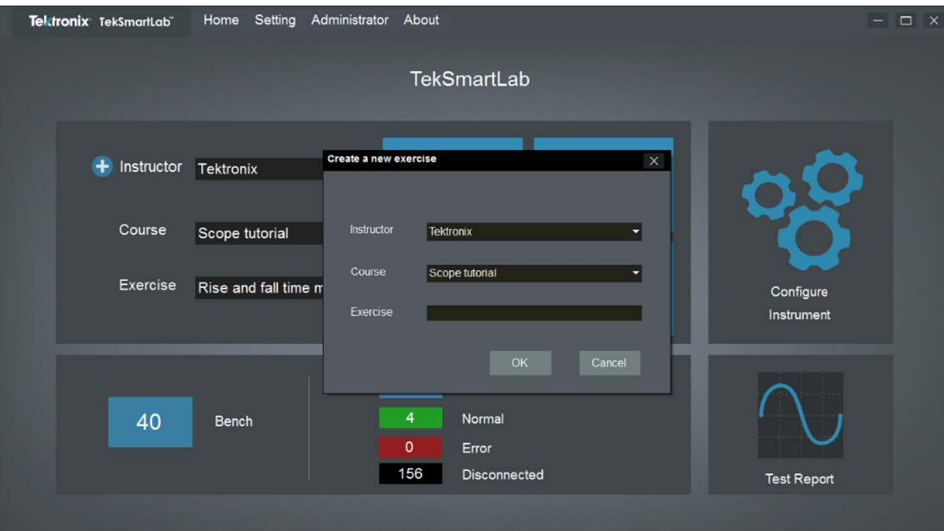


Figure 93: Create a new course

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.

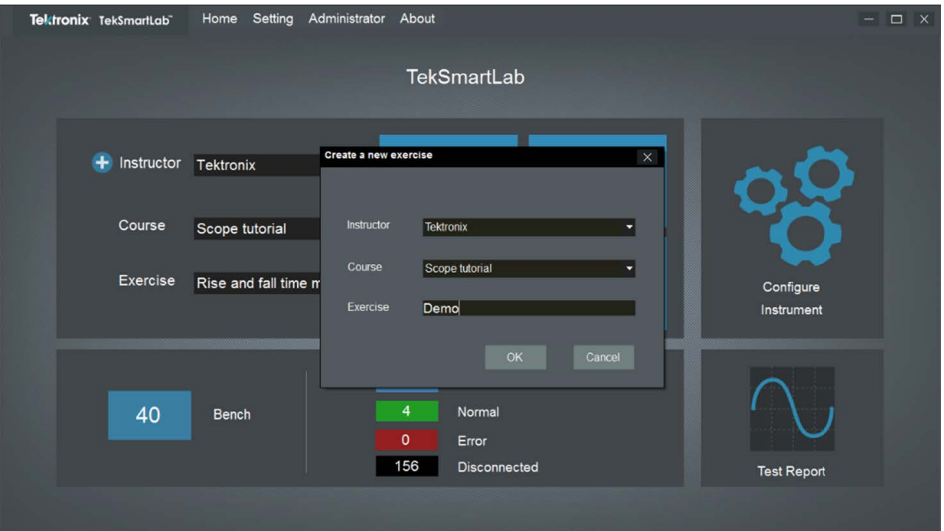


Figure 94: Create new exercise



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

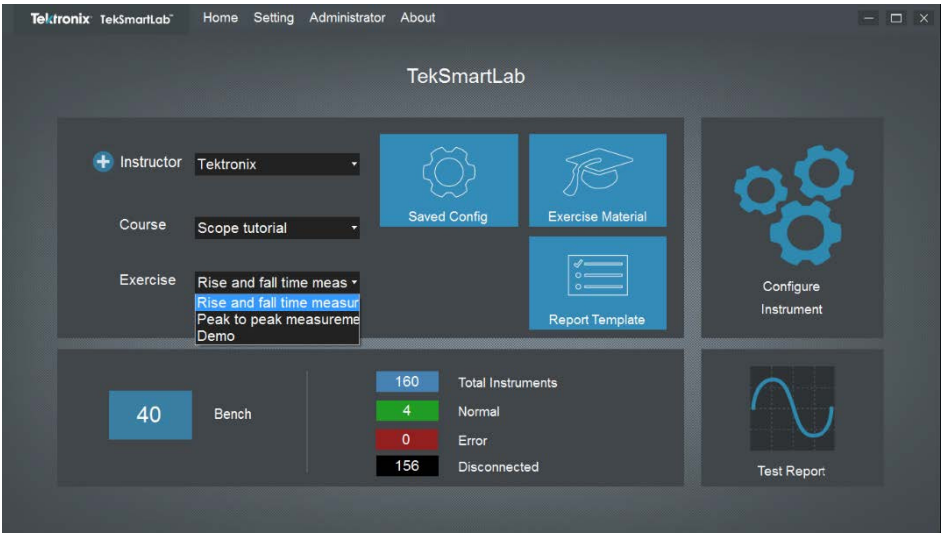


Figure 95: Select an existing exercise

**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.

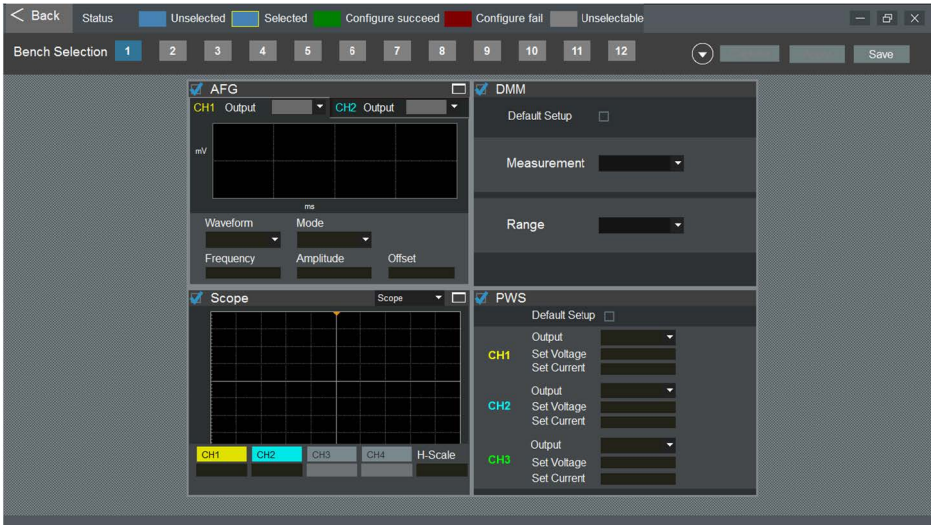


Figure 96: Configure the instruments

As shown in the previous 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 97: 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.

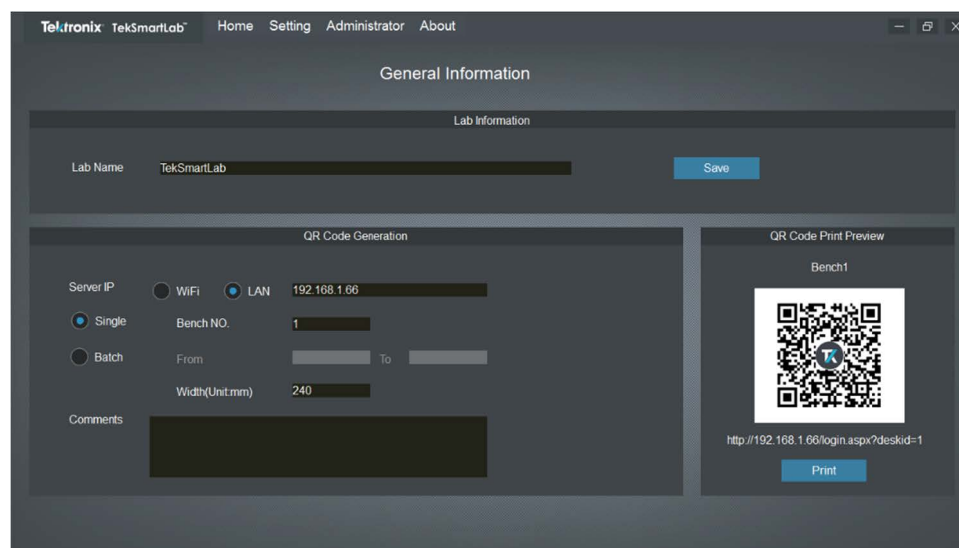


Figure 98: Generating QR code

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 benchspecific IP address distributed by the server.

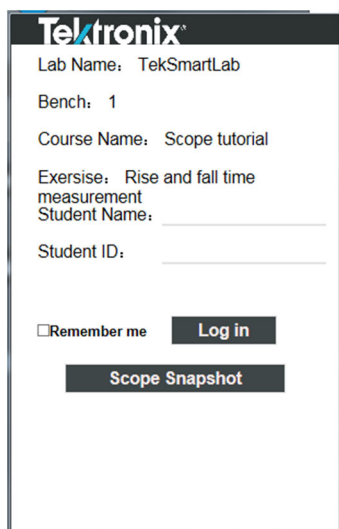
---

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.



The screenshot shows a web interface with the Tektronix logo at the top. Below the logo, the following information is displayed: Lab Name: TekSmartLab, Bench: 1, Course Name: Scope tutorial, Exercise: Rise and fall time measurement. There are input fields for Student Name and Student ID. A checkbox labeled 'Remember me' is next to a 'Log in' button. Below these is a 'Scope Snapshot' button.

