

**TLA7000 Series
Logic Analyzers
Installation Manual**

www.tektronix.com



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Tektronix

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Important safety information

This manual contains information and warnings that must be followed by the user for safe operation and to keep the product in a safe condition.

To safely perform service on this product, additional information is provided at the end of this section. (See page ix, *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.

Before use, always check the product with a known source to be sure it is operating correctly.

This product is not intended for detection of hazardous voltages.

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

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

To avoid fire or personal injury

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

Do not use the provided power cord for other products.

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

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

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

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.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

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 proper ventilation. Refer to the installation instructions in the manual for details on installing the product so it has proper ventilation.

Slots and openings are provided for ventilation and should never be covered or otherwise obstructed. Do not push objects into any of the openings.

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.

Use care when lifting and carrying the product. This product is provided with handles for lifting and carrying.



WARNING. *The product is heavy. To reduce the risk of personal injury or damage to the device get help when lifting or carrying the product.*

Use only the Tektronix rackmount hardware specified for this product.

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.

Verify safety after repair. Always recheck ground continuity and mains dielectric strength after performing a repair.

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



Protective Ground
(Earth) Terminal



Earth Terminal



Chassis Ground



Mains Disconnected
OFF (Power)



Mains Connected
ON (Power)



Standby



WARNING
High Voltage

Preface

This manual contains information needed to install your Tektronix logic analyzer and related accessories.

To prevent personal injury or damage, consider the following requirements before starting service:

- The procedures in this manual should be performed only by qualified service personnel.
- Read the General Safety Summary and Service Safety Summary found at the beginning of this manual.

Be sure to follow all warnings, cautions, and notes in this manual.

TLA7000 Series Logic Analyzers

The TLA7000 Series Logic Analyzers consist of a 2-module portable mainframe (TLA7012) and a 6-module benchtop mainframe (TLA7016).

The TL708EX TekLink 8-Port Hub and a local area network (LAN) gigabit (Gb) switch expand the system and connect it to your network. You can also load the application software on your PC.

The logic analyzers are built on the Microsoft Windows operating system, which allows you to install PC-compatible, third-party hardware and software on the instrument.

The user interface operates under the Microsoft Windows operating system. Microsoft recommends the following to ensure your instrument is protected:

- Use an Internet firewall.
- Install operating system updates regularly.
- Use up-to-date antivirus software.

The TLA7000 series logic analyzers combine high-performance logic analyzer modules with optional application modules or an external Tektronix oscilloscope.

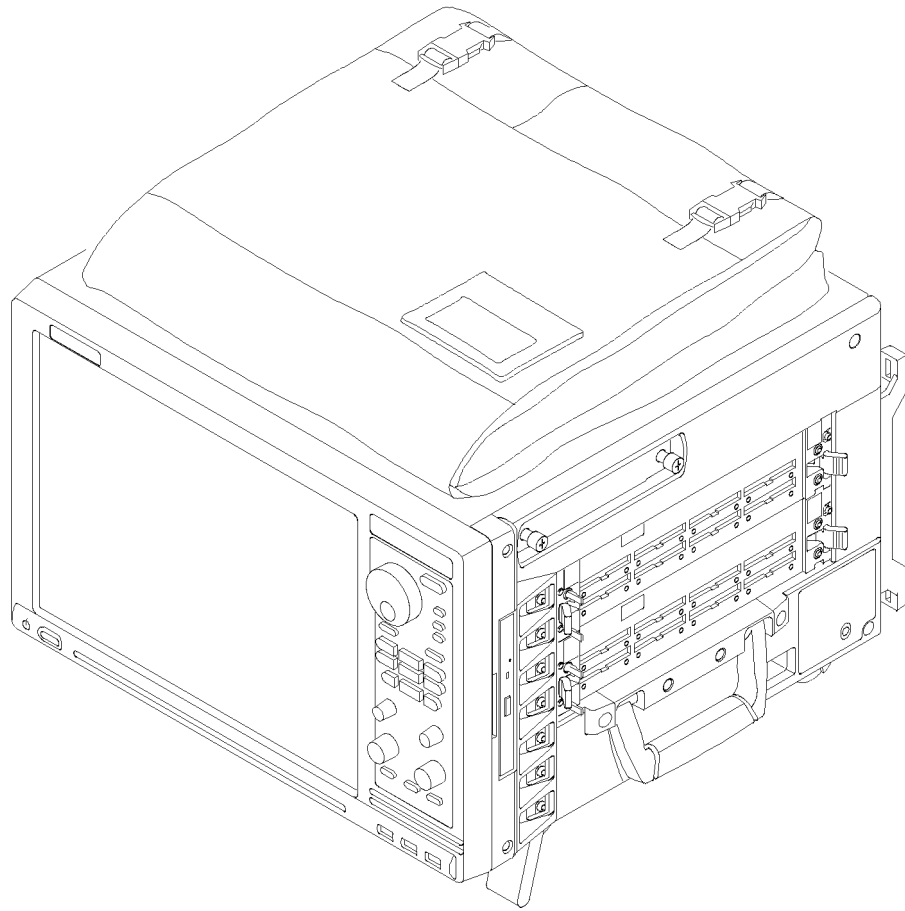


Figure i: TLA7012 Portable Mainframe

Several logic analyzer modules are available in various combinations of channel width, state speed, and memory depth. All of the logic analyzer modules provide simultaneous state and timing measurements through a single probe.

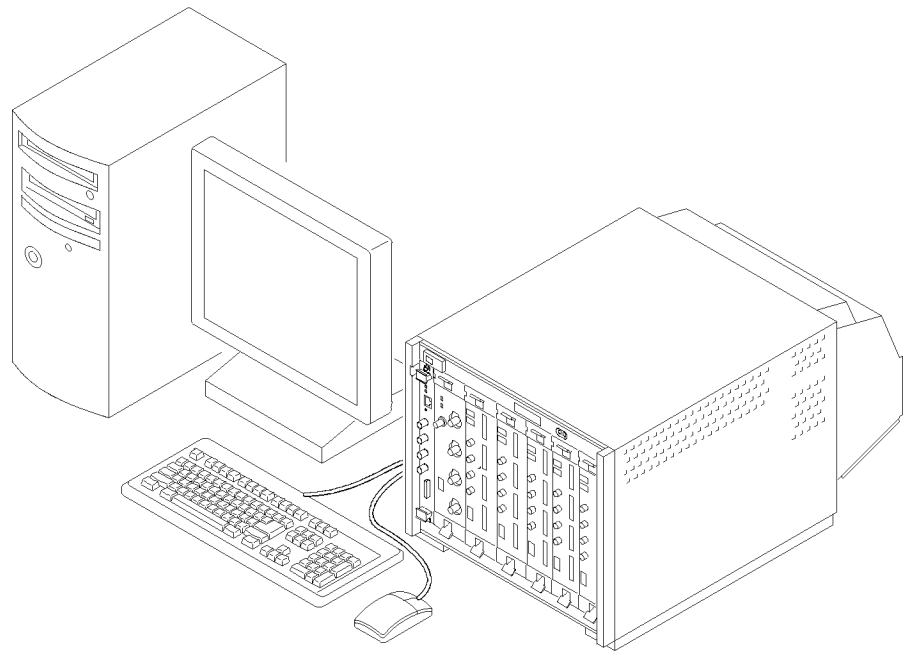


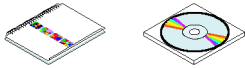


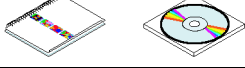

Figure ii: TLA7016 Benchtop Mainframe (with user-supplied PC controller)

Documentation





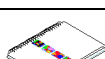

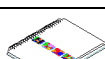

The following table lists related documentation available for your logic analyzer. The documentation is available on the TLA Documentation CD and on the Tektronix Web site (www.tektronix.com/manuals).

For documentation not specified in the table, contact your local Tektronix representative.

Related Documentation

Item	Purpose	Location
TLA Quick Start User Manuals	High-level operational overview	
Online Help	In-depth operation and UI help	
Installation Quick Reference Cards	High-level installation information	
Installation Manuals	Detailed first-time installation information	
XYZs of Logic Analyzers	Logic analyzer basics	 www.Tektronix.com

Related Documentation (cont.)

Item	Purpose	Location
Declassification and Security instructions	Data security concerns specific to sanitizing or removing memory devices from Tektronix products	 www.Tektronix.com
Application notes	Collection of logic analyzer application specific notes	
Product Specifications & Performance Verification Procedures	TLA Product specifications and performance verification procedures	
TPI.NET Documentation	Detailed information for controlling the logic analyzer using .NET	
Field upgrade kits	Upgrade information for your logic analyzer	 
Optional Service Manuals	Self-service documentation for modules and mainframes	 

Basic installation

This chapter describes all of the steps needed to install your Tektronix logic analyzer and its related accessories. It is written from the perspective that you purchased most of the items uninstalled and you intend to install all of the pieces. If you purchased a logic analyzer with modules already installed, you should still review this chapter and perform the steps that apply to your situation.

Check the Shipping list

Verify that you have received all of the parts of your logic analyzer using the shipping list and the accessories list. (See page 81, *Accessories*.) Also check for the following:

- Power cords are correct for your geographical area
- Correct probes and modules
- Standard accessories
- All optional accessories that you ordered



CAUTION. *This notice applies only to the TLA7016 Benchtop Mainframe with Option A6. (See Table 17 on page 83.)*

A special high-current power cord set is provided and is for use exclusively with this product.

Site considerations

Read this section before installing the logic analyzer. This section describes operating considerations and power requirements for your logic analyzer. The environmental considerations apply to all TLA7000 series products.

Table 1: TLA7000 Series Logic Analyzer environmental requirements

Feature		Description
Temperature	Operating	0 °C to +50 °C, TLA7016 Benchtop Mainframe and TL708EX TekLink 8-Port Hub +5 °C to +45 °C, TLA7012 Portable Mainframe
	Nonoperating	-20 °C to +60 °C
Humidity ¹	Operating	10% to 95% relative humidity, TLA7016 Benchtop Mainframe 20% to 80% relative humidity, TLA7012 Portable Mainframe 5% to 95% relative humidity, TL708EX TekLink 8-Port Hub
	Nonoperating	5% to 95%, TLA7016 Benchtop Mainframe and TL708EX TekLink 8-Port Hub 8% to 80%, TLA7012 Portable Mainframe
Altitude	Operating	To 3000 m (9843 ft.)
	Nonoperating	12,000 m (39,370 ft.)

¹ 29 °C maximum wet bulb temperature



CAUTION. Allow a 15.3 cm (6-in) clearance at the top, back, and sides of the instrument to ensure proper cooling. Avoid blocking any exhaust fans or vents when using the instrument on a cart or in a rackmount. Inadequate clearances can cause the instrument to overheat and shut down.

Portable mainframe site considerations

You can use the portable mainframe on a bench or on a cart in the normal position (on the bottom feet). The front feet extend to give a better view of the instrument display. You can also mount the mainframe in an instrument rack.

Table 2: TLA7012 Portable Mainframe power requirements

Feature	Description
Voltage range and frequency	100 V _{RMS} to 240 V _{RMS} , 50 Hz to 60 Hz 115 V _{RMS} , 400 Hz
Power consumption	750 W maximum

Benchtop mainframe site considerations

The Benchtop Mainframe is designed to operate on a bench, on a cart, or in a rackmount environment. If you need to stack more than two benchtop mainframes, install the mainframes in a rack.



WARNING. To avoid personal injury, never lift or move a benchtop mainframe by yourself. The size and weight of the mainframe requires two people to lift or move it.

Do not stack more than one benchtop mainframe on top of another benchtop mainframe. Always use a rackmount kit to ensure that the mainframes are secure and will not fall.

NOTE. The ratings in the following table are nominal line voltages and power going into the power supply. The ratings apply to TLA7016 mainframes with serial numbers B020000 and higher.

Table 3: TLA7016 Benchtop mainframe power requirements

Feature	Description
Configuration A	Maximum load condition, 1000 W
Voltage range and frequency	100 V _{RMS} to 120 V _{RMS} , 50 Hz to 60 Hz and 115 _{RMS} , 400 Hz, 1450 W maximum
Configuration B	Maximum load condition, 1300 W
Voltage range and frequency	120 V _{RMS} to 240 V _{RMS} , 50 Hz to 60 Hz, 1900 W maximum

Support hardware site considerations

The TL708EX Hub and GbE switch units can operate separately on your workbench, equipment rack, or cart. You can also mount them to your benchtop mainframe using the brackets provided with the benchtop mainframe.

Table 4: TL708EX power considerations

Product	Description
TL708EX	Voltage range and frequency
	90 VAC to 250 VAC at 45 Hz to 66 Hz
	Input Current
	2 A maximum at 100 VAC
	Power Consumption
	200 W maximum

Chassis ground connections

Use the chassis ground connections to connect the grounds of the target system (system-under-test) to the logic analyzer to ensure a common ground connection between instruments. (See Figure 1 on page 4.)



CAUTION. To reduce the risk of ground-loop noise, ground all of the instruments in the system to the logic analyzer mainframe using the ground connections shown.

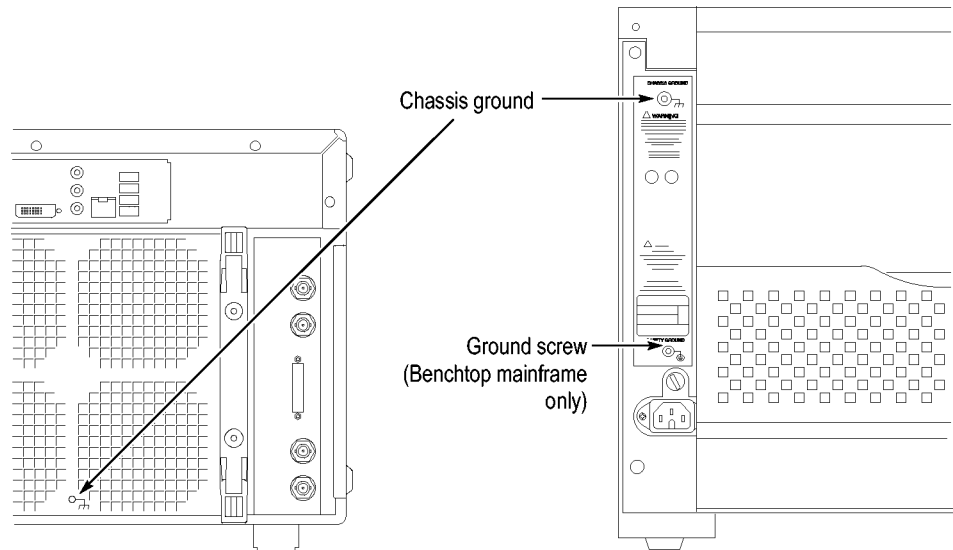


Figure 1: Location of the ground connection on the TLA7000 logic analyzers

Mainframe configurations

Use this section to make the connections between the logic analyzer mainframes and the support hardware: the controller, network switch, router, and TL708EX Hub. Then connect the peripheral components such as the display, keyboard, and other accessories. (See page 44, *Connecting accessories*.)

First time setup considerations

The first time you start up your instrument you should decide if you are going to connect to a network. Plan to connect to a network if you want to:

- Share files over the network
- Print to a shared printer
- Control the instrument remotely

The TLA7000 series mainframes can be set up in several configurations, depending on the number of mainframes you want to use and whether you want to connect to a network. The following table shows the network configurations that can be set up.

Table 5: Mainframe Network Configurations

Configuration	Network services available	User-supplied PC	TLA7016
Stand-alone — no LAN connection	None — stand-alone	Configure with DHCP. Leave TCP/IP properties set to DHCP, but if there is no LAN connection and thus no DNS service, Windows assigns a nonroutable IP address 169.254.xxx.xxx ¹	Configure with static IP. Recommend nonroutable IP address 169.254.xxx.xxx using preset IP address capability on TLA7016
Connected to private LAN	Only DHCP (no DNS)	Configure with DHCP. ¹	Configure with DHCP. Use router with DHCP service.
Connected to corporate LAN	Both DHCP and DNS	Configure with DHCP	Configure with DHCP

¹ A hosts file is required to minimize the time needed to resolve IP addresses when DNS (Domain Naming Service) is not available (for example, DNS is often provided by a Windows Server). (See page 6, *TLA7016 network search performance*.)

Connecting to a network

If you want to control the mainframe remotely from your PC, you need to load the TLA application software. (See page 30, *Install the TLA application software on a PC*.) You may need help from your IT department or network administrator to complete the network configuration.

Networking overview

The TLA7000 series instruments communicate between the controller and mainframes via GbE (gigabit Ethernet) connections using IP (Internet Protocol) standards. Because of the size of typical TLA data files, GbE components are the preferred network hardware over more typical 100BaseT networks. Use at least a Cat5e cable for your network connections.

All connected devices must have unique IP addresses to operate on a network. This can be achieved by manually entering a static address in the TLA, or if your network has a DHCP (Dynamic Host Control Protocol) server, it can dynamically provide an address that meets these needs.

TLA7016 network search performance. The TLA Application software requires a DNS (Domain Name Service) service to translate TLA7016 host names into IP addresses. If there is not a DNS service available on the network, then you may experience long search times when attempting to locate TLA7016 mainframes on your network.

To eliminate this long search time, Tektronix recommends that you include a hosts file on your PC under <Windows folder>\system32\drivers\etc directory. (An example of the contents of this file is shown below.)

```
120.0.0.1          localhost
192.168.0.19      TLA7016_Lab1
192.168.0.20      TLA7016_Lab2
192.168.0.21      TLA7016_Lab3
```

TLA IP address lease time. To facilitate reliable network operation, DHCP-assigned IP addresses have a "lease time" where they are normally "leased" to a device for a preset time, for example, one day or one week. After the lease time expires, the actual IP address may change.

If the lease expires causing an IP change, all network connections between the TLA and host will also expire, stopping network communications and causing the TLA application to terminate. The TLA application must be restarted to correct this condition.

If you plan to operate the TLA application remotely for extended periods of time (whether acquiring data or not), then lease times must be set to a period of time that guarantees that the IP address does not change. Talk to your network administrator if you have questions.

Network security

The user interface on the logic analyzer system operates under the Microsoft Windows Operating System. Tektronix strongly recommends the following to ensure your instrument is protected:

- All TLA mainframes are configured to enable the standard Windows firewall by default. Windows provides details for changing firewall settings in the Control Panel.
- Install operating system updates regularly
- Use up-to-date antivirus software

NOTE. *To use your instrument over a network you must join either a workgroup or a domain. If you plan to control your instrument remotely, both the instrument and the remote computer must be in either the same workgroup or the same domain on the network.*

If you plan to connect to a network, you will need the following information from your IT department or network administrator to complete your network configuration:

- Workgroup or domain name
- IP address, either DHCP (default) or static
- Domain name Service (DNS)
- Other network information from your network administrator

The Teklink/TLA7000 series mainframes require the following services:

- DNS
- DHCP

Firewall blocking network ports. If you are having problems with any of the following applications, your firewall may be blocking communications using the following network ports:

- TLA Application - port 111
- TPI.NET - port 9000
- Windows Remote Desktop - port 3389

NOTE. Tektronix recommends that you conduct a network installation site survey with the help of your network administrator to determine the networking requirements. A recommended site survey form is available at the end of this document. (See page 87, TLA7000 network installation site survey.)

First time network setup

Check with your network administrator to determine whether your instrument should use the Microsoft Workgroup model or the Microsoft Domain model. Power on your instrument and use the following table to answer the Windows questions.

Table 6: First time network setup

	Stand-alone	Workgroup	Domain
Protect your PC.	N/A	Choose "Help protect my PC by turning on Automatic Updates now"	
What's your computer's name? (Wait several minutes after answering)	Check with your network administrator for the standard naming convention of your organization. If your organization does not have a naming convention, choose a name that follows the suggestions given.		
What's your administrator password?	You must have an administrator account to install most software, change the workgroup, perform Windows updates, or change firewall settings. Check with your network administrator for the appropriate password. The default administrator password on all TLA systems is blank.		
Is this computer in a domain?	No (Is given Workgroup membership)		Yes. Enter the domain name that your instrument will log onto.
Enter your domain settings.	N/A		Enter the name/password of user who can add the instrument to the domain.
Checking your Internet connectivity	Press 'Skip'	Wait for this to finish	
How will this computer connect to the Internet?	N/A		Choose the appropriate answer
Setting up a high-speed connection	N/A		Enter either the fixed IP/DNS assigned by your network administrator or select "Obtain Automatically".
(If LAN is connected) Will this computer connect to the Internet directly or through a network?	N/A	Choose 'Yes through a network'	N/A
(If LAN is not connected) Windows unable to determine LAN connectivity	N/A	Set up a LAN later.	N/A
Ready to register with Microsoft	Windows is already enabled to run on your instrument. This registration is to allow Microsoft to contact you.		
Who will use this computer?	Entering names here allows administrator permissions for multiple users on the instrument. By default, their passwords are blank.		

Network switch. The 16 port network switch controls the data flow between the controller and mainframes. Connect the GbE switch between the logic analyzer mainframe and the TLA7PC1 Controller or an external PC (loaded with the TLA application). (See Figure 2.)

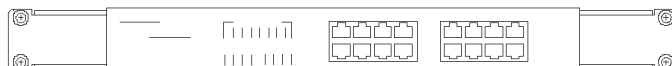


Figure 2: Network switch

Preset IP addresses

You may need to change the IP address of the benchtop mainframe(s), depending on the number of mainframes you have connected in your test system, and the requirements of the network that it will be connected to.

A preset list of recommended IP addresses is programmed into the benchtop mainframe. (See Table 7.) You can also set a specific address. (See page 34, *Change the TLA7016 factory network settings.*)

To cycle through the list of preset IP addresses, do the following:

1. Press and hold the reset button on the TLA7016 Interface Module. (See Figure 3.)

The front-panel display cycles every 2-3 seconds to the next preset address. (See Table 7.)

