Service Manual

Tektronix

TLA 711
Color Benchtop Chassis

070-9773-00

Warning
The 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.

CE

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Tektronix, Inc., P.O. Box 1000, Wilsonville, OR 97070–1000

WARRANTY

Tektronix warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If a 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.

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 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.

TEKTRONIX SERVICE OPTIONS

Tektronix offers the following service options. These options are modular, flexible, and easy to order with your instrument. Designed to ease installation and start up, to support tracking of calibration to requirements of ISO9000, and to provide for extended repair coverage, these options help fix your long-term maintenance costs and eliminate unplanned expenditures. And these options can be converted from service at Tektronix service depots to service on-site (see Option S3), which helps keep downtime to a minimum.

Product installation service[1]	Option IN	Provides initial installation of the product and familiarizes new users with some of its operation features
Three years of calibration services	Option C3	Provides initial Certification on delivery, plus two more annual calibrations from your service center
Test data	Option D3	Provides test data on delivery and when annual calibration services are provided (three total, requires Option C3)
Three years repair coverage	Option R3	Provides three years of repair coverage for the instrument, including displays and accessories sold with the instrument
One year uplift to on–site service[1,2]	Option S1	Converts the standard one year, “return to depot” warranty to provide service on site for one year
Three year uplift to on-site service[1,2]	Option S3	Converts any C3, D3, and R3 options purchased to on-site services for three years

Tektronix Service Options are available at the time you order your instrument. Contact your local Tektronix Sales Office for more information.

1 Availability of installation and on-site services depends on the type of product and may vary by geography.

2 Uplift options are ordered with the mainframe products and cover individual modules.

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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 the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating 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.

Connect and Disconnect Properly. Do not connect or disconnect probes or test leads while they are connected to a voltage source.

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, ensure that the product is properly grounded.

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

The common terminal is at ground potential. Do not connect the common terminal to elevated voltages.

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

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

Use Proper Fuse. Use only the fuse type and rating specified for this product.

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

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

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.

Symbols and Terms

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.*

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.

Symbols on the Product. The following symbols may appear on the product:

WARNING
High Voltage

Protective Ground
(Earth) Terminal

CAUTION
Refer to Manual

Double
Insulated

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, disconnect the main power by means of the power cord or, if provided, the power switch.

Use Caution When Servicing the CRT. To avoid electric shock or injury, use extreme caution when handling the CRT. Only qualified personnel familiar with CRT servicing procedures and precautions should remove or install the CRT.

CRTs retain hazardous voltages for long periods of time after power is turned off. Before attempting any servicing, discharge the CRT by shorting the anode to chassis ground. When discharging the CRT, connect the discharge path to ground and then the anode. Rough handling may cause the CRT to implode. Do not nick or scratch the glass or subject it to undue pressure when removing or installing it. When handling the CRT, wear safety goggles and heavy gloves for protection.

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.

X-Radiation. To avoid x-radiation exposure, do not modify or otherwise alter the high-voltage circuitry or the CRT enclosure. X-ray emissions generated within this product have been sufficiently shielded.

Preface

This is the service manual for the TLA711 Benchtop Chassis. Read this preface to learn how this manual is structured, what conventions it uses, and where you can find other information related servicing this product. Read the *Introduction*, which follows this preface, for safety and other important background information needed before using this manual for servicing this product.

Manual Structure

The *TLA 711 Benchtop Chassis Service Manual* is divided into chapters, which are made up of related subordinate topics. These topics can be cross referenced as sections.

Be sure to read the introductions to all procedures. These introductions provide important information needed to do the service correctly, safely, and efficiently.

A brief description of each chapter follows:

- *Specifications* contains a product description of the Benchtop Chassis and tables of the characteristics and descriptions that apply to it.
- *Operating Information* includes basic installation and operating instructions at the level needed to safely operate and service the Benchtop Chassis. For complete installation and configuration procedures, refer to the *Installation Manual*. Instructions for shipping the module are also found in this chapter.
- *Theory of Operation* contains circuit descriptions that support general service to the replaceable part level.
- *Performance Verification* refers you to the *TLA 700 Series Performance Verification and Adjustment Technical Reference Manual* that contains the performance verification procedures for the Benchtop Chassis and for other major components in the TLA 700 Series Logic Analyzer.
- *Adjustment Procedures* refer you to the *TLA 700 Series Performance Verification and Adjustment Technical Reference Manual* that contains the adjustment procedures for the Benchtop Chassis and for other major components in the TLA 700 Series Logic Analyzer.
- *Maintenance* contains information and procedures for doing preventive and corrective maintenance on the Benchtop Chassis. Included are instructions for cleaning, for removal and installation of replaceable parts, and for troubleshooting.

