TLA7S08 & TLA7S16
Serial Analyzer Modules
Technical Reference

This document applies to TLA System Software Version 5.1 or higher

Warning

These servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

Tektronix

Contacting Tektronix

Warranty 2

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

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

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

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

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

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.

To Avoid Fire or Personal Injury

Ground the Product. This product is indirectly grounded through the grounding conductor of the mainframe 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, ensure that the product is properly grounded.

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

The inputs are not rated for connection to mains or Category II, III, or IV circuits.

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

Power Disconnect. The power cord disconnects the product from the power source. Do not block the power cord; it must remain accessible to the user at all times.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Do Not Operate With Suspected Failures. If you suspect that there is damage to this product, have it inspected by qualified service personnel.

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

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Provide Proper Ventilation. Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

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.

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

⚠
CAUTION
Refer to Manual

⏚
Earth Terminal

⏚
Chassis Ground

Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

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 instrument power, then disconnect the power cord from the mains power.

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.

To avoid electric shock, do not touch exposed connections.

Preface

Manual Conventions

This manual uses certain conventions that you should be familiar with before attempting service.

Acquisition Board   The acquisition board is one of the circuit boards inside the instrument module. The circuit board receives and stores acquisition data from the probes and works with the Local Processor Unit (LPU) board to provide information to the operator of the instrument.

LPU Board   The Local Processor Unit (LPU) board is one of the circuit boards inside the instrumentmodule that provides the main communications interface with the acquisition board and the mainframe.

Maintenance Procedures   Maintenance procedures are used for fault isolation and repair to the circuit board level or to the replaceable part level.

Modules   Throughout this manual, the terms "module" or "instrument module" refers to a logic analyzer, serial analyzer, or pattern generator unit that mounts inside a mainframe. A module is composed of circuit boards, interconnecting cables, and a user-accessible front panel.

Replaceable Parts   This manual refers to any field-replaceable assembly or mechanical part specifically by its name or generically as a replaceable part. In general, a replaceable part is any circuit board or assembly that is listed in the replaceable parts list near the end of this manual.

Safety   Symbols and terms related to safety appear in the Safety Summary found at the beginning of this manual.

Related Documentation

The following table lists related documentation available for your instrument. The documentation is available on the TLA Documentation CD, included with your instrument, and on the Tektronix Web site (www.Tektronix.com).

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

Table i: Related Documentation

Item	Purpose	Location
TLA Quick Start User Manual	Basic operational overview	
Online Help	In depth operation and UI help	
Installation Quick Reference Cards	Basic installation information	
Installation Manuals	Detailed first-time installation information	
XYZs of Logic Analyzers	Introduction to logic analyzer basics	www.Tektronix.com
TLA Product Specifications	Complete list of TLA product specifications	
TPI.NET Documentation	Detailed information for controlling the logic analyzer using .NET	
Field upgrade kits	Upgrade information for your logic analyzer product	
Optional Service Manuals	Self-service documentation for modules and mainframes	
TLA Application Software Release Notes	Software description, compatibility, impact of changes, contact information, installation, upgrade, and operational notes, and known issues.	Go to Start→All Programs→Tektronix logic Analyzer→TLA Release Notes
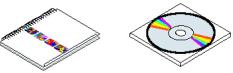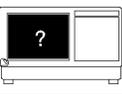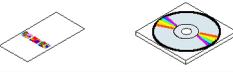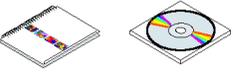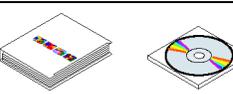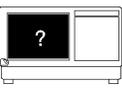
Introduction

This manual contains information needed to service the TLA7S08 and TLA7S16 serial analyzer modules.

To prevent personal injury or damage to the instrument, consider the following requirements before attempting service:

- Read the General Safety Summary and Service Safety Summary found at the beginning of this manual.

- The procedures in this manual should only be performed by a qualified service person.

Be sure to follow all warnings, cautions and notes.

Service Strategy

This manual supports and contains information needed for periodic maintenance of the instrument. It supports and contains the following information for corrective maintenance:

- Supports removal and replacement of boards or assemblies.

- Supports removal and replacement of the mechanical parts listed in the parts lists.

- This manual does not support component-level fault isolation and replacement.

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 equipped to service the instrument. Services are provided at Tektronix Services Centers and on-site at your facility, depending on your location.

Warranty Repair Service Tektronix warrants this product for one year from date of purchase. The warranty is located behind the title page in 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 which provide solutions to your service needs and quality standards compliance requirements.

The following services can be tailored to fit your requirements for calibration and/or repair of your portable mainframe.

Service Options. Tektronix Service Options can be selected at the time you purchase your instrument. You select these options to provide the services that best meet your service needs.

Service Agreement. If service options are not added to the instrument purchase, then service agreements are available on an annual basis to provide calibration services or post-warranty repair coverage. Service agreements may be customized to meet special turn-around time and/or on-site requirements.

Service on Demand. Tektronix offers calibration and repair services on a "per-incident" basis that is available with standard prices.

Self Service. Tektronix supports repair to the replaceable-part level by providing for circuit board exchange.

Use this service to reduce down-time for repair by exchanging circuit boards for remanufactured ones. Tektronix ships updated and tested exchange boards. Each board comes with a 90-day service warranty.

For More Information. Contact your local Tektronix service center or sales engineer for more information on any of the Calibration and Repair Services just described.

Maintenance

⚠ **WARNING.** *To avoid electric shock, always power off the instrument and disconnect the power cord before cleaning or servicing the instrument.*

Preventing ESD

When performing any service which requires internal access to the instrument, adhere to the following precautions to avoid damaging internal circuit boards and their components due to electrostatic discharge (ESD).

⚠ **CAUTION.** *Many components within the instrument are susceptible to static discharge damage.*

Service the instrument only in a static-free environment. Observe standard handling precautions for static-sensitive devices.

- ■ Minimize handling of static-sensitive circuit boards.

- ■ Transport and store static-sensitive circuit boards in their static protected containers or on a metal rail. Label any package that contains static-sensitive boards.

