

**Tektronix Logic Analyzer Family
Product Safety & Compliance
Instructions**



071-2591-06

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Instructions**

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- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

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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 iv, *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.

Connect and disconnect properly.

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

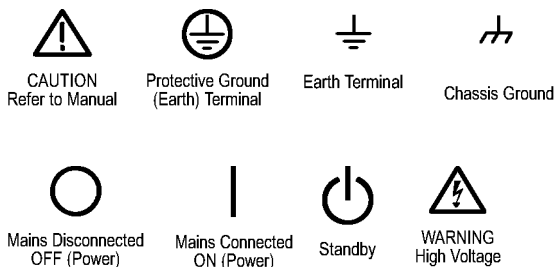
These terms may appear on the product:

- 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:



Compliance information

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

EMC compliance

EC Declaration of Conformity – EMC

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

EN 61326-1. EMC requirements for electrical equipment for measurement, control, and laboratory use. ^{1 2}

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

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

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

European contact.

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

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

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

**Australia / New Zealand
Declaration of
Conformity – EMC**

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

- CISPR 11. Radiated and Conducted Emissions, Group 1, Class A, in accordance with EN 61326-1 and EN 61326-2-1.

Australia / New Zealand contact.

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

Safety compliance

This section lists the safety standards with which the product complies and other safety compliance information.

**EU declaration of
conformity – low voltage**

Compliance was demonstrated to the following specification as listed in the Official Journal of the European Union:

Low Voltage Directive 2006/95/EC.

- EN 61010-1. Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements.

**U.S. nationally recognized
testing laboratory listing**

- UL 61010-1. Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements.

Canadian certification

- CAN/CSA-C22.2 No. 61010-1. Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements.

Additional compliances

- IEC 61010-1. Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements.

Equipment type

Test and measuring equipment.

Safety class

Class 1 – grounded product.

Pollution degree descriptions

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

- Pollution degree 1. No pollution or only dry, nonconductive pollution occurs. Products in this category are generally encapsulated, hermetically sealed, or located in clean rooms.
- Pollution degree 2. Normally only dry, nonconductive pollution occurs. Occasionally a temporary conductivity that is caused by condensation must be expected. This location is a typical office/home environment. Temporary condensation occurs only when the product is out of service.
- Pollution degree 3. Conductive pollution, or dry, nonconductive pollution that becomes conductive due to condensation. These are sheltered locations where neither temperature nor humidity is controlled. The area is protected from direct sunshine, rain, or direct wind.
- Pollution degree 4. Pollution that generates persistent conductivity through conductive dust, rain, or snow. Typical outdoor locations.

Pollution degree rating

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

IP rating

IP20 (as defined in IEC 60529).

Measurement and overvoltage category descriptions

Measurement terminals on this product may be rated for measuring mains voltages from one or more of the following categories (see specific ratings marked on the product and in the manual).

- Category II. Circuits directly connected to the building wiring at utilization points (socket outlets and similar points).
- Category III. In the building wiring and distribution system.
- Category IV. At the source of the electrical supply to the building.

NOTE. *Only mains power supply circuits have an overvoltage category rating. Only measurement circuits have a measurement category rating. Other circuits within the product do not have either rating.*

Mains overvoltage category rating

Overvoltage category II (as defined in IEC 61010-1).

Environmental considerations

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

Product end-of-life handling

Observe the following guidelines when recycling an instrument or component:

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



This symbol indicates that this product complies with the applicable European Union requirements according to Directives 2012/19/EU and 2006/66/EC on waste electrical and electronic equipment (WEEE) and batteries. For information about recycling options, check the Support/Service section of the Tektronix Web site (www.tektronix.com).

Perchlorate materials. This product contains one or more type CR lithium batteries. According to the state of California, CR lithium batteries are classified as perchlorate materials and require special handling. See www.dtsc.ca.gov/hazardouswaste/perchlorate for additional information. ¹

¹ The perchlorate materials information does not apply to the TLA6400 series products (TLA6401, TLA6402, TLA6403, TLA6404).

Restriction of hazardous substances

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

Preface

This document contains safety, environmental, and compliance information for your Tektronix TLA6400 and TLA7000 Series Logic Analyzer products.

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.
- For detailed installation information, refer to the installation manual specific to your product, available on the TLA Documentation CD or on the Tektronix Web site (www.tektronix.com/manuals).