- *Options* contains information on the factory-installed options that may be available for the Benchtop Chassis.
- *Diagrams* contains a block diagram and an interconnection diagram useful for isolating failed circuit boards or assemblies**.**
- *Mechanical Parts List* includes a table of all replaceable parts, their descriptions, and their Tektronix part numbers.

Manual Conventions

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

Modules

Throughout this manual, the term *module* refers to a TLA 700 Series Logic Analyzer or DSO unit that mounts inside a TLA 700 Series Portable or Benchtop Chassis. A module is composed of circuit cards, 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, such as the hard disk drive, or a mechanical part, such as the I/O port connectors, that is listed in the replaceable parts list of Chapter 10. Also, see *Strategy for Servicing* on page xiii.

Safety

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

Related Manuals

The following manuals are available as part of the TLA 700 Series Logic Analyzer documentation set. See *Standard Accessories* on page 10–1 and *Optional Accessories* on page 10–17 for part numbers.

The procedures and information in this manual assumes that service personnel have access to all manuals listed in the following table.

Manual Name	Description	Service Use
The *TLA 700 Series Installation Manual*	Provides the basic installation instructions for the TLA 700 Series Logic Analyzer.	Installation and removal of DSO, Logic Analyzer, and Benchtop-Controller Modules Reinstallation of Windows 95 and TLA 700 software Replacing individual podlet cables in the logic analyzer probes Reformatting hard disk
The *TLA 700 Series Performance Verification and Adjustment Technical Reference Manual*	Provides performance verification, certification, and adjustment procedures for the TLA 700 Series Logic Analyzer.	Performing periodic or after-repair functional or performance verifications Performing periodic or after-repair adjustment
The *TLA 700 Series User Manual* and *TLA 700 Online Help*	Provides operating information on the TLA 700 Series Logic Analyzer.	Augments operating information found in chapter 2 of this manual
The *TLA 711 Color Benchtop Controller Service Manual*	Provides service information for the slot 0 controller in the benchtop chassis.	Isolating and correcting failures in the benchtop controller
The *TLA 704 Color Portable Mainframe Service Manual*	Provides service information for the portable mainframe.	Isolating and correcting failures in the portable mainframe
The *TLA 7Lx/TLA 7Mx Logic Analyzer Service Manual*	Provides service information for the logic analyzer modules.	Isolating and correcting failures in the logic analyzer module
The *TLA Dx/TLA 7Ex Digitizing Oscilloscope Service Manual*	Provides service information for the digitizing oscilloscope modules.	Isolating and correcting failures in the DSO module
The *TLA 7QS Training Manual*	Provides examples of using the TLA QuickStart training board with TLA 700 Series Logic Analyzers.	Used for training on operation of TLA 700 Series Logic Analyzer.
The *TLA 7QS Technical Reference Manual*	Provides service information and technical information for the TLA QuickStart Training board.	Servicing the TLA Quickstart Training board only.

Introduction

This manual contains information needed to properly service the Benchtop Chassis This introduction contains information critical to safe and effective servicing.

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

- The procedures in this manual should be performed only by a qualified service person.
- Read the *General Safety Summary* and *Service Safety Summary* found at the beginning of this manual.
- Read the *Preface* beginning on page ix.
- Read *Operating Information* beginning on page 2–1.

When using this manual for servicing, be sure to follow all warnings, cautions, and notes.

Adjustment Interval

There are no adjustments or certifiable parameters for the TLA711 Benchtop Chassis. Refer to the *TLA 711 Color Benchtop Controller Service Manual* for more information on adjustment and certification of the controller.

Strategy for Servicing

This manual supports and contains all the information needed for periodic maintenance of the Benchtop Chassis. (Examples of such information are procedures for fault isolation of a failed circuit board or assembly and for removal and replacement of same.)