- ■ Discharge the static voltage from your body by wearing a grounded antistatic wrist strap while handling these circuit boards.

- ■ Nothing capable of generating or holding a static charge should be allowed on the work station surface.

- ■ Handle circuit boards by the edges when possible.

- ■ Do not slide the circuit boards over any surface.

- ■ Avoid handling circuit boards in areas that have a floor or work-surface covering capable of generating a static charge.

Inspection and Cleaning

The instrument is inspected mechanically and electrically before shipment. It should be free of marks or scratches and should meet or exceed all electrical specifications. To confirm this, inspect for physical damage incurred during transit. Retain the packaging in case shipment for repair is necessary. If there is damage or deficiency, contact your local Tektronix representative. Cleaning procedures consist of exterior and interior cleaning. Periodic cleaning reduces instrument breakdown and increases reliability. Clean the instrument as needed, based on your operating environment.

Exterior Inspection Modules that appear to have been dropped or otherwise abused should be checked thoroughly to verify correct operation and performance. Immediately repair defects that could cause personal injury or lead to further damage to the benchtop controller, expansion module, or the mainframes that the module plug into.

Table 1: External inspection check list

Item	Inspect for	Repair action
Front panel	Cracks, scratches, deformations, missing or damaged retainer screws, or ejector handles	Replace defective or missing parts.
Front and rear connectors	Broken shells, cracked insulation, and deformed contacts Dirt in connectors	Replace defective parts. Clear dirt out of connectors.
Accessories	Missing items or parts of items, bent pins, broken or frayed cables, and damaged connectors	Replace damaged or missing parts, frayed cables.

⚠ *CAUTION. To prevent damage to electrical components from moisture during external cleaning, use only enough liquid to dampen the cloth or applicator.*

Exterior Cleaning Procedure Clean the exterior surfaces with a soft dry lint-free cloth, or a soft-bristle brush. If any dirt remains, use a soft cloth or swab dipped in a 75% isopropyl alcohol solution. Use a swab to clean narrow spaces around controls and connectors. Do not use abrasive cleaning compounds.

⚠ *CAUTION. Avoid getting moisture inside the instrument during exterior cleaning; use just enough moisture to dampen the cloth or swab.*

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

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

Interior Inspection Remove the module covers to access the inside of the instrument for inspection and cleaning. (See page 6, *Covers*.) Inspect the internal portions of the modules and the mainframes for damage and wear. Defects found should be repaired immediately.

Table 2: Internal inspection check list

Item	Inspect for	Repair action
Circuit boards	Loose, broken, or corroded solder connections. Burned circuit boards. Burned, broken, or cracked circuit-run plating	Return to a Tektronix Service Center.
Solder connections	Cold solder or rosin joints	Return to a Tektronix Service Center.
Wiring and cables	Loose plugs or connectors. Burned, broken, or frayed wiring	Firmly seat connectors. Repair or replace parts with defective wires or cables.
Chassis	Dents, deformations, and damaged hardware	Straighten, repair, or replace defective hardware.

⚠ *CAUTION. To prevent damage from electrical arcing, ensure that circuit boards and components are dry before applying power.*

Interior Cleaning Procedure

Use a dry, low-velocity stream of air to clean the interior of the modules and the mainframes. Use a soft-bristle brush for cleaning around components. If you must use a liquid for minor interior cleaning, use a 75% isopropyl alcohol solution and rinse with deionized or distilled water.

Removal and Installation

This section provides detailed instructions for removing or installing parts of the module. The procedures in this section assume that you already have removed the module from the mainframe. Removal and installation instructions are not provided for all replaceable parts. (See page 22, *Parts List*.)

⚠ ***WARNING.*** *Before doing any procedures in this manual, read the General Safety Summary and Service Safety Summary found at the beginning of this manual.*

When performing any service which requires internal access to the instrument, avoid damaging internal circuit boards and their components by electrostatic discharge (ESD). (See page 1, Preventing ESD.)

Tools Required

The following table lists the tools needed to replace the internal components of the instrument.

Table 3: Tools required for circuit board replacement

Description	Example
Screwdriver with a T-9 and a T-10 Torx tip	Standard tool
1/4-inch nut driver	Standard tool
9/16-inch nut driver	Standard tool
Needle-nose pliers	Standard tool

Torque Requirements

Tighten all T-9 and T-10 screws to 4 in-lbs. Tighten standoff posts to 8 in-lbs.

Covers

Removal   Refer to the exploded view of the module to remove the covers. (See Figure 6.)

Installation   Use the following procedure to install the covers:

> **NOTE.** *Install the cover tightly against the chassis. This will ensure that the module fits into adjacent slots in the mainframe.*

1. Place the module on its right side.

> ⚠ **CAUTION.** *To prevent damage to the module during the installation process, reinstall the cover exactly as described in steps 2 through 9.*
>
> *If the cover is not properly seated, the module can be damaged when you install it in a mainframe.*

2. Insert the cover at an angle such that the front edge of the cover engages with the EMI gaskets on the back of the front panel. Then push the rear of the cover in place.

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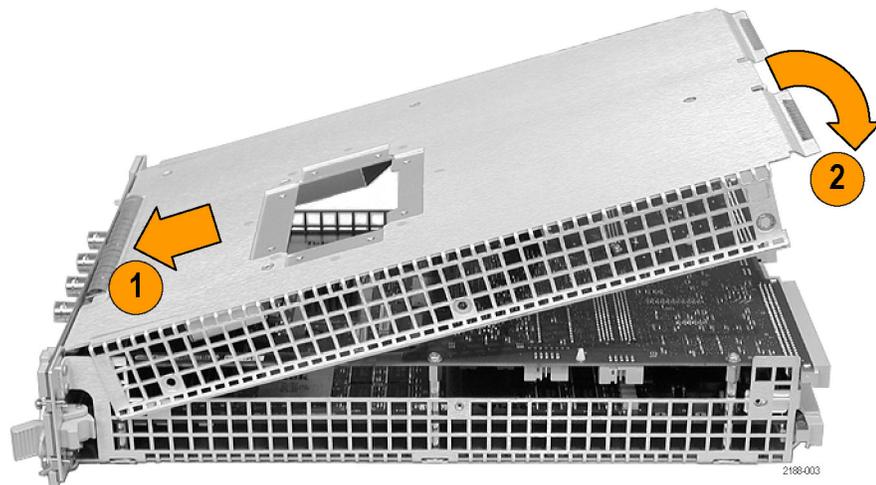
Figure 1: Installing the cover onto the chassis