**Figure 99: Log in to 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.

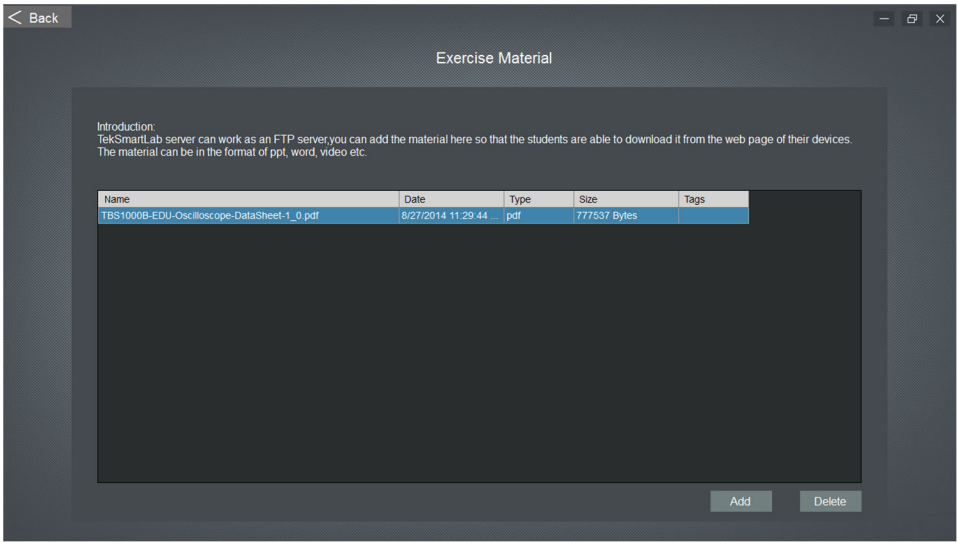


Figure 100: Edit exercise material

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

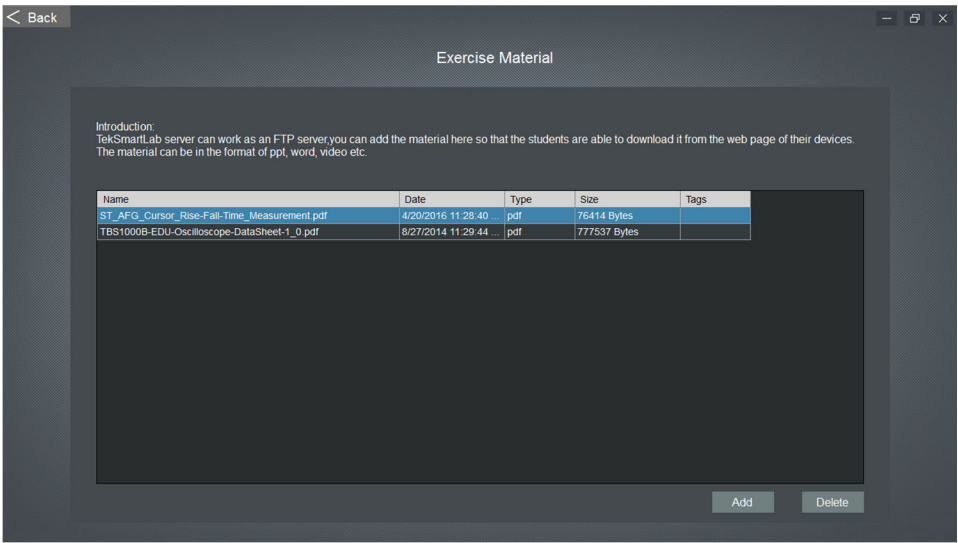


Figure 101: Add or delete exercise material

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

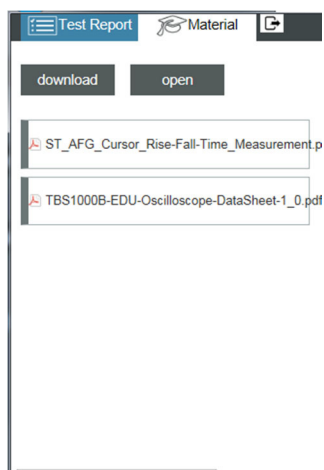


Figure 102: Download exercise material

## 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.

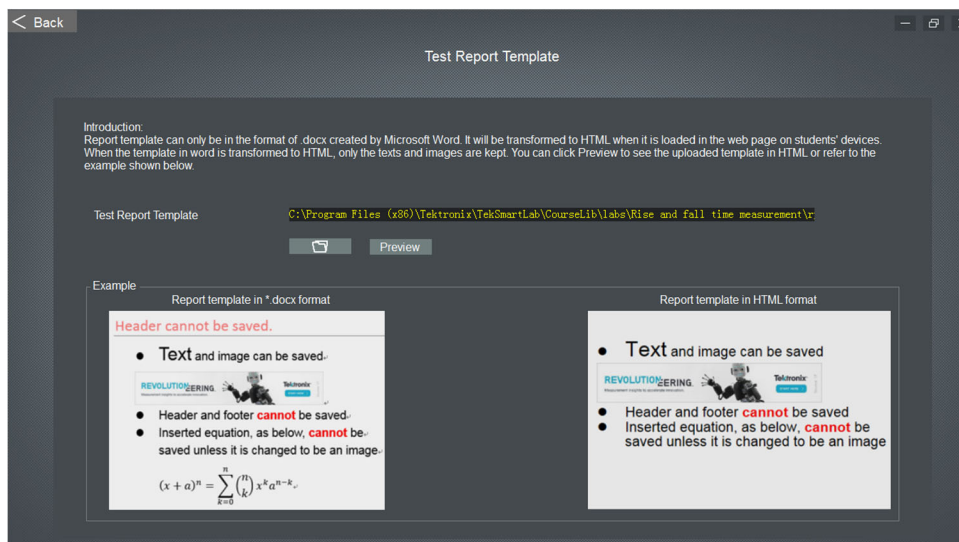


Figure 103: Importing test report template

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 104: 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.

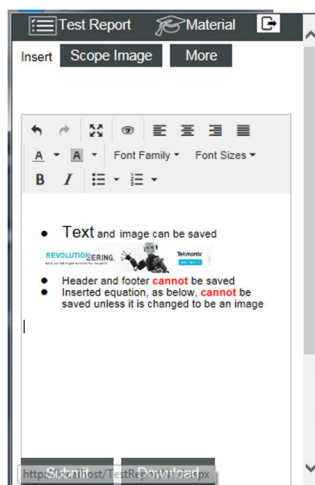
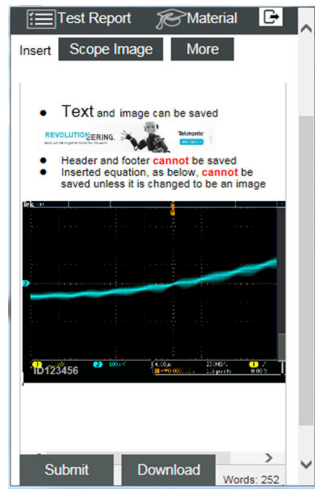


Figure 105: Create a new test report

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 106: 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.

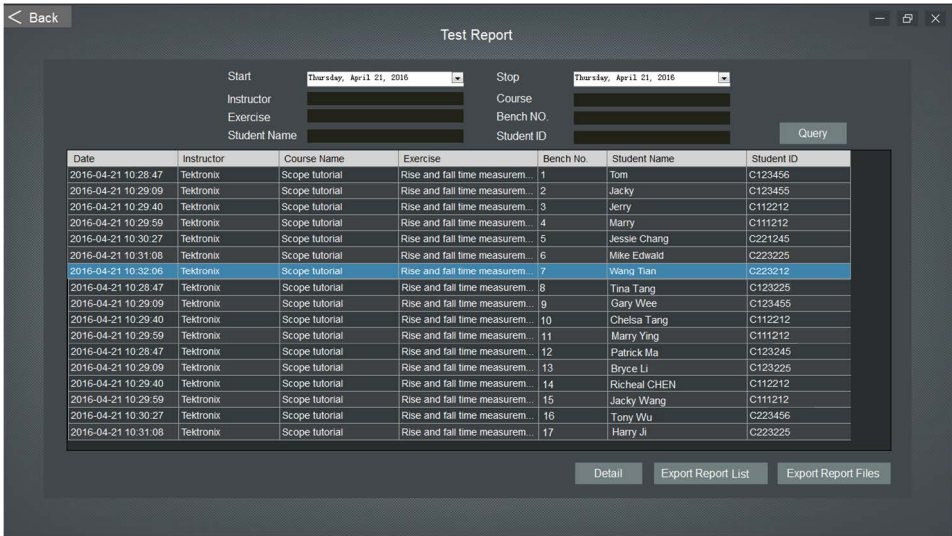


Figure 107: Query test report

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.

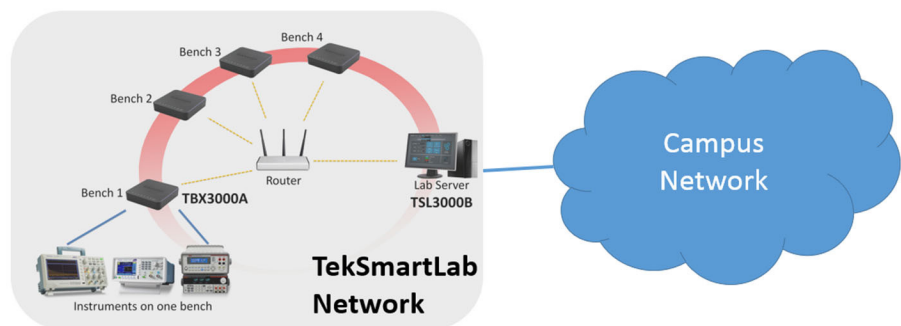
You can click **Delete** to delete the selected report.

## 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 108: TekSmartLab**

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 to 1 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:  $\geq -50\text{dBm}$  (recommended)
- WIFI signal to noise ratio:  $\geq 35\text{dB}$  (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, (See page 8, *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 109: 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:

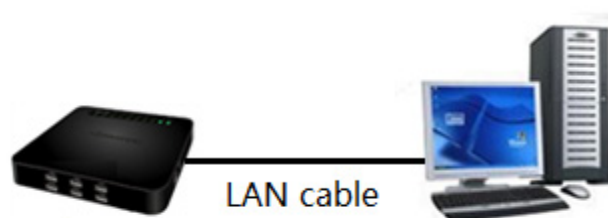


Figure 110: Connect the TBX3000A directly to a computer

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:

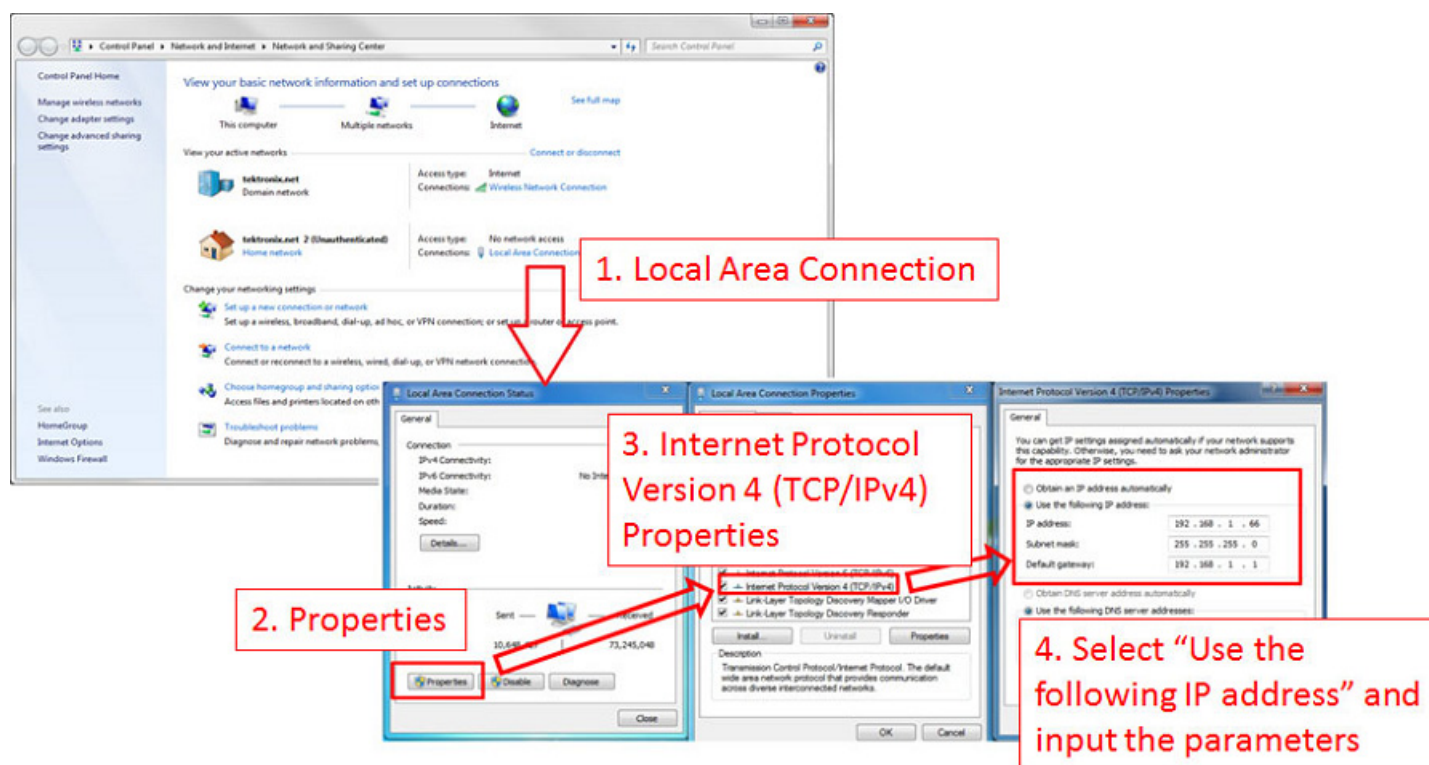


Figure 111: LAN configuration

The LAN parameters are set as follows:

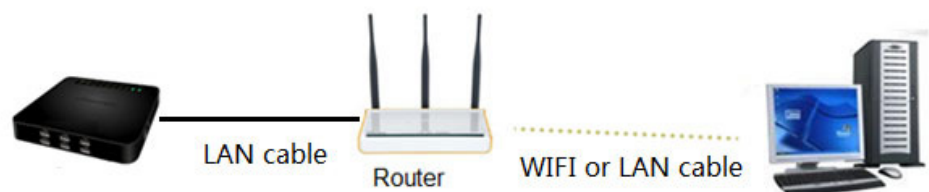
*IP address : 192.168.1.66*

*Subnet mask: 255.255.255.0*

*Default gateway: 192.168.1.1*

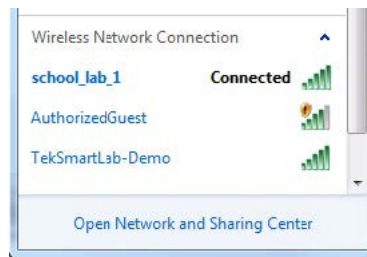
Enter the IP address 192.168.1.101 in your browser, and then configure the TBX3000A.

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



**Figure 112: 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 113: 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.

Welcome Page	
Instrument Model:	TBX3000A
Firmware Revision:	01.01.06_20150303
Serial Number:	C000001
LAN Connection Status:	Connected
WIFI Connection Status:	Disconnected
Host Name (FQDN):	Bench1.local

Figure 114: TBX3000A 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.

LAN Configuration	
Hostname:	Bench1
TCP/IP Configuration Mode:	Manual
IP Address:	192.168.1.101
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.1.1
Connect Status:	Connected
Speed:	100Mbps

**Modify**

Figure 115: LAN configuration

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

Modify LAN Configuration	
TCP/IP Configuration Mode:	<input type="radio"/> Automatic <input checked="" type="radio"/> Manual
IP Address:	192.168.1.101
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.1.1
Host Name:	Bench1

**Submit**

Figure 116: 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.

WIFI Configuration	
Hostname:	Bench1
TCP/IP Configuration Mode:	Manual
IP Address:	
Subnet Mask:	
Default Gateway:	
SSID:	
Connect Status:	Disconnected
Signal Intensity:	

Figure 117: WIFI configuration

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

SSID	BSSID	Strength	Security
<input type="radio"/> TekSmartLab-Demo	14:75:90:29:2D:52	<div></div>	WPA-PSK/TKIP
<input type="radio"/> DanaheTM	68:BD:AB:D2:75:A0	<div></div>	WPA2-802.1x/AES
<input type="radio"/> AuthorisedGuest	68:BD:AB:D2:75:A4	<div></div>	None
<input type="radio"/> AuthorizedGuest	68:BD:AB:D2:75:A2	<div></div>	None
<input type="radio"/>	68:BD:AB:D2:75:A1	<div></div>	WPA2-802.1x/AES
<input type="radio"/>	C0:61:18:B0:4C:06	<div></div>	WPA-PSK/WPA2-PSK/AES
<input checked="" type="radio"/> school_lab_1	50:BD:5F:37:5B:86	<div></div>	WPA-PSK/WPA2-PSK/AES
<input type="radio"/> school_lab_2	50:BD:5F:37:68:10	<div></div>	WPA-PSK/WPA2-PSK/AES
<input type="radio"/> teksmartlab-lbj	C0:61:18:B0:53:00	<div></div>	None
<input type="radio"/> richeal-smartlab	52:BD:5F:53:B3:50	<div></div>	None
<input type="radio"/> DanaheTM	B4:A4:E3:1E:4A:B0	<div></div>	WPA2-802.1x/AES

Tektronix®

Figure 118: 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.

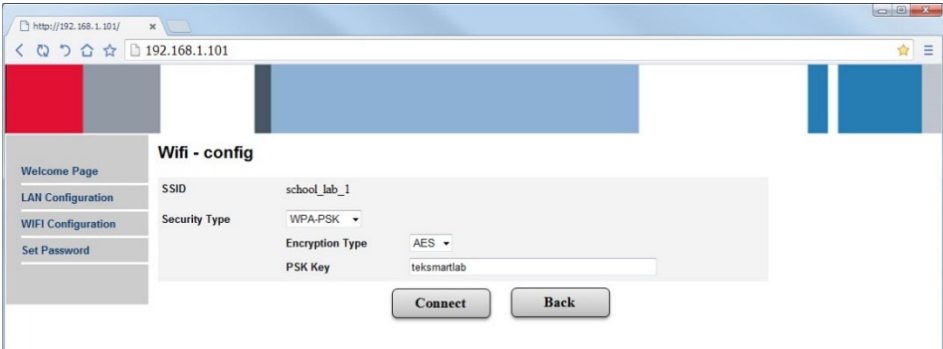


Figure 119: Input password

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

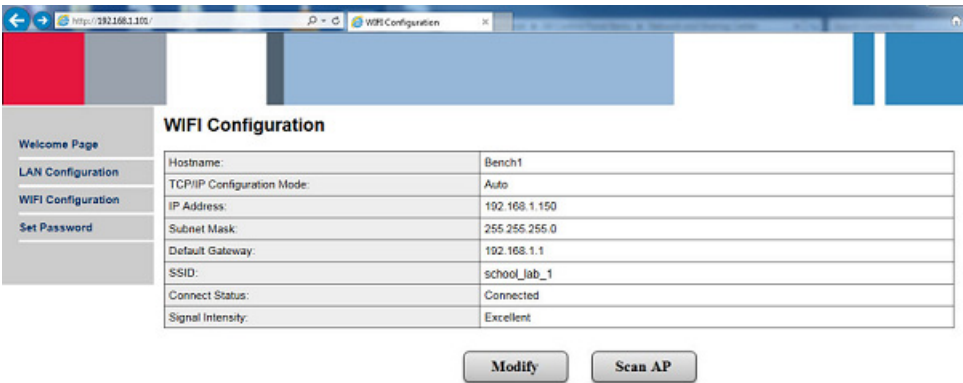


Figure 120: WIFI configuration

9. If you 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.

Modify WIFI Configuration	
TCP/IP Configuration Mode:	<input type="radio"/> Automatic <input checked="" type="radio"/> Manual
IP Address:	192.168.1.111
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.1.1
Host Name:	Bench1

**Submit**

Figure 121: Modify WIFI configuration

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

Welcome Page	
Instrument Model:	TBX3000A
Firmware Revision:	2.0.0
Serial Number:	C010977
LAN Connection Status:	Connected
WIFI Connection Status:	Connected
Host Name (FQDN):	Bench1.local

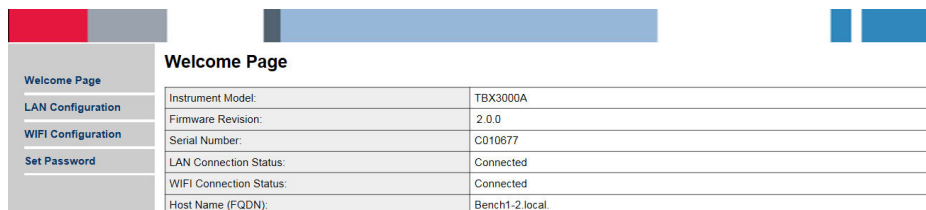
Figure 122: WIFI configuration finished

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.



The screenshot shows the 'Welcome Page' of a TBX3000A device. On the left is a sidebar with navigation links: 'Welcome Page' (selected), 'LAN Configuration', 'WIFI Configuration', and 'Set Password'. The main content area is titled 'Welcome Page' and contains a table with the following information:

Instrument Model:	TBX3000A
Firmware Revision:	2.0.0
Serial Number:	C010877
LAN Connection Status:	Connected
WIFI Connection Status:	Connected
Host Name (FQDN):	Bench1-2.local

Figure 123: 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.