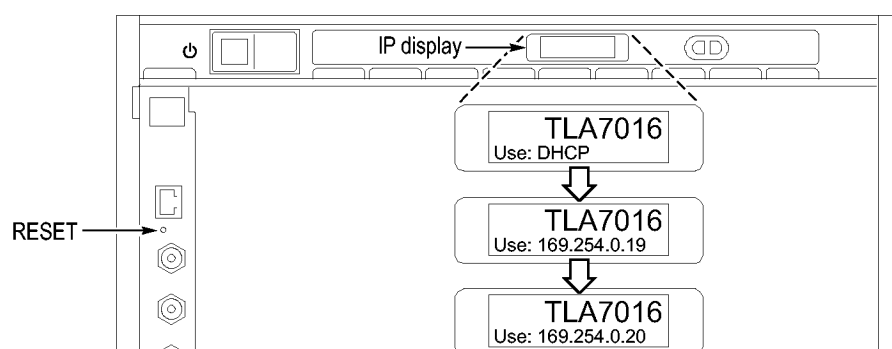


Figure 3: Setting the IP address

2. Release the reset button when the desired address is displayed.

The following addresses are available and displayed sequentially, beginning with the DHCP selection:

Table 7: Preset IP addresses

Selection	IP address	Subnet mask	Default gateway	Comments
Use: DHCP	–	–	–	IP addressing provided by a DHCP-capable router
Use: 169.254.0.19	169.254.0.19	255.255.0.0	0.0.0.0	Static, non-routable address used for direct PC connection
Use: 169.254.0.20	169.254.0.20	255.255.0.0	0.0.0.0	Static, non-routable address used for direct PC connection
Use: 192.168.0.19	192.168.0.19	255.255.0.0	0.0.0.0	Static, non-routable address used for private LAN with DHCP-capable router
Use: 192.168.0.20	192.168.0.20	255.255.0.0	0.0.0.0	Static, non-routable address used for private LAN with DHCP-capable router
Factory default	–	–	–	Return to factory settings (Use DHCP and restore default Host Name to TLA7016_<Mainframe S/N>)
No change	–	–	–	Retain current IP address and Host Name

Instrument installations

The following configurations are described in order of complexity. The most common setup is as a stand-alone mainframe.

- Stand-alone TLA7012 portable
- Stand-alone TLA7016 benchtop (requires a separate controller)
- TLA7016 benchtop on a private LAN
- TLA7016 benchtop on a corporate LAN

NOTE. *You must have TLA Application software Version 5.6 or higher installed on the controller PC. (See page 30, Install the TLA application software on a PC.)*

Stand-alone installation (portable mainframe)

If you plan to use the portable mainframe as a stand-alone instrument, do the following:

1. Set up the instrument in a convenient location relative to your target system.
2. Connect the peripheral components that you plan to use. (See page 44, *Connecting accessories*.)
3. Install the modules. (See page 42, *Installing modules*.)
4. Refer to the *TLA Quick Start User Manual* and to the online help for operating information.

The following figure shows the stand-alone setup for the portable mainframe.

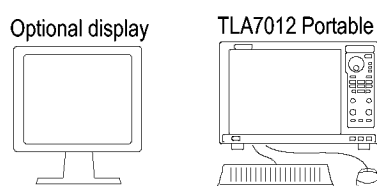


Figure 4: Portable mainframe setup (up to two modules)

Network configuration overview

The benchtop mainframe requires an external PC controller with the TLA application software. The controller and mainframes communicate through Ethernet connections.

This section covers configuring your network settings and establishing communication between the controller and benchtop mainframes. After making the cable connections, all of the network configuration options generally follow these steps:

1. Start the controller and mainframe and exit any TLA applications.
2. Establish LAN connectivity using the Windows Networking tools (set the IP addresses, and if necessary, get user names and passwords from your IT group).
3. Start the TLA application on the controller.
4. Find and connect to the TLA mainframe through software control.
5. Repeat for all mainframes in the test system.
6. Operate the TLA from the controller or remote computer.

**Stand-alone installation
(benchtop mainframe)**

After making connections with either a crossover cable (peer-to-peer) or a LAN cable, get the IP addresses to use for the controller and mainframes.

The following figure shows the stand-alone setup for the benchtop mainframe.

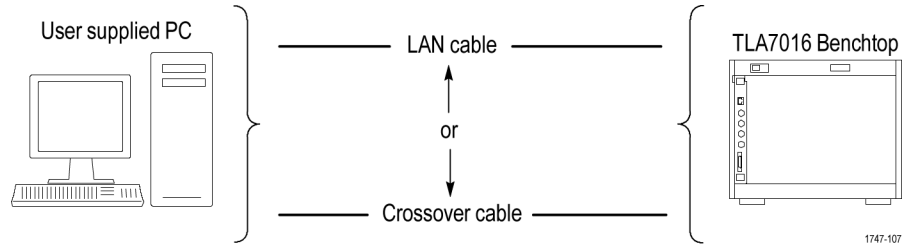


Figure 5: Benchtop mainframe setup (up to six modules)

Configure the PC controller IP address to a static address. Complete the following steps to set the IP address of the PC controller as a static address.

1. From the Control Panel on the controller, select **Network Connections**.
2. Right-click the Local Area Connection icon that corresponds to your local LAN card and select **Properties** from the menu. The Properties dialog box appears. (See Figure 6.)

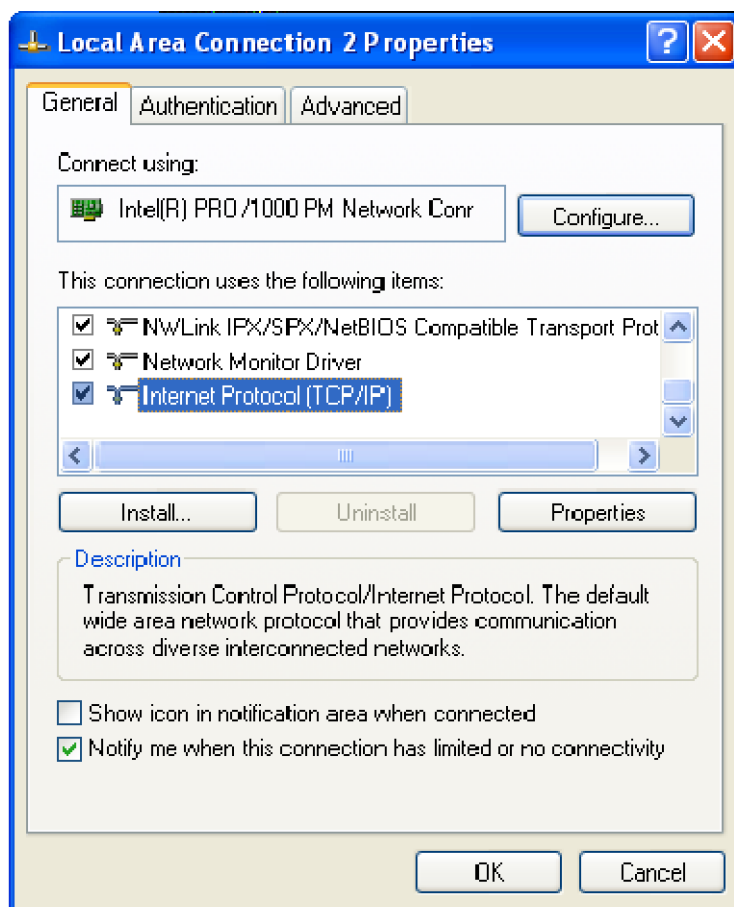


Figure 6: LAN Connection dialog box

3. Scroll down the list and select **Internet Protocol (TCP/IP)**; and then click **Properties**. The Internet Protocol (TCP/IP) Properties dialog appears. (See Figure 7.)

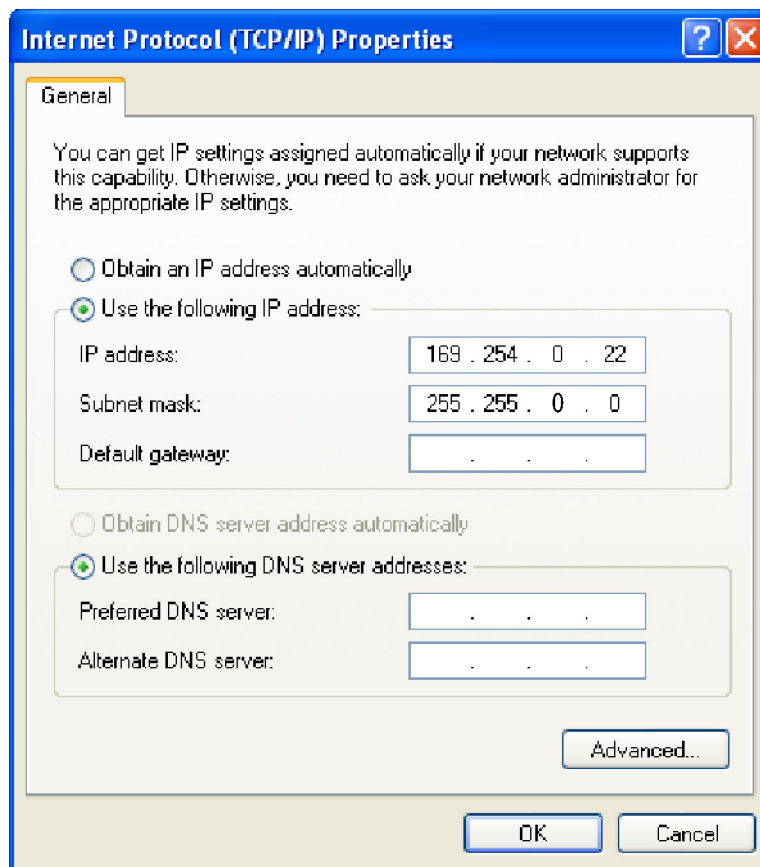


Figure 7: IP Properties dialog box

4. Select **Use the following IP address**.
5. Enter the IP address **169.254.0.22** and Subnet mask **255.255.0.0** for the controller. No Default gateway or DNS server information is required.
6. Click **OK** and close the dialog boxes.

Configure the benchtop mainframe IP address to a static address.

To complete the setup, set the IP address of the benchtop mainframe as a static address. You can do this one of two ways: use the preset addresses described in step 7, or specify an address using the *Changing the TLA7016 Factory Network Settings* procedure. (See page 34, *Change the TLA7016 factory network settings*.)

7. On the TLA7016 Interface Module, press and hold the RESET button until the IP address 169.254.0.19 shows in the TLA7016 front panel display. (See Figure 3 on page 9.) The front-panel display cycles every 2-3 seconds to the next preset address. (See Table 7 on page 9.)
8. Start the TLA application by double-clicking the TLA Application icon on the controller. The TLA Connection dialog box appears. (See Figure 8.)

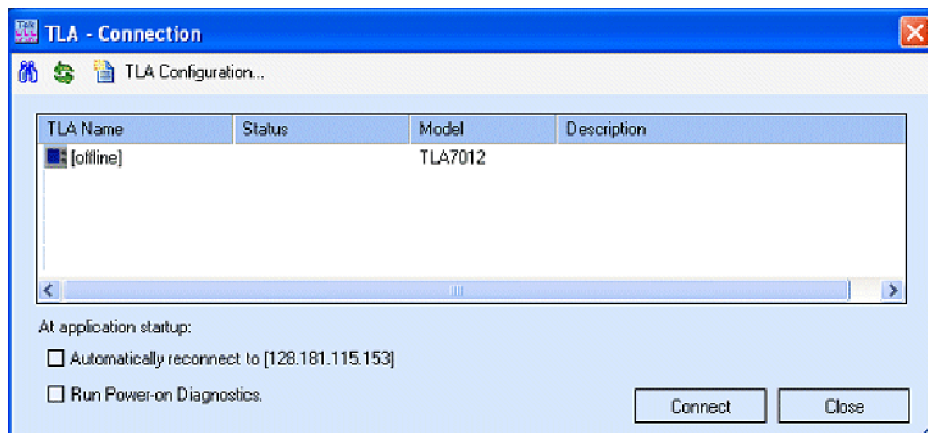



Figure 8: TLA Connection dialog box

9. Select the mainframe in the TLA Connection dialog box, and then click the **Connect** button. The application opens on the controller display.
10. If the mainframe is not displayed in the Connection dialog box:
 - a. Click  (Search icon) to open the TLA Network Search dialog box. (See Figure 9.)

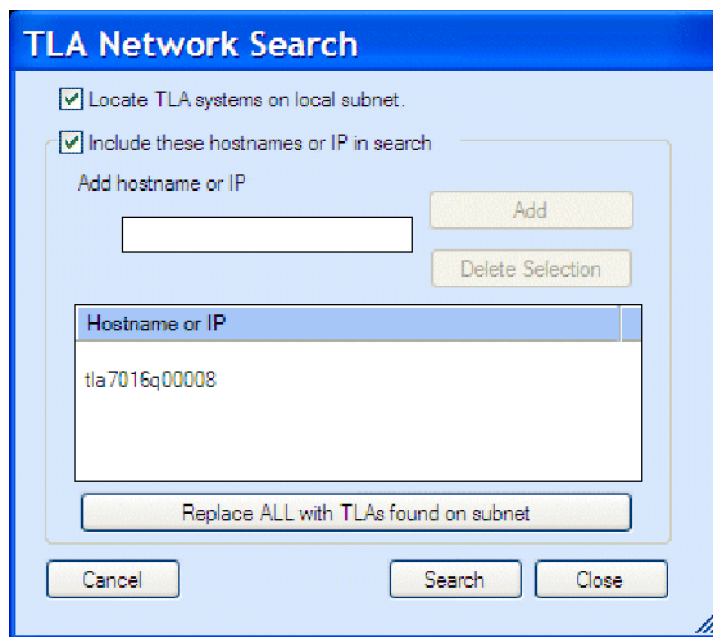


Figure 9: TLA Network Search dialog box

- b. Verify that **Locate TLA systems on local subnet** is checked.
- c. Verify that **Include these hostnames or IP in search** is checked.

- d. If you know the hostname or IP address of the TLA, add it to the list of hosts to search.
- e. Click **Search**.

When the search is complete, the mainframe is listed in the display.

- 11. Select the mainframe and click the **Connect** button. The application opens on the controller display.
- 12. For information about operating your logic analyzer, refer to the *TLA Quick Start User Manual* and to the online help.

Private LAN (benchtop mainframe)

The benchtop mainframe requires an external PC controller with the TLA application software. The controller and mainframes communicate through Ethernet connections.

You need a GbE network switch for optimum file transfer speed between the controller and the benchtop mainframe. For stand-alone installations, you must also connect a router to the network switch to assign IP addresses through DHCP. Routers can be purchased from other vendors; the D-Link model DI-604 met the requirements at the time of publication.

The following figure shows the private LAN setup for the benchtop mainframe.

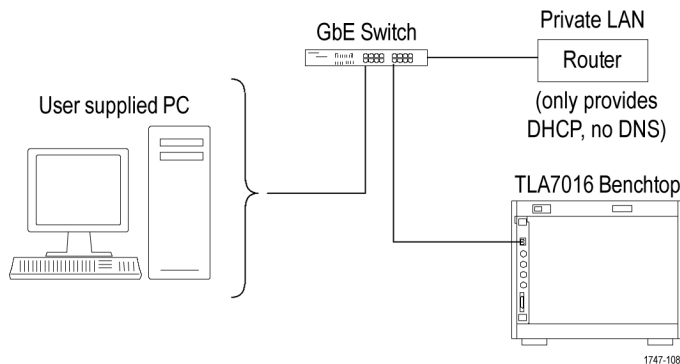


Figure 10: Benchtop mainframe private LAN setup (up to six modules)

Configure the setup. To configure the benchtop mainframe in a private LAN setup, do the following:

1. Make the cable connections from the controller, through the switch and router, to the mainframe.
2. Connect the peripheral components that you plan to use. (See page 44, *Connecting accessories*.)
3. Connect the power cord to the router and power on the router.
4. Connect the power cords and power on the controller and mainframe.
5. From the Control Panel on the controller, select **Network Connections**.

6. Right click the Local Area Connection icon that corresponds to your local LAN card and select **Properties**. The Properties dialog box appears. (See Figure 11.)

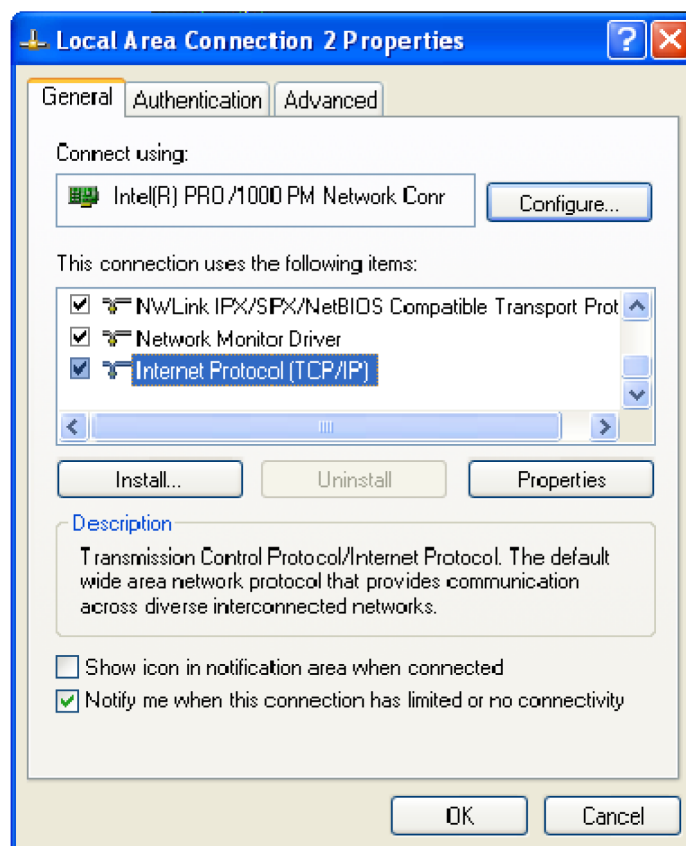


Figure 11: LAN Connection dialog box

7. Scroll down the list and select **Internet Protocol (TCP/IP)**, and then click **Properties**. The Internet Protocol (TCP/IP) Properties dialog box appears. (See Figure 12.)

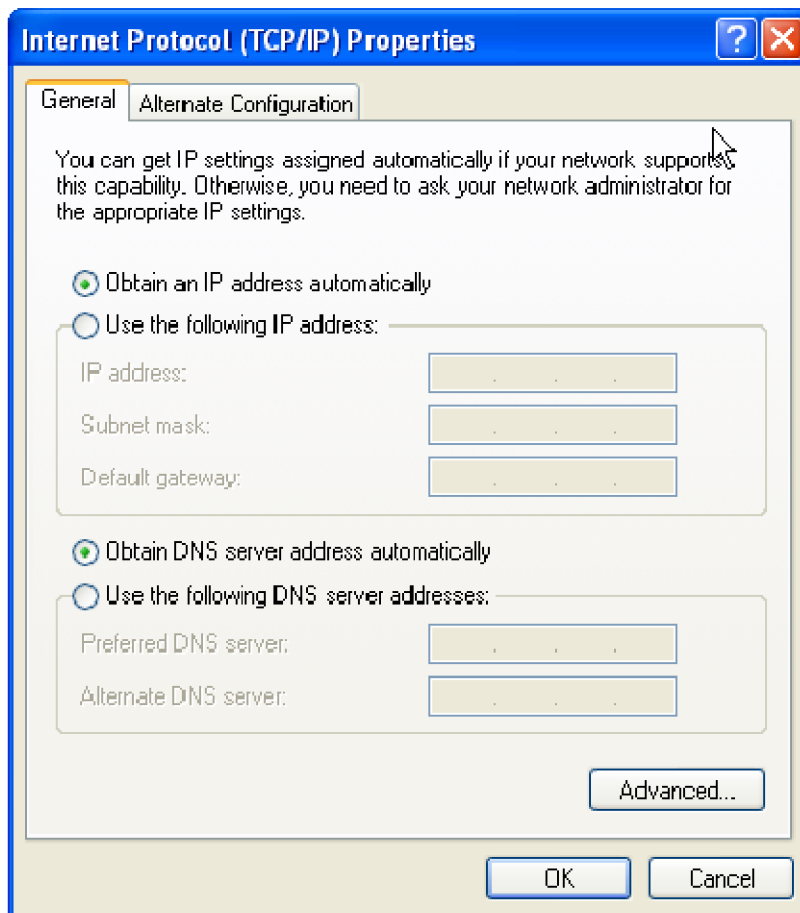


Figure 12: IP Properties dialog box

8. Select **Obtain an IP address automatically**.
9. Click **OK** and close the dialog boxes.
10. Start the TLA application by double-clicking the TLA Application icon on the controller. The TLA Connection dialog box appears. (See Figure 13.)

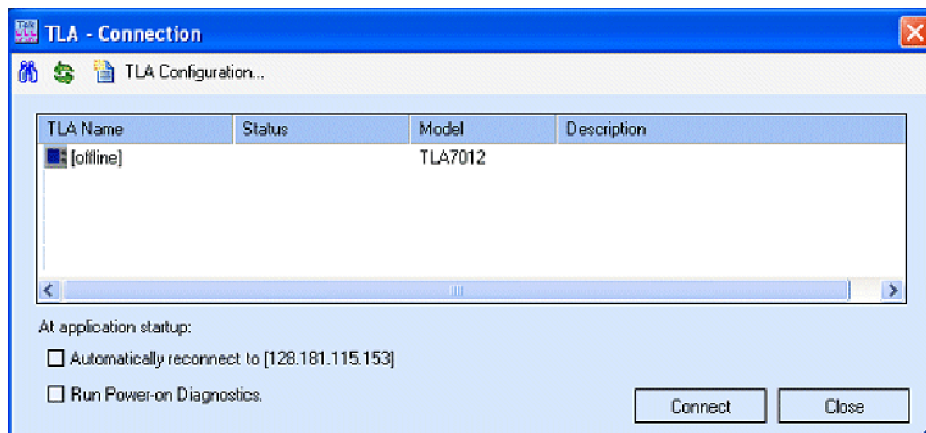



Figure 13: TLA Connection dialog box

11. Select the mainframe in the TLA Connection dialog box, and then click the **Connect** button. The application opens on the controller display.
12. If the mainframe is not displayed in the Connection dialog box:
 - a. Click  (Search icon) to open the TLA Network Search dialog box. (See Figure 14.)