Related documentation

Item	Purpose
TLA Quick Start User Manual	High-level operational overview
Online help	In-depth operation and UI help
Installation reference sheets	High-level installation information
Installation manuals	Detailed first-time installation information
XYZs of Logic Analyzers	Logic analyzer basics
Declassification and securities instructions	Data security concerns specific to sanitizing or removing memory devices from Tektronix products
Application notes	Collection of logic analyzer application specific notes
Product specifications & performance verification procedures	TLA Product specifications and performance verification procedures
Field upgrade kits	Upgrade information for your logic analyzer
Optional service manuals	Self-service documentation for modules and mainframes

Operating requirements

Read this section before installing the instrument. This section describes environmental and power requirements for your logic analyzer product.

Verify that you have received all of the parts of your instrument and the following:

- Correct power cords for your geographical area



CAUTION. *This notice applies only to the TLA7016 Benchtop Mainframe with Option A6.*

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

- Correct probes and modules
- Standard accessories
- All optional accessories that you ordered

TLA6400 Series Logic Analyzer environmental requirements

The following table describes the environmental requirements for the TLA6400 Series Logic Analyzer.



CAUTION. *Allow a 15.3 cm (6-in) clearance at the back and sides of the instrument to allow proper cooling. Avoid blocking any exhaust or intake fans or vents when using the instrument on a cart or in an instrument rack. Avoid placing loose paper or other material near the bottom intake vents that could suck against the instrument and block air flow. Inadequate clearances can damage the instrument..*

Table 1: Environmental considerations

Feature	Description
Temperature	Operating +5 °C to +40 °C
	Nonoperating -20 °C to +60 °C
Humidity	Operating 20% to 80% relative humidity, non-condensing
	Nonoperating 8% to 80% relative humidity, non-condensing
Altitude	Operating To 3000 m (9842.5 ft.)
	Nonoperating To 12,000 m (39,370 ft.)

TLA6400 Series Logic Analyzer site considerations

Use the TLA6400 Series Logic Analyzer on a bench or on a cart in the normal position (on the bottom feet). The logic analyzer also mounts in an instrument rack.

Table 2: TLA6400 Series Logic Analyzer power requirements

Feature	Description
Voltage range and frequency	100 to 240 VAC, 50 Hz to 60 Hz
Power consumption	400 W maximum



WARNING. To reduce risk of fire and shock, ensure the mains supply voltage fluctuations do not exceed 10% of the operating voltage range.

TLA7000 Series Logic Analyzer environmental requirements

The following table describes the environmental requirements for the TLA7000 Series Logic Analyzer.



CAUTION. For the TLA7012 Portable Mainframe, allow a 15.3 cm (6-in) clearance at the top, back, and sides of the instrument to ensure proper cooling. Keep the bottom of the instrument clear. Avoid blocking any exhaust fans or vents when using the instrument on a cart or in an instrument rack.

For the TLA7016 Benchtop Mainframe, allow a 5.1 cm (2-in) clearance at the top, back, and sides of the instrument to ensure proper cooling.

For the TL708EX TekLink 8-Port Hub allow a 15.3 cm (6-in) clearance at the back of the instrument to ensure proper cooling.

Inadequate clearances can cause the instrument to overheat and shut down.

Table 3: 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

TLA7012 Portable Mainframe site considerations

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. The mainframe also mounts in an instrument rack.

Table 4: 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

TLA7016 Benchtop Mainframe site considerations

The TLA7016 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 5: 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



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:

NOTE. *The following calculations are based on the power from the power supply, module power consumption, and worse case line voltages (nominal minus 10% low-line).*

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 following table and illustration. (See Figure 1 on page 5.)