LAN Configuration	
Hostname:	Bench1
TCP/IP Configuration Mode:	Manual
IP Address:	192.168.1.101
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.1.1
Connect Status:	Connected
Speed:	100Mbps

**Modify**

Figure 124: LAN configuration

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

Modify LAN Configuration	
TCP/IP Configuration Mode:	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
IP Address:	192.168.1.101
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.1.1
Host Name:	Bench1

**Submit**

Figure 125: 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 126: Four-instrument bench layout

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

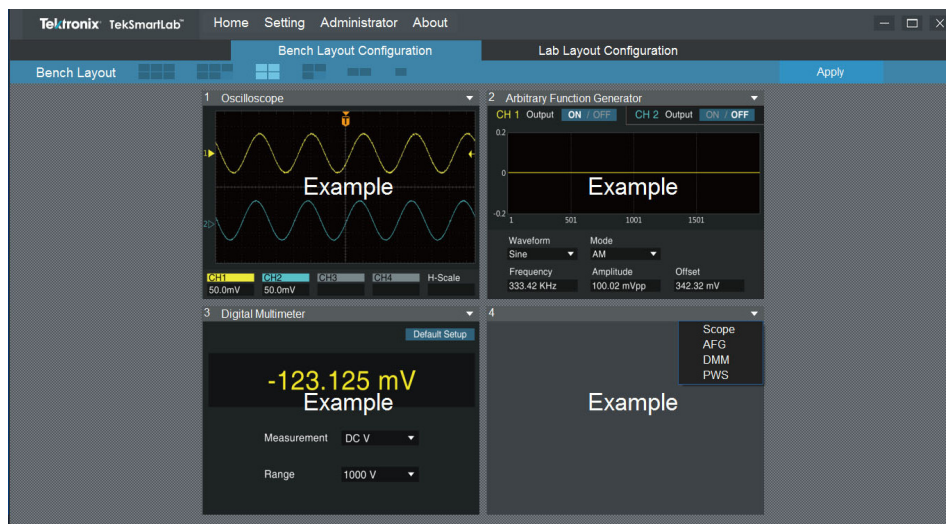


Figure 127: Choosing instruments

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.

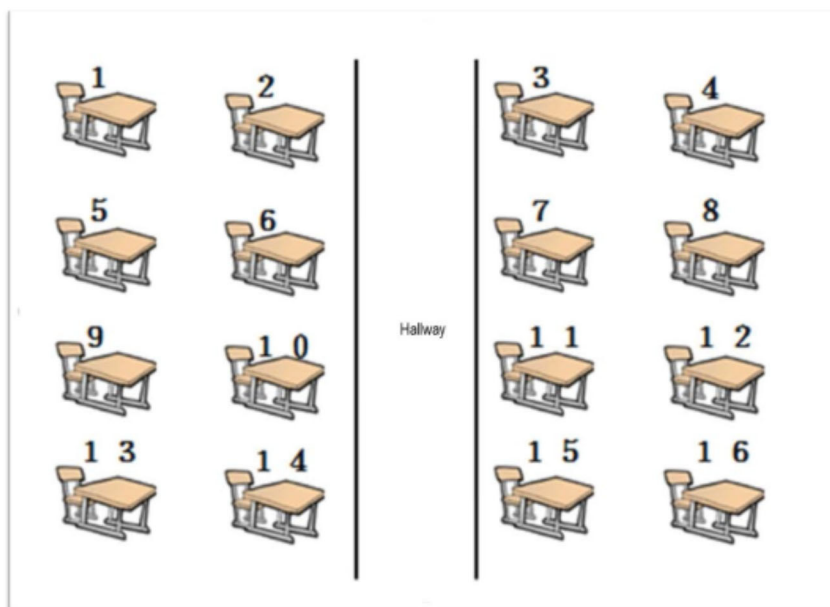


Figure 128: Lab layout

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 129: 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.

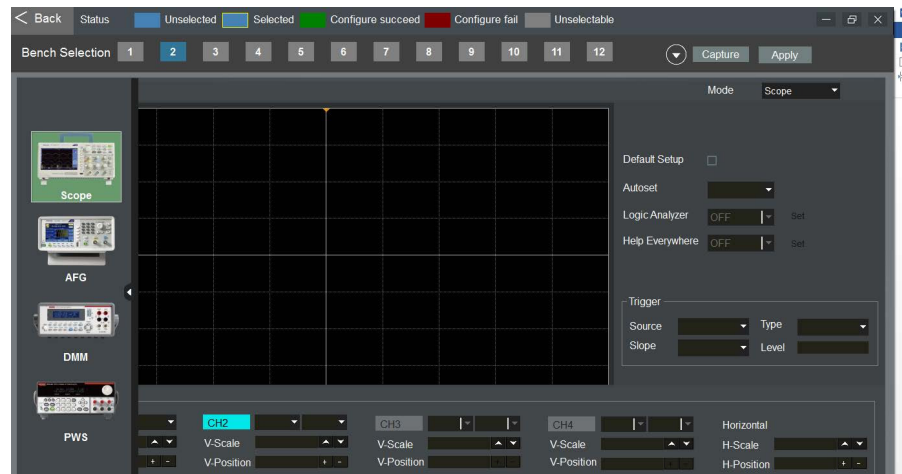


Figure 130: Configure instrument

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.

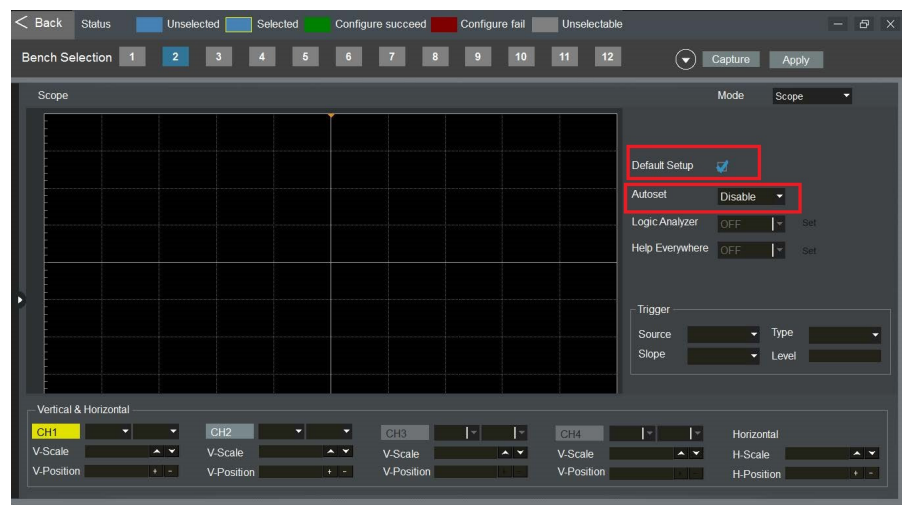


Figure 131: Configure oscilloscope

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



Figure 132: Bench selection

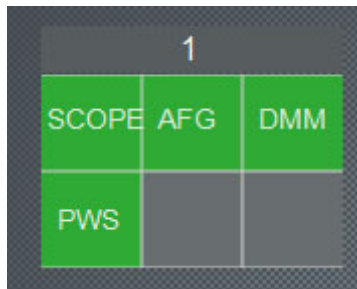
- Choose all the benches displayed in blue, or click **All** to choose.
- Click **Apply** to distribute the configuration to the chosen benches. The configured benches will be displayed in green.
- Press the **Autoset** button on the oscilloscope, and you will get a message that “Autoset is disabled.”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

## Monitoring a bench

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

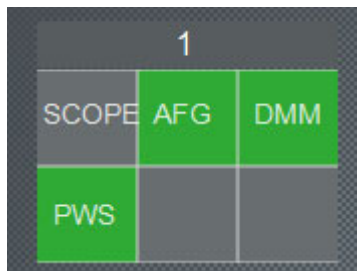
### Checking the status of an instrument

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



**Figure 133: 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 134: 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.

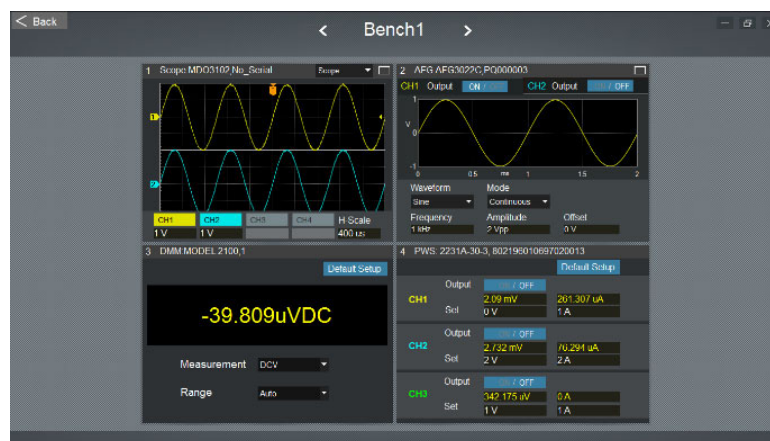


Figure 135: Monitoring a bench

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 136: 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.

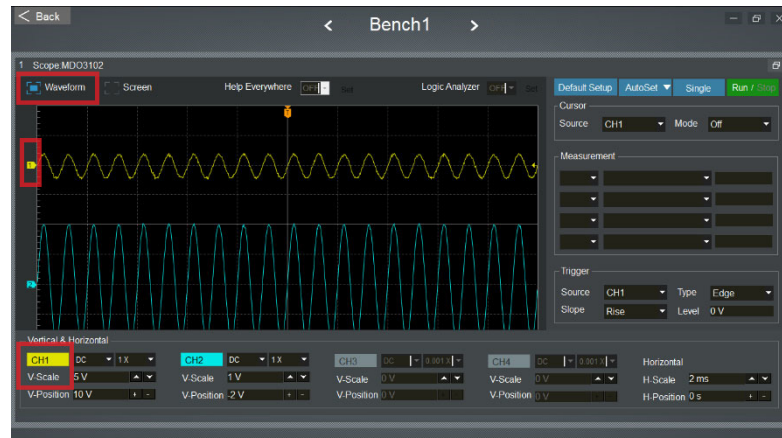


Figure 137: Monitoring an oscilloscope

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.