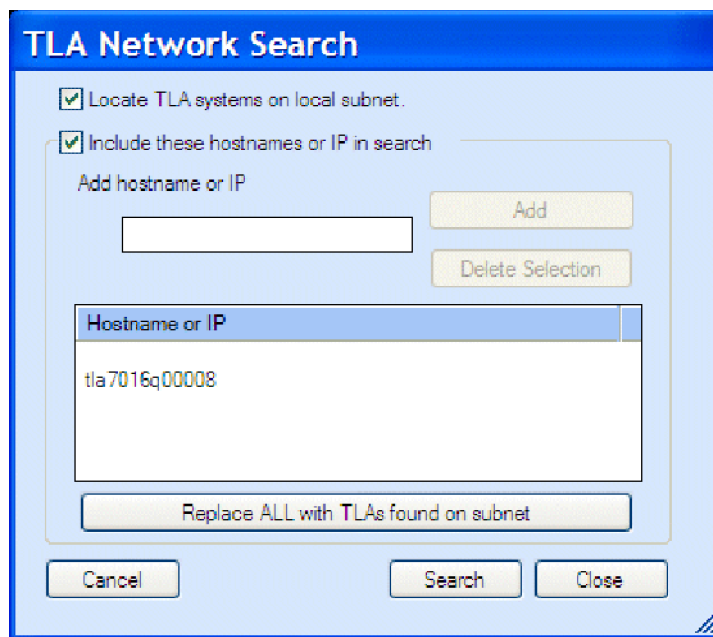


Figure 14: TLA Network Search dialog box

- b. Verify that **Locate TLA systems on local subnet** is checked.
- c. Verify that **Include these host names or IP in search** is checked.

- d. If you know the host name or IP address of the TLA, add it to the list of hosts to search.
- e. Click **Search**.

When the search is complete, the mainframe is listed in the display.

NOTE. You may see a delay in the response time if you have more than three instruments on the LAN. To limit this delay, refer to *Multi-mainframe Systems*. (See page 37, *Multi-mainframe systems*.)

- 13. Select the mainframe and click the **Connect** button. The application opens the controller display.
- 14. Refer to the *TLA Quick Start User Manual* and to the online help for operating information.

Corporate LAN (benchtop mainframe)

The benchtop mainframe requires an external PC controller with the TLA application software. The controller and mainframes communicate through Ethernet connections. You need a GbE network switch for optimum file transfer speed between the controller and the benchtop mainframe.

The following figure shows the corporate LAN setup for the benchtop mainframe.

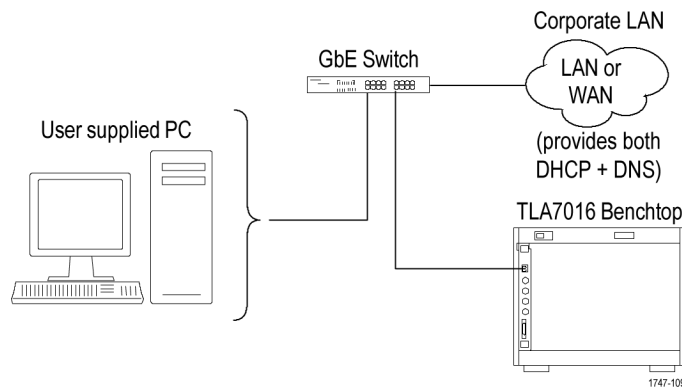


Figure 15: Benchtop mainframe corporate LAN setup (up to six modules)

NOTE. Tektronix recommends that you conduct a network installation site survey with the help of your network administrator to determine the networking requirements. A recommended site survey form is available at the end of this document. (See page 87, *TLA7000 network installation site survey*.)

Configure the setup. To configure the benchtop mainframe in a corporate LAN setup, you need to contact your IT Administrator for network information, such

as Workgroup or Domain name, and IP address (either static or DHCP) before setting the IP properties for the controller PC and mainframe.

1. Make the cable interconnections. (See Figure 15.)
2. Power on the equipment.
3. From the Control Panel on the controller, select **Network Connections**.
4. Right-click the Local Area Connection icon that corresponds to your local LAN card and select **Properties**. The Properties dialog box appears. (See Figure 16.)

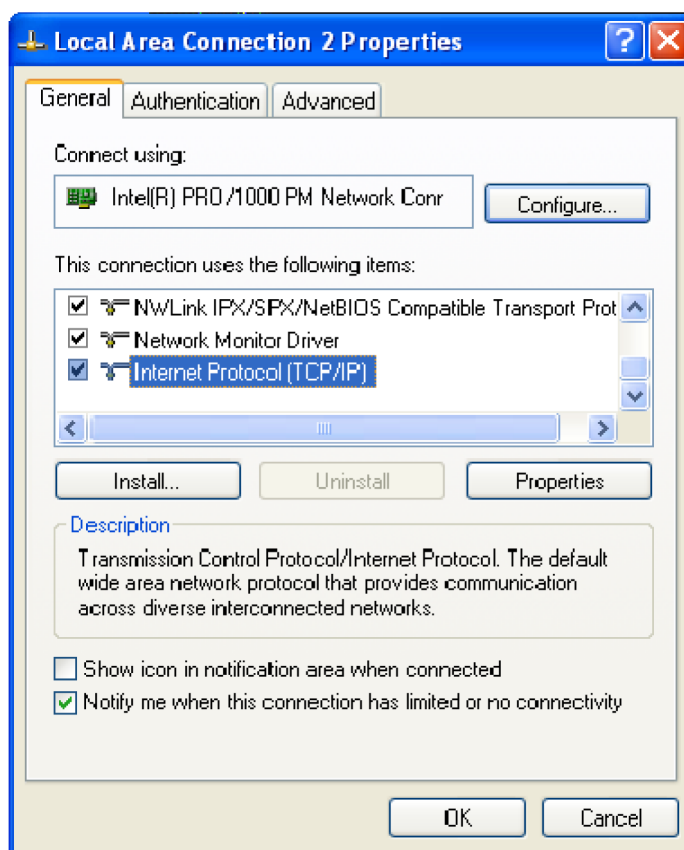


Figure 16: LAN Connection dialog box

5. Scroll down the list and select **Internet Protocol (TCP/IP)**, and then click **Properties**. The Internet Protocol (TCP/IP) Properties dialog appears. (See Figure 17.)

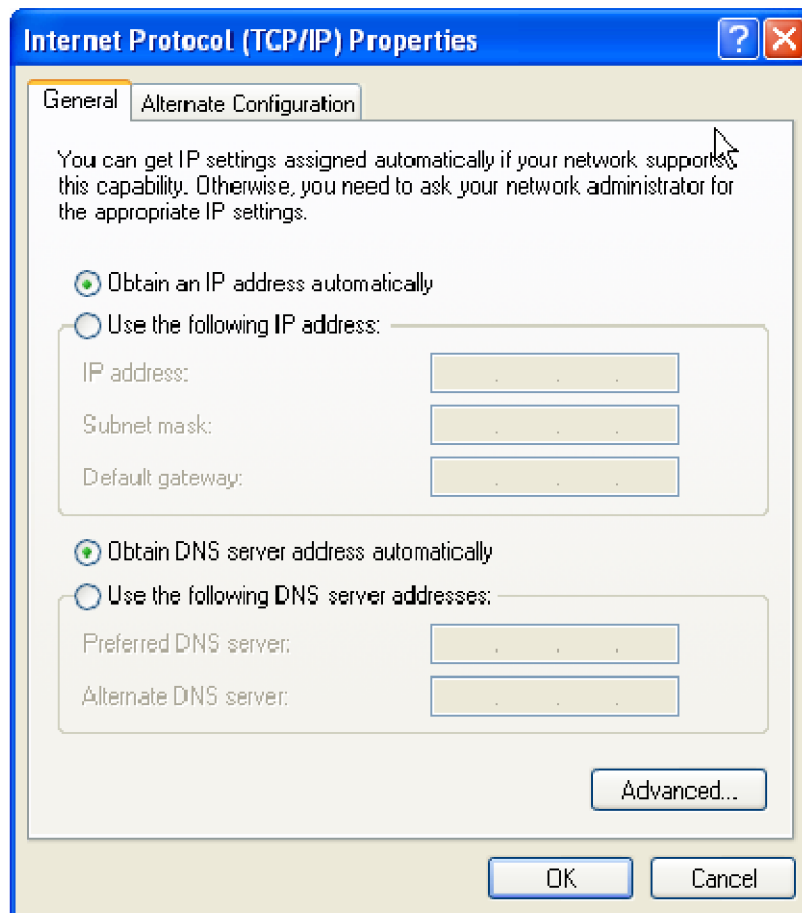


Figure 17: IP Properties dialog box

6. Select **Obtain an IP address automatically**.
7. Click **OK** and close the dialog boxes.
8. Start the TLA application by double-clicking the TLA Application icon on the controller. The TLA Connection dialog box appears. (See Figure 18.)

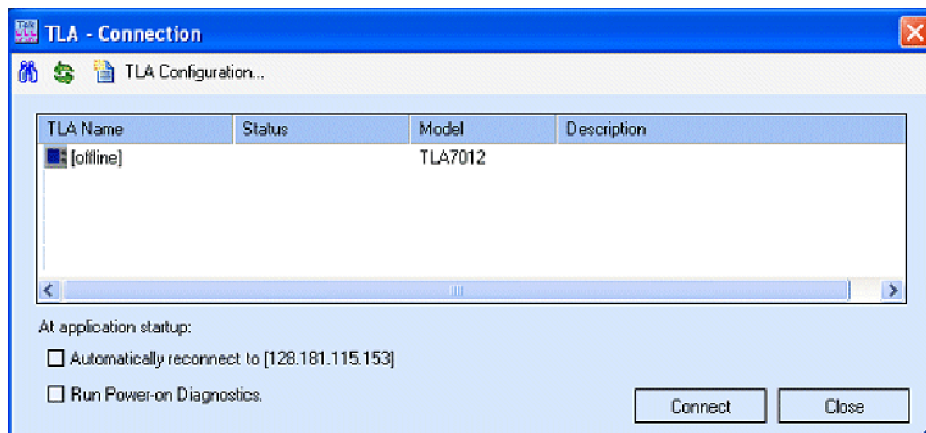



Figure 18: TLA Connection dialog box

9. Select the mainframe in the TLA Connection dialog box and then click the **Connect** button. The application opens on the controller display.
10. If the mainframe is not displayed in the Connection dialog box:
 - a. Click  (Search icon) to open the TLA Network Search dialog box. (See Figure 19.)

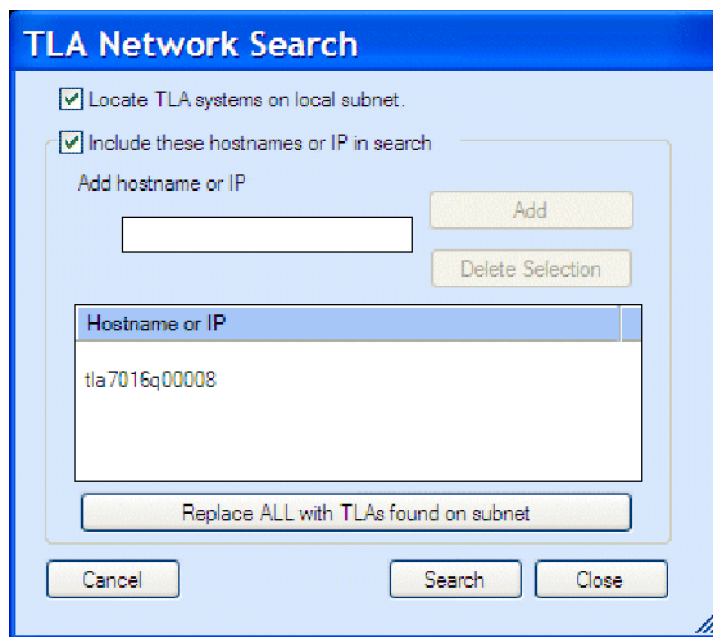


Figure 19: TLA Network Search dialog box

- b. Verify that **Locate TLA systems on local subnet** is checked.
- c. Verify that **Include these host names or IP in search** is checked.

- d. If you know the host name or IP address of the TLA, add it to the list of hosts to search.
- e. Click the **Search** button.

When the search is complete, the mainframe is listed in the display.

NOTE. *You may see a delay in the response time if you have more than three instruments on the LAN. To limit this delay, refer to Multi-mainframe Systems. (See page 37, Multi-mainframe systems.)*

- 11. Select the mainframe and click the **Connect** button. The application opens the controller display.
- 12. Refer to the *TLA Quick Start User Manual* and to the online help for operating information.

Setting up multiple mainframe configurations

You can configure your system to link up to eight mainframes together, for a total of up to 48 modules. The TLA7000 Series mainframes use the TekLink system to connect multiple-mainframe systems together. The TekLink system is described here in the two *Expanded system* sections.

The benchtop mainframes that are connected as expansion mainframes are automatically powered on in a delayed sequence when the first benchtop or portable mainframe is powered on. When everything is properly connected and operational, the expansion mainframe and the installed module icons appear in the System window.

NOTE. You must have a module installed in the expansion mainframes before the expansion mainframes appear in the System window.

Expanded system (two mainframes)

If you are going to expand your system to two mainframes, you must connect a TekLink cable between the TekLink connectors on the mainframes. (See Figure 20.)

TekLink is a real-time communication system that coordinates trigger signals, input/output signals, and time references between mainframes.

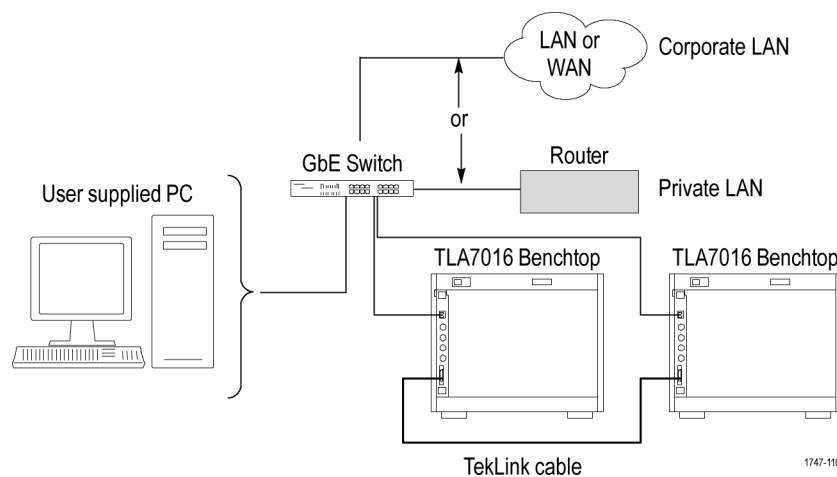


Figure 20: Expanded benchtop system with TekLink cable (up to 12 modules)



CAUTION. TLA7000 Series components are not compatible with TLA7XM expansion mainframes. If you need to expand your TLA7000 system, use additional TLA7016 benchtop mainframes, or upgrade your TLA720/721/7XM expansion mainframe to a TLA7016 with TLA7KUP Option 19.

Configure the setup. Configure the two instruments as follows:

1. Connect the TekLink cable between the host mainframe and the expansion benchtop mainframe (up to six additional modules). You can also use the Teklink cable to expand a portable mainframe to either another portable mainframe or to a benchtop mainframe.
2. Power on the equipment.
3. Start the TLA application by double-clicking the TLA Application icon on the controller. The TLA Connection dialog box appears.
4. Select one instrument from the TLA Connection dialog box.
5. Click the **TLA Configuration** icon. The TLA Configuration dialog box opens. (See Figure 21.) Use this dialog box to assign one instrument as the master mainframe and the other as the expansion mainframe.

NOTE. This dialog box is only available if you have two TLA7000 mainframes connected with a TekLink cable; it is not available if you are using the TL708EX TekLink 8-Port Hub.

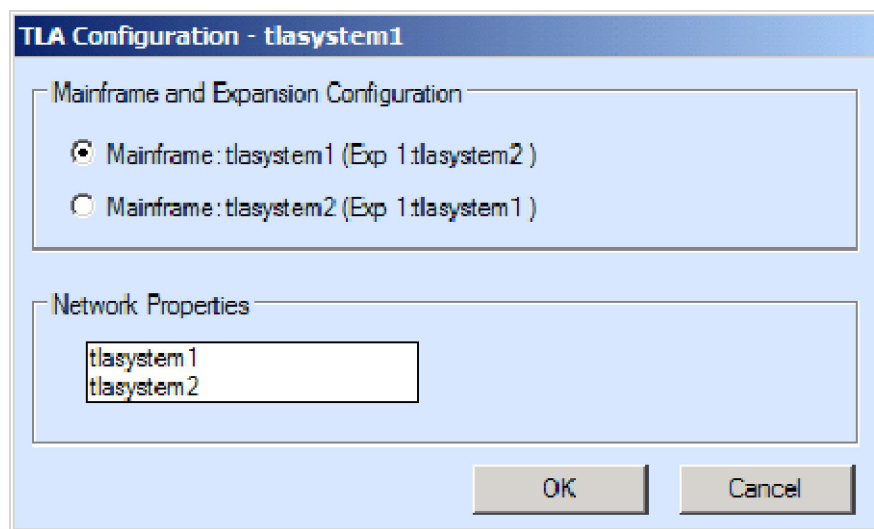


Figure 21: Two instrument configuration

6. Refer to your *TLA Quick Start User Manual* and to the online help for operating information.

Expanded system (three to eight mainframes)

To expand your system to more than two mainframes, you must add the TL708EX TekLink 8-Port Hub and the TekLink cables. (See Figure 22.) The hub can accommodate up to eight mainframes (48 modules total).

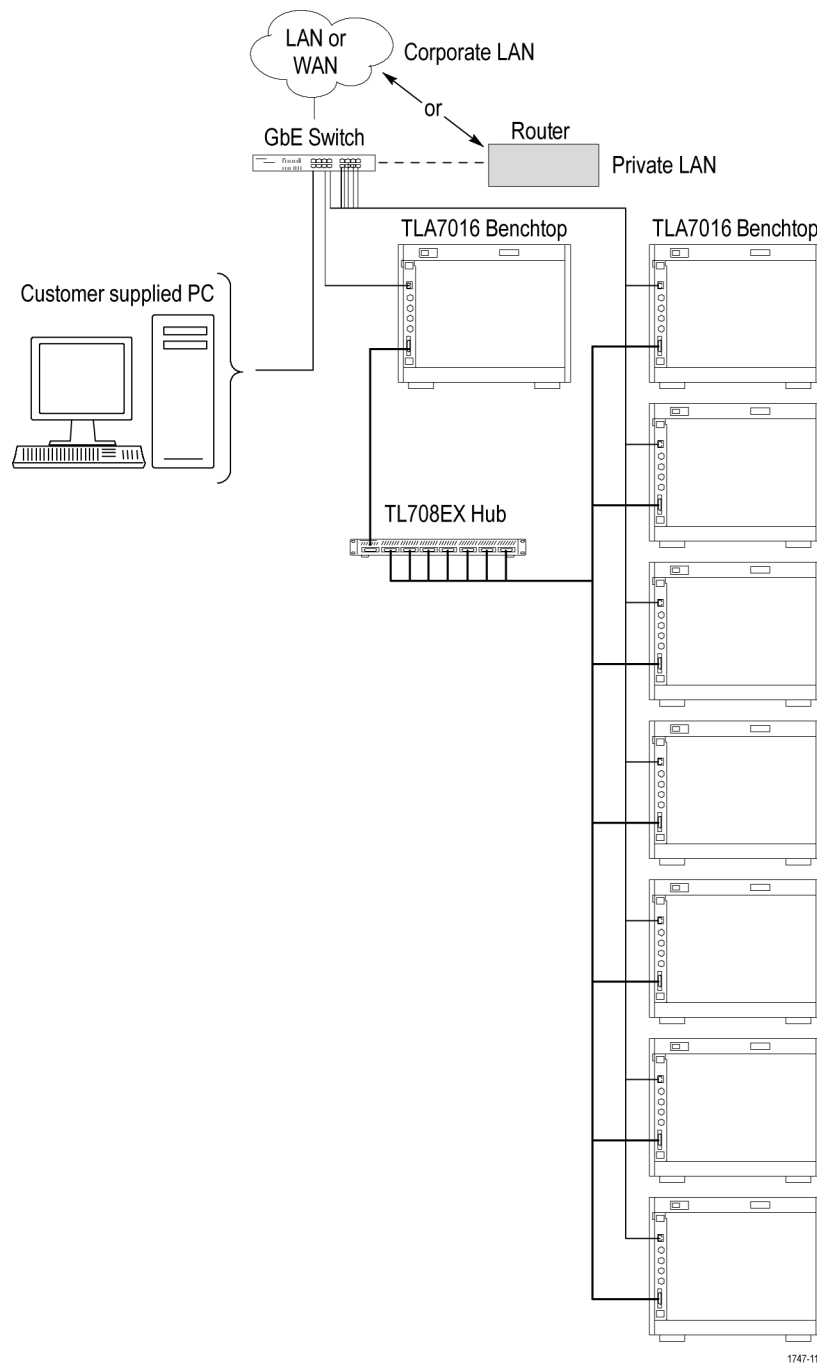


Figure 22: Expanded benchtop system with TL708EX Hub (up to 48 modules)

TL708EX TekLink 8-Port Hub. The TL708EX Hub is housed in a standard 19 inch rackmount frame. (See Figure 23.) The hub allows you to expand your system to accommodate up to seven additional TLA7000 Series mainframes, configured as expansion mainframes (48 modules total).

When you power on the TL708EX TekLink 8-Port Hub, the hub scans the eight TekLink connectors sequentially. The hub then assigns master mainframe status to the mainframe that is connected to the lowest number hub connector used (the #1 connector is used for the master mainframe). The next-highest numbered hub connector that you use is assigned as the first expansion mainframe. Any remaining expansion mainframes that are connected to the hub are assigned second, third, etc. using this hierarchy.

Configure the setup. Set up your expanded system by following the steps below. This power-on sequence must be followed to ensure that the mainframes are acknowledged by the hub and controller.

1. Connect a TekLink cable from the first mainframe to a TekLink connector on the TL708EX Hub. (The #1 connector is recommended for the master mainframe).
2. Connect another TekLink cable from the next TekLink connector on the hub to the TekLink connector on your expansion mainframe. Repeat for all expansion mainframes in your system.
3. Connect the power cord to the back of the hub and to an appropriate AC power source.