Table 6: 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
TLA7SA08	90
TLA7SA16	120

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

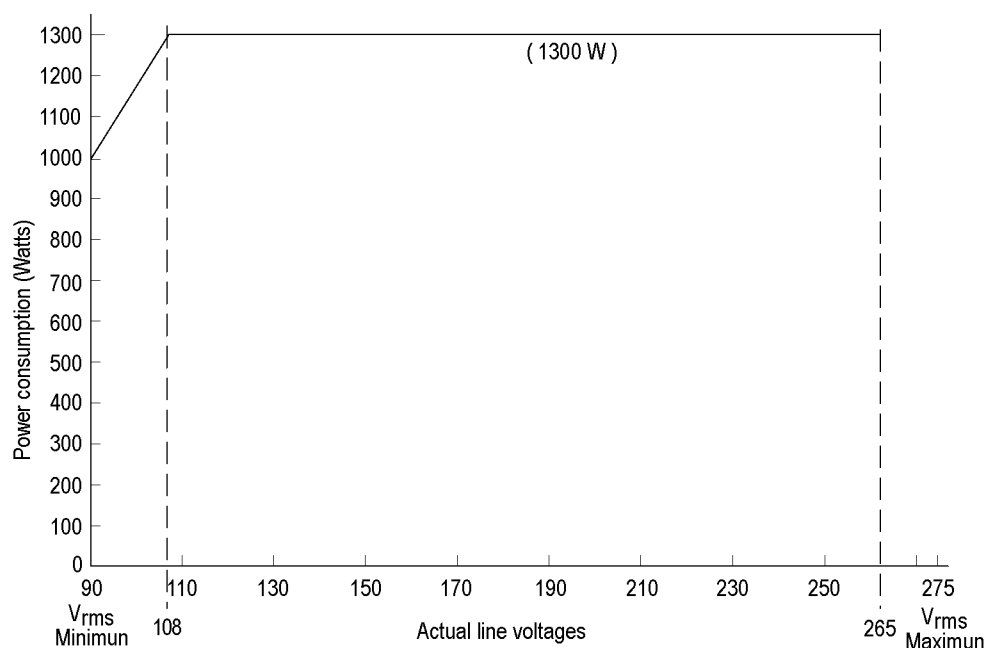


Figure 1: Maximum power allowed to modules at various line voltages for TLA7016 mainframes serial number B020000 and higher

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 7: TL708EX Hub power requirements

Feature	Description
Voltage range and frequency	100 V _{RMS} to 240 V _{RMS} , 47 Hz to 63 Hz
Power consumption	110 W maximum

TLA6400 Series basic installation

For detailed installation information, refer to the *TLA6400 Series Logic Analyzer Installation Manual* available on the TLA Documentation CD or on the Tektronix Web site (www.tektronix.com/manuals).

TLA6400 chassis ground connections

Use the chassis ground connections to connect the grounds of the target system (system-under-test) to the logic analyzer to verify a common ground connection between instruments.