3. Make sure that the cover is fully seated (no gaps) against the front and rear chassis flanges.
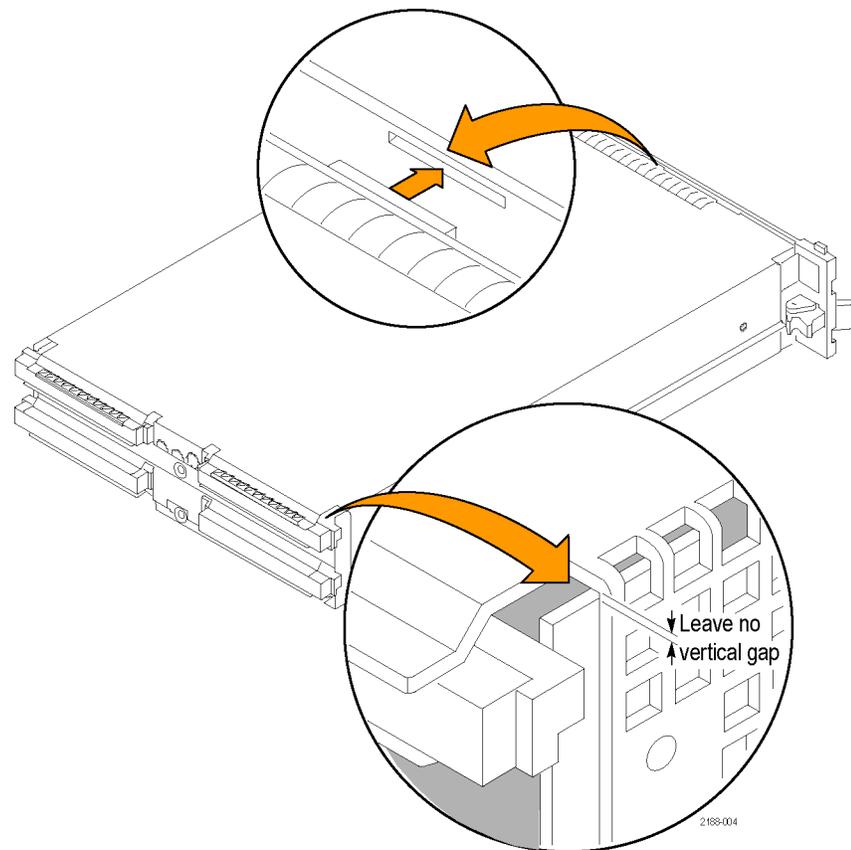
Figure 2: Seating the cover on the chassis

4. While holding the cover in place, install the four T-10 Torx-drive screws nearest the front of the module (two on each side of the cover), to secure the cover to the chassis.

5. Slide the rear panel on the chassis and install the two rear panel T-10 Torx-drive screws.

6. Gently squeeze the chassis flange and rear panels flange together while tightening the screws on the sides. This ensures that the rear panel does not rotate, otherwise the module may not seat properly when installed in the mainframe.

7. Install the two remaining T-10 Torx-drive screws nearest the rear of the module (one on each side of the cover).

8. Place the cover onto the chassis.

9. Check and tighten all screws.

Local Processor Unit (LPU) Board

NOTE. When placing an order for a replacement LPU board or an LPU exchange board from the Tektronix Exchange Center, you must supply the model number, serial number, and firmware level.

Removal   Refer to the exploded view of the module to remove the LPU board. (See Figure 6.)

⚠ *CAUTION. Handle the LPU board gently to avoid breaking the front panel LED extension.*

Installation   Use the following procedure to install the LPU board:

1.   Place the LPU board (component side down) over the chassis and insert the tabs on the LPU board into the front subpanel.

2.   Line up the pins on the 160-pin connector from the LPU board to the acquisition board and gently press the LPU board in place.

3.   Install the five T-10 Torx screws to secure the LPU board to the chassis.

4.   Install the cover. (See page 6, *Covers*.)

Acquisition Board

Removal Use the following procedure to remove the acquisition board:

1. Remove the cover. (See page 6, *Covers*.)

2. Remove the Local Processor Unit Board. (See page 8, *Local Processor Unit (LPU) Board*.)

3. Turn the chassis over and use a 1/4 nut driver to remove the five spacer posts from the acquisition board.

4. Remove the two screws securing the probe interface board.

5. Carefully separate the probe interface board from the acquisition board by gently pulling up on the mating connector.

6. Slide the probe interface board away from the front panel and out of the chassis.

7. Disconnect the four coaxial cables on the acquisition board.

8. Remove the three T-10 screws located near the front of the acquisition board.

9. Carefully slide the acquisition board away from the front panel until the probe connectors clear the front panel. Then lift the circuit board out of the chassis.

Installation Use the following procedure to install the acquisition board:

1. Place the acquisition board into the chassis.

2. Carefully slide the acquisition board into the chassis until the probe connectors fit snuggly into the front panel slots.