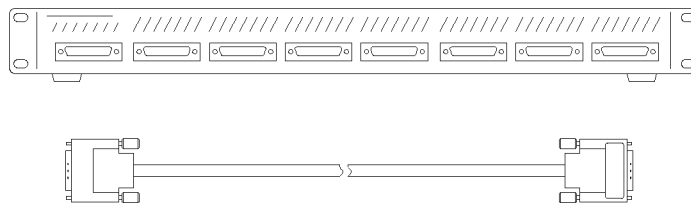



Figure 23: TL708EX Hub and TekLink cable

4. Install the modules that you intend to use in the mainframes.
5. Verify that all mainframes are connected to a proper AC source.
6. Connect the power cord to the router and power on the router.
7. Power on the hub.
8. Power on the master mainframe and verify that all of the expansion mainframes power on. This will take a moment because a sequential power-on delay is built into the hub.
9. Start the TLA application. The TLA Connection dialog box appears.

- Click  (Search icon) to open the TLA Network Search dialog box. The search for instruments returns with the name of the mainframes that are connected to the master mainframe. (See Figure 24.)

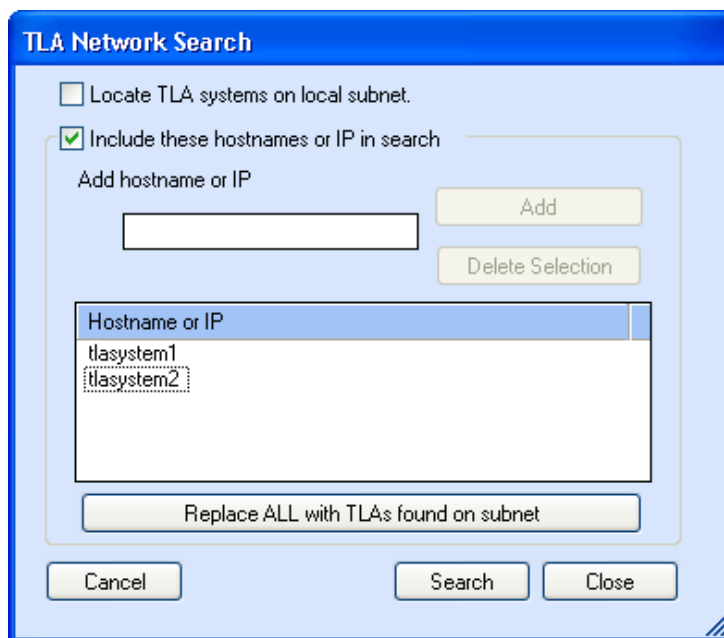


Figure 24: TLA Network Search dialog box

You can use the front-panel display on the benchtop mainframe to identify the IP address and whether it is a Mainframe or Expansion. Press the Next button on the mainframe front panel until the IP address is displayed. (For the TLA7012, this information is provided through the TLA Connection Dialog box).

- Click the Configuration icon and verify that the system is configured as you intended. Note that in systems with three or less benchtop mainframes, physically merged modules are not automatically established as a merged set until you merge them through software. (See Figure 25.)

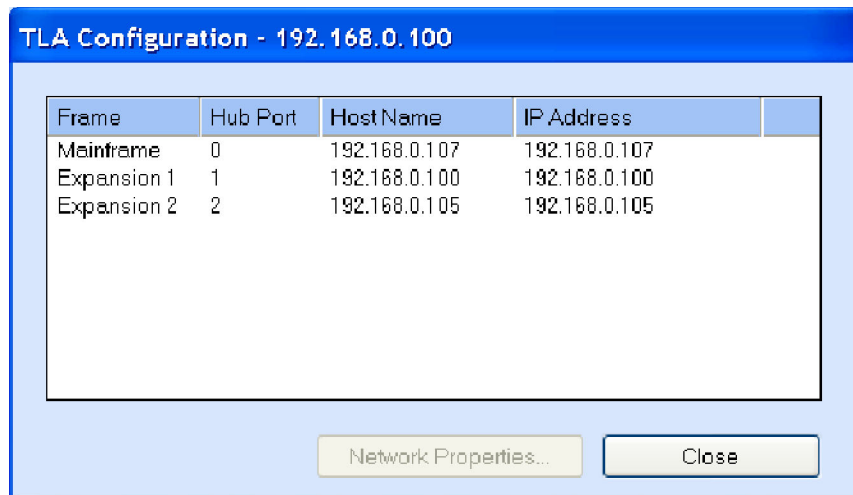


Figure 25: Instrument search results

Install the TLA application software on a PC

The TLA application CD includes the application software that allows you to control the logic analyzer from a remote PC. Install the TLA application software on a PC for the following purposes:

- To run the TLA application software in the Offline mode.
- Control a logic analyzer with the same TLA Application Software over a network.

Perform the following procedure to install the TLA application software on your PC for remote operation.

1. Insert the TLA Application Software CD in the CD drive.
2. Browse to the TLA Application SW folder on the CD and run the Setup.exe program. Follow the on-screen instructions.

If you have an older version of the software on the hard disk, the installation program will detect it and ask if you want to remove it. Follow the on-screen instructions to remove the software, answering "Yes" to any prompts. Do not cancel the uninstall program, as this may cause undesirable effects. Restart the PC when prompted.

Load third-party software. After installing the TLA application software on your PC, you can install the additional third-party software.

Controlling the logic analyzer remotely


After you configure the network settings of your system, use this section to connect and control your logic analyzer from the controller or remote PC. There are four ways that you can communicate with the mainframe from the controller.

- TLA Application — online
- TLA Application — offline
- Windows Remote Desktop
- TPI.NET

Start the TLA server on the mainframe

The TLA server application must be running on the portable mainframe before it can be operated over the network from another PC. (The benchtop mainframe is factory-set to be controlled remotely, so this step is not required.) If you are setting up a benchtop mainframe, go to *Connect to the mainframe*.

To start the TLA server on the portable mainframe, do the following:

1. Right-click  (TLA server icon, on the right side of the task bar) and select **Start TLA Server**.

The red circle on the icon disappears, indicating that the server is now running.

2. Configure your PC as described below.

NOTE. *You can configure the portable mainframe to start the TLA server when you turn on the instrument. (See page 40, TLA7012 server control.)*

Connect to the mainframe

To connect to the logic analyzer mainframe from your PC:

1. Start the TLA application by double-clicking the TLA Application icon on the PC. The TLA Connection dialog box appears. (See Figure 26.)

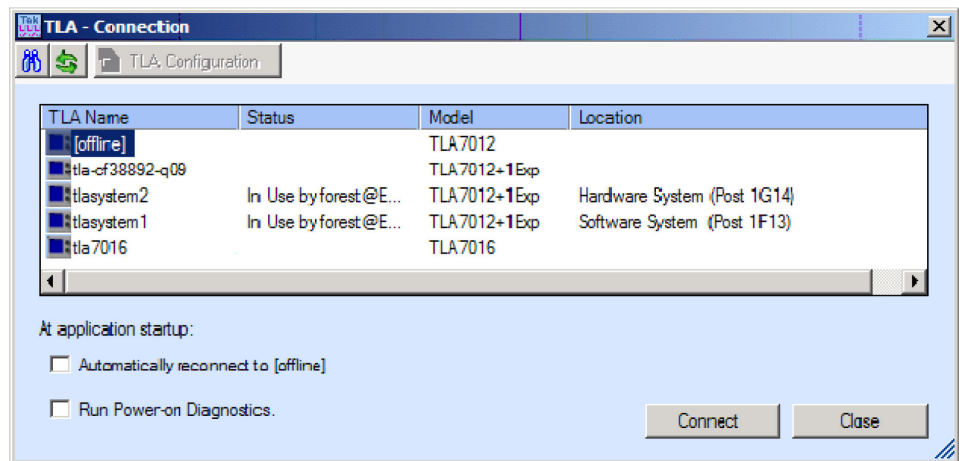



Figure 26: TLA Connection dialog box

2. Select an instrument in the TLA Connection dialog box and then click the **Connect** button. You can connect to any instrument on your local network that is not being used by another user. If no instruments are displayed in the Connection dialog box:
 - a. Click  (Search icon) to open the TLA Network Search dialog box. (See Figure 27.)
 - b. Verify that **Locate TLA systems on local subnet** is checked.
 - c. Verify that **Include these host names or IP in search** is checked.
 - d. If you know the host name or IP address of the TLA, add it to the list of hosts to search.

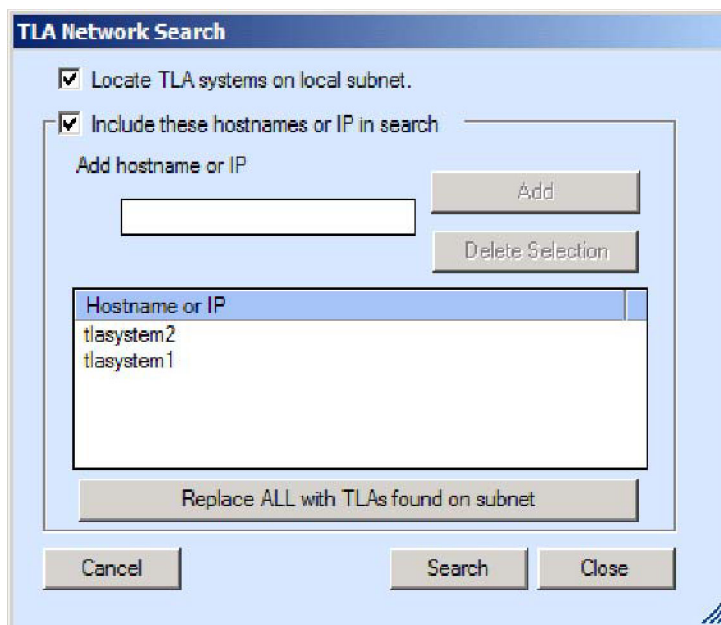


Figure 27: TLA Network Search dialog box

- e. Click the **Search** button.

When the search is complete, a list of found TLA systems is displayed, along with the current status of the system: In Use, Server Down, Blank (available), etc.

3. Select the mainframe that you want to connect to and click the **Connect** button. The application opens on the remote instrument and displays on your PC. Note that the IP Address identification is shown in the title bar. This confirms that you have connected to the correct device.

Change the TLA7016 factory network settings

The TLA7016 is configured for operation on a network that has DHCP and DNS. If you want to change these settings, do the following:

1. Connect to the TLA7016 mainframe with TLA Application software.
2. Open TLA Connection dialog box.
3. Click the TLA Configuration icon. The TLA Configuration dialog box opens. (See Figure 28.)

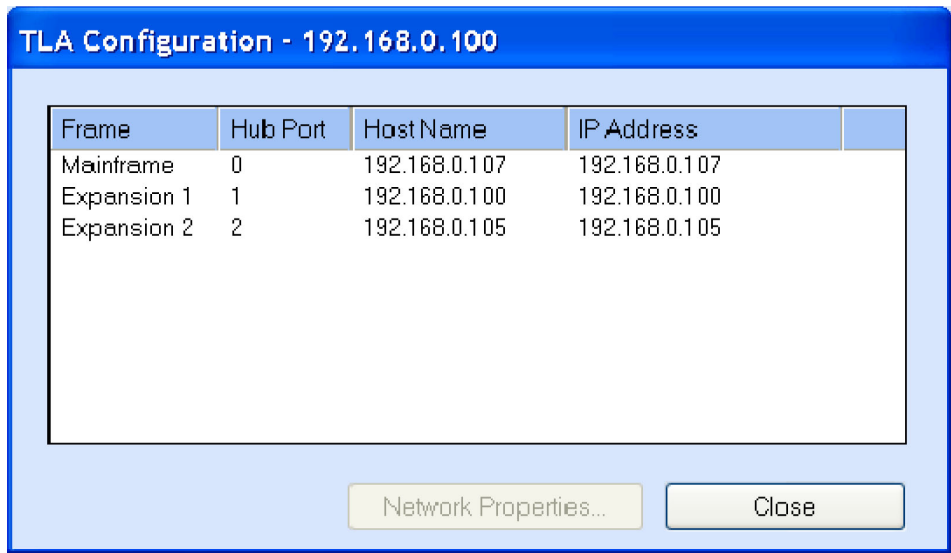


Figure 28: TLA Configuration dialog box

4. Select the mainframe that you want to change and click **Network Properties**. The Network Properties dialog box appears. (See Figure 29.)

TLA Network Properties - 192.168.0.100

Product: TLA7016, Serial Number:

Host Name

Default name (tla7016) Lookup IP Address

Use the following Name

You can get a network address automatically if your network supports DHCP. Otherwise, you must get an IP address from your network administrator.

Obtain Address Automatically

Use the following Address

IP Address: Lookup Host Name

Subnet Mask:

Gateway:

Figure 29: Make changes to the TLA network settings

5. Make the desired changes and click **OK**. For example, to change the mainframe to a static address, click the **Use the following Address** and enter the IP address information in the appropriate fields.

Networking tips & troubleshooting

The following tips may help you to make or improve your network connections, and to optimize your system performance.

Connect to the mainframe

If you cannot establish a communication link between the controller and the mainframe, do the following:

1. Open a Command Prompt window on the controller and enter **ipconfig**.
2. If the above address is not returned, enter **ipconfig release** and then **ipconfig renew**.
3. Press the **Next** button on the front panel of the TLA7016 until the IP address is displayed. Use this address to ping the mainframe from the controller.

NOTE. You may need to disable the firewall before performing the ping test.

4. Enter **ping xxx.xxx.xxx.xxx** (the IP address of the mainframe). The mainframe should reply to the command. (See Figure 30.)

```
C:\>ping 128.181.60.83

Pinging 128.181.60.83 with 32 bytes of data:

Reply from 128.181.60.83: bytes=32 time<1ms TTL=63
Reply from 128.181.60.83: bytes=32 time<1ms TTL=63
Reply from 128.181.60.83: bytes=32 time<1ms TTL=63
Reply from 128.181.60.83: bytes=32 time<1ms TTL=63

Ping statistics for 128.181.60.83:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Figure 30: Example of the ping command

5. If you get a reply using the ping command, yet cannot see the mainframe in the configuration dialog box, check to see if a firewall is enabled.
6. Use the **tracert** command to display the path of the data packets from the controller PC to the mainframe. (See Figure 31.)

```
J:\>Tracert www.tektronix.com

Tracing route to www.tektronix.com [192.65.40.31]
over a maximum of 30 hops:
|
|  1    1 ms    1 ms    2 ms  bwirelessdhcp.bu.tek.com [128.181.88.1]
|  2    4 ms    9 ms    4 ms  rs39b1D.ens.tek.com [128.181.1.100]
|  3   10 ms    3 ms    5 ms  ns-bv1.ens.tek.com [128.181.164.7]
|  4    9 ms   23 ms    5 ms  www.tek.com [192.65.40.31]
|
Trace complete.

J:\>tracert www.microsoft.com


Tracing route to lb1.www.ms.akadns.net [207.46.198.30]
over a maximum of 30 hops:


    1  bwirelessdhcp.bu.tek.com [128.181.88.1]  reports: Destination net unreacha
ble.