This manual also supports and contains information for corrective maintenance of this product:

- supports isolation of faults to the failed circuit board or assembly level shown in the replaceable parts list of Chapter 10
- supports removal and replacement of those boards or assemblies
- supports removal and replacement of fuses, knobs, chassis, and other mechanical parts listed in the replaceable parts list

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 well equipped to service the TLA 711 Benchtop Chassis. Tektronix technicians train on Tektronix products; they have access to the latest information on improvements to the TLA 711 Benchtop Chassis as well as the latest new product upgrades. *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 appears 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 or you can visit us on our *Customer Services World Center* web site at http://www.tek.com/Measurement/Service. See our latest service offerings and contact us by email.

Calibration and Repair Service

In addition to warranty repair, Tektronix Service offers calibration and other services which 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.

The following services can be tailored to fit your requirements for calibration and/or repair of the TLA 711 Benchtop Chassis.

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. These service options are listed on the *Tektronix Service Options* page following the title page of this manual.

Service Agreements. 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 for the TLA 711 Benchtop Chassis. Service agreements may be customized to meet special turn-around time and/or on-site requirements.

Service on Demand. Tektronix also offers calibration and repair services on a “per-incident” basis that is available with standard prices for many products.

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.

Contacting Tektronix

Product Support	For application-oriented questions about a Tektronix measurement product, call toll free in North America: 1-800-TEK-WIDE (1-800-835-9433 ext. 2400) 6:00 a.m. – 5:00 p.m. Pacific time Or contact us by e-mail: tm_app_supp@tek.com For product support outside of North America, contact your local Tektronix distributor or sales office.
Service Support	Contact your local Tektronix distributor or sales office. Or visit our web site for a listing of worldwide service locations. http://www.tek.com
For other information	In North America: 1-800-TEK-WIDE (1-800-835-9433) An operator will direct your call.
To write us	Tektronix, Inc. P.O. Box 1000 Wilsonville, OR 97070-1000

Specifications

This chapter provides a general description of the Benchtop Chassis and a list of specifications under Characteristics Tables beginning on page 1–3.

Product Description

The Benchtop Chassis is designed to be used as part of a TLA 700 Series Logic Analyzer. It is an intelligent, 13-slot chassis with the following features:

- High output power supply
- Intelligent cooling for installed modules
- High quality auto-configurable backplane
- Optional adjustable rackmounts

Standard features are explained in more detail in the following paragraphs. Refer to the *Options* chapter for a description of optional features.

Power Supply

The Benchtop Chassis provides voltages at levels sufficient for the most demanding TLA 700 Series applications. The power supply has a volt-ampere capacity of 1660 VA with 872 watts usable by TLA 700 Series instrument modules at any one time. The chassis accommodates exclusively digital applications (using the logic analyzer module), exclusively analog applications (using the DSO module), or combinations of both.

The power supply plugs directly into the rear of the chassis and has no cables to disconnect. Because of this design, you can replace the power supply in less than three minutes, keeping downtime to a minimum. The power supply automatically accommodates the appropriate input voltage and frequency; no mechanical switch is required to select the correct line voltage.

Intelligent Cooling

The Benchtop Chassis provides optimal cooling for all installed modules. The chassis uses an intelligent, adaptive cooling scheme to efficiently remove heat while maintaining quiet operation. When you set the blower to variable speed (default), the chassis automatically adjusts the blower speed to keep the temperature rise above the modules to approximately 10° C, or less. Using a rear panel switch, you can set the blower to full speed to provide maximum cooling at all times.

Air is exhausted at the sides of the chassis allowing you to stack the chassis with other rackmount equipment. You don't have to to worry about restricting any airflow out of the top of the chassis or creating a chimney effect.

Cooling is not wasted on empty slots. Card guides automatically direct air to only those slots containing modules; empty slots are shut off. The chassis directs airflow across each installed module from the bottom to the top of each slot. Baffles balance the airflow from the front to back and across occupied slots in the chassis.

You can replace the blower without disassembling the entire chassis.

Backplane

The Benchtop Chassis has an autoconfigurable, solid-state backplane that uses electronic jumpering of the IACK and BUS GRANT signal lines. There are no jumpers to move or install on the backplane. This results in a high quality backplane that is ideal for automatic test environment systems that must be reconfigured frequently.

Full differential distribution of the CLK10 signals provide a clean timing source for your TLA 700 Series instruments.