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

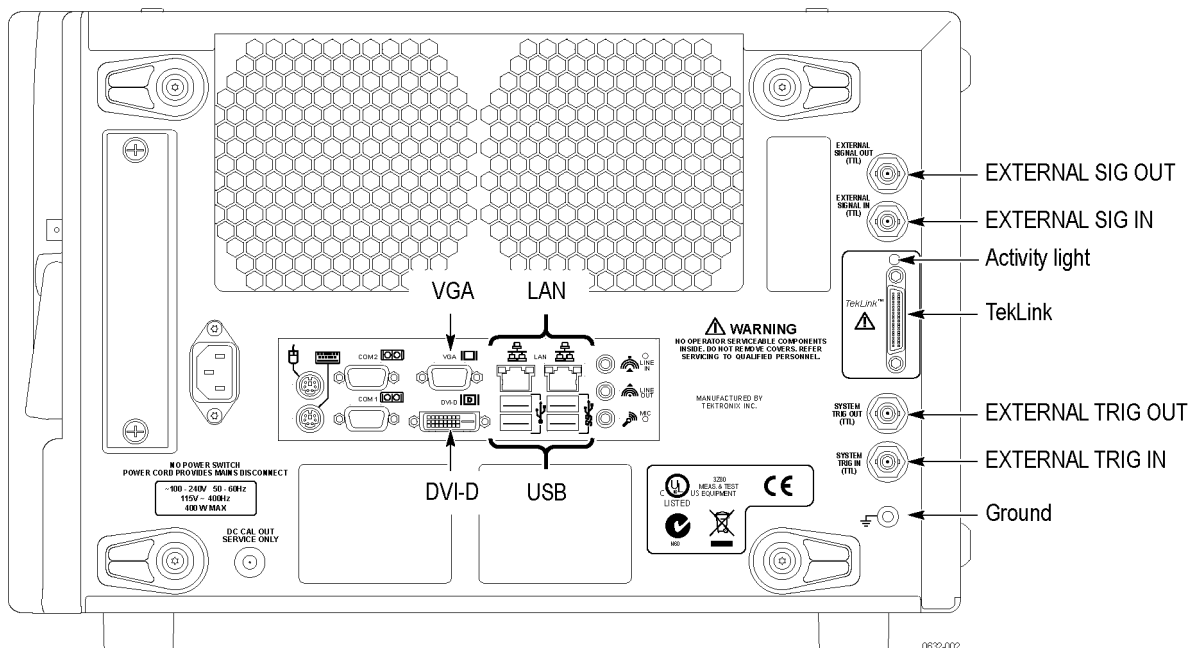


Figure 2: TLA6400 accessories and ground connection location

Connect the accessories

Connect the accessories such as an external monitor, keyboard, and printer. (See Figure 2.)

Table 8: Additional TLA6400 accessory connection information

Item	Description
Monitor	There are two display ports on the logic analyzer: VGA, and DVI. Simulscan mode displays the same information on the internal display and the external monitor connected to either Primary or Secondary. To change the display settings, right-click the mouse on the desktop, and select Properties > Settings > Advanced > Intel Graphics. Note that some of the display settings may not function until you connect an external monitor.
LAN	Connect the logic analyzer to your network through the Gbit LAN connectors. Remotely control the logic analyzer through a LAN switch using a PC (loaded with the TLA application software).
Printer	The instruments send printer information to the USB ports. Use any of the four USB ports for your printer.

TLA7000 Series basic installation

The TLA7000 Series products are normally used in a network environment and the installation instructions for instruments in a network environment are beyond the scope of this document.

For detailed network installation information, refer to the *TLA7000 Series Logic Analyzer Installation Manual* available on the TLA Documentation CD or on the Tektronix Web site (www.tektronix.com/manuals).

TLA7000 chassis ground connections

Use the chassis ground connections to connect the grounds of the target system to the logic analyzer to ensure a common ground connection between instruments. (See Figure 3 on page 9.)



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.

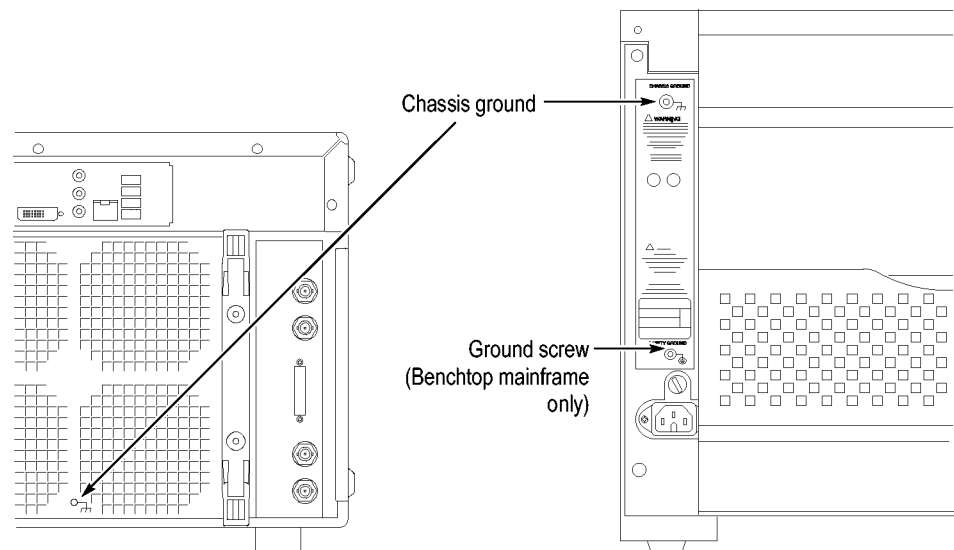


Figure 3: Location of the ground connection on the TLA7000 series logic analyzers

Installing modules in TLA7000 Series mainframes

TLA700 Modules or TLA7000 Modules are fully compatible with the TLA7000 Series mainframes.



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

Merge modules together to create wider modules. If your application requires you to merge modules, do so before installing the modules in the mainframe.

Use a screwdriver to tighten the retaining screws to 2.5 in-lbs after seating the modules in place. (See Figure 4 on page 10.)