3. Install the three T-10 screws located near the front of the acquisition board.

4. Slide the probe interface board into the front panel and out of the chassis.

5. Carefully join the probe interface board to the acquisition board by gently pressing down on the mating connector.

6. Install the two screws securing the probe interface board.

7. Install the five spacer posts that secure the acquisition board to the chassis.

8. Connect the four analog output cables from the front panel to the acquisition board.

9. Install the LPU board. (See page 8, *Local Processor Unit (LPU) Board*.)

10. Install the cover. (See page 6, *Covers*.)

EMI Gaskets

Removal   Use the following procedure to remove the EMI gaskets:

For the two rear gaskets on the cover:

1. Remove the cover.

2. Lift the gasket fingers and rotate the gasket off.

For the two rear gaskets on the chassis:

1. Remove the LPU board and the acquisition board.

2. Lift the gasket fingers and rotate the gasket off.
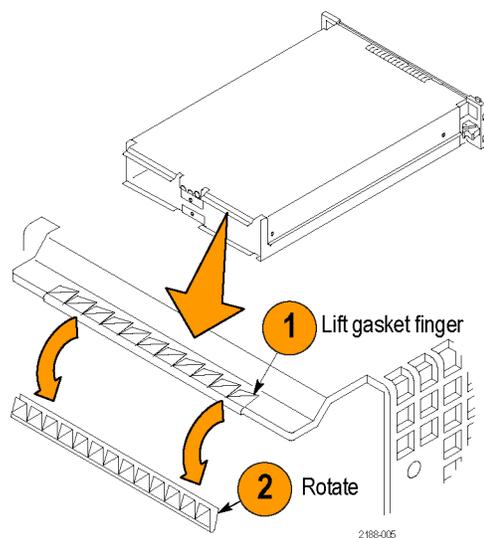
Figure 3: Rear EMI gasket removal

Installation   Use the following procedure to install the EMI gaskets:

1. Position each gasket so the gasket fingers face the outside of the module.

⚠ **CAUTION.** *To avoid breaking the gasket fingers, do not lift the fingers too high.*

2. Pick up each gasket at the end where the gasket finger is formed up. Then rotate the gasket on. As you do this, lift up any fingers that bind to the chassis or cover.

3. Slide each gasket gently from side to side to ensure that the gasket snaps in place.

① Slide open end onto module

② Rotate into place lifting any gasket fingers that bind

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③ Make sure gasket snaps into holes by pulling on gasket
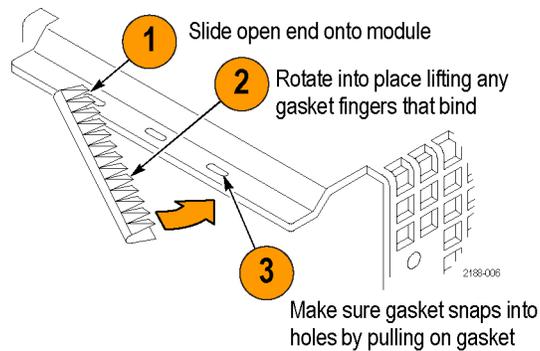
Figure 4: Side EMI gasket installation

4. Reinstall the acquisition board and the LPU board if you removed them to install the rear EMI gaskets.

5. Install the cover. (See page 6, *Covers*.)

Troubleshooting

This section provides troubleshooting information at the circuit board level. There are no parts on the circuit boards (other than the ones listed in the parts list) that are replaceable.

In most cases, faults are isolated to circuit boards or assemblies, but not to individual components on those boards. (See page ix, *Service Strategy*.) Fault isolation is to the following circuit boards and replaceable parts:

- LPU board

- Acquisition board

⚠️ **WARNING.** *Before performing any procedures in this manual, read the General Safety Summary and Service Safety Summary found at the beginning of this manual.*

When performing any service which requires internal access to the instrument, avoid damaging internal circuit boards and their components by electrostatic discharge (ESD). (See page 1, Preventing ESD.)

This section contains information and procedures designed to help isolate faults to within the module. The process is as follows:

1. Check for common problems. (See page 14, *Check for Common Problems*.).

2. Eliminate the mainframe, probes, and other modules as the source of the fault(s). (See page 15, *Eliminate Other Problem Sources*.)

3. Identify the failed replaceable part within the module. (See page 15, *Troubleshoot the Module*.)

Check for Common Problems

The following table lists common problems related to the instrument module and possible causes. The list is not exhaustive, but it may help you eliminate a problem that is easy to fix.

⚠ *CAUTION. To avoid damaging the instrument module or the mainframe, be sure to power down the mainframe before removing or reinstalling any modules.*

Table 4: Failure symptoms and possible causes

Symptom	Possible cause(s)
Modules not recognized	Modules not fully inserted; make sure front of module is flush with front panel
	Mainframe power supply failure; contact local Tektronix service center
	Corrupted module firmware; reinstall firmware. (See page 20, *Updating the Module Firmware*.)
	Module logical address switches set to 00. Reset the switches to FF.
Module does not pass the normal power on diagnostics (READY indicator not green)	Module not fully inserted; make sure front of module is flush with front panel
	Module failure. (See page 15, *Troubleshoot the Module*.) If necessary, contact local Tektronix service center
Module loses settings when power is turned off	Module failure. (See page 15, *Troubleshoot the Module*.) If necessary, contact local Tektronix service center
	NV RAM failure. Replace the LPU board. (See page 8, *Local Processor Unit (LPU) Board*.)
Module will not acquire data or the acquired data is incorrect	Module failure. (See page 15, *Troubleshoot the Module*.) If necessary, contact local Tektronix service center
	Faulty probe, leadset, or probe adaptor

Eliminate Other Problem Sources

The module is part of the Tektronix Logic Analyzer Family, which consists of one or more instrument modules installed in either a benchtop or portable mainframe. The following procedures will help you eliminate the mainframe and other modules as possible sources of failures.

Substitute Good Module   If you have available a known-good module, perform the following procedure:

1. Remove the suspect module from the mainframe.

2. Install a known-good module in the same slot as the suspected module (verify that address switches on the rear of the module are set to same address as the module that you are replacing).

3. Power-on the instrument and check for normal operation.

4. If the failure symptoms are still present with the known-good module installed, the problem most likely is in the mainframe or in the attached probes, not in the module.

5. To eliminate the probes, use known-good probes and verify that the probes are properly connected to the SUT.

NOTE. Viewing the diagnostic window from the TLA application may help you isolate failures to individual modules or to the mainframe.

6. If the instrument operates normally with the known-good module and with known-good probes, the suspect module needs to be repaired. (See *Troubleshoot the Module*.)