Characteristics Tables

This section lists specifications for the Benchtop Chassis. All specifications are warranted unless noted “typical.” Typical characteristics describe typical or average performance and provide useful reference information. Specifications marked with the ✓ symbol are checked in the *Performance Verification* chapter.

Table 1–1: AC power source

Characteristic	Description
Source Voltage	90–250 $V_{RMS,}$ 45–66 Hertz, continuous range CAT II 100–132 $V_{RMS,}$ 360–440 Hertz, continuous range CAT II
Maximum Power Consumption	1350 W line power (The maximum power consumed by a fully loaded 13-slot instrument)
Fuse Rating (Current and voltage ratings and type of fuse used to fuse the source line voltage)	
90 V – 132 VAC_{RMS} Operation (High-power/Low Line (159-0379-00)	Safety: UL198G/CSA C22.2, Size: 0.25 in × 1.25 in, Style: Slow acting, Rating: 20 A/250 V
103 V – 250 VAC_{RMS} Operation (159-0256-00)	Safety: UL198G/CSA C22.2, Size: 0.25 in × 1.25 in, Style: No. 59/Fast acting, Rating: 15 A/250 V
207 V – 250 VAC_{RMS} Operation (159-0381-00)	Safety: IEC 127/sheet 1 Size: 5 mm × 20 mm, Style: Sheet 1, Fast acting “F”, high-breaking capacity, Rating: 6.3 A/250 V
Inrush Surge Current	70 A maximum
Steady State Input Current	15 A RMS maximum at 90 VAC_{RMS} 6.3 Amps RMS maximum at 207 VAC_{RMS}
Power Factor Correction	Yes

Table 1–2: Secondary power

Characteristic	Description			
✓ DC Voltage Regulation (Combined System, voltage available at each slot)	Voltage	Vmin,	Vnom,	Vmax
	+24 V	23.28 V,	24.24 V,	25.20 V
	+12 V	11.64 V,	12.12 V,	12.60 V
	+5 V	4.875 V,	5.063 V,	5.25 V
	–2 V	–2.1 V,	–2.000 V,	–1.9 V
	–5.2 V	–5.46 V,	–5.252 V,	–5.044 V
	–12 V	–12.60 V,	–12.12 V,	–11.64 V
	–24 V	–25.20 V,	–24.24 V,	–23.28 V

Table 1–3: Cooling

Characteristic	Description
Cooling System	Forced air circulation system (positive pressurization) utilizing a single low-noise centripetal (squirrel cage) blower configuration with no removable filters.
Blower Speed Control	Rear panel switch selects between full speed and variable speed. Slot exhaust temperature and ambient air temperature are monitored such that a constant delta temperature is maintained across the module with the highest exit air temperature at the minimum operational blower speed.
Slot Activation	Installing a module activates the cooling for the corresponding occupied slots by opening the air flow shutter mechanism. Optimizes cooling efficiency by only applying airflow to modules that are installed.
Delta Temperature Readout Sensitivity	100 mV/° C with 0° C corresponding to 0 V output
Temperature Sense Range	–10° C to +90° C, Delta temperature ≤ 50° C
Clearance	2 in (50.8 mm), rear, top, and sides of chassis

Table 1–4: Safety

Characteristic	Description
Safety Certification	Conforms to, and is certified where appropriate to the following requirements: Listed to UL3111-1 for Electrical Measuring and Test Equipment, Approved (cUL) to CAN/CSA–22.2 No. 1010.1 – 92 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1 Manufacturers declaration of conformity to EN 61010–1/A2 1995 “Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.” Following the directive 73/23/EEC
IEC Characteristics	Installation Category II Pollution Degree 2 Safety Class I

Table 1–5: Environmental

Characteristic	Description
Classification	
Atmospherics	
Temperature	
Operating	+5° C to 50° C, 15 ° C/hr max gradient, non-condensing (derated 1° C per 1000 ft. above 5000 ft. altitude
Nonoperating	–20° C to 60° C, 15° C/hr max gradient, non-condensing
Relative Humidity	
Operating	20% to 80% relative humidity, non-condensing. Max wet bulb temperature: +29°C (derates relative humidity to approximately 22% @ 50°C).
Nonoperating	8% to 80% relative humidity, non-condensing. Max wet bulb temperature: +29° C (derates relative humidity to ~55% @ 50°C).
Altitude	
Operating	To 10,000 ft. (3,048 m) (derated 1° C/1000 ft. (305m) above 5000 ft. (1524m) altitude)
Nonoperating	40,000 ft. (12,190 m)