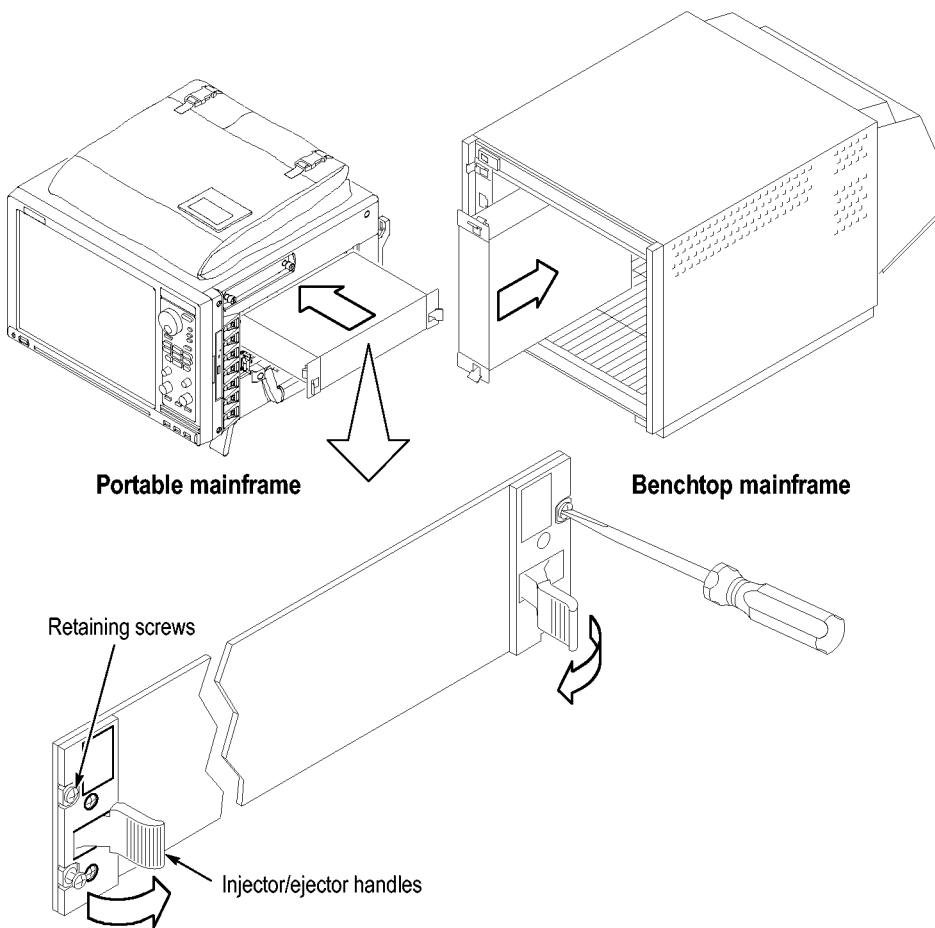


Figure 4: Installing modules

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 5.) Install the blank slot-panels on the benchtop mainframe. (See Figure 6.) Install the blank-slot panel covers before you install 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.