Troubleshoot the Module

Follow the procedure in this section to identify the failed part within the module. This procedure requires that the module is installed in a fully functional mainframe. If you have not determined that the mainframe is functional, or if you suspect the problem might be in a probe or in another module, you need to eliminate those possibilities. (See page 15, *Eliminate Other Problem Sources*.)

Equipment Required   The basic troubleshooting procedures require minimal test equipment. There are no accessible test points to measure voltages.

Preparation The fault isolation procedure requires that you:

- ■ Recognize codes flashed by the front-panel LEDs during power up

- ■ Are familiar with the power-on diagnostics

To fill these requirements, read the following topics before performing the Fault Isolation Procedure. (See page 17, *Fault Isolation Procedure*.)

Diagnostic Procedures The following diagnostic procedures will help you diagnose problems.

Power-On Diagnostics. Power-on diagnostics check basic functionality of the instrument at every power on. If any failures occur at power on, the screen displays the calibration and diagnostics property sheet.

If there are no diagnostic failures when you power on the instrument, you can display and run the calibration and diagnostics property sheet by selecting Calibration and Diagnostics from the System menu.

Extended Diagnostics. The extended diagnostics execute more thorough tests than the power-on diagnostics. Using the extended diagnostics, you can do the following tasks:

- ■ Run tests individually or as a group

- ■ Run tests once or continuously

- ■ Run tests until failures occur

Certain diagnostic tests will fail if probes are attached. For best results, run the diagnostics with probes disconnected from the module.

To run the extended diagnostics, do the following steps:

1. Disconnect the probes from the instrument.

2. Start the TLA application if it is not already running.

3. From the System menu, select Calibration and Diagnostics.

4. Select the Extended Diagnostics property page.

5. Select the individual tests, group of tests, or all tests.

6. Click the Run button.

While the tests are executing, the word Running displays adjacent to the tests. When the tests are complete, either a Pass or Fail indication displays adjacent to each test.

Fault Isolation Procedure
The Primary Troubleshooting Tree provides troubleshooting steps that test the module. Use the following procedure with the tree: To determine if module is recognized, perform the following steps:

1. Install the module into a known-good mainframe.

2. Before you power on the mainframe, look at the READY, ACCESSED ARM'D, and TRIG'D front panel indicators.

3. Power on the mainframe and note how the front panel indicators respond.

   a. Verify that the green READY indicator turns on while the diagnostics are being checked. If the green READY indicator does not turn on, the module is not being recognized which indicates possible problems on the LPU board.

   b. Verify that after a few seconds the ACCESSED indicator turns on. The indicator stays on while the module is accessed by the controller. After the TLA application starts, the indicator blinks anytime the controller accesses the module.

4. If the previous steps are not verified, the module is not recognized. Proceed as the troubleshooting tree instructs.

5. If diagnostic failures occur, replace the circuit board indicated by the troubleshooting tree or see the diagnostics table. (See page 19, *Diagnostics Table*.)

   If any of the Kernel test groups fail (ROM check, LPU RAM, LPU Address decode, etc.) replace the LPU board.

   If the kernel group passes, but there are other failures, replace the acquisition board. Also, ensure that the probes are disconnected from the module before running the diagnostics.

   If multiple tests fail, the problem could be power-supply related problems or the mainframe. If replacing the acquisition board does not remedy the failures, try replacing the LPU board.

NOTE. Due to the module design, there are no accessible test points on the module to connect external test equipment to isolate faults to an individual circuit board.

6. Replace the faulty circuit board. (See page 5, *Removal and Installation*.)

Primary Troubleshooting Chart

Start TLA application

Module recognized?

No → Module fully inserted in main frame?

No → Reseat module. If it does not seat properly, check for bent pins on the backplane connectors.

Yes ↓ Run extended diagnostics

Yes ↓ Address switches set to 00?

Yes → Set switches to FF

Kernel tests pass?

No → Replace LPU board

No ↓ Faulty mainframe?

Yes → Repair mainframe

Yes ↓ Other test fail?

Yes → Replace acquisition board

No ↓ Faulty module firmware?

Yes → Reinstall firmware

No ↓ Good module

No ↓ Replace LPU board

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Diagnostics Table   The following table will help you isolate a problem to one of the circuit boards in the module.

Table 5: Diagnostic tests

Circuit Board	Group & test	Power-on	Extended
LPU board	Kernel Tests		
	ROM Check	✔	✔
	LPU RAM	✔	✔
	LPU Address Decode	✔	✔
	NVRAM Check	✔	✔
Acquisition board	Interface Tests		
	FPGA Addressing	✔	✔
	Trigger	✔	✔
	Acquisition RAM 0	✔	✔
	Acquisition RAM 1	✔	✔
	Acquisition RAM 2	✔	✔
	SERDES 0	✔	✔
	SERDES 1	✔	✔
	Acquisition RAM Tests		
	Acquisition RAM 0	✔	✔
	Acquisition RAM 1	✔	✔
	Acquisition RAM 2	✔	✔
	Miscellaneous Tests		
	At-Speed Acquire	✔	✔

Updating the Module Firmware

After you install the PCI Express Support software and restart the instrument, a message may appear on the screen indicating that your current module firmware is unsupported by the currently installed software. A new version of the firmware must be installed on the instrument so that it will work with the latest PCI Express Support software.

1. If you haven't already done so, exit the TLA application.

2. Click Start → All Programs → Tektronix Logic Analyzer → TLA Firmware Loader.

3. Select your mainframe instrument from the TLA Connection dialog box.

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

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

   The instrument will scan the mainframe to detect all installed modules, and to determine which modules have firmware that needs to be upgraded.

5. Select your module(s) from the list displayed in the Supported list box near the top of the window. If you are updating the firmware for more than one module, note the locations of the modules in the mainframe and select them from the list.

6. Select Load Firmware from the Execute menu.

7. Navigate to C:\Program Files\TLA 700\Firmware and select the file TLA7Sxx.lod.

NOTE. Be sure to correctly associate your module with this file. Note the slot number in the title bar so that you select the correct module.