Table 1–6: Electromagnetic compatibility (EMC)

Characteristic	Description
Emissions	Emissions shall be within the limits specified by the following requirements:
Enclosure:	EN 55011 Class A limits for radiated emissions
AC Mains:	EN 55011 Class A limits for conducted emissions EN 60555-2 AC power line harmonic emissions
Immunity, Enclosure, RF Electromagnetic Field	No instrument failures when the instrument is subjected to a 3 V/m electromagnetic field over the frequency range of 27 MHz to 500 MHz.
Immunity, Enclosure, Electrostatic Discharge	Up to 8 kV with no change to control settings or impairment of normal operation.
Immunity, Fast Transients, Common Mode	No loss of stored data, change to control settings, degradation of performance, or temporary loss of function will occur when the system is subjected to the following transients:

Port	Peak Voltage (k/V)	Tr/Th (ns)	Rep Frequency (k/Hz)
Signal & Control	0.5	5/50	5
AC Power	1	5/50	5

Table 1–7: Mechanical

Characteristic	Description
Overall Dimensions	(See Figure 1–1 for overall chassis dimensions)
Standard Chassis	
Height (with feet)	14.25 in (362.0 mm)
Width	16.75 in (425.5 mm)
Depth	26.5 in (673.1 mm)
Chassis with Rackmount	
Height	14.0 in (355.6 mm)
Width	18.9 in (480.1 mm)
Depth	29.4 in (746.7 mm) min to 34.4 in (873.8 mm) max
Weight	
Minimum mainframe configuration with Benchtop Controller and slot filler panels installed (5 dual wides and 1 single wide	62 lbs 2 oz. (28.18 kg)
Typical configuration: same as as minimum above with the addition of 2 TLA7x4 LA's and 1 TLA7x2 DSO at 5 lbs 10 oz's each, and removal of 3 slot filler panels	77 lbs 14 oz. (35.32 kg)
Shipping weight: minimum configuration with Benchtop Controller module (only) and all mainframe standard accessories (2 manuals, 5 dual wide, 1 single slot filler panels, power cord, empty pouch, front cover, keyboard, software, and cables	118 lb (53.52 kg)
Shipping weight: fully configured instrument. Same as minimum above with the addition of 3 LA's (TLA7M1, TLA7M2, and TLA7M3) and 2 DSO's (TLA 7D1 and TLA7E1), and all module standard accessories (probes, clips)	175 lb (79.38 kg)
Rackmount kit adder	20 lbs (9.07 kg)
Module Size	13 plug-in slots