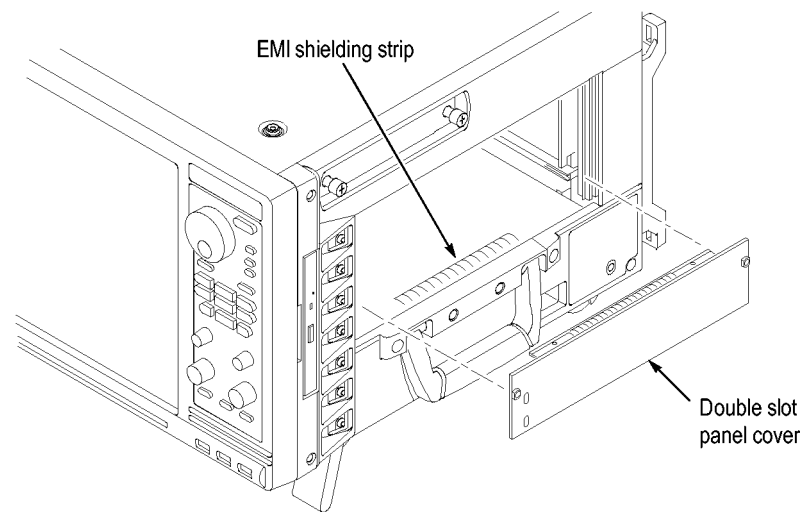


Figure 5: Installing panel covers on the portable mainframe

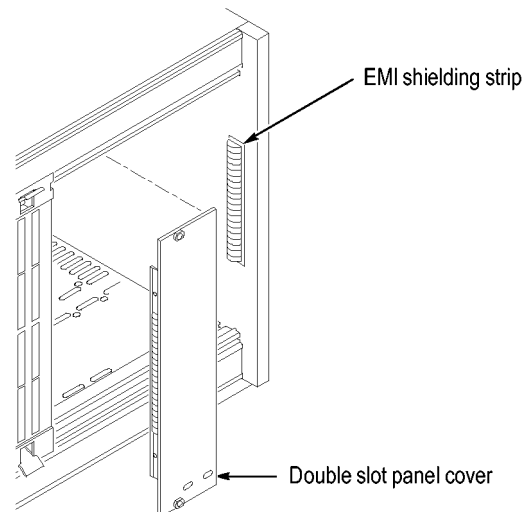


Figure 6: Installing panel covers on the benchtop mainframe

TLA7000 accessory connections

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

Connect the accessories to the TLA7012 Portable Mainframe. (See Figure 7.)
 If you have a TLA7016 Benchtop Mainframe, connect the accessories to the external PC; connect other cables and connectors to the mainframe. (See Figure 8 on page 13.)