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

   The program will begin to load the firmware. The process may take several minutes.

9. When the process is complete, the firmware has been loaded for the module. Exit the firmware loader program and power down the instrument. You must power down the instrument to allow the software application to start up properly.

Repackaging Instructions

If at all possible, use the original packaging to ship or store the instrument. If the original packaging is not available, use a corrugated cardboard shipping carton having a test strength of at least 275 pounds (125 kg) and with an inside dimension at least six inches (15.25 cm) greater than the instrument dimensions. Add cushioning material to prevent the instrument from moving around in the shipping container. Seal the shipping carton with an industrial stapler or strapping tape.

Shipping the Instrument to the Service Center

Contact the Service Center to get an RMA (return material authorization) number, and any return or shipping information you may need.

If the instrument is being shipped to a Tektronix Service Center, enclose the following information:

- The RMA number

- The owner's address

- Name and phone number of a contact person

- Type of instrument and serial number

- Reason for returning

- A complete description of the service required

Mark the address of the Tektronix Service Center and the return address on the shipping carton in two prominent locations.

Storage

When not used in a mainframe, store the serial analyzer module in a clean, dry environment. The following environmental characteristics apply for both shipping and storage:

- Temperature range: -40 °F to +160 °F (-40 °C to +71 °C)

- Altitude: To 9843 feet (3000 meters)

Parts List

This chapter contains a list of the replaceable parts for the TLA7S08 & TLA7S16 Serial Analyzer Modules. Use this chapter to order replacement parts for your instrument. Refer to the individual module service manuals for replaceable parts for those product modules.

Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative. Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order.

- Part number (see Part Number Revision Level below)

- Instrument type or model number

- Instrument serial number

- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

Part Number Revision Level   Tektronix part numbers contain two digits representing the revision level of the part. For most parts in this manual, you will find the letters XX in place of the revision level number.

Part Number Revision Level   Revision Level May Show as XX

670-7918-03   **670-7918-XX**
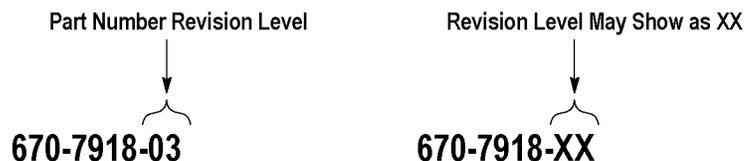
When you order parts, Tektronix will provide you with the most current part for your product type, serial number, and modification (if applicable). At the time of your order, Tektronix will determine the part number revision level needed for your product, based on the information you provide.

Using the Replaceable Parts List

The following table describes each column in the replaceable parts lists.

Table 6: Parts list column descriptions

Column number	Column name	Description
1	Figure & index number	Figure and index numbers in the exploded view illustrations.
2	Tektronix part number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial number	Column 3 indicates the serial number at which the part was first effective. Column 4 indicates the serial number at which the part was discontinued. No entries in either column indicates the part is good for all serial numbers.
5	Qty	Quantity of parts used.
6	Name & description	An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear incomplete. Use the U. S. Federal Catalog Handbook H6-1 for further item name identification.

Abbreviations Abbreviations conform to American National Standard ANSI Y1.1-1972.

| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-1	348-1365-XX			2	SHLD GSKT, ELEC; SYMETRICAL SLOTTED FINGER, 0.350 W X 7.5 L, RIVIT MTG, SNAP-IN, RIVIT SPACING 1.5 INCH, BECU
5-2	200-5013-XX			1	COVER
5-3	211-0409-XX			8	SCR, ASSEM WSHR; 4-40 X 0.312, PNH, 410 SS PASSIVATED, T-10 TORX DR
5-4	348-1537-XX			6	GASKET, EMI; CLIP-ON, 1.98 L, BE CU, TIN PLATED, W/T LANCES
5-5	441-2488-XX			1	CHASSIS, ASSEMBLY, X16, MAIN, TLA7S16
5-5	441-2490-XX			1	CHASSIS, ASSEMBLY; X8, MAIN, TLA7S08
5-6	386-7490-XX			1	BRACKET, END (TWO WIDE)
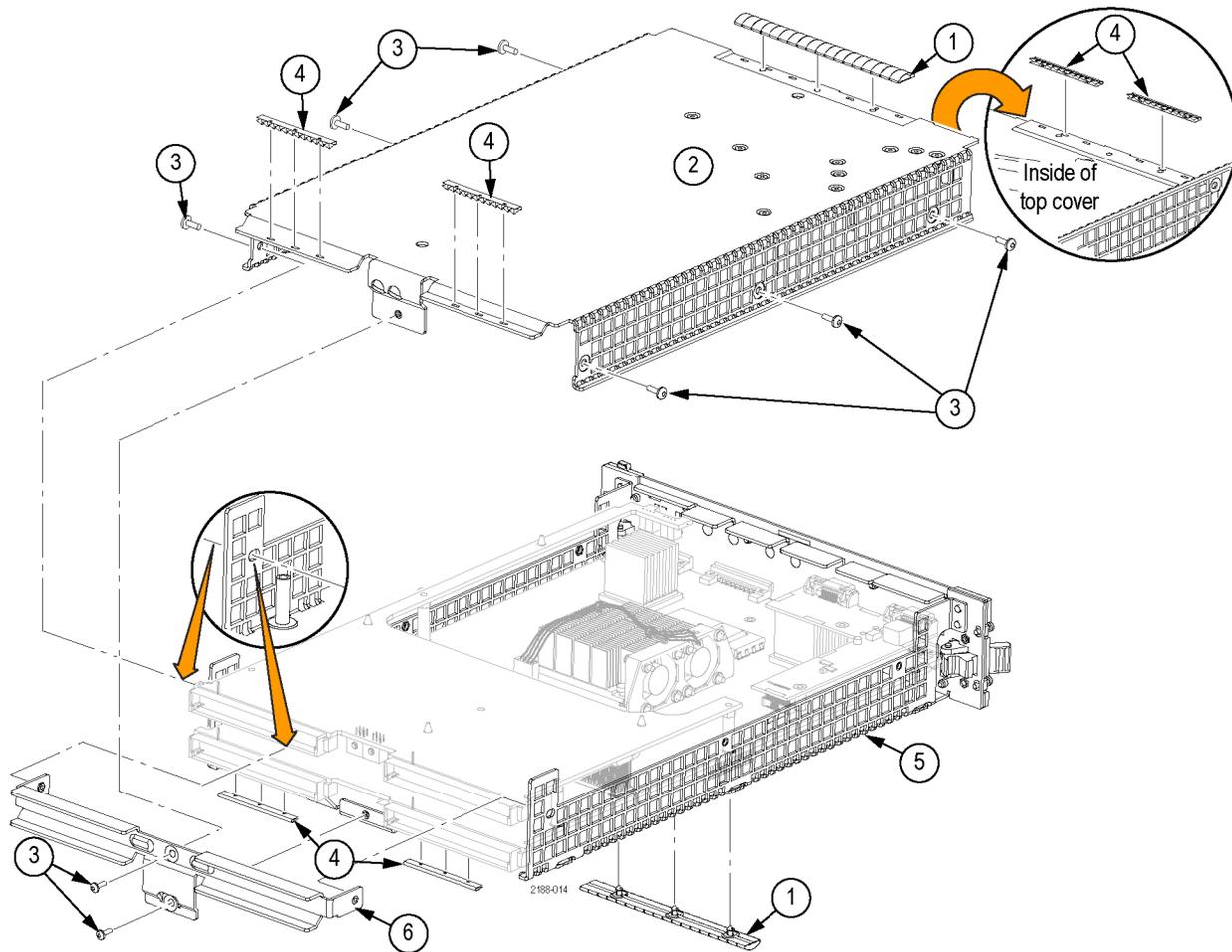
Figure 5: TLA7S08 &TLA7S16 chassis and cover

| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
6-1	664-6142-XX			1	CIRCUIT BD ASSY; LPU BOARD, TESTED
6-2	211-0409-XX			10	SCR, ASSEM WSHR; 4-40 X 0.312, PNH, 410 SS PASSIVATED, T-10 TORX DR
6-3	679-6219-XX			1	CIRCUIT BOARD ASSY; PROBE INTERFACE BD
6-4	348-1866-XX			4	GASKET, SHIELD
6-5	220-0272-XX			4	JACK, NUT, 4-40
6-6	664-6181-XX			1	CIRCUIT BOARD ASSEMBLY; TLA7S16 MODULE ACQUISITION
6-6	664-6336-XX			1	CIRCUIT BOARD ASSEMBLY; TLA7S08 MODULE; ACQUISITION
6-7	129-1478-XX			5	SPACER, POST; 1.738 L, 1.113 SPACING, W/ 0.35 L, 0.25 HEX, W/ 4-40 INT THD X 6-32 EXTERNAL THD, NICKEL
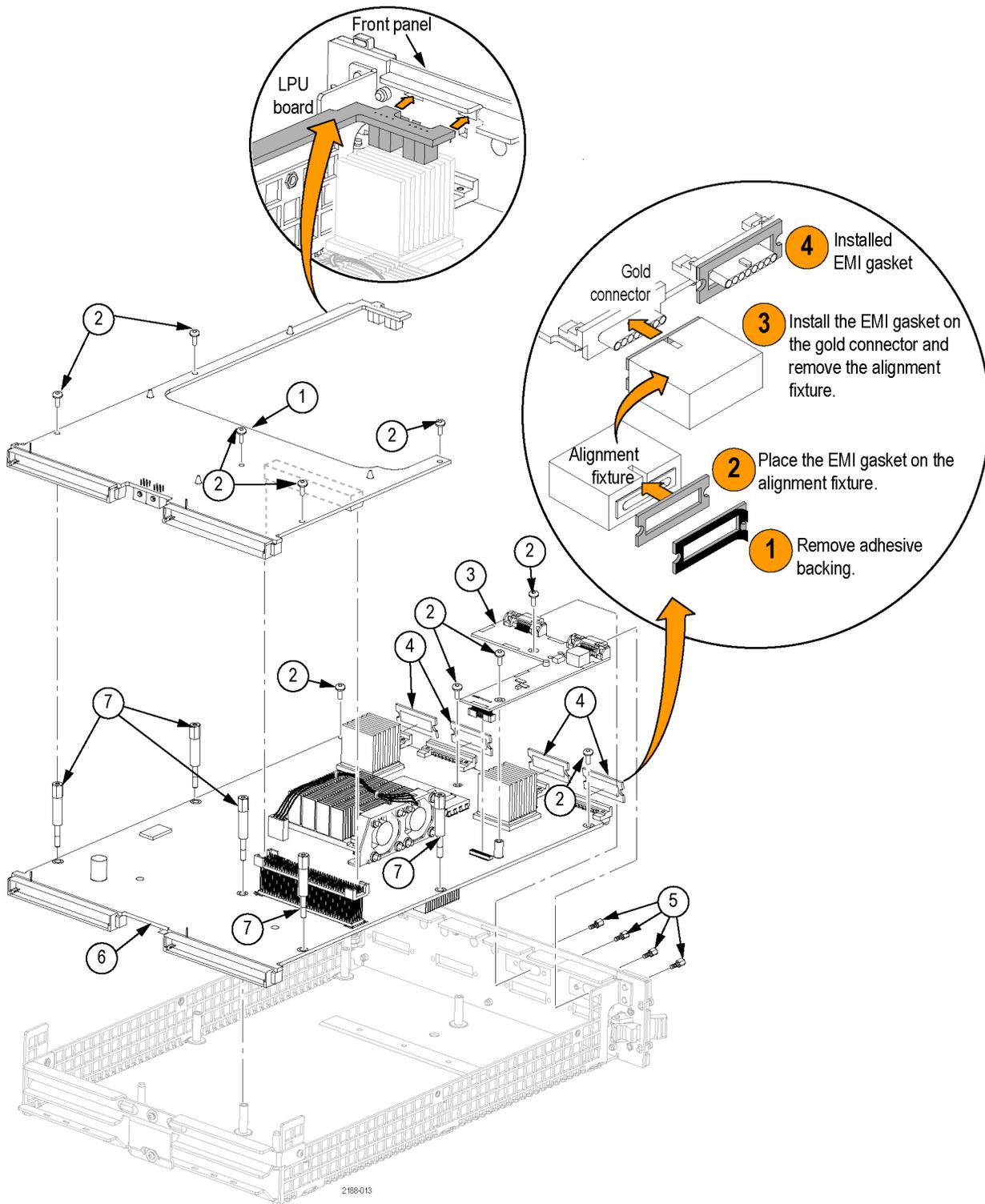
Figure 6: TLA7S08 &TLA7S16 circuit board assemblies