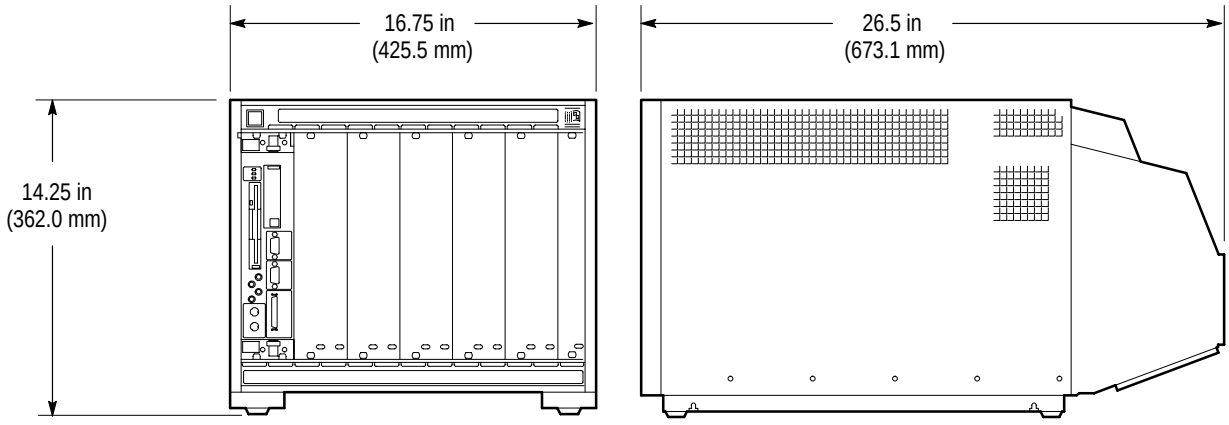


Figure 1–1: Front view and side view of standard Benchtop Chassis

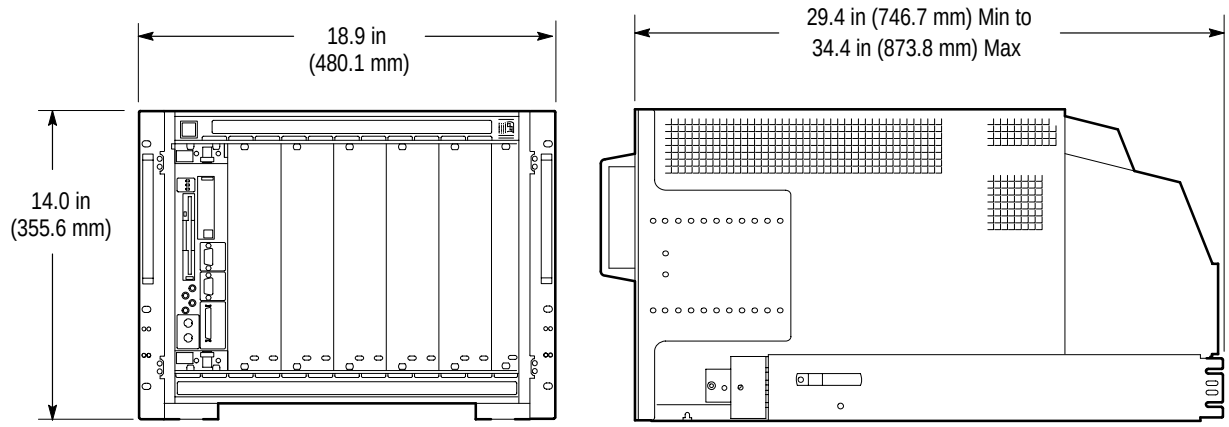


Figure 1–2: Front view and side view of Benchtop Chassis with Rackmount Option

Operating Information

This chapter contains information about operating the Benchtop Chassis. Refer to the *TLA 700 Series Installation Manual* for information on how to install and configure the Benchtop Chassis. For more detailed operating information, refer to the *TLA 700 Series Logic Analyzer User Manual* (Tektronix part number 070-9775-XX) and in the online help.

Installation

Basic installation instructions are contained in the *TLA 700 Series Installation Manual*.

Operating Information

Figure 2–1 and Figure 2–2 show front and rear views, respectively, of the Benchtop Chassis. Chassis slots 2 through 11 are labeled on the top and bottom of the chassis. Slots 0 and 1 are reserved for the dual-wide controller; all other slots are available for any other TLA 700 Series modules.