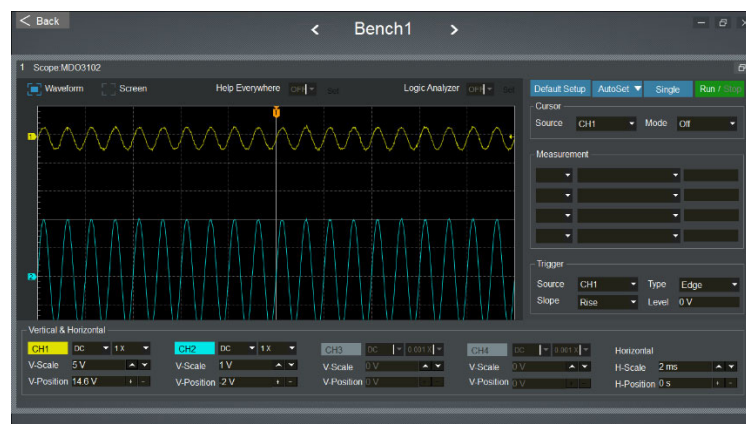
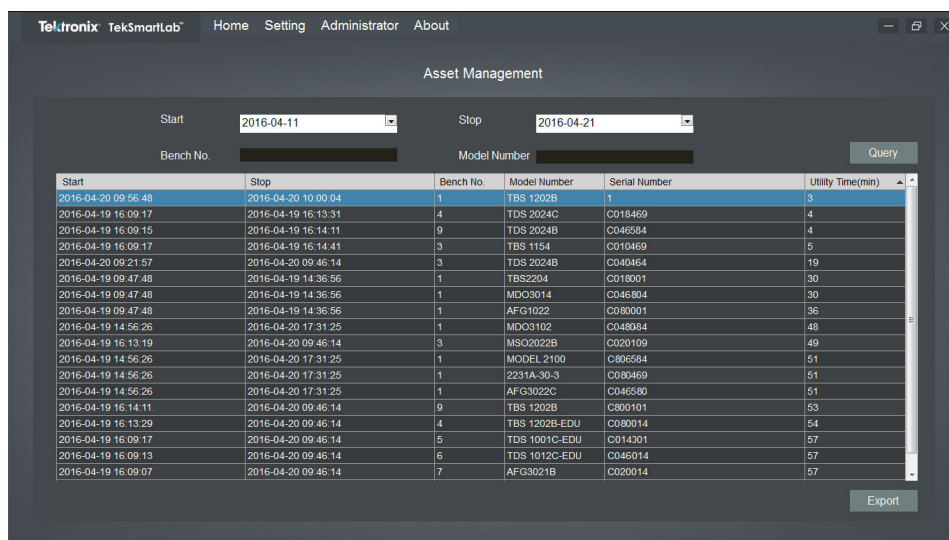


Figure 138: V-position changed

## 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.



The screenshot shows the 'Asset Management' window in the TekSmartLab application. It features a menu bar with 'Home', 'Setting', 'Administrator', and 'About'. Below the menu, there are input fields for 'Start' (2016-04-11) and 'Stop' (2016-04-21), and a 'Query' button. A table displays the results of the query, with columns for 'Start', 'Stop', 'Bench No.', 'Model Number', 'Serial Number', and 'Utility Time(min)'. The table contains 20 rows of data, including instrument models like TBS 1202B, TDS 2024C, and AFG3022C.

Start	Stop	Bench No.	Model Number	Serial Number	Utility Time(min)
2016-04-20 09:56:48	2016-04-20 10:00:04	1	TBS 1202B	1	3
2016-04-19 16:09:17	2016-04-19 16:13:31	4	TDS 2024C	C018469	4
2016-04-19 16:09:15	2016-04-19 16:14:11	9	TDS 2024B	C046584	4
2016-04-19 16:09:17	2016-04-19 16:14:41	3	TBS 1154	C010469	5
2016-04-20 09:21:57	2016-04-20 09:46:14	3	TDS 2024B	C040464	19
2016-04-19 09:47:48	2016-04-19 14:36:56	1	TBS2204	C018001	30
2016-04-19 09:47:48	2016-04-19 14:36:56	1	MDO3014	C046804	30
2016-04-19 09:47:48	2016-04-19 14:36:56	1	AFG1022	C080001	36
2016-04-19 14:56:26	2016-04-20 17:31:25	1	MDO3102	C048084	48
2016-04-19 16:13:19	2016-04-20 09:46:14	3	MSO2022B	C020109	49
2016-04-19 14:56:26	2016-04-20 17:31:25	1	MODEL 2100	C806584	51
2016-04-19 14:56:26	2016-04-20 17:31:25	1	2231A-30-3	C080469	51
2016-04-19 14:56:26	2016-04-20 17:31:25	1	AFG3022C	C046580	51
2016-04-19 16:14:11	2016-04-20 09:46:14	9	TBS 1202B	C800101	53
2016-04-19 16:13:29	2016-04-20 09:46:14	4	TBS 1202B-EDU	C080014	54
2016-04-19 16:09:17	2016-04-20 09:46:14	5	TDS 1001C-EDU	C014301	57
2016-04-19 16:09:13	2016-04-20 09:46:14	6	TDS 1012C-EDU	C046014	57
2016-04-19 16:09:07	2016-04-20 09:46:14	7	AFG3021B	C020014	57

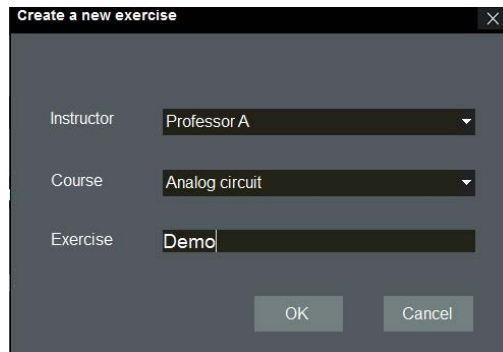
Figure 139: Query the instruments

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.



A dialog box titled "Create a new exercise" with a close button (X) in the top right corner. It contains three dropdown menus: "Instructor" with "Professor A" selected, "Course" with "Analog circuit" selected, and "Exercise" with "Demo" entered. At the bottom are "OK" and "Cancel" buttons.

Figure 140: 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.

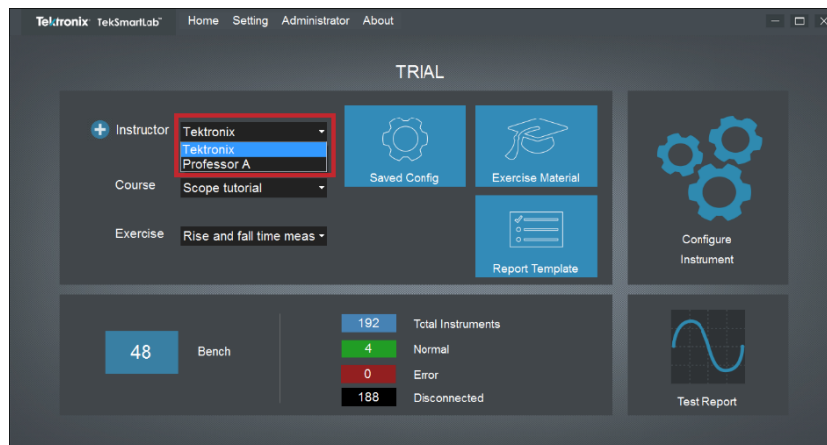


Figure 141: Selecting an instructor

## 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 142: Select Scope and AFG



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



Figure 143: 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.

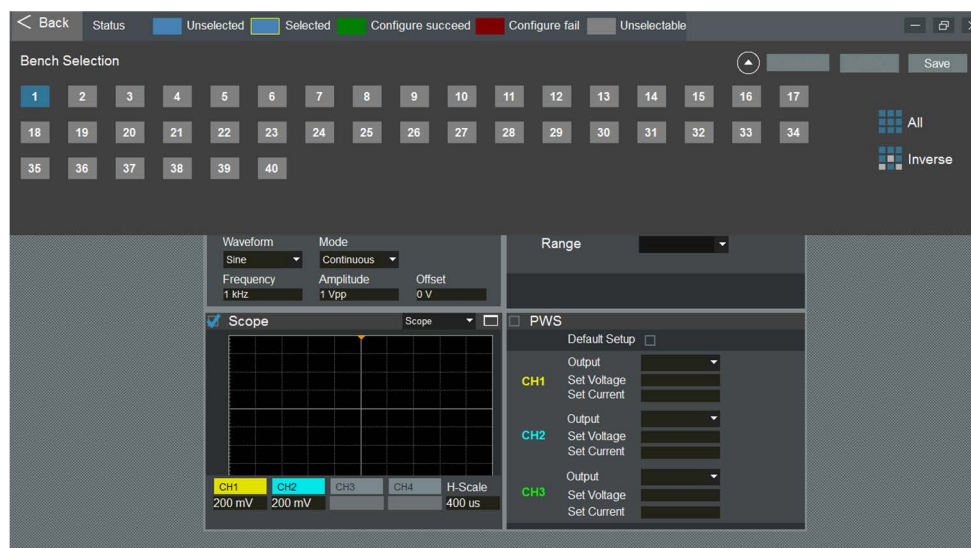


Figure 144: Apply to other benches

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 145: 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.

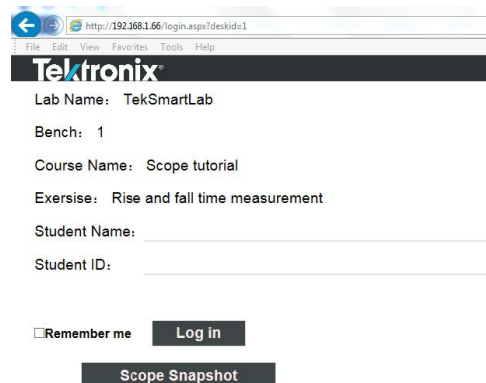


Figure 146: Visiting bench webpage

## 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.

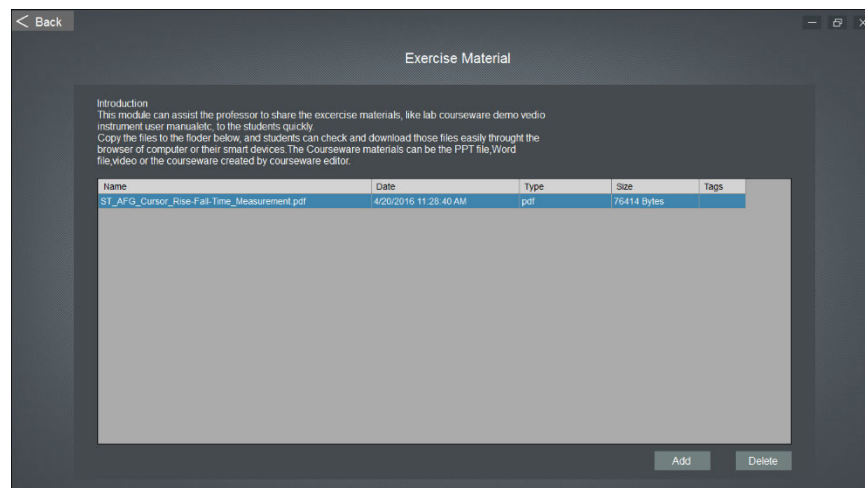


Figure 147: Share exercise material



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.