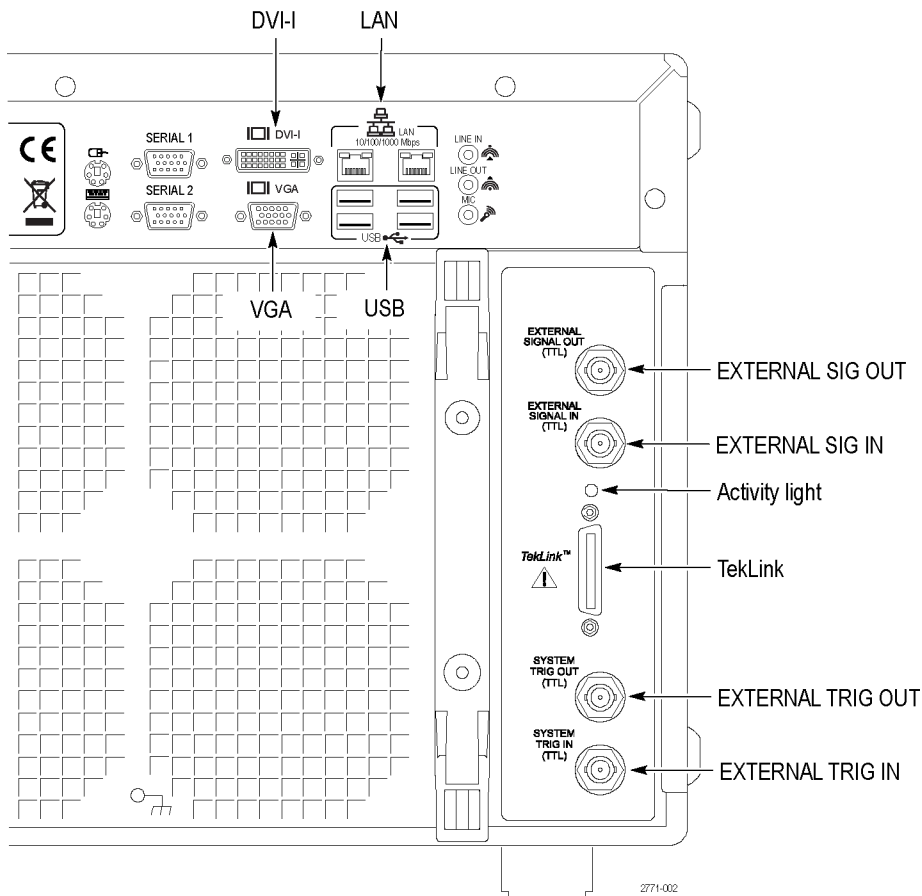


Figure 7: TLA7012 accessories connections

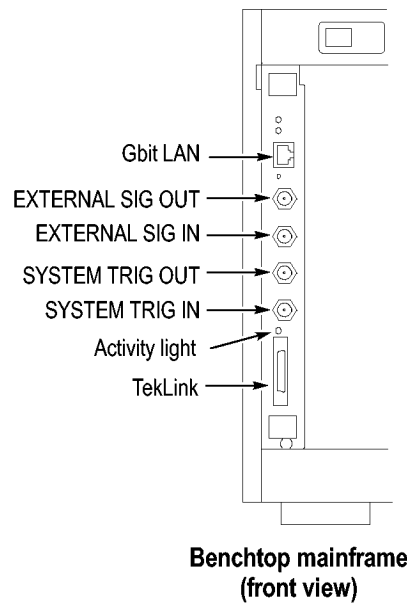


Figure 8: TLA7016 accessories connections

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

Table 9: Additional accessory connection information

Item	Description
Monitor	<p>There are two display ports on the TLA7012: Primary: VGA and DVI-I. Simulscan mode displays the same information on the internal display and the external monitor.</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>
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>

Prepare the instrument for the first time operation

Connect the keyboard, mouse, and other accessories before applying power to the logic analyzer. Complete the following steps to turn on the logic analyzer for the first time:

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. Refer to one of the following illustrations, if needed, to locate the On/Standby switch for your instrument.

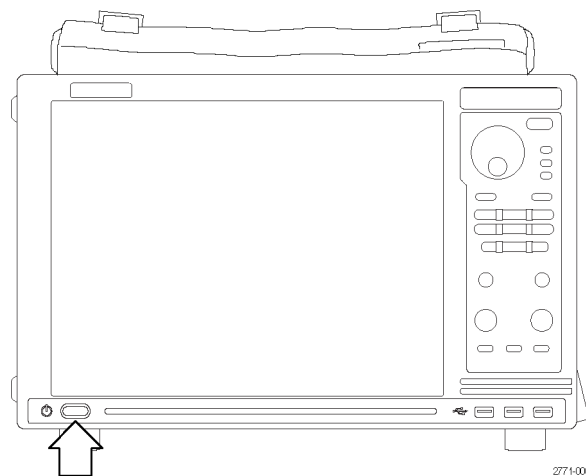


Figure 9: TLA6400 On/Standby switch location

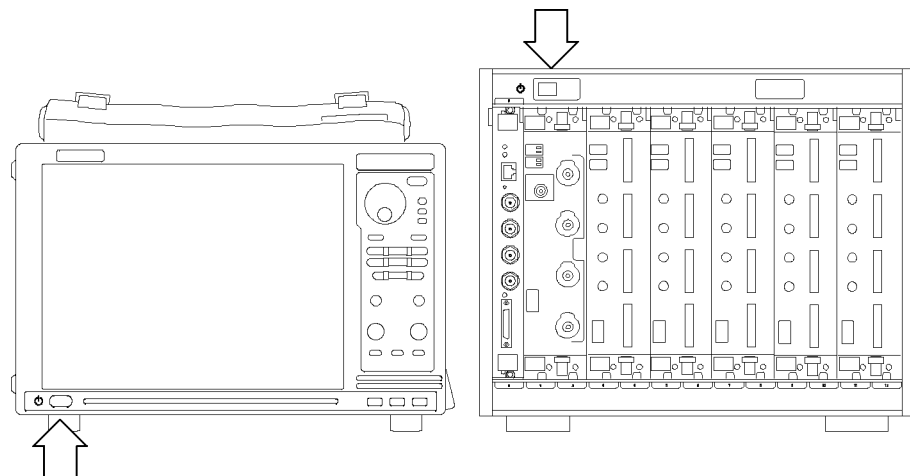


Figure 10: TLA7000 On/Standby switch locations

4. Turn on the logic analyzer as follows:
 - a. Press the On/Standby switch on the front of the instrument.
 - b. Wait for the logic analyzer to complete the power-on self-tests and to start Windows.



WARNING. *To avoid personal injury, do not remove any modules from the instrument or open the instrument to perform any internal cleaning procedures that could allow moisture to enter while the power cord is connected. Always remove the power cord to disconnect the instrument from the mains supply before opening the instrument.*

To power off the logic analyzer, press the On/Standby switch. The logic analyzers have a built-in soft power-off function that safely powers off the instruments when you press the On/Standby switch. Expansion mainframes automatically power off when you turn off the benchtop or portable mainframe.