Trace complete.
```

Figure 31: Example of the tracert command

Multi-mainframe systems

If your system has three or more mainframes on a common network, you may see a delay in the response time. This happens when you open the TLA application or select  (Refresh icon) in the TLA Connection Dialog box. A delay of approximately two seconds occurs for each mainframe if the mainframes that were previously identified on the common network are powered off. To minimize this delay, you can delete the mainframes from the system by doing the following:

1. From the TLA Connection Dialog box, click  (Search icon) to open the TLA Search dialog box. (See Figure 32.)

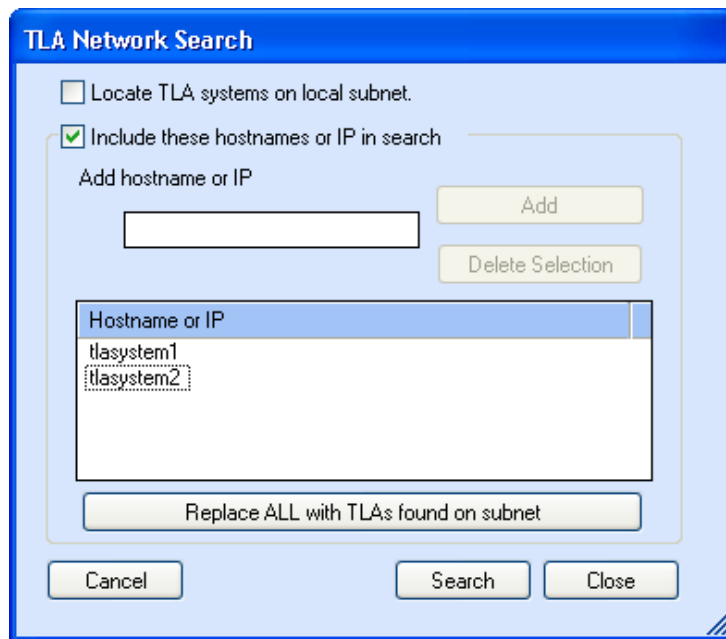


Figure 32: TLA Network Search dialog box

2. Clear the **Locate TLA systems on local subnet** selection.
3. If you know the IP address or the name of the system that you are looking for, do the following:
 - a. Enter the host name or IP address of your instrument.
 - b. Click **Search**.
4. If you don't know the IP address or the name of the system that you are looking for, do the following:
 - a. Click **Replace ALL with TLAs found on subnet** to display a list of all instruments on the subnet.
 - b. Scroll through the list and select the instruments that you are not interested in.
 - c. Click **Delete Selection** to remove the instruments from the list.
 - d. Repeat the above steps for all unneeded instruments until you locate your instrument.
 - e. Click **Search** to search for the remaining instruments in the list.

When the search is complete, a list of found, powered-on TLA systems is displayed. (See Figure 33.) The list also shows the current status, model, and location of the instruments.

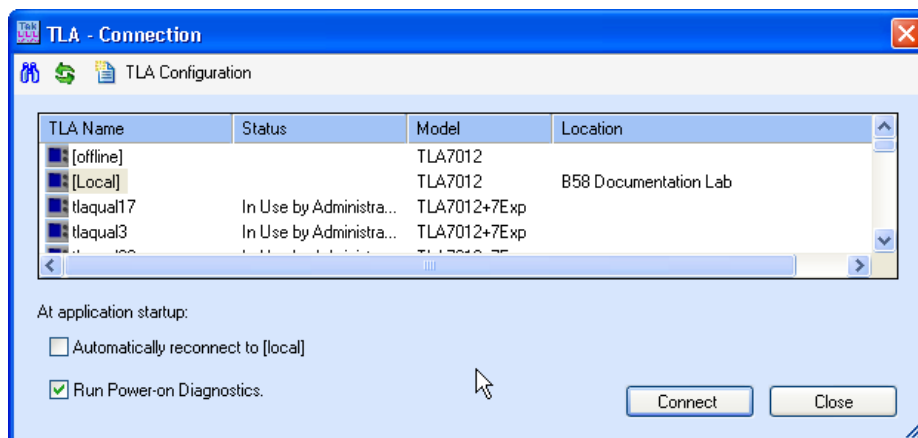


Figure 33: TLA Connection dialog box, search results

NOTE. The list of instruments is a static list; it is not updated automatically. If you change the status of instruments on the network and experience delays, you may want to repeat the above steps to improve the system performance.

Add location information for the Connection dialog box

To help you identify the location of specific mainframes, you can add location details to each mainframe in the System Properties dialog box:

1. Connect to your logic analyzer.
2. From the System menu, select **System Properties**. The System Properties dialog box appears. (See Figure 34.)

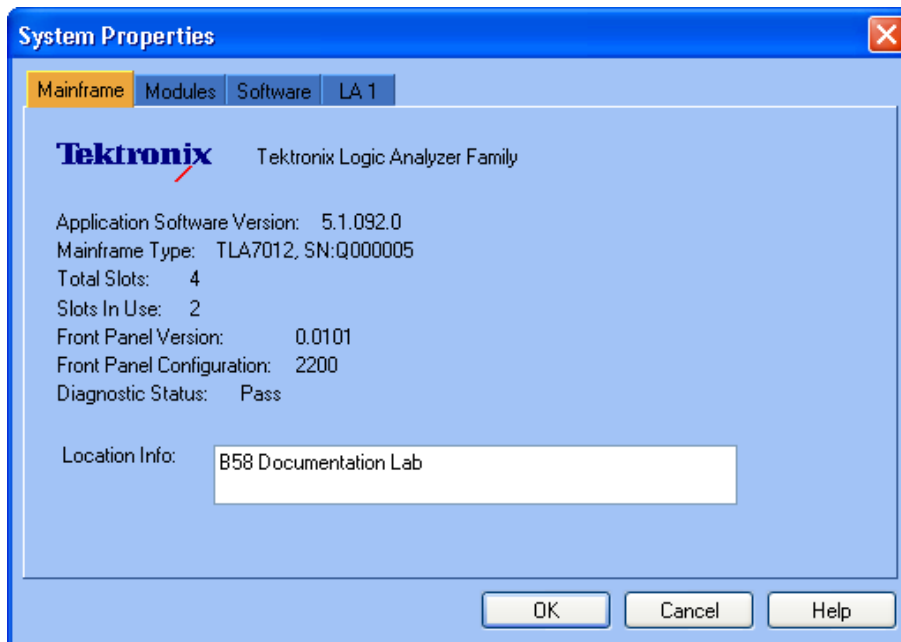



Figure 34: TLA System Properties dialog box

3. Add the location details in the Location Info text field.
4. Close the dialog box.

The location details of the mainframe are displayed in the Connection dialog box.

TLA7012 server control

The portable mainframe has its own server that must be started if you want to see the instrument listed on the network. The server control is turned off by default. To change the server control so that the instrument starts the server when you turn on the instrument, complete the following steps:

1. Right-click the  (TLA Server) icon in the taskbar and select **Server Properties**.
2. Check **Launch TLA Server Control during login**. (See Figure 35.)

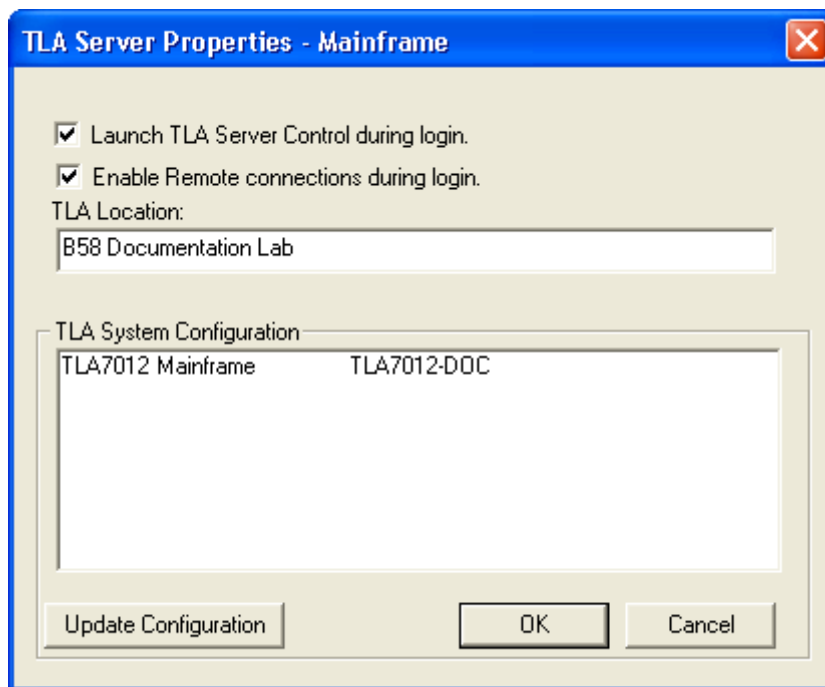


Figure 35: TLA Server Properties dialog box

3. Click **OK**.

If you experience other network connection problems, call the Technical Support group. See *Contacting Tektronix* in the front of this manual.

Installing modules

TLA700 Modules are fully compatible with the TLA7000 Series mainframes. This section describes how to install TLA700 modules in your TLA7000 mainframe.



CAUTION. *To avoid damaging the instrument, do not install or remove any modules while the instrument is powered on. Always power down the instrument before installing or removing modules.*

You can merge modules together to create wider modules. If your application requires you to merge modules, do so before installing the modules in the mainframe. (See page 51, *Merging modules*.)

Installing modules in the portable mainframe

You can install any of the modules in any slot of the portable mainframe. If you are not merging the modules, and for air flow considerations, follow these guidelines:

- Install a single module in slots 3-4. Place a double-width slot cover over slots 1-2.
- When installing two logic analyzer modules, install the module with the higher channel count in slots 1-2. Install the module with the lower channel count in slots 3-4.
- When installing two logic analyzer modules with different amounts of memory, install the module with the larger memory in slots 3-4. Install the module with the lower memory in slots 1-2.

Use a screwdriver to tighten the retaining screws to 2.5 in-lbs after seating the modules in place. (See Figure 36 on page 43.)

Installing modules in the benchtop mainframe

You can install any of the modules in any slot of the benchtop mainframe. If you intend to merge the modules, disregard the following suggestions and refer to the merging modules rules. (See page 51, *Merging modules*.) If you are not merging the modules, and for airflow considerations, follow these guidelines:

- Install a single module in slots 1-2. Place a double-width slot cover over slots 3-4, 5-6, 7-8, 9-10, and 11-12.
- When installing two or more logic analyzer modules, install the module with the highest channel count in slots 1-2. Install the module with the lower channel count in slots 3-4. Place double-width slot covers over slots 5-6, 7-8, 9-10, and 11-12.
- When installing two or more logic analyzer modules with different amounts of memory, install the module with the largest memory in slots 1-2. Install the

module with the lower memory in slots 3-4. Place double-width slot covers over slots 5-6, 7-8, 9-10, and 11-12.

- In systems with three or less benchtop mainframes, physically merged modules are not automatically established as a merged set until you merge them through software.

Use a screwdriver to tighten the retaining screws to 2.5 in-lbs after seating the modules in place. (See Figure 36 on page 43.)

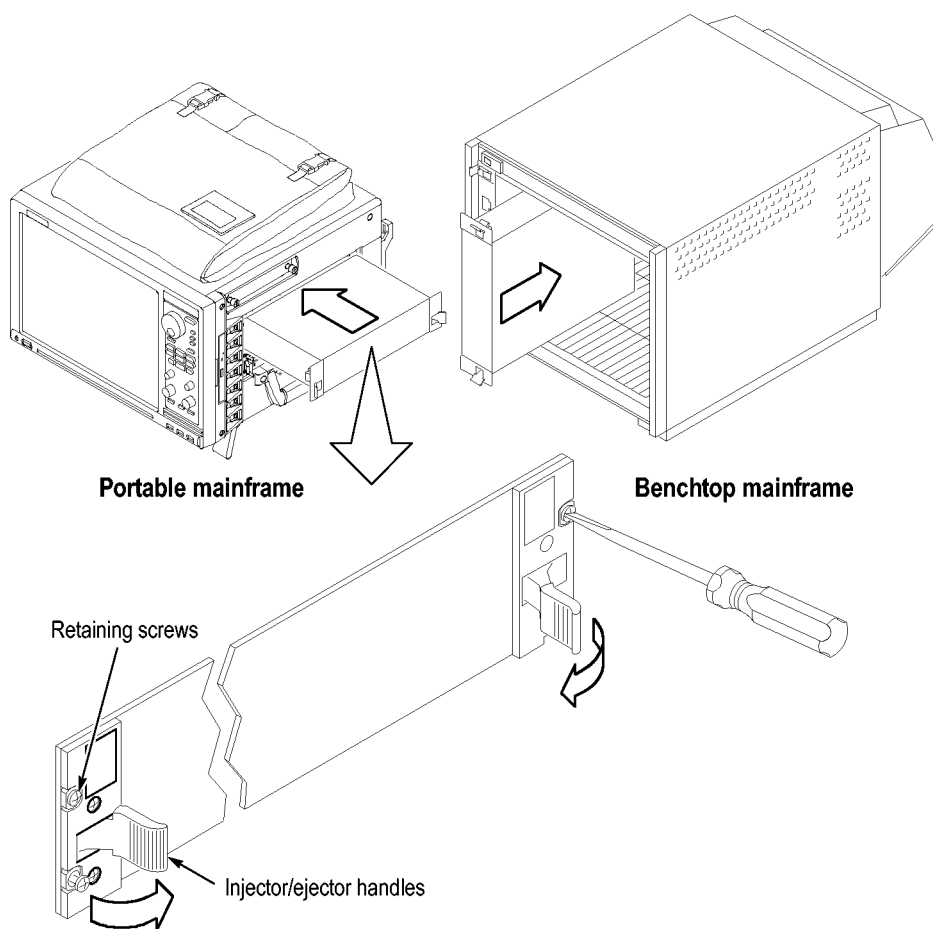


Figure 36: Installing modules

Cover empty slots

If you have any unused (empty) slots in your mainframe, install blank-slot panel covers to meet EMC and cooling specifications. Install a blank-slot panel cover for the empty slot in the Portable Mainframe. (See Figure 37.) Install the blank slot-panels on the benchtop mainframe. (See Figure 38.) Install the blank-slot panel covers before any modules. Use only Tektronix TLA covers; otherwise the mainframe may not meet EMC and cooling requirements.

Make sure that the EMI shielding is in contact with the adjacent panel or module cover, and that the airflow shutter activation arms protrude through the holes in the blank-slot panel.

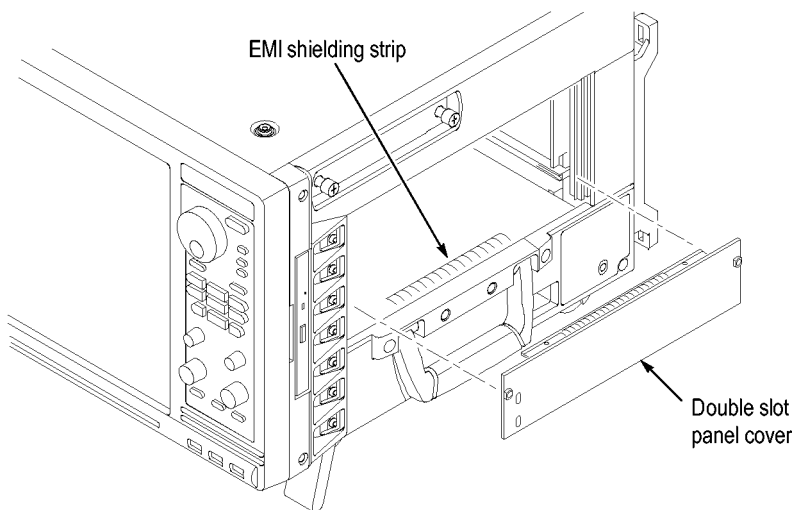


Figure 37: Installing panel covers on the portable mainframe

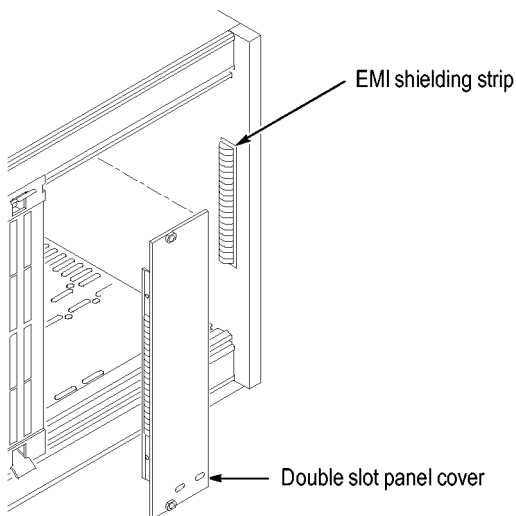


Figure 38: Installing panel covers on the benchtop mainframe

Connecting accessories

After installing the mainframes and modules, you can connect the accessories such as external monitors, keyboard, and printer.

Connect the accessories to the portable mainframe. (See Figure 39.) If you have a benchtop mainframe, connect the accessories to external PC; connect other cables and connectors to the benchtop mainframe. (See Figure 40 on page 46.)

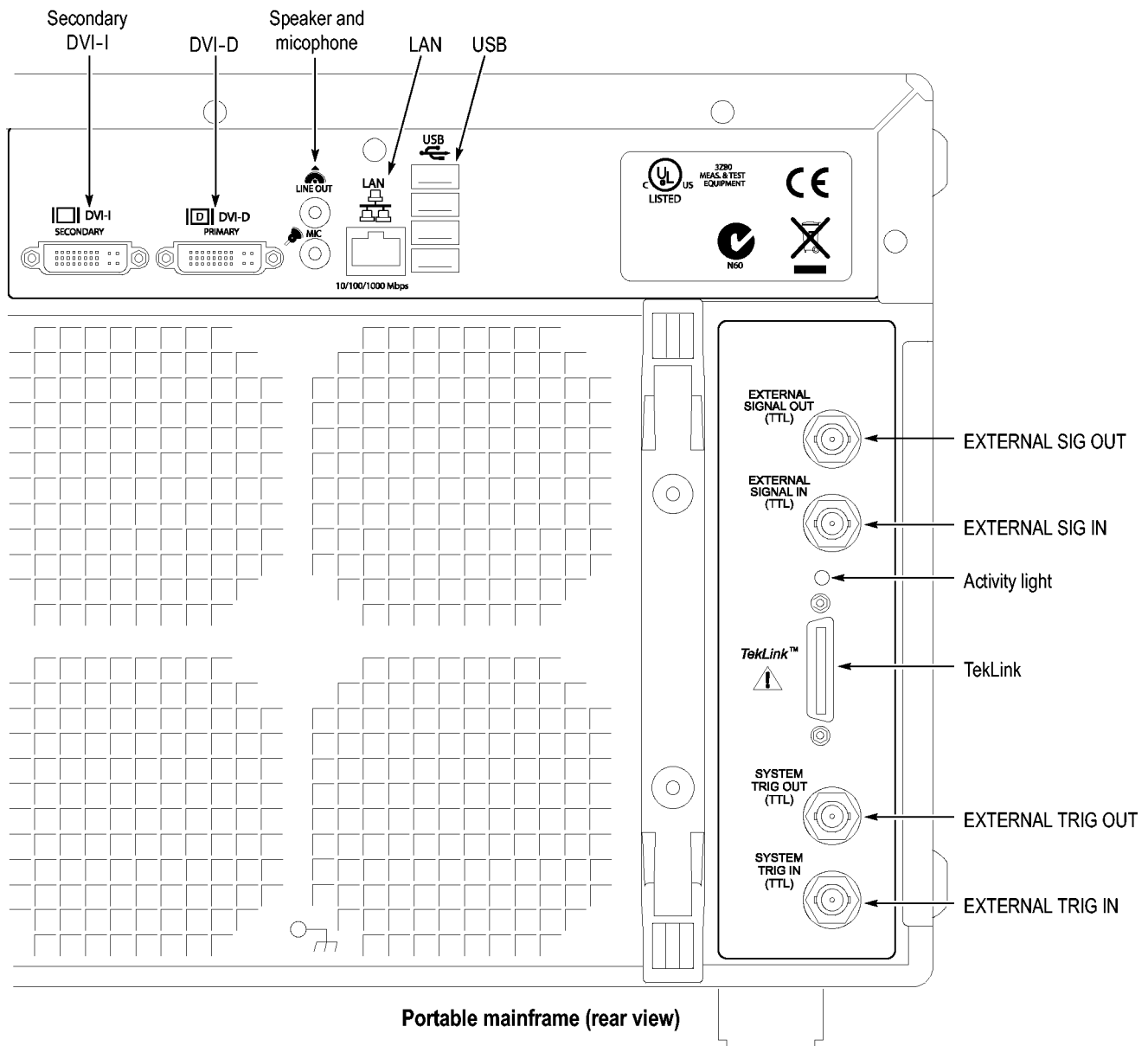


Figure 39: TLA7012 accessories connections

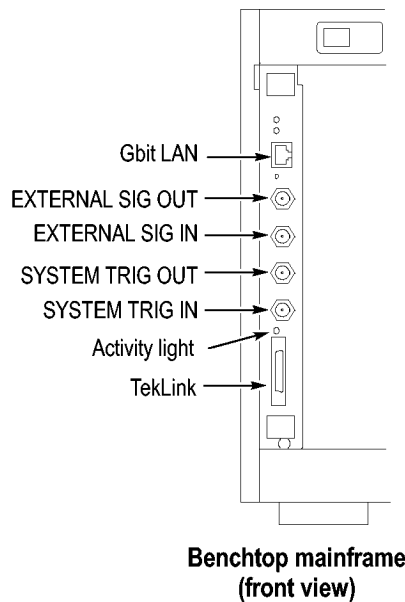


Figure 40: TLA7016 accessories connections

Additional accessory connection information

Connect additional accessories as needed. (See Table 8.)

Table 8: Additional accessory connection information

Item	Description
Monitor	<p>There are two display ports on the TLA7012: Primary (DVI-D, digital output only), and Secondary (DVI-I, digital/analog out). Simulscan mode displays the same information on the internal display and the external monitor connected to either Primary or Secondary.</p> <p>To change the display settings, right-click the mouse on the desktop, select Properties, and go to the Settings tab. Select the settings for your monitor. Note that some of the display settings may not function until you connect an external monitor.</p> <p>Use the VGA-to-DVI display adapter to connect a VGA monitor to the Secondary DVI-D output. Part numbers for accessories and options are listed at the end of this manual. (See page 81, <i>Accessories and options.</i>) If you use a nonstandard monitor, you may need to change the Windows display settings to achieve the proper resolution.</p>
LAN	<p>Connect the mainframes to your network through the Gbit LAN connectors. You can remotely control the mainframes through a LAN switch using your PC (loaded with the TLA application software).</p>
Printer	<p>The instruments send printer information to the USB ports. Use any of the four USB ports for your printer.</p>

Connecting probes

After you have connected all the accessories, you can connect the probes to the instrument. Refer to the appropriate section for your instrument.

For additional information on the individual probes, refer to the instructions that accompanied your probes.



CAUTION. When attaching the probe to the logic analyzer, you must use care to evenly tighten probe screws until they are snug. First slightly tighten screws, then snug each screw to 4 in-lbs (maximum). Under tightening the probe screws can result in intermittence. Over tightening can result in stripped screws.

Connect the probes to the logic analyzer

Connect the logic analyzer probes to the logic analyzer.

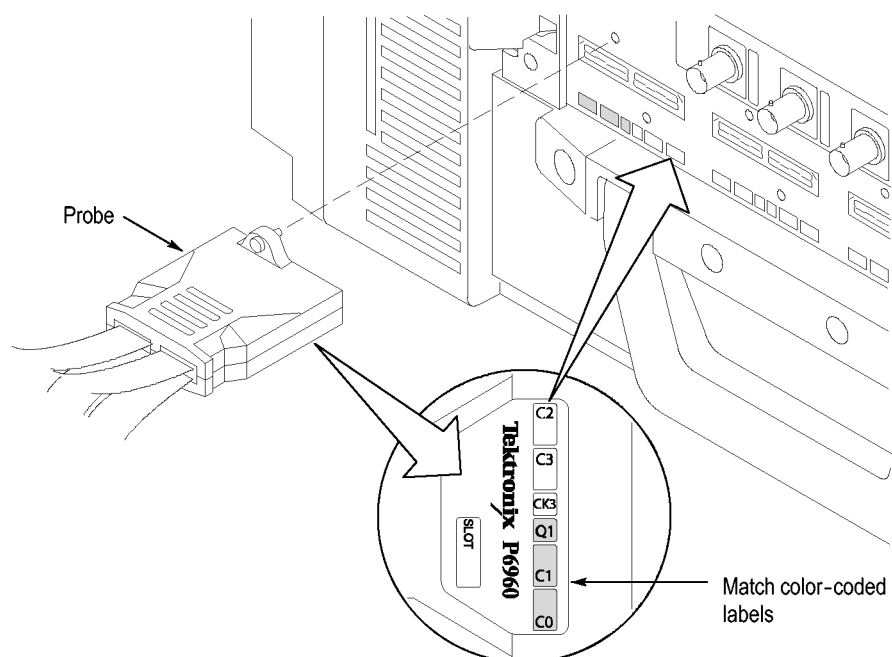


Figure 41: Connecting the P69xx logic analyzer probes to the TLA7Bxx logic analyzer module

First time operation

Use the information in this section to turn on the logic analyzer for the first time.



CAUTION. Connecting the accessories after turning on the logic analyzer may damage the accessories. Connect accessories before applying power to the logic analyzer.

Turn on the logic analyzer

Follow these steps to turn the logic analyzer on:

1. Connect the power cord to your instrument.
2. If you have an external monitor, connect the power cord and turn on the monitor.
3. Press the On/Standby switch to turn on the mainframe. (See Figure 42.)
4. Wait for the mainframe to complete the power-on self tests.

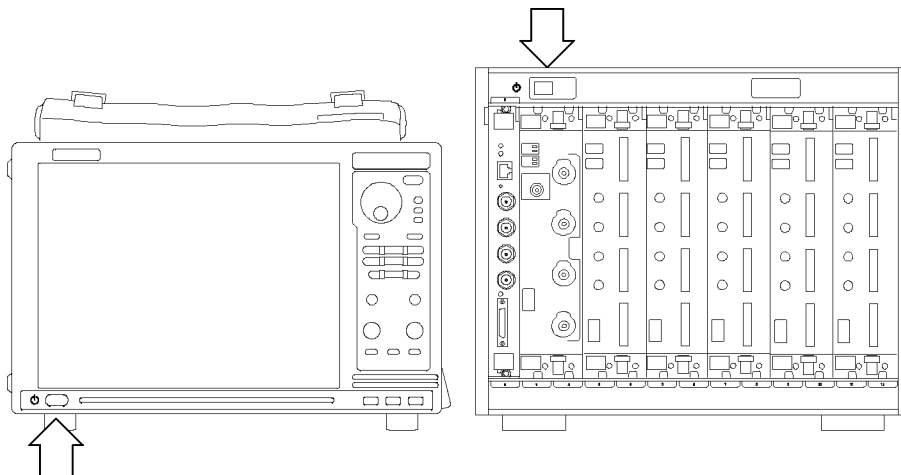


Figure 42: TLA7000 On/Standby switch locations

Turn on the expansion mainframes

The benchtop mainframes that are connected as expansion mainframes are automatically powered on when the first benchtop or portable mainframe is powered on. If everything is properly connected and operational, you will see the expansion mainframe and the installed modules in the System window.

NOTE. You must have a module installed in an expansion mainframe before the expansion mainframe appears in the System window.

Turn off the mainframes

To power off the mainframes, press the On/Standby switch on the mainframe. Both the portable and benchtop mainframes have a built-in soft power-off function that safely powers off the mainframe when you press the On/Standby switch. The expansion mainframes automatically power off when you turn off the benchtop or portable mainframe.

Create operating system restore discs

The instrument does not ship with an operating system restore disc. Use the following procedure to create a set of discs that enable you to restore the operating system if the need arises.

NOTE. *This procedure creates a set of restore discs for the Microsoft Windows operating system. After restoring the operating system, use the TLA Application disc to reinstall the TLA application software. (See page 70, Reinstall the TLA application software.)*

Complete the following steps to create a set of restore discs. You will need blank discs (one for each backup file).

1. Insert a blank disc in the instrument DVD drive.
2. Open the Windows Explorer and navigate to C:\backup.

The backup folder contains the operating system restore files. You will need to create one disc per file in the folder.

3. Right-click the first file and select **Burn image to disc**.
4. Repeat the previous step for each file in the folder.

Perform the incoming inspection

Incoming inspection consists of verifying the basic operation of the logic analyzer. The power-on diagnostics check the basic functionality. The diagnostics run every time you turn on the logic analyzer.

You can also verify more detailed functionality by running the self-calibration and extended diagnostics.

NOTE. *Allow the mainframe and modules to warm up for 30 minutes before running the self-calibration.*

To run self-calibration and diagnostics, perform the following:

1. Disconnect any probes attached to the modules.
2. Select the System menu and click Calibration and Diagnostics.
3. Run the self-calibration, and then run the extended diagnostics by selecting the proper tab. Results of the tests display on the individual property page.

NOTE. *The time required to run the self-calibration on the logic analyzer modules depends on the number of acquisition channels. Modules with a large number of channels may take several minutes to run the self-calibration.*

Check the logic analyzer probes (optional)

Connect the logic analyzer probes to a signal source and (if necessary) adjust the threshold levels for the probes to acquire the signals. Use the threshold and activity indicators in the LA Setup window to verify signal activity at the probe tips.

Check the TLA7000 mainframe (optional)

To check the mainframe diagnostics not covered by the TLA Application software, run the TLA7000 Mainframe Diagnostics located under the Windows Start menu (Start/Programs/Tektronix Logic Analyzer/TLA Mainframe Diagnostics). Exit the TLA Application before running the external diagnostics.

Back up user files

Back up your user files on a regular basis. Use the Windows back up tools or copy the files to another media. Always keep a backup copy of files that you access on a regular basis.

Connecting probes to the target system

The logic analyzer connects to the target system through the probes. The logic analyzer probes allow you to connect to the target system in several different ways. For probe-specific connection details, refer to the appropriate probe instruction manual or browse through the Tektronix Web site.

Merging modules