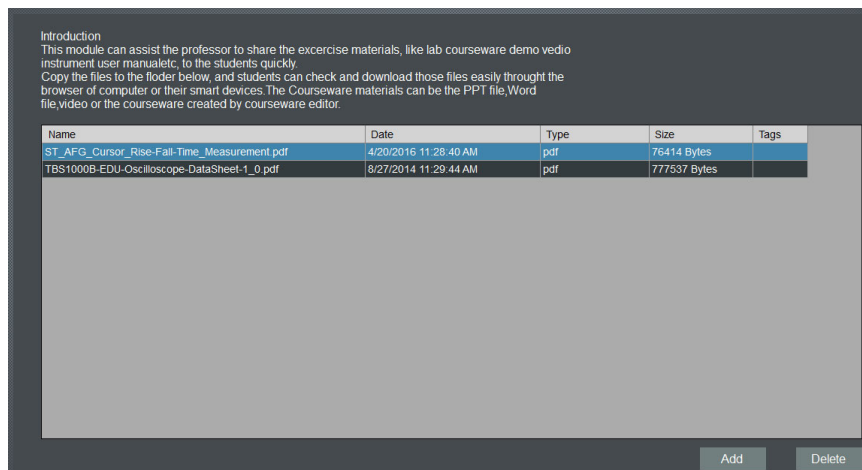


Figure 148: Add exercise material

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.

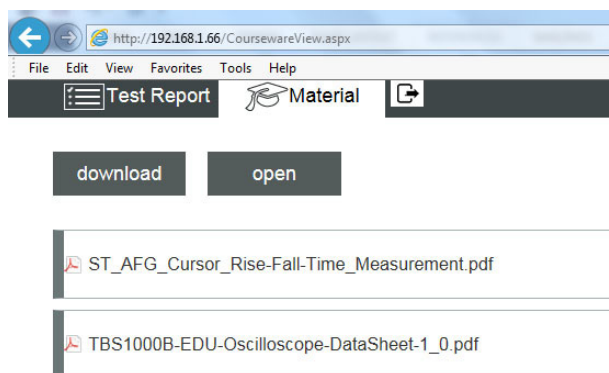


Figure 149: Access exercise material

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.

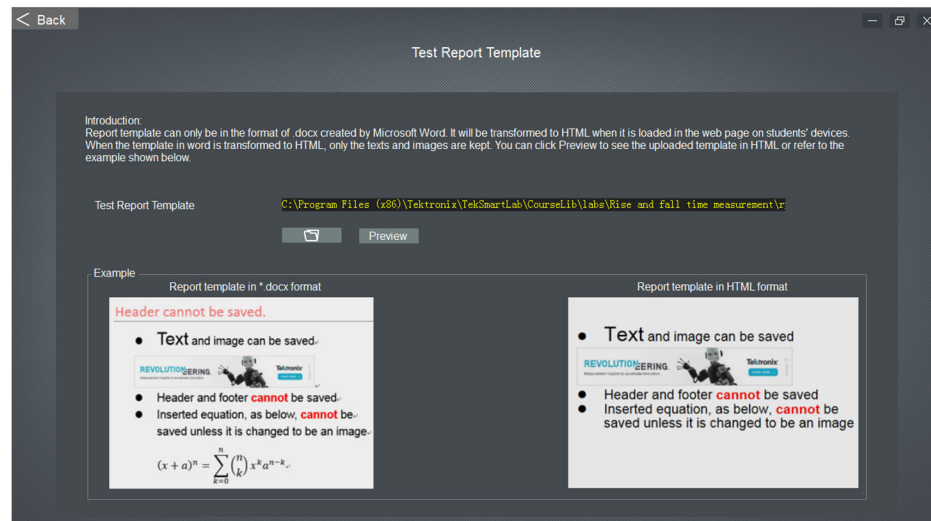



Figure 150: Edit report template

2. Click **Preview** to check the existing template.
3. You can also create your own template and click the  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.

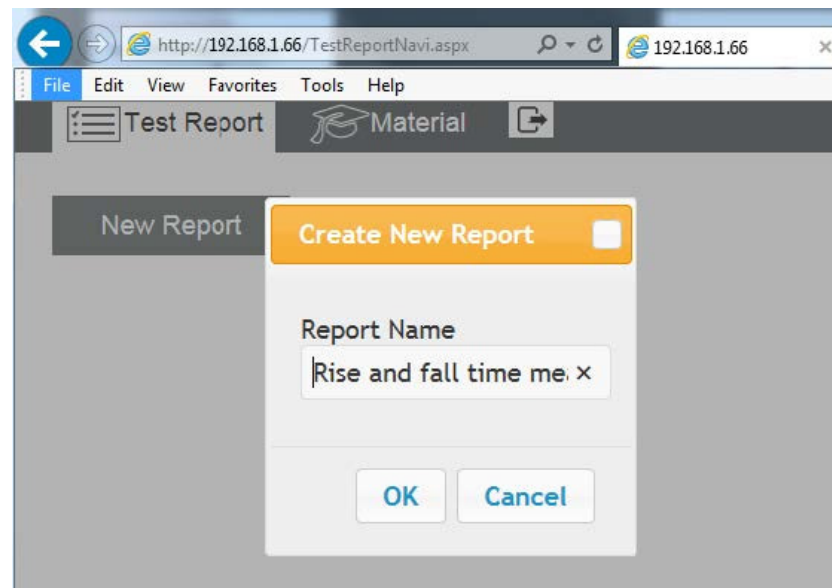


Figure 151: Create a new report

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

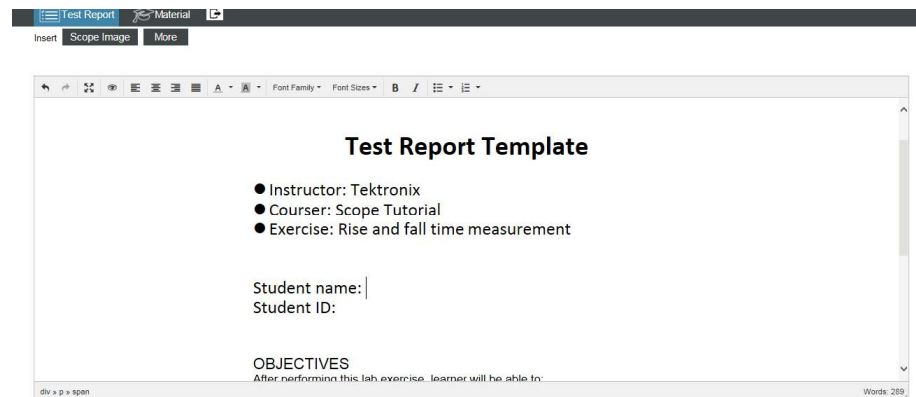


Figure 152: Edit new report

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

- 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.

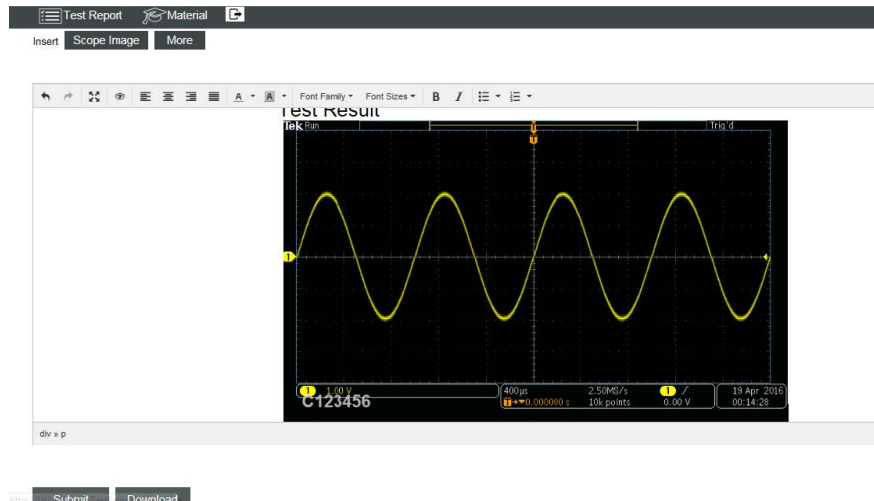


Figure 153: Scope snapshot inserted

- Click **Submit**.
- 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.

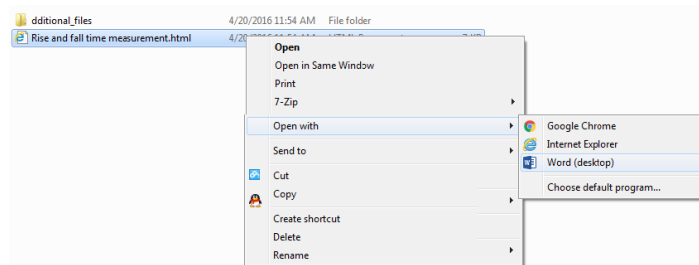


Figure 154: Open the test report on the computer

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.

The screenshot shows a 'Test Report' window with a query form at the top and a table of test results below. The query form includes fields for Start, Stop, Instructor, Course, Exercise, Bench NO, Student Name, and Student ID, along with a 'Query' button. The table below lists test results with columns for Date, Instructor, Course Name, Exercise, Bench No, Student Name, and Student ID. The table contains 17 rows of data, with the 7th row highlighted in blue.

Date	Instructor	Course Name	Exercise	Bench No	Student Name	Student ID
2016-04-21 10:28:47	Tektronix	Scope tutorial	Rise and fall time measur...	1	Tom	C123456
2016-04-21 10:29:09	Tektronix	Scope tutorial	Rise and fall time measur...	2	Jacky	C123455
2016-04-21 10:29:40	Tektronix	Scope tutorial	Rise and fall time measur...	3	Jerry	C112212
2016-04-21 10:29:59	Tektronix	Scope tutorial	Rise and fall time measur...	4	Marry	C111212
2016-04-21 10:30:27	Tektronix	Scope tutorial	Rise and fall time measur...	5	Jessie Chang	C221245
2016-04-21 10:31:08	Tektronix	Scope tutorial	Rise and fall time measur...	6	Mike Edward	C223225
2016-04-21 10:32:06	Tektronix	Scope tutorial	Rise and fall time measur...	7	Wang Tian	C223212
2016-04-21 10:28:47	Tektronix	Scope tutorial	Rise and fall time measur...	8	Tina Tang	C123225
2016-04-21 10:29:09	Tektronix	Scope tutorial	Rise and fall time measur...	9	Gary Wee	C123455
2016-04-21 10:29:40	Tektronix	Scope tutorial	Rise and fall time measur...	10	Chelsea Tang	C112212
2016-04-21 10:29:59	Tektronix	Scope tutorial	Rise and fall time measur...	11	Marry Yang	C111212
2016-04-21 10:28:47	Tektronix	Scope tutorial	Rise and fall time measur...	12	Patrick Ma	C123245
2016-04-21 10:29:09	Tektronix	Scope tutorial	Rise and fall time measur...	13	Bryce Li	C123225
2016-04-21 10:29:40	Tektronix	Scope tutorial	Rise and fall time measur...	14	Richeal CHEN	C112212
2016-04-21 10:29:59	Tektronix	Scope tutorial	Rise and fall time measur...	15	Jacky Wang	C111212
2016-04-21 10:30:27	Tektronix	Scope tutorial	Rise and fall time measur...	16	Tony Wu	C223456
2016-04-21 10:31:08	Tektronix	Scope tutorial	Rise and fall time measur...	17	Harry Ji	C223225

At the bottom of the window, there are buttons for 'Detail', 'Export Report List', 'Export Report Files', and 'Delete'.