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Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
7-1	174-5366-XX			2	CABLE ASSEMBLY, COAXIAL 50 OHM, MCX TO SMA
7-2	437-0520-XX			1	FAN ASSY
7-3	367-0483-XX			1	HANDLE; INJECTOR/EJECTOR ASSEMBLY, TWO WIDE, W/KEYING, SPRING LOADED, PLASTIC, 20% GLASS-FILLED SILVER GRAY
7-4	367-0484-XX			1	HANDLE; INJECTOR/EJECTOR ASSEMBLY, TWO WIDE, W/OUT KEYING, SPRING LOADED, PLASTIC, 20% GLASS-FILLED SILVER GRAY
7-5	211-0409-XX			4	SCR, ASSEM WSHR; 4-40 X 0.312, PNH, 410 SS PASSIVATED, T-10 TORX DR
7-6	672-6285-XX			1	CIRCUIT BD ASSY; REFERENCE CLOCK FILTER BD W/CABLES
7-7	174-5392-XX			2	CABLE ASSEMBLY (REFERENCE CLOCK JUMPER)
7-8	211-0372-XX			2	SCREW, 4-40, T-10 TORX DR

Clip and remove
before attaching

Front panel

Cable
connections

Collar indicates polarity.
Connect cable pairs as
shown.

Part of
cable sets

Acquisition board

2188-002
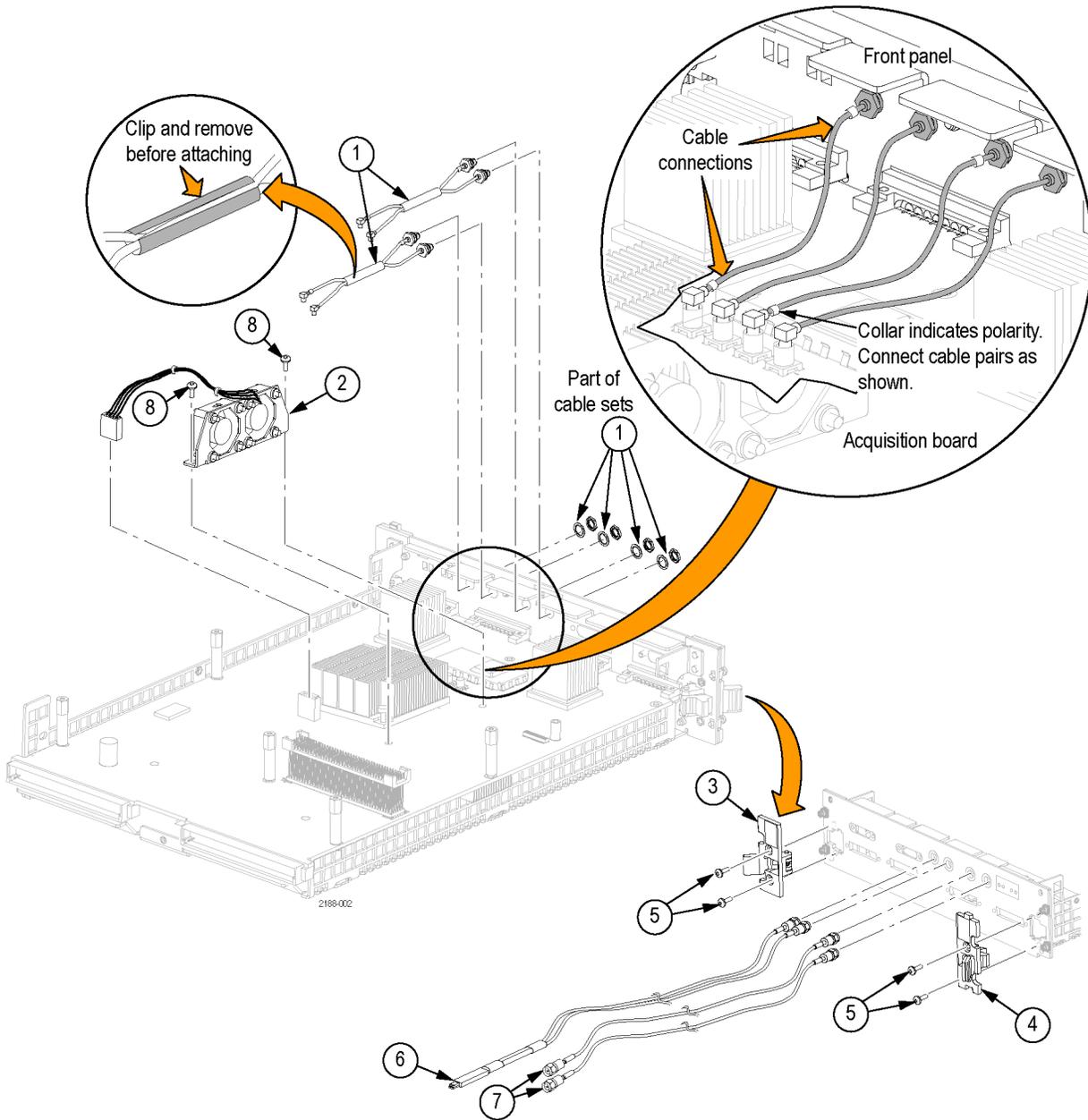
Figure 7: TLA7S08 &TLA7S16 internal cables and connectors

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