A merged logic analyzer module set consists of a master logic analyzer module and up to four slave logic analyzer modules that are physically connected together by a merge cable and are merged in software. Review the guidelines under *Logic analyzer module merging rules*, and then follow the steps to physically connect the modules together before installing the modules in the mainframe.

Logic analyzer merging rules

The following logic analyzer module merging rules must be followed:

- The TLA7BB2 Logic Analyzer Module is the only 68-channel module that can be merged. For other modules, 102 or 136 channel modules can be merged.
- Logic analyzer modules must be in adjacent slots and physically connected.
- Logic analyzer modules cannot be merged across mainframes (between the benchtop mainframe and one or more expansion mainframes).
- Merging logic analyzer modules with unequal memory depths will result in the merged modules assuming the depth of the shallowest module.
- When merging logic analyzer modules of unequal channel widths, use the logic analyzer module with the highest number of channels as the master module. If there is a second slave module, the first slave must have at least as many channels as the second slave module. Slave 3 cannot have more channels than the master, slave 1 or slave 2. Slave 4 cannot have more channels than the master, slave 1, slave 2, or slave 3.
- The logic analyzer modules must have the same firmware version.
- The maximum merged combinations are five TLA7Axx modules or five TLA7Bxx modules.
- TLA7Bxx modules cannot be merged with TLA7Axx modules.
- To merge a logic analyzer module to an established merged set, the established merged set must first be unmerged through software. Unmerged modules are the only potential candidates to add to a merged configuration.
- In systems with three or fewer benchtop mainframes, physically merged modules are not automatically established as a merged set until you merge them through software.

Merge procedure

Complete the following steps to create a merged module from two or more individual modules. You must complete these steps prior to installing the modules in a mainframe.



CAUTION. *To avoid damaging the mainframe or any modules, always power off the mainframe before removing or installing modules.*

1. Determine which modules will reside in the highest-numbered slots in a single mainframe.
2. Place the merge connector of these modules in the extended position. The module in the lowest-numbered slot must have the merge connector in the recessed position.

The following figure shows an example for determining the location of the master module with the merged module set. (See Figure 43.) Even though the figure shows a five module set, you can still use it to position the master module with respect to the slave module. If you have a two module set, the master module is located in the lower-numbered slot, and the slave module is in the higher-numbered slot.

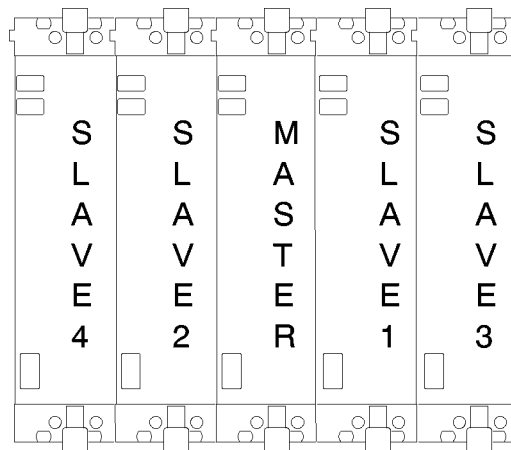


Figure 43: Location of modules in a merged system

Merging modules

Complete the following steps to create a merged module from two to five individual TLA7Axx or TLA7Bxx modules.

1. Place the module on the right side.
2. Using a Torx T-10 screwdriver, remove the two screws holding the merge connector to the module. (See Figure 44.)

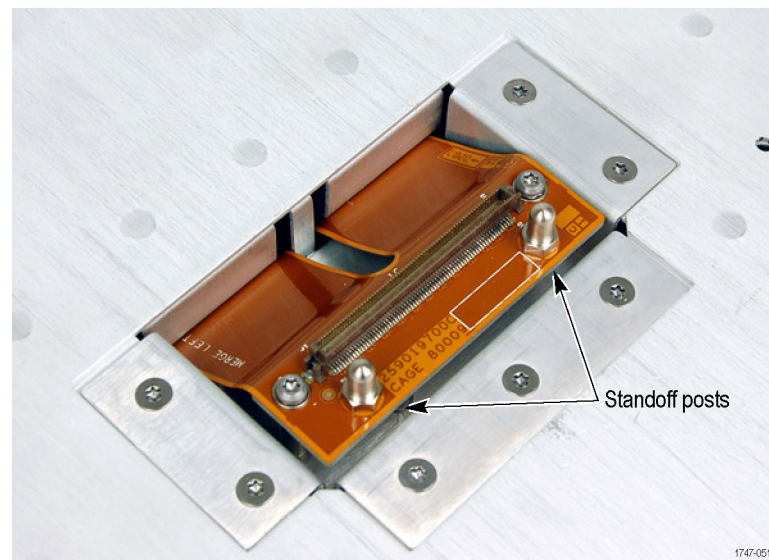
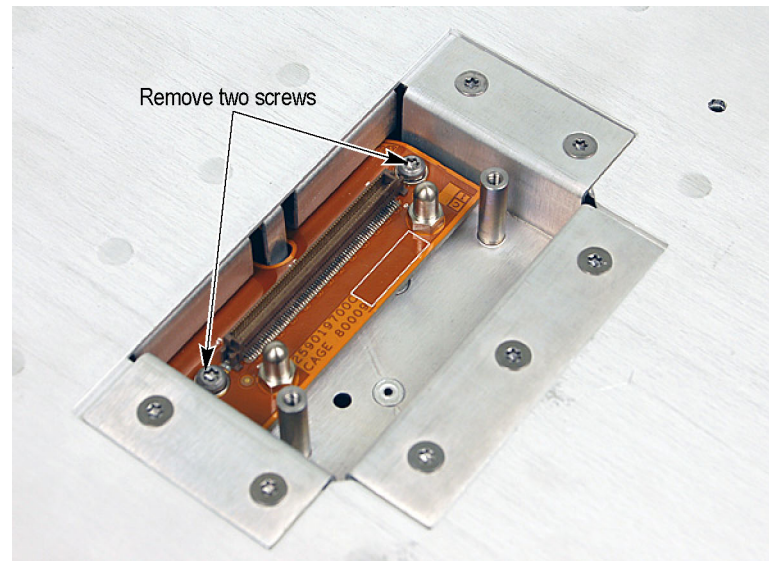


Figure 44: Removing the merger connector assembly from the module

3. Gently lift the merge connector out of the slot and place it in the extended position such that the screw holes line up over the two standoff posts.

4. Install the two screws into the standoff posts. Tighten the screws to 4-in. lbs.
5. Repeat steps 1 through 4 for the remaining modules.

NOTE. *When installing the merged modules into a mainframe, you may need the help of another person.*

6. Place the first pair of modules to be merged side-by-side such that the merge connector assemblies line up between the two modules. (See Figure 45.)
7. Push the two modules together until the connectors are seated in place.
8. Add any additional modules to the set.

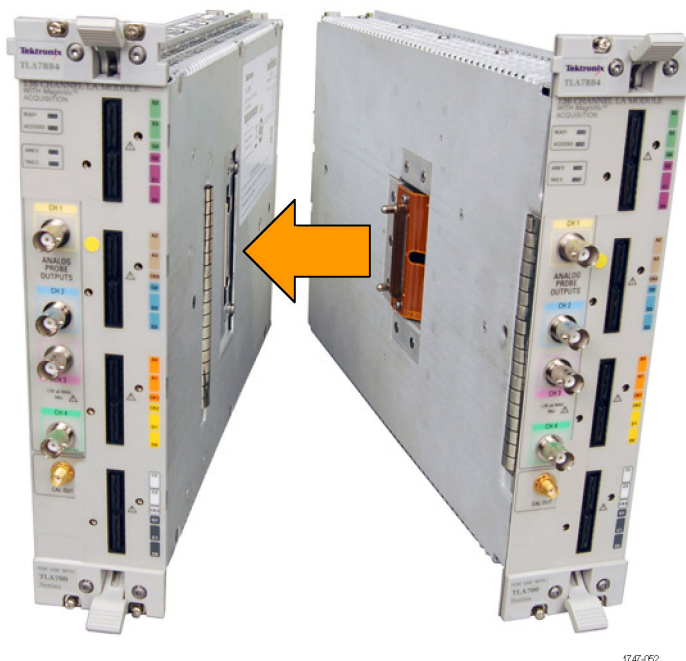
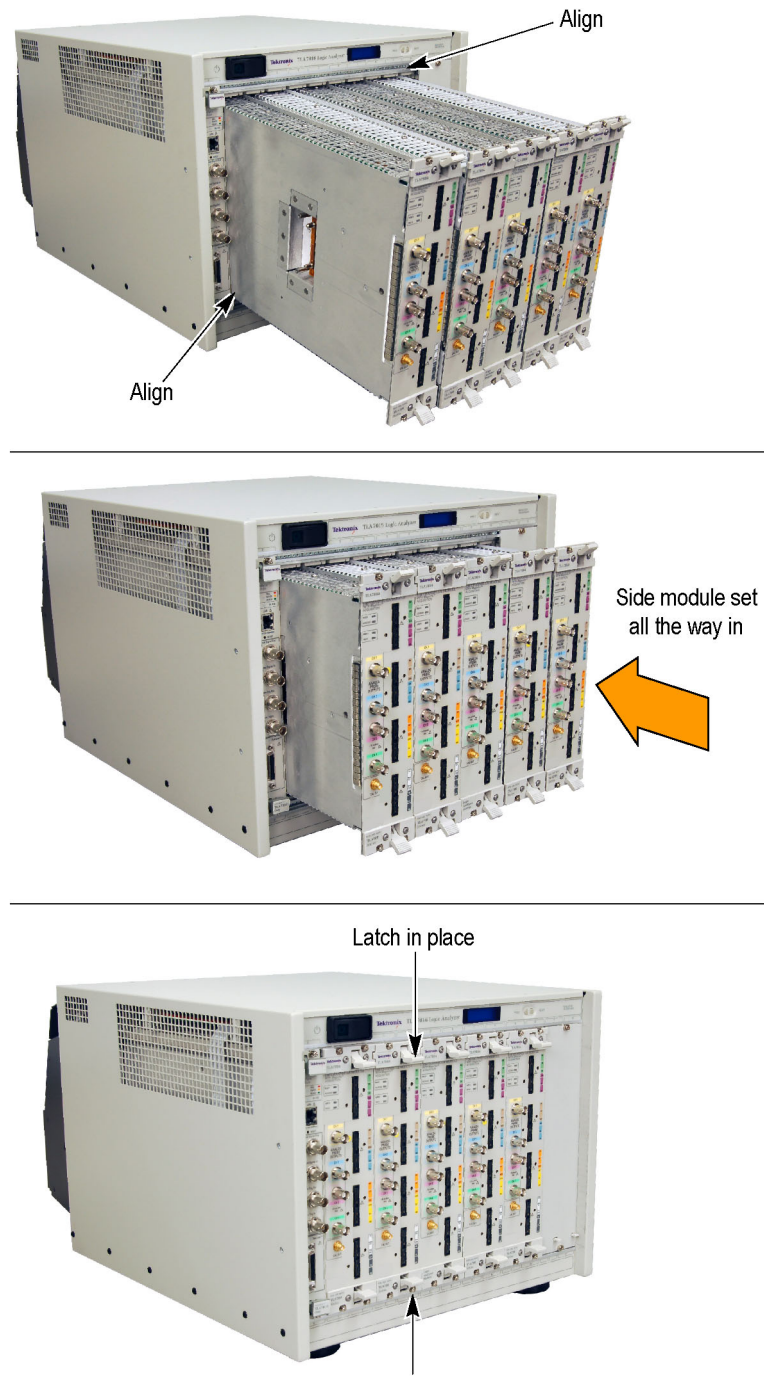


Figure 45: Connecting modules in a merged set



CAUTION. *Ensure that the mainframe is powered-off before installing or removing the modules. Failure to do so can damage the mainframe or the modules.*

9. Place the merged module set into the mainframe.
10. Align the tops and bottoms of the modules with the slots in the mainframe. (See Figure 46 on page 55.) You may need the help of another person if your merged module set contains more than two modules.



1747-053

Figure 46: Installing the merged module set in the mainframe

11. Slide the modules all the way into the mainframe until they rest against the rear panel connectors.
12. Use the injector handles to firmly seat the modules in place one at a time. The merge cable assembly should allow enough movement between two side-by-side modules to allow you to seat or unseat them individually.
13. Tighten the four retaining screws on each module to 2.5-in. lbs.
14. After installing all of the modules, power on the mainframe and complete the merge process listed under the Merged Modules tab in the System Configuration dialog box.

Unmerging modules

Although you can unmerge modules from a merged set from within the TLA application without physically separating modules, there will be times when you have to physically unmerge the modules. The following procedures provide the steps for unmerging the modules.



CAUTION. *Ensure that the mainframe is powered-off before installing or removing the modules. Failure to do so can damage the mainframe or the modules.*

1. Power off the mainframe before removing the modules from the mainframe.
2. Loosen the four retaining screws on each module.
3. Use the ejector handles to disengage each module in the merged module set from the mainframe.
4. With the assistance of another person, slide all of the merged modules out of the mainframe and place them on a static-free working surface.
5. Gently separate the modules one at a time from the merged module set.
6. Lay the modules on their right sides.
7. Remove the two Torx T-10 screws that hold the merge cable assembly to the module.
8. Place the merge cable assembly into the recessed position.
9. Install the two Torx T-10 screws onto the assembly and tighten the screws to 4 in-lbs.
10. Repeat steps 7 through 9 for the other modules.

You can now reinstall the modules in the mainframe as needed.

TLA7Bxx deskew procedures

Tektronix recommends that you perform the deskew procedures to provide enhanced performance for high-speed applications using the TLA7Bxx Logic Analyzer modules and probes. The procedures use the TLACAL software with a deskew fixture to adjust the timing of probes to the logic analyzer module.

NOTE. *The deskew fixtures are available as optional accessories. Make sure that you use the correct deskew fixture to match your logic analyzer probes. (See page 81, Accessories and options.)*

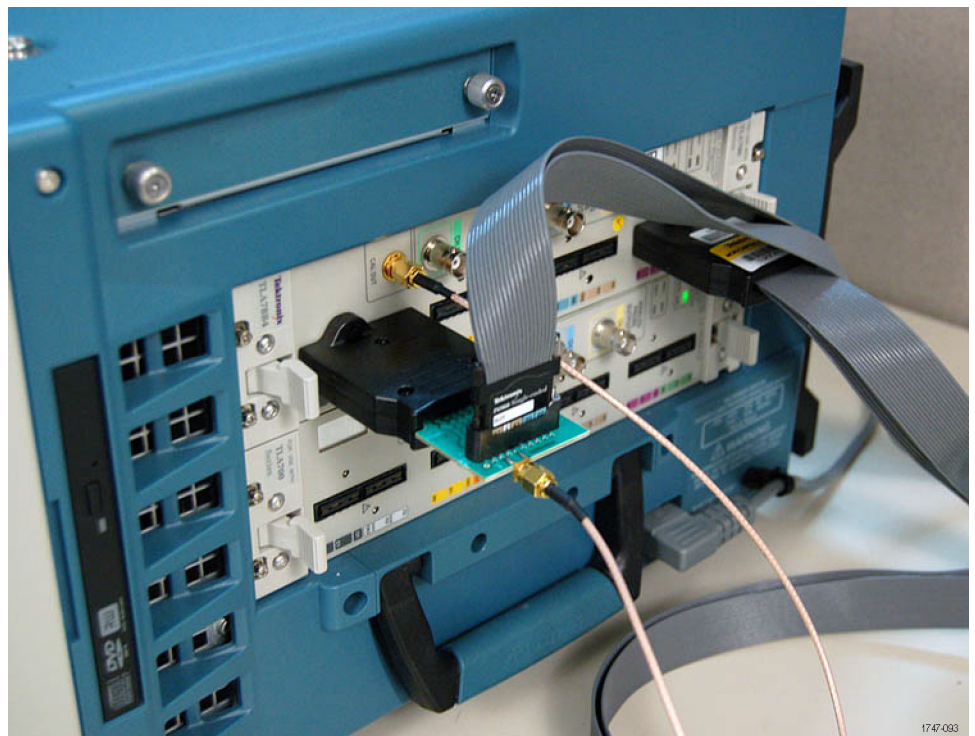


Figure 47: TLA7012 with TLA7Bxx module and deskew fixture

There are no manual adjustments. The TLACAL software adjusts the instrument hardware using the deskew fixture in response to prompts on the screen. Upon successful completion of each test, the software automatically loads the new calibration data.

Prerequisites

Perform these procedures after meeting the following requirements:

- The logic analyzer requires a 30-minute warm-up time in a +20 C to +30 C environment before performing these procedures.
- The TLACAL software must be installed on the instrument.
- The logic analyzer application must not be running.
- The logic analyzer probes must be securely connected (screwed down) to the specific probe connector on the logic analyzer module as required by your application. All adjustments are made with the logic analyzer probes connected to specific probe connectors.



CAUTION. *Moving the probes to a different slot connector after performing the deskew procedures invalidates the adjustments. If you have to disconnect a probe after performing the deskew procedure, make sure that you reconnect the probe to the same probe connector.*

Install the TLACAL software

The TLACAL software must be installed on the instrument before you can use it. You must close the TLA application before starting the TLACAL software; you cannot run both applications at the same time.

NOTE. *If your instrument already has the TLACAL software installed, verify that the software version is the same as the version that came with the TLA application. If necessary, refer to the TLA Release Notes for software version information. If the software versions do not match, you must remove the old TLACAL software and install the correct version.*

Click the About TLACAL button in the TLACAL startup window for firmware version information.

Complete the following steps to install the TLACAL software:

1. Close all open applications.
2. Insert Disc 1 of the Tektronix Logic Analyzer Family application software CD in the disc drive.
3. On the desktop select Start → Run....
4. In the Run dialog box, enter the following path or use the Browse button to navigate to the path:
`D:\TLACAL\Setup.exe`
5. Click OK to begin the installation program and then follow the on-screen instructions.
6. Remove the disc when the installation is complete.

After you install the software a TLACAL icon appears on your desktop.

To remove the TLACAL software from the instrument, use the Add/Remove Program utility from the Windows Control Panel.

Deskew procedure

Perform the Deskew procedures using the specific set of probes attached in the same configuration that will be used with your application to keep the skew to a minimum. The deskew measurements are only valid for specific probe and module configurations. The following deskew procedures are available:

- **Deskew.** This procedure measures relative delays from a module and probe combination. It compensates for variances due to differences between cable lengths and other factors that cause delay differences between channels across the module.
- **Merged Deskew.** This procedure measures the relative delay between modules in a merged configuration to align data from all modules within the merged set. The modules must be physically merged together.
- **Restore Factory Defaults.** This option removes the results from previous Deskew and Merge Deskew adjustment settings and restores the default factory deskew settings. This prevents you from reusing calibration data that was intended for other specific module and probe configurations.

Complete the following steps to start the TLACAL software and to complete the adjustments:

1. Close the TLA application (if it is running).
2. Double-click the TLACAL icon on the desktop to start the software.
3. When the TLA Connection dialog box appears, connect to your instrument.

The TLACAL window appears on your desktop. (See Figure 48.)

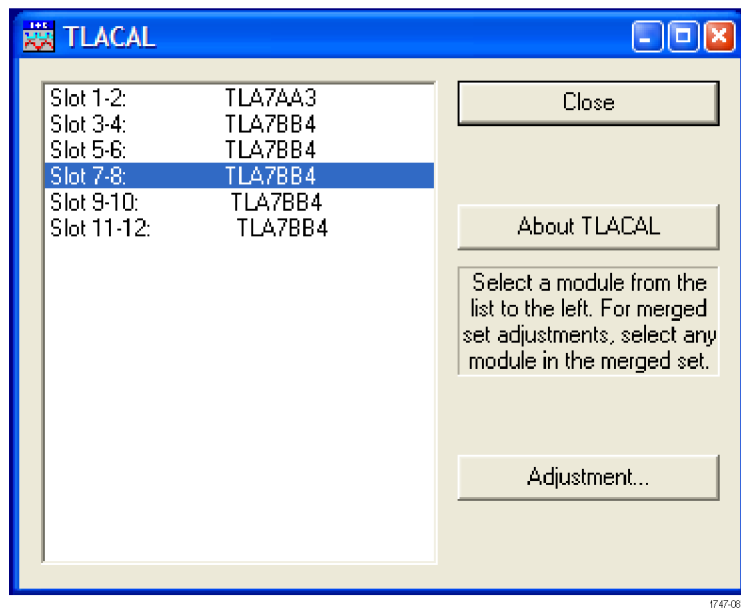


Figure 48: TLACAL startup window

4. In the dialog box, select the module that you want to deskew.
5. Click the Adjustment button to start the software. The Adjustment procedure dialog box appears. (See Figure 49.)

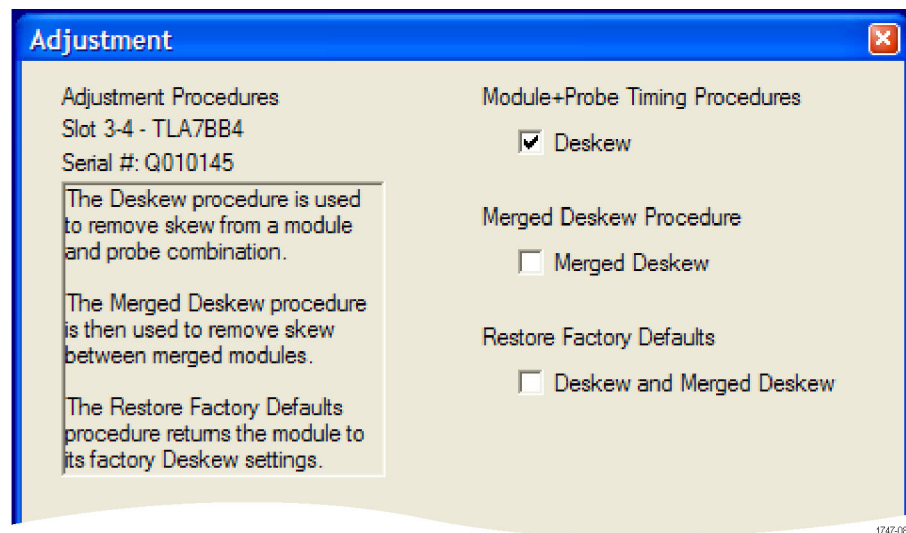


Figure 49: Adjustment procedure dialog box with Deskew selected

6. Verify that Deskew is selected at the top of the dialog box.

7. Click the Next button at the bottom of the dialog box to display the probe connection instructions.
8. Follow the on-screen instructions to connect the probes, clock cable, and the deskew fixture.
9. Click the Next button to begin the procedures and follow the on-screen instructions. The software will begin the adjustment procedures and display the results in the dialog box. (See Figure 50.)

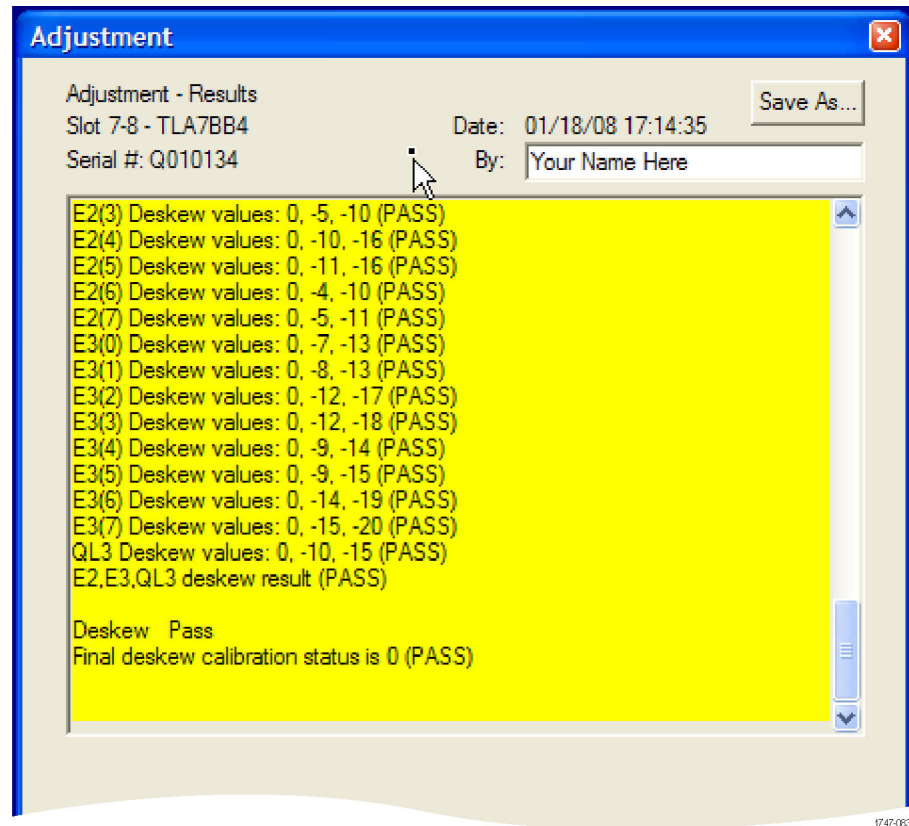


Figure 50: Example of adjustment results

NOTE. If any failures occur, check your probe or deskew fixture connections and reseal them, if necessary. Then click the Back button to restart the test.

10. After the tests have completed, click the Next button to save the deskew adjustment values.

NOTE. *The procedure has you connect and disconnect probes and the deskew fixture. After you complete the procedures, make sure that the correct probes are connected for your configuration. These procedures are only valid for the probes connected to the specific probe connectors. If you change the probe connections, you must redo the procedures.*

11. Repeat the Deskew procedure for every module in the merge configuration.
12. Click the Finish button to finish the procedure and return to the startup window.

NOTE. *To perform the deskew procedure on a specific probe section, you can bypass probe sections by clicking the Next button until you see the probe section that you want. Any probe sections that you skip will display a FAIL status. The FAIL status on other probe sections will not affect the current probe section.*

Merged deskew procedure

The Merged Deskew procedure depends on successful completion of the Deskew operation on each module in a merge configuration. Make sure that you complete the Deskew procedure for the individual modules before performing the Merged Deskew procedure.

1. Click the Adjustment button to start the procedure.
2. Clear the Deskew check box.
3. Select Merged Deskew in the dialog box. (See Figure 51.)
4. Click the Next button and follow the on-screen instructions to complete the Merge Deskew procedure.

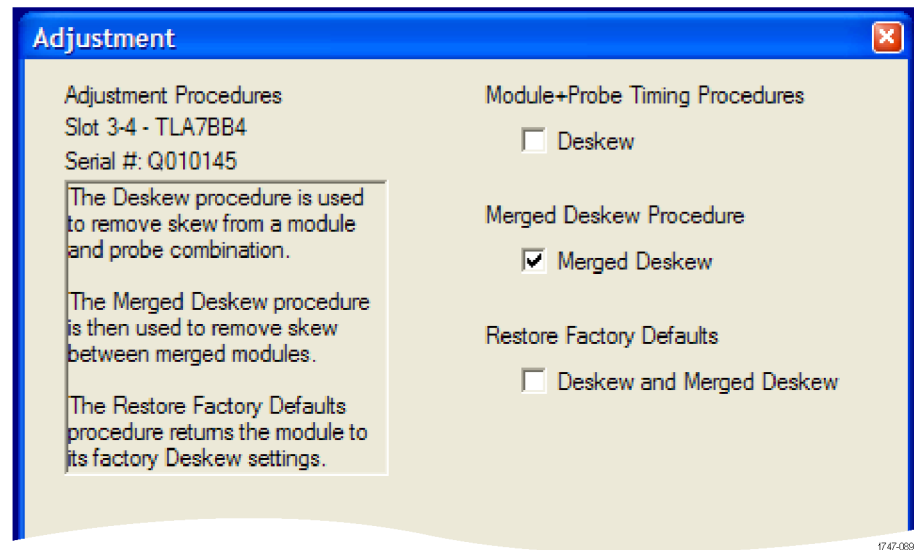


Figure 51: Adjustment procedure dialog box with Merged Deskew selected

Restore the factory defaults

Use the following procedure to remove calibration data from a previous Deskew or Merged Deskew procedure and to return the module to the factory default deskew settings.

1. In the Adjustment procedure dialog box, select Deskew and Merged Deskew. (See Figure 52.)

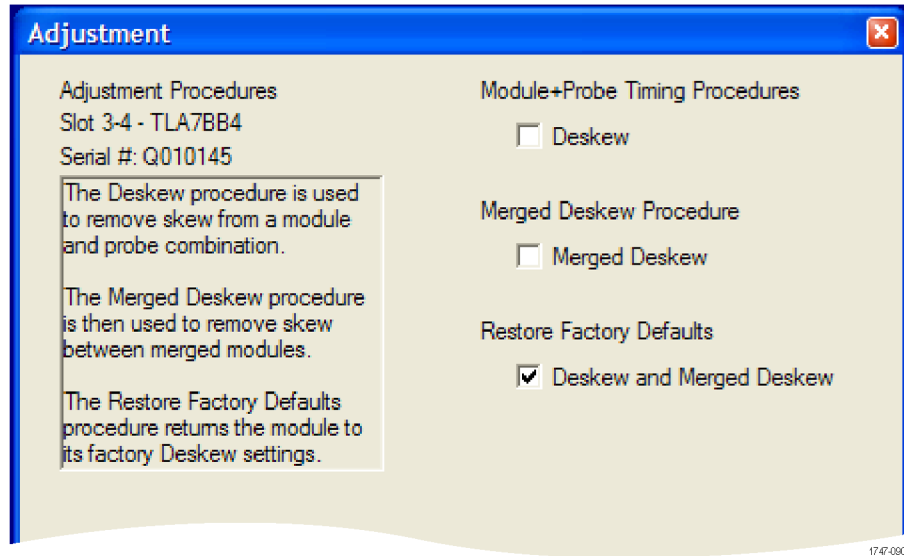


Figure 52: Adjustment procedure dialog box with Deskew and Merged Deskew selected

2. Click the Next button and note the instructions in the dialog box. (See Figure 53.)

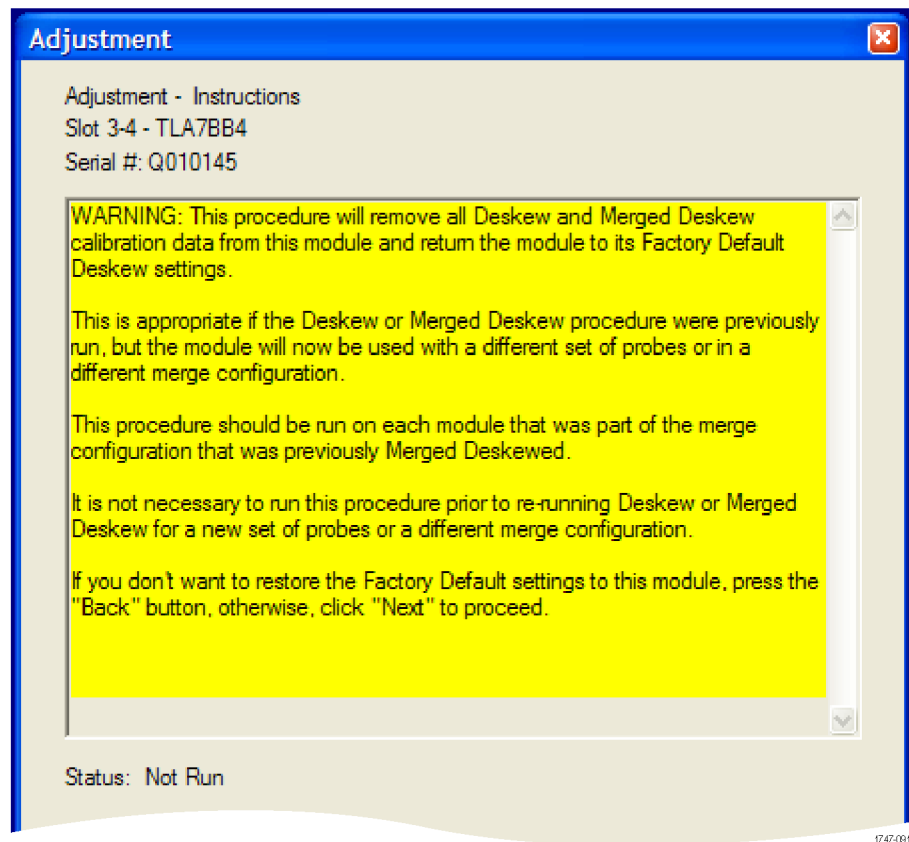


Figure 53: Deskew procedure: Restore Factory Default instructions

3. If you are sure that you want to run the procedure, click the Next button.
The results of the procedure are displayed. (See Figure 54.)

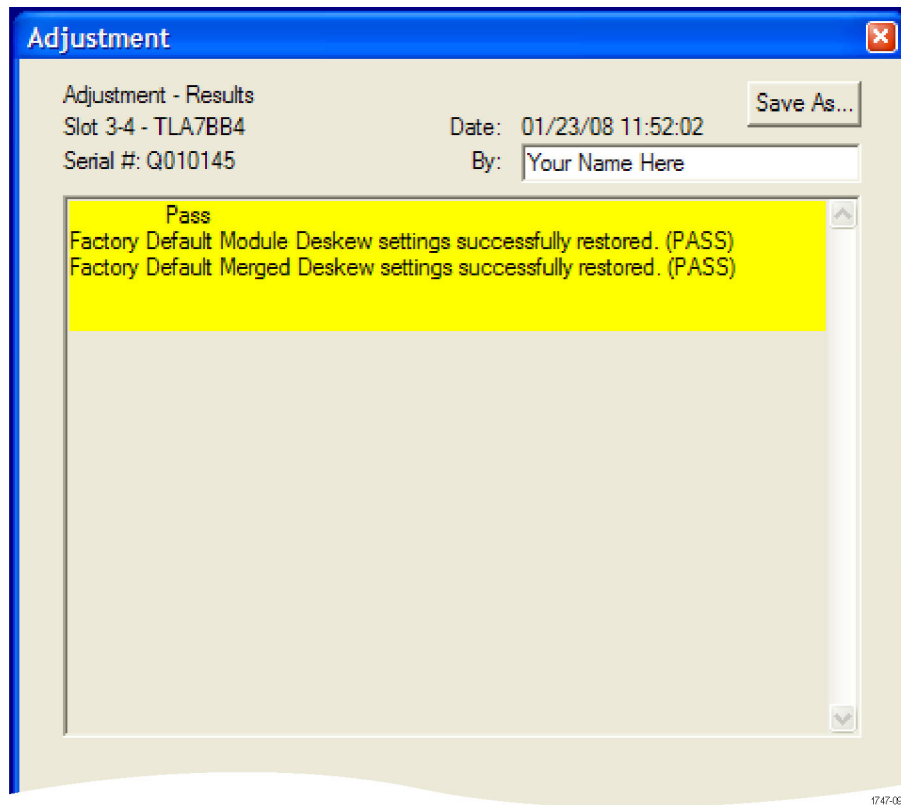


Figure 54: Restore Factory Default settings results

4. Click the Finish button to finish the procedure and return to the startup window.

Product overview