Figure 155: 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.

## Campus Level TekSmartLab

When one lab manager must manage multiple labs, it can be a challenge to manage all of the instruments efficiently since the lab manager needs to spend time visiting each of the different labs. With campus level TekSmartLab, the lab manager can centrally control and monitor the instruments in different labs remotely from his own office.

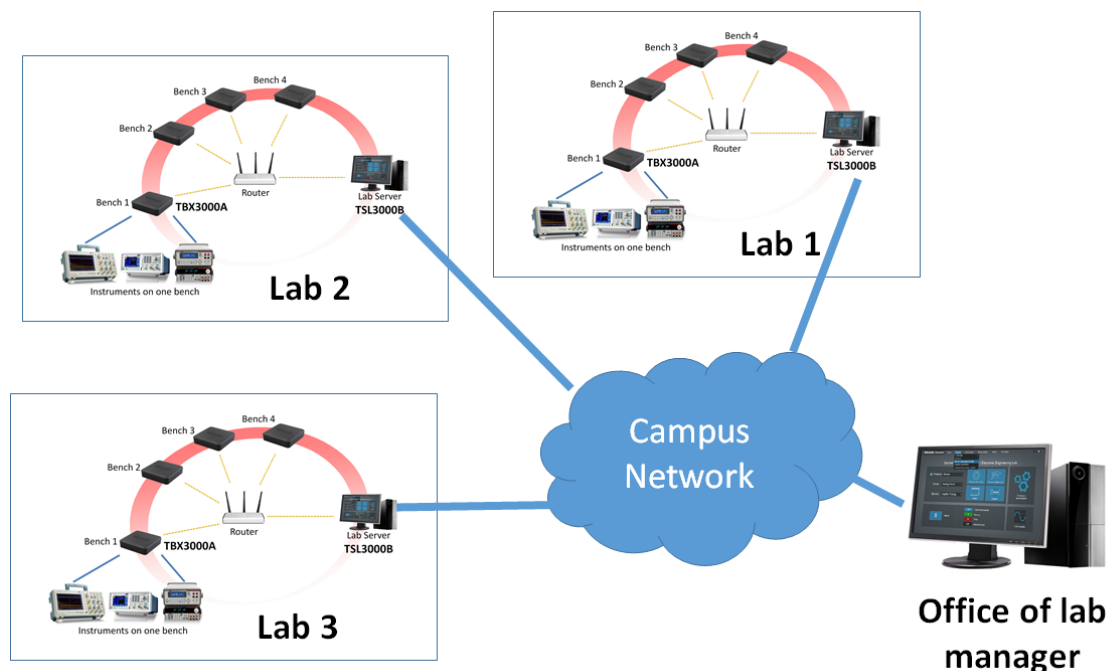


Figure 156: Campus level TekSmartLab network diagram

As shown in the example above, TekSmartLab systems are setup in each of the labs and the lab servers are connected to a local area network, such as a campus network. TekSmartLab software is installed on the lab manager's computer, which is connected to the same local area network. When the IP addresses of lab servers and lab manager computers can communicate with each properly, lab manager can access to the lab server in certain lab, and centrally control and monitor the instruments in that lab remotely.

Here is the process to setup campus level TekSmartLab through a campus network

### For lab server in a specific lab

1. Refer to Installing TSL3000B to install TSL3000B properly on the lab server, (See page 8, *Installing TSL3000B*.).
2. Start TSL3000B TekSmartLab software, and click **Setting -> Remote Lab configuration** on the menu bar.
3. Select **IP address**, which should be the IP of lab server when connecting to campus network.
4. Set **Allow Remote Control** to be **Yes**, and set the Access Password, for example “123”, and click **Save** to finish.

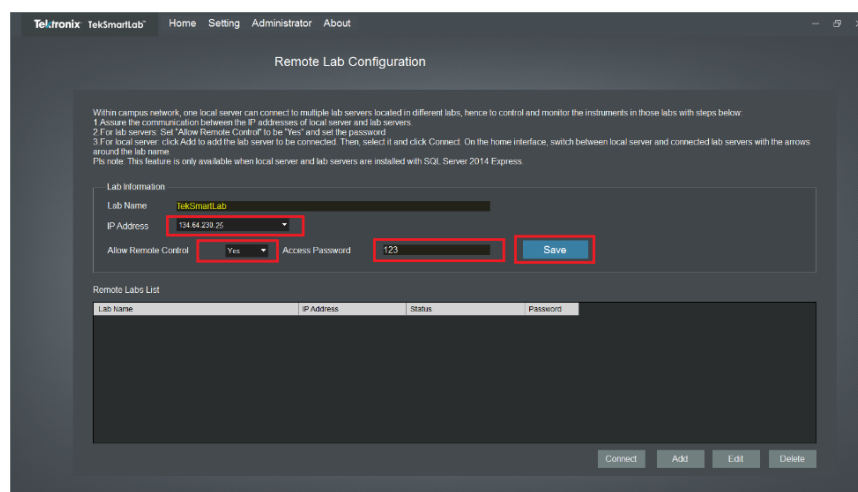


Figure 157: Remote lab configuration interface on the lab server

### For lab manager computer in the office

1. Refer to Installing TSL3000B to install TSL3000B properly on the lab manager computer, (See page 8, *Installing TSL3000B*.).
2. Connect to campus network, and check the communication with lab server through pinging the lab server IP.

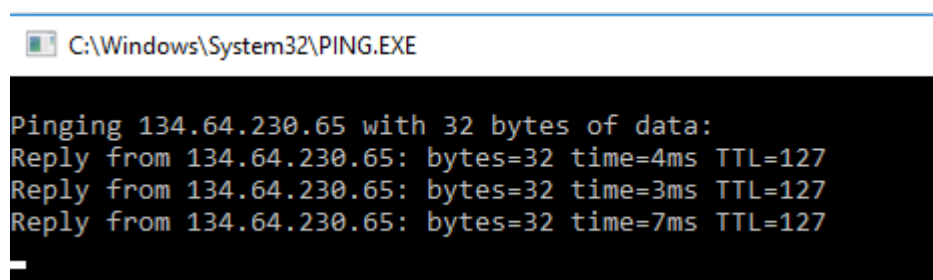


Figure 158: Pinging lab server IP from lab manager computer

3. Start TekSmartLab software on the computer and click **Setting -> Remote Lab configuration** on the main interface.

- Click **Add** and input the **IP address** and **Access Password** of the lab server to be connected.

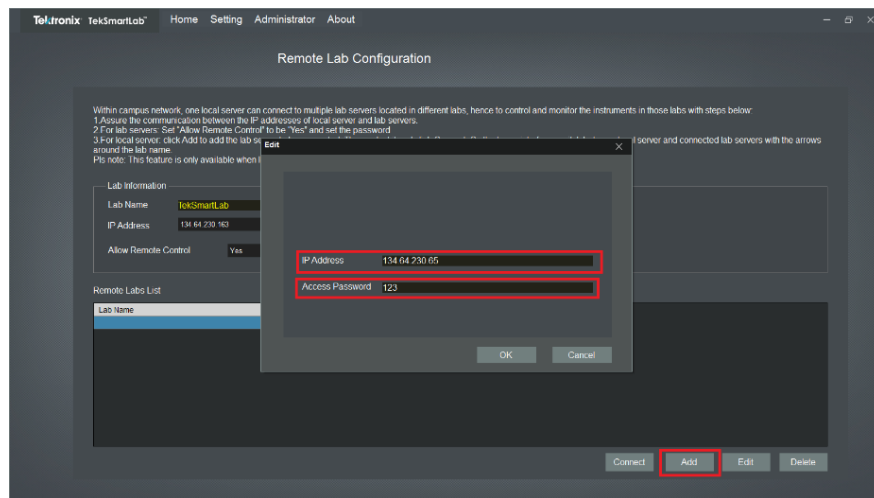


Figure 159: Remote lab configuration interface on lab manager computer

- Select the added lab server IP address and click **Connect**. It takes up to one minute to finish, and the status will be changed to **Connected** once succeed.

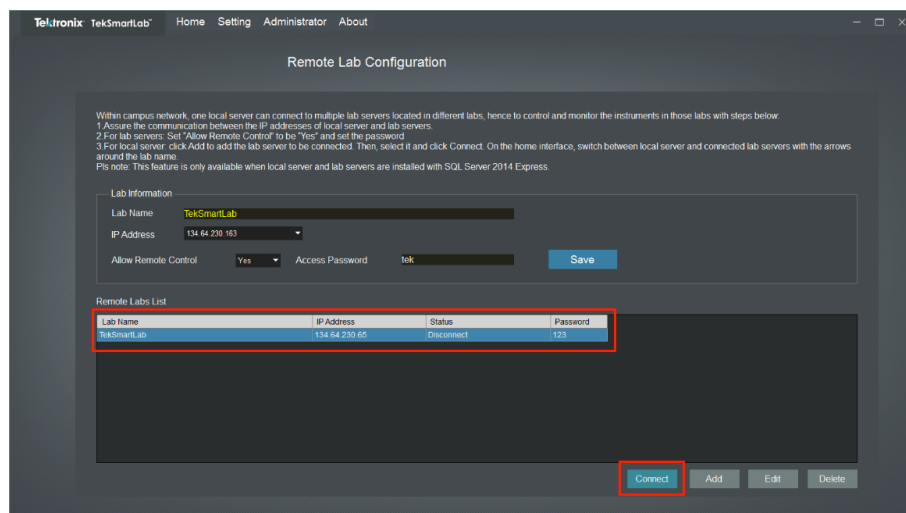


Figure 160: Connect to lab server from lab manager computer



6. On the main interface, switch between different labs via arrows.

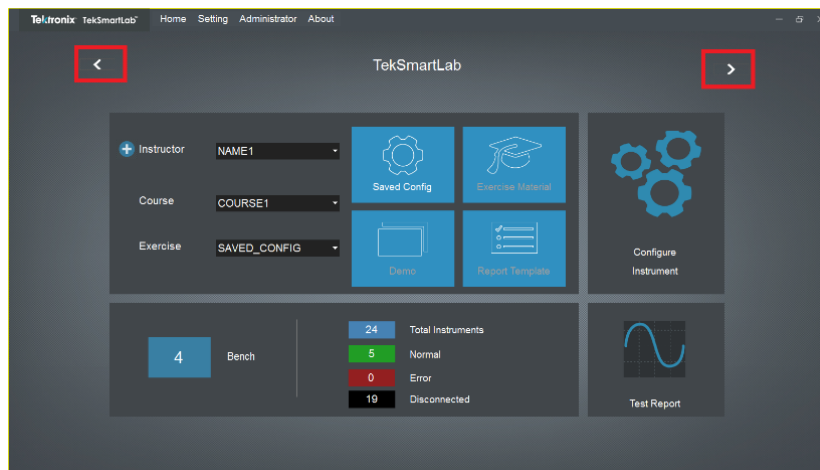


Figure 161: Main interface on lab manager computer

The interface will be shown with yellow boarder when connecting to a lab server remotely.