This chapter describes the product controls and connectors of the logic analyzers. Refer to the *TLA Quick Start User Manual* for operating information on the logic analyzer.

Front panel controls

You can use the front-panel controls to operate most of the portable mainframes. (See Figure 55.) You can also attach an external keyboard, monitor, and mouse to operate the logic analyzers. The benchtop mainframes do not have front-panel controls and require an external controller—the TLA7PC1 benchtop PC with a keyboard, monitor, and mouse, or a user-supplied PC loaded with the TLA application software.

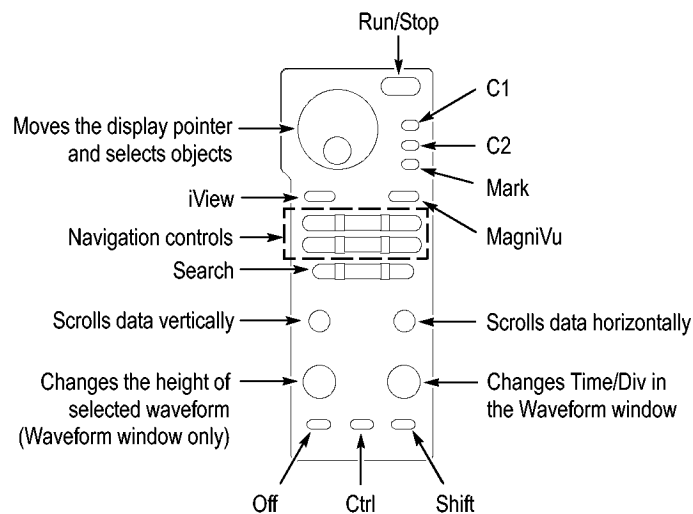


Figure 55: Portable mainframe front panel

TLA7000 series external connectors

The following mainframe external connections are available. (See Figure 56.)

- System Trigger In and System Trigger Out, used to receive or send a trigger from/to an external source
- External Signal In and External Signal Out, used to receive or send a signal from/to an external source
- TekLink, used to coordinate trigger signals, input/output signals, and time references between mainframes
- Accessory connections, such as USB, LAN, and audio/video outputs

Connecting an external display

There are two display ports on the TLA7012: Primary (DVI-D, digital output only), and Secondary (DVI-I, digital/analog out). Simulscan mode displays the same information on the internal display and the external monitor connected to either Primary or Secondary.

To enable Simulscan mode, or to enable/disable external monitors or make other display changes, right click on your desktop and select Properties > Graphics > Intel Graphics Technology.

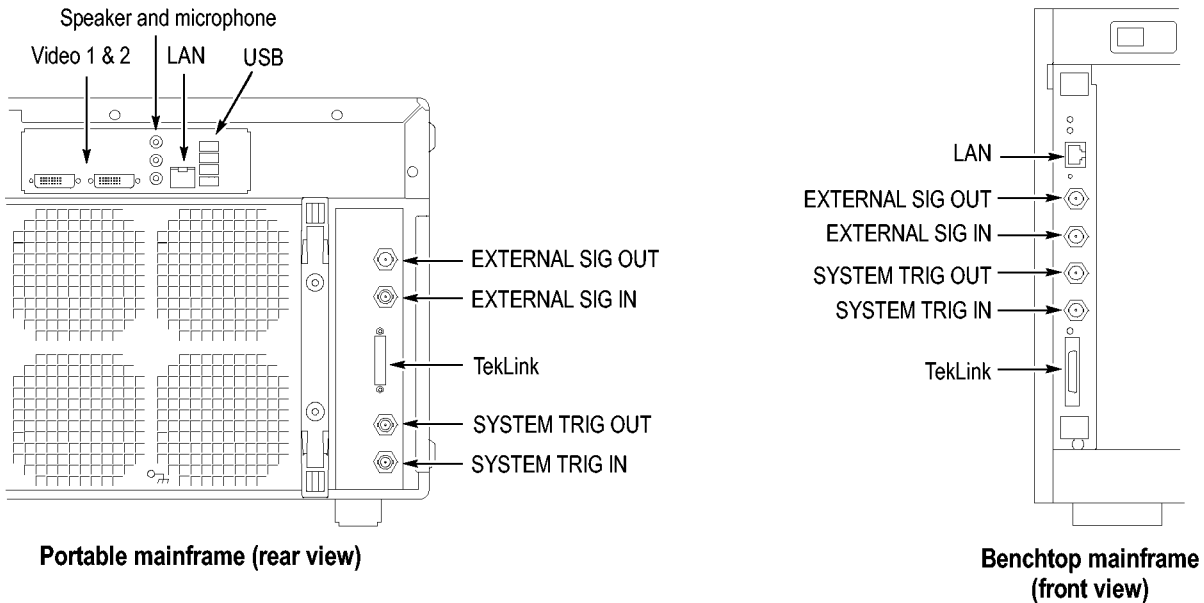


Figure 56: TLA7000 Series external connectors

Restoring and reinstalling software

Most of the software is installed when your instrument is shipped from the factory. Refer to this section if you need to reinstall your software. These instructions refer only to reinstalling the TLA application software and operating system. If you want to upgrade to a newer TLA application software version, download the latest version of the software from the Tektronix Web site (www.tektronix.com/software).

NOTE. *If you install or reinstall software on a remote PC, make sure that the software version matches that of the main application on the logic analyzer.*

Restore the operating system

If the need arises, the instrument contains an operating system restore file on a separate partition of the hard drive or you can restore the operating system from discs that you may have created. (See page 49, *Create operating system restore discs.*)



CAUTION. *Restoring the operating system reformats the hard disk drive. All saved data will be lost. If possible, save important files to external media before restoring the operating system.*

1. Restart the instrument. During the startup process, you will see the following message at the top of the screen:

Starting Acronis Loader press F5 for Acronis Startup
Recovery Manager

NOTE. *To successfully complete the system restore process you must use the Windows version of the Acronis software. Using a generic MAC keyboard starts the DOS version of the Acronis software. Do not use a MAC keyboard.*

2. Repeatedly press the F5 key until the Acronis True Image Tool opens. There is a short delay from the time the message appears until the instrument proceeds with the normal instrument startup. If the instrument does not open the Acronis application, power off the instrument, and then power on the instrument and try again.
3. Click Recover.
4. In the Confirmation dialog box, click Yes to restore the instrument operating system, or No to exit the restore process. The restore process

takes approximately 30 minutes; the actual time depends on the instrument configuration.

Change the BIOS settings

Before reinstalling the operating system, you may need to change the BIOS settings to enable starting the logic analyzer from the DVD drive.

1. For TLA7012 Portable Mainframe, restart the instrument and then press function key F2 repeatedly to enter the BIOS setup.
2. In the BIOS setup, go to the Boot menu.
3. Set the Boot devices for your instrument. (See Table 9.) Follow the on-screen instructions to change the settings.

Table 9: BIOS settings for reinstalling software from the CD-ROM

Instrument	Setting
TLA7012	USB FDC:
	IDE 2: (DVD Drive ID)
	IDE 0: (Hard Drive ID)

4. Save the settings by pressing function key F10 and confirm that you want to save the new settings.

Reinstall the TLA application software

Complete the following steps to reinstall the latest version of the TLA application software. Use these steps as a first resort to recovering from application software problems. If you still experience problems you may have to restore the hard disk image. (See page 69, *Restore the operating system.*)

While using this procedure you will be asked to log on as Administrator. The logic analyzer is initially set up to automatically log on as Administrator (with no password) so you may not see the login prompt. If the network setups have been changed on your instrument, make sure that you log on as Administrator or as a user who has administrator privileges. Failure to do so can prevent the software upgrade from completing successfully.

1. Log on to the instrument as Administrator and quit any applications.
2. Install the TLA Application Software CD in the CD drive of the logic analyzer.
3. If the installation software does not start automatically, click Run in the Windows Start menu to display the Run dialog box. Enter D:\TLA Application SW\Setup.exe in the Run dialog box (if your CD drive is not the D-drive, enter the appropriate letter for your drive).
4. Click OK to perform the installation.

If you have an older version of the software on the hard disk, the installation program will detect it and ask if you want to remove it. Follow the on-screen instructions to remove the software, answering "Yes" to any prompts.

5. After the software has been successfully installed, restart the instrument.
6. If you have installed the TLA application software on a PC for remote operation, start the software by double-clicking on the TLA Application icon. The TLA Startup dialog box displays.
 - a. Select an instrument in the TLA Connection dialog box, and then click the Connect button. If your instrument is connected to a network, you can connect to any instrument on your local network that has a TLA server running, enabled, and is not currently being used by another user.
 - b. Click Offline to start an offline version of the TLA application software. The TLA Offline software allows you to run the TLA application without connecting to a real instrument. You can analyze previously acquired data from a logic analyzer, create or modify reference memories, or perform system tests without being connected to a real instrument.

Calibrate the touchscreen

If you have a TLA7012 Portable Logic Analyzer, you might need to perform the following steps to calibrate the touchscreen:

1. Go to the Windows desktop and double-click the Touch screen configurator (the pointing Device icon or small mouse graphic). The Touch Screen Properties window appears.
2. Click Calibrate and follow the on-screen instructions to perform the alignment routine. Use a stylus to ensure the best accuracy.

You can also customize some of the functions of your touchscreen in the Touch Screen Properties window. Right-click on the selection text to view a description of the function.

Install other software

If you purchased any microprocessor support packages, you need to reinstall them after you reinstall the operating system and TLA application. If you do not have a copy of the microprocessor support software, contract your Tektronix Account Manager to order a replacement copy. If you cannot contact the account manager, contact the Tektronix Support Center (refer to *Contacting Tektronix* at the beginning of this document).

Upgrade or restore firmware

You may have to upgrade the firmware on the logic analyzer or on individual modules if the firmware version is not compatible with the TLA application software version. This will be indicated by one or more messages (one per module) when you start the logic analyzer. The most current firmware for the TLA application software resides in a file on the hard disk of the logic analyzer.

Although the firmware update procedures are similar, there are some key differences between the Tektronix Logic Analyzer products and are therefore listed as separate procedures. If you have mixed modules within your TLA7000 mainframe, review the procedures for each of the modules before beginning the upgrade.

Upgrade the firmware on logic analyzer modules

Use the following procedure to upgrade the firmware for the logic analyzer modules.

1. Note which modules require new firmware.

If any modules are missing from the System window, you can verify the status of the modules by doing the following steps:

- a. Select System Properties from the System menu.
- b. Click the Modules tab.
- c. Note the information under the Messages column for any installed modules. If any modules indicate invalid messages, you must update the firmware for those modules.

2. Exit the logic analyzer application.
3. Click Start → All Programs → Tektronix Logic Analyzer → TLA Firmware Loader.
4. Select the instrument from the TLA Connection dialog box.

You are given a choice of loading either Mainframe or Instrument Module Firmware. Click the Load button in the Instrument Module Firmware section (bottom part of the dialog box).

5. You may be prompted about cycling the power on the mainframe after completing the upgrade operation. Click Yes to continue.

The logic analyzer will scan the mainframe to determine which modules are installed and which modules can have their firmware upgraded.

6. Select the modules that you want to update from the list of modules displayed in the Supported list box near the top of the window. If you are updating more than one module at a time, note the slot location of the module in the selection box.
7. Select Load Firmware from the Execute menu.
8. Select the proper firmware file (TLA7Axx.lod, TLA7Bxx.lod, or TLA7SAxx_PCIe3.lod) for your logic analyzer module.

NOTE. *Be sure to select the proper file for each module. Note the slot number in the title bar so that you select the correct module.*

9. Click OK. You will be prompted to confirm your action; click Yes.

NOTE. *The program will not allow you to load firmware to an incompatible module. For example, the program will not load oscilloscope firmware to a logic analyzer module.*

The program will load the firmware for each module one at a time. The process may take several minutes per module.

10. When the firmware has been loaded for each module, exit the firmware loader program and power down the logic analyzer. You must power down the logic analyzer to allow the TLA application to start up properly.
11. Remove the module from the mainframe.
12. Locate the big label on the side of the module.
13. Record the firmware version that is printed on the label. You will need this information to see that the firmware version matches the label.
14. Reinstall the module in the mainframe and power on the mainframe.
15. After the logic analyzer completes the power-on diagnostics, select System Properties from the System menu.
16. Click the module tab (for example, LA1).

17. Verify that the firmware version for the selected module matches the version on the label that you recorded in step 13.
18. If the firmware versions do not match, power down the mainframe, remove the module from the mainframe and update the label.

**Upgrade the firmware
on the interface module
and the TL708EX TekLink
8-Port Hub**

Use the following procedure to upgrade the firmware on the benchtop mainframe interface module and the hub.

1. Start the Firmware Loader.
2. A list of installed mainframes displays. Select the mainframe you want to upgrade and click Connect.
3. The Firmware Loader dialog box appears. You have the choice of loading either Mainframe or Instrument Module firmware. Click the Load button corresponding to Mainframe and TekLink firmware.
4. A list of all the currently installed Mainframe and TekLink firmware displays. The list shows the version currently running and the version available for installation. Select the items you want to load.
5. Click the Update Firmware button. A file dialog box displays a list of available firmware images.
6. Select the appropriate file. Click Open to open the selected firmware image. You must do this for each firmware image selected.
7. The Firmware Load Progress dialog displays. Click the Start Flash Operation button to start the flash operation for the selected flash images. Once the flash operation is started it cannot be canceled.
8. As the flash operation runs, it identifies what steps are being performed. When complete, it will inform you to reboot the system you just flashed.
9. Turn off and restart the TLA system after the flash operation is complete.

Appendix A: Mainframe power information



CAUTION. *By placing too many modules in a TLA7016 Benchtop Mainframe, you can overload the power distribution system and damage the mainframe or modules. To avoid this, ensure that your module configuration in a single mainframe does not exceed 1000 W at line voltages less than 120 V nominal at 50 Hz or 60 Hz or at line voltages of 115 V at 400 Hz. Use the following table and illustration to calculate the total power for your mainframe.*

The power consumption depends on the number and type of modules installed in the mainframes. To determine the total power consumption, perform the following steps:

1. Use the following table to determine the power consumption for each module.
2. Add the power for each module to determine the total power consumption (include 170 W for each benchtop mainframe).
3. Ensure that the total power consumption is less than the limits shown in the table. (See Figure 57 on page 76.)

Table 10: Power for instrument modules

Module type	Power (Watts)
One benchtop mainframe ¹	170
TLA7AA1	45
TLA7AA2, TLA7AB2 TLA7AC2	65
TLA7AA3, TLA7AC3	85
TLA7AA4, TLA7AB4, TLA7AC4	105
TLA7BB2	81
TLA7BB3	119
TLA7BB4, TLA7BC4	158
TLA7S08	65
TLA7S16	105

Table 10: Power for instrument modules (cont.)

Module type	Power (Watts)
TLA7SA08	90
TLA7SA16	120

¹ Power for mainframe and controller module with fans operating at maximum speed.

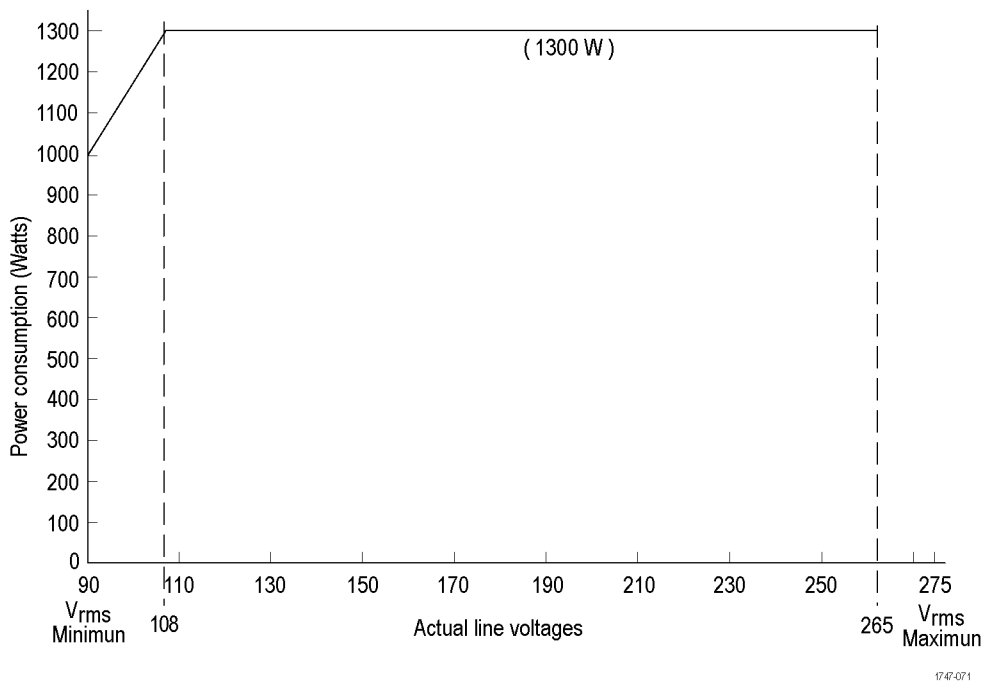