Figure 162: Connecting to a lab server remotely

**NOTE.** Even with a trial version software, lab manager can control and monitor the instruments in different labs remotely. However, if lab manager wants to export asset information and test reports of a lab remotely, it is necessary to purchase a license (TSL3000B-FL) to active the software on lab manager computer.



# 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.

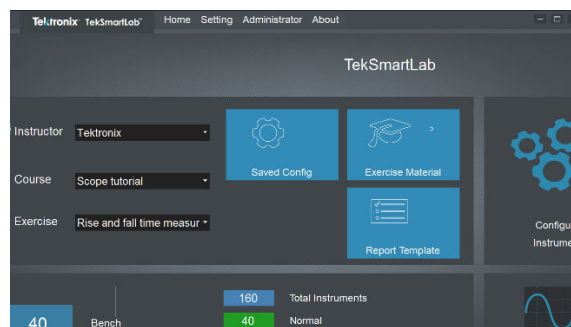


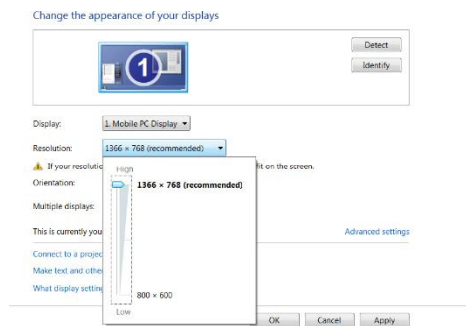
Figure 163: Screen page not displayed properly

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.

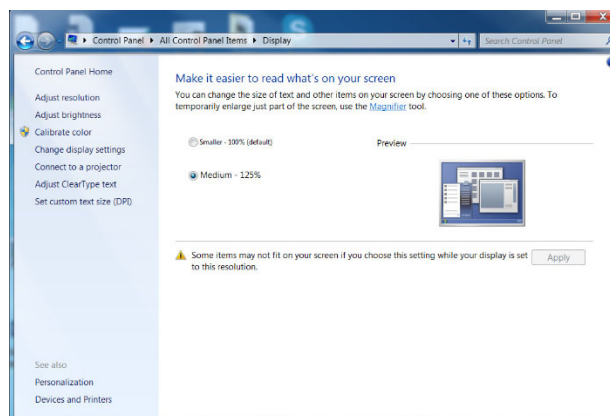


**Figure 164: Set the screen resolution**

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 165: 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.

---

**NOTE.** For steps 2 to 4, please refer to *Configure the TBX3000A*, (See page 4, *Configure the TBX3000A*.) 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.

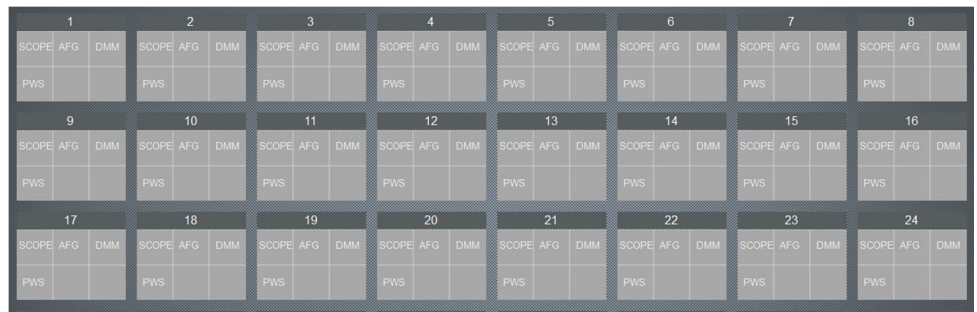


Figure 166: All the benches not connected

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, (See page 4, *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](http://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](http://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.

```
Pinging 192.168.1.151 with 32 bytes of data:
Reply from 192.168.1.151: bytes=32 time=105ms TTL=64
Reply from 192.168.1.151: bytes=32 time=41ms TTL=64
Reply from 192.168.1.151: bytes=32 time=59ms TTL=64
Reply from 192.168.1.151: bytes=32 time=12ms TTL=64

Ping statistics for 192.168.1.151:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 12ms, Maximum = 105ms, Average = 54ms
```

Figure 167: 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.

1			2			3			4			5		
SCOPE	AFG	DMM	SCOPE	AFG	DMM	SCOPE	AFG	DMM	SCOPE	AFG	DMM	SCOPE	AFG	DMM
PWS			PWS			PWS			PWS			PWS		

**Figure 168: Instruments on bench 1 displayed disconnected**

Take the following steps:

1. Visit [www.tek.com](http://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](http://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](http://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](http://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](http://www.tek.com) and search using the search 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](http://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](http://www.tek.com).
4. Check the TSL3000B datasheet, to see whether the instruments are supported.

## Students can't log in the bench webpage

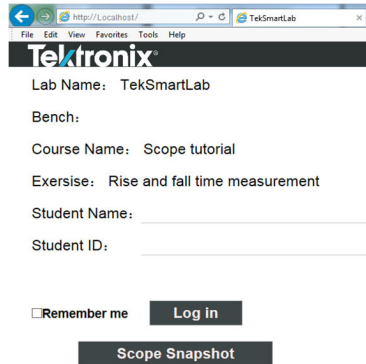
The students can't log in the bench webpage either through bench computer or smart device.

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**

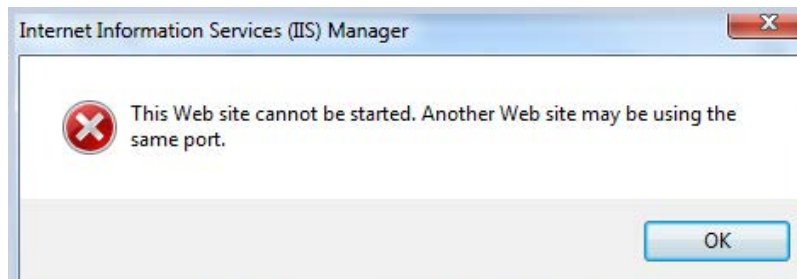
1. On the server with the TSL3000B running, open a web browser and input the address of “localhost”. If the IIS is properly configured, a “please input bench number” dialog box will be popped up and the following figure will be displayed.



**Figure 169: Localhost webpage**

2. If the IIS is not properly configured, please refer to *IIS Installation and Configuration*, (See page 27, *IIS installation and configuration*.) to check every step of the configuration.

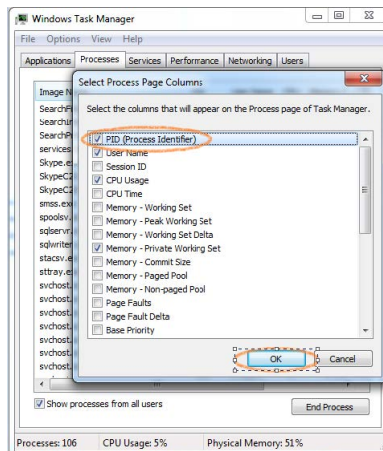
If the following error message appears when configuring the IIS, then the 80 port conflict is the fault.



**Figure 170: 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 171: 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.

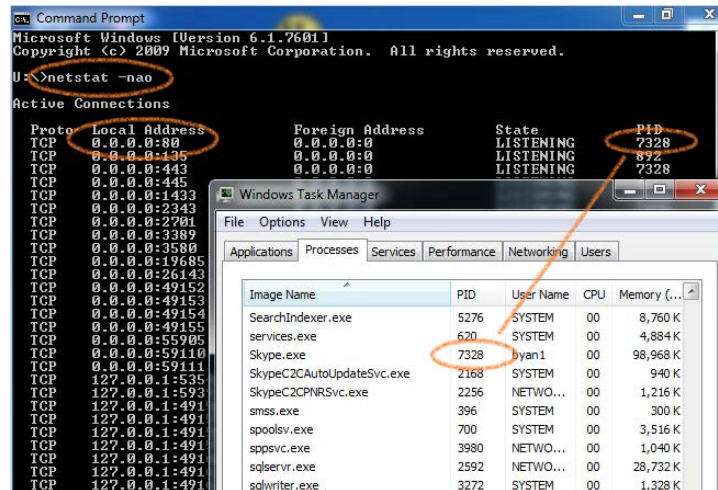


Figure 172: Command prompt

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.

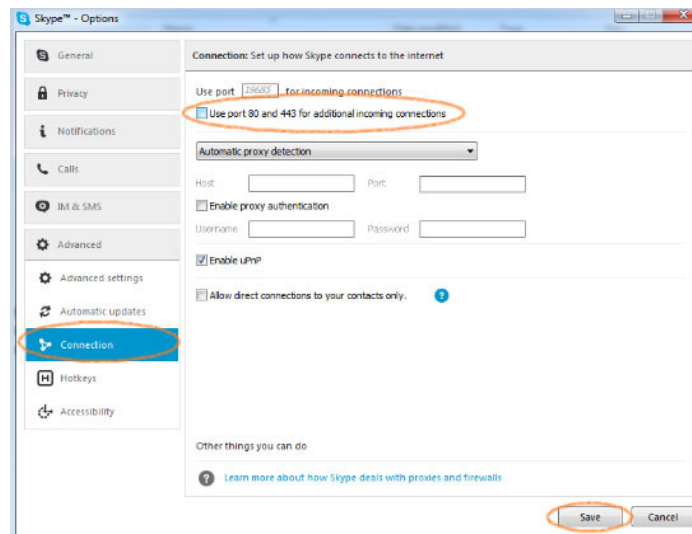


Figure 173: Changing port for Skype

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.