Figure 57: Maximum power allowed to modules at various line voltages for TLA7016 mainframes serial number B020000 and higher

Appendix B: User service procedures

This appendix describes high-level service information and procedures for the Tektronix logic analyzers. Mainframe and module service troubleshooting procedures are located in the service manuals.

Service offerings

Tektronix provides service to cover repair under warranty as well as other services that are designed to meet your specific service needs.

Whether providing warranty repair service or any of the other services listed below, Tektronix service technicians are well equipped to service the logic analyzers. *Services are provided at Tektronix Service Centers and on-site at your facility, depending on your location.*

Warranty repair service

Tektronix warrants this product as described in the warranty statements at the front of this manual. Tektronix technicians provide warranty service at most Tektronix service locations worldwide. The Tektronix product catalog lists all service locations worldwide.

Calibration and repair service

In addition to warranty repair, Tektronix Service offers calibration and other services that provide cost-effective solutions to your service needs and quality-standards compliance requirements. Our instruments are supported worldwide by the leading-edge design, manufacturing, and service resources of Tektronix to provide the best possible service.

General care

Protect the instrument from adverse weather conditions. The instrument is not waterproof. Do not store or leave the instrument where the LCD display will be exposed to direct sunlight for long periods of time.



CAUTION. *To avoid damage to the instrument, do not expose it to sprays, liquids, or solvents.*

Preventive maintenance

Once a year the electrical performance should be checked and the instrument accuracy should be certified (calibrated). This service must be performed by a qualified service technician using the procedures outlined in the appropriate service manual for the Tektronix Logic Analyzer product.

Preventive maintenance mainly consists of periodic cleaning. Periodic cleaning reduces instrument breakdown and increases reliability. Clean the instrument as needed, based on the operating environment. Dirty conditions may require more frequent cleaning than computer room conditions.

Refer to your logic analyzer probe instructions for specific cleaning procedures for the probes and probe connectors.

Cleaning the flat panel display

The LCD flat panel is a soft plastic display and must be treated with care during cleaning.



CAUTION. *Improper cleaning agents or methods can damage the flat panel display.*

Do not use abrasive cleaners or commercial glass cleaners to clean the display surface.

Do not spray liquids directly on the display surface.

Do not scrub the display with excessive force.

Avoid getting moisture inside the instrument while cleaning the display; use only enough solution to dampen the wipe.

Clean the flat panel display surface by gently rubbing the display with a cleanroom wipe (such as Wypall Medium Duty Wipes, #05701, available from Kimberly-Clark Corporation).

If the display is very dirty, moisten the wipe with distilled water or a 75% isopropyl alcohol solution and gently rub the display surface. Avoid using excess force or you may damage the plastic display surface.

Exterior surfaces

Clean the exterior surfaces with a dry, lint-free cloth or a soft-bristle brush. If dirt remains, use a cloth or swab dampened with a 75% isopropyl alcohol solution. A swab is useful for cleaning in narrow spaces around the controls and connectors. Do not use abrasive compounds on any part of the instrument.



CAUTION. *To avoid damaging the instrument follow these precautions:*

Avoid getting moisture inside the instrument during external cleaning and use only enough solution to dampen the cloth or swab.

Do not wash the front-panel On/Standby switch. Cover the switch while washing the instrument.

Use only deionized water when cleaning. Use a 75% isopropyl alcohol solution as a cleanser and rinse with deionized water.

Do not use chemical cleaning agents; they may damage the instrument. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

In case of problems

Review the following sections if you encounter any problems with your instrument. Detailed troubleshooting procedures are available in the service manuals for your logic analyzer product. For additional help, contact your local Tektronix Service Representative.

Diagnostics

The logic analyzer runs power-on diagnostics every time you power on the instrument. You can view the results of the diagnostics by selecting Calibration and Diagnostics from the System menu. You can run more detailed diagnostics by selecting Extended diagnostics. Here you can run all tests, loop on one or more tests, or loop on a test until a failure occurs.

Before running the extended diagnostics, disconnect any attached probes.

The TLA mainframe diagnostics program is a stand-alone application. These diagnostics check the operation of the mainframe beyond the basic PC circuitry. These diagnostics also check the front-panel knobs of the portable mainframe.

Software problems

Your logic analyzer comes with most software installed. Before running any of the diagnostics, check the online release notes to verify that the logic analyzer software is compatible with the module firmware.

Many software problems can be due to corrupted or missing software files. In most cases the easiest way to solve software problems is to reinstall the software and follow the on-screen instructions. (See page 69, *Restoring and reinstalling software*.)

Hardware problems

If you are certain that you have installed the logic analyzer correctly, run the extended diagnostics (located under the System menu) to identify any problems. If your logic analyzer powers on so that you have access to the desktop, run the CheckIt Utilities software to identify possible controller hardware problems.

You can also run the external TLA mainframe diagnostics to identify problems not covered by other diagnostics. The TLA mainframe diagnostics are located under the Start menu under the Tektronix Logic Analyzer programs.

Repacking for shipment

If a mainframe or module is to be shipped to a Tektronix service center for repair, attach a tag to the mainframe or module showing the owner's name and address, the serial number, and a description of the problem(s) encountered and/or service required. Always include the module and the probes so that the entire unit can be tested.

When packing an instrument for shipment, use the original packaging. If it is unavailable or not fit for use, contact your Tektronix representative to obtain new packaging.

Appendix C: Accessories and options

Accessories

This section lists the standard and optional accessories available for the portable and benchtop instruments. Options to the compatible logic analyzer modules are also listed.

Table 11: Standard accessories, portable mainframe

Quantity	Accessory	Part number
1 ea	Power cord clip	343-1213-00
1 ea	USB optical wheeled mouse	119-7054-00
1 ea	Mouse pad	016-1524-05
1 ea	Module filler panel	333-4206-00
1 ea	Front panel cover	200-4939-00
	Product CD, TLA application software V6.1	
	Microsoft Windows 7 (64-bit) Certificate of Authenticity (COA) for New PCs	
	Acronis software license	
	Literature package	
	Certificate of Traceable Calibration	

Table 12: Standard accessories, benchtop mainframe

Quantity	Accessory	Part number
1 ea	TLA7016 Interface module, 1-slot	650-4733-00
1 ea	LAN cable, 8 meters	174-5225-xx
5 ea	Module filler panel	333-4206-00
	Product CD, TLA application software V6.1	
	Microsoft Windows 7 (64-bit) Certificate of Authenticity (COA) for New PCs	
	Acronis software license	
	Literature package	
	Certificate of Traceable Calibration	

Table 13: Recommended accessories, portable mainframe

Quantity	Accessory	Part number
1 ea	Removable hard drive assembly (no software)	650-4815-xx
1 ea	Wheeled transit case	016-1522-xx
1 ea	Rackmount kit	020-2664-xx

Table 14: Recommended accessories, benchtop mainframe

Quantity	Accessory	Part number
1 ea	Wheeled transit case	061-1651-xx
1 ea	Rackmount kit	020-2369-xx

Table 15: Recommended accessories, Deskew fixture

Quantity	Accessory	Part number
1 ea	P6800 Deskew fixture; uses any of the P6800 style acquisition probes; includes coaxial cable with SMA connectors	020-2942-00
1 ea	P6960 Deskew fixture; uses any of the P6960 style acquisition probes	020-2940-00

Options

The following options can be ordered for the instruments.

Table 16: Instrument options

Option	Description	TLA7012 Portable	TLA7016 Benchtop
18	Add touchscreen	✓	
1C	Add iView External Oscilloscope Cable Kit	✓	✓
2C	Add USB-iView External Oscilloscope Cable kit	✓	✓
1K	Add LACART Instrument Cart (TLA7012)	✓	
1K	Add K4000 Instrument Cart (TLA7016)		✓
1N	On-site product installation service	✓	✓
88	Module installation by factory	✓	✓
LG1	TLA Documentation CD-ROM	✓	✓
PO	Add accessory pouch	✓	
TL	Add TekLink Cable	✓	✓
Field upgrades			
TLA7KUP	Many are available. Contact Tektronix (see the beginning of the manual for contact information) for a complete list of available TLA7KUP options	✓	✓
Service offerings			
C3	Calibration services extended to cover three years	✓	✓
C5	Calibration services extended to cover five years	✓	✓
D1	Calibration data report	✓	✓
D3	Test Data for calibration services in Opt. C3	✓	✓
D5	Test Data for calibration services in Opt. C5	✓	✓
R3	Repair warranty extended to cover three years	✓	✓
R5	Repair warranty extended to cover five years	✓	✓
S1	On-site service 1 year	✓	✓
S3	On-site service 3 years	✓	✓
S5	On-site service 5 years	✓	✓

Table 17: Power cords

Option	Description	Part number
TLA7012 Portable Mainframe		
A0	North America, IEC320 C13	161-0104-00
A1	Universal European, IEC320 C13	161-0104-06
A2	United Kingdom, IEC320 C13	161-0104-07
A3	Australia, IEC320 C13	161-0104-14

Option	Description	Part number
A4	240 V North American, IEC320 C13	161-0104-08
A5	Switzerland, IEC320 C13	161-0167-00
A6	Japan, IEC320 C13	161-A005-00
A10	China, IEC320 C13	161-0306-00
A11	India/South Africa, IEC320 C13	161-0324-00
A12	Brazil, IEC320 C13	161-0356-00
A99	No power cord	
TLA7016 Benchtop Mainframe		
A0	North America, IEC320 C19	161-0328-00
A1	Universal European, IEC320 C19	161-0333-00
A2	United Kingdom, IEC320 C19	161-0329-00
A3	Australia, IEC320 C19	161-0330-00
A4	240 V North America, IEC320 C19	161-0332-00
A5	Switzerland, IEC320 C19	161-0331-00
A6	Japan, IEC320 C19 (US 120 V)	161-0328-00
A6	Japan, IEC320 C19 (US240 V)	161-0332-00
A10	China, IEC320 C19	161-0337-00
A11	India/South Africa, IEC320 C19	161-0338-00
A12	Brazil, IEC320 C13	161-0356-00
A99	No power cord	
GBe Switch, TL708EX		
A0	North America, IEC320 C13	161-0066-00
A1	Universal European, IEC320 C13	161-0066-09
A2	United Kingdom, IEC320 C13	161-0066-10
A3	Australia, IEC320 C13	161-0066-13
A4	240 V North American, IEC320 C13	161-0066-12
A5	Switzerland, IEC320 C13	161-0154-00
A6	Japan, IEC320 C13	161-0298-00
A10	China, IEC320 C13	161-0304-00
A11	India/South Africa, IEC320 C13	161-0400-00
A99	No power cord	

Table 18: Options for TLA7ACx modules

1S	Increase to 8 Mb record length @235 MHz state speed
2S	Increase to 32 Mb record length @235 MHz state speed
3S	Increase to 128 Mb record length @235 MHz state speed

Table 18: Options for TLA7ACx modules (cont.)

4S	Increase to 2 Mb record length @450 MHz state speed
5S	Increase to 8 Mb record length @450 MHz state speed
6S	Increase to 32 Mb record length @450 MHz state speed
7S	Increase to 128 Mb record length @450 MHz state speed
88	Factory configuration
R3	Repair warranty extended to cover 3 years
R5	Repair warranty extended to cover 5 years
C3	Initial certification plus two additional calibrations
C5	Initial certification plus four additional calibrations
D1	Add test data report
D3	Add test data report (must order Option C3)
D5	Add test data report (must order Option C5)
IN	On-site installation service

Table 19: Options for TLA7Bxx modules

1S	Increase to 4 Mb record length @750 MHz state speed
2S	Increase to 8 Mb record length @750 MHz state speed
3S	Increase to 16 Mb record length @750 MHz state speed
4S	Increase to 32 Mb record length @750 MHz state speed
5S	Increase to 64 Mb record length @750 MHz state speed
6S	Increase to 2 Mb record length @1.4 GHz state speed
7S	Increase to 4 Mb record length @1.4 GHz state speed
8S	Increase to 8 Mb record length @1.4 GHz state speed
9S	Increase to 16 Mb record length @1.4 GHz state speed
AM	Add four iCapture, BNC-to-BNC, low-loss, 10x cables
AS	Increase to 32 Mb record length @1.4 GHz state speed
BS	Increase to 64 Mb record length @1.4 GHz state speed
88	Factory configuration
R3	Repair warranty extended to cover 3 years
R5	Repair warranty extended to cover 5 years
CA1	Single calibration event or designated calibration interval
C3	Initial certification plus two additional calibrations
C5	Initial certification plus four additional calibrations
D1	Add test data report

Table 19: Options for TLA7Bxx modules (cont.)

D3	Add test data report (must order Option C3)
D5	Add test data report (must order Option C5)

Table 20: Options for TLA7BC4 modules

1S	Increase to 128 Mb record length @1.4 GHz state speed
88	Factory configuration
R3	Repair warranty extended to cover 3 years
R5	Repair warranty extended to cover 5 years
CA1	Single calibration event or designated calibration interval
C3	Initial certification plus two additional calibrations
C5	Initial certification plus four additional calibrations
D1	Add test data report
D3	Add test data report (must order Option C3)
D5	Add test data report (must order Option C5)

Appendix D: TLA7000 network installation site survey

Photocopy this sheet and use it for your system installation.

Customer:

Installer:

Date:

TLA7000 Networking Information (share with Customer IT department)

Item	Description	Value
1	IP address default	DHCP
2	Operating System/Service Pack	
3	Computer name	
4	Admin password	
5	Firewall	Microsoft, enabled
6	Virus Scanner	None
7	Network Port Information	TLA Application – port 111 TPI.NET – port 9000 Windows Remote Desktop – port 3389

Network Installation Information (provided by IT department)

Item	Description	Value
1	User Name	
2	Default password	
3	Domain name	
4	DNS suffix	
5	IP address (Fixed or DHCP)	
6	Security requirements	
7	Computer naming convention	
8	DNS address	
9	Proxy Server address	
10	RJ45 outlet location/activation	

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