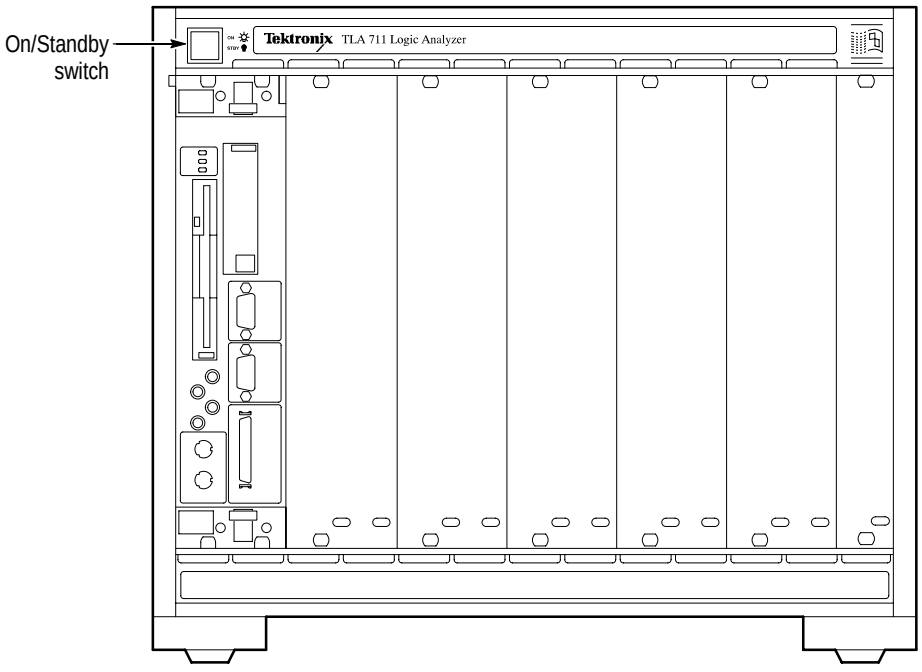


Figure 2–1: Front view of the standard Benchtop Chassis

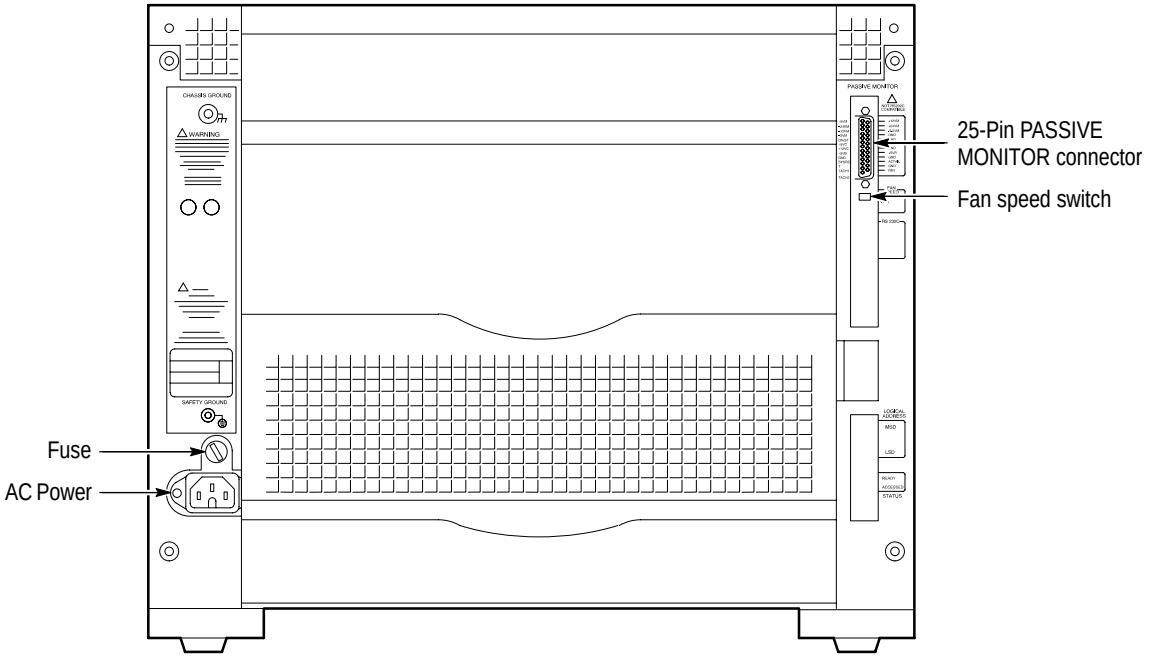


Figure 2–2: Rear view of the standard Benchtop Chassis

When you install a module with a front panel, shutters on the bottom of each slot automatically open to provide cooling for the installed modules. The shutters remain closed for empty slots so that airflow is directed only where it is needed.

On/Standby Switch

The On/Standby switch on the top-left corner of the front panel applies DC voltages to the chassis. The switch is a momentary contact switch. The switch is lighted when DC voltages are applied to the chassis. You can also remotely control the chassis.

You can configure your chassis to bypass the On/Standby switch. (Refer to *Remote Power Switch Configuration* on page 6–20 of the *Maintenance* chapter for information on configuring the power switch.) In this configuration, the On/Standby switch remains lighted while power is applied, but the switch itself no longer controls the chassis.

AC Power Connector

The AC power connector is located on the bottom left side on the rear of the chassis. The AC fuse holder is located just above the power connector.

Chassis Ground Screw The chassis ground screw (if installed) can be used to connect more than one chassis to a common ground point.

Fan Speed Switch The Fan Speed switch controls the speed of the system cooling fan. When the switch is set to the VAR (variable) position, the chassis automatically controls the speed of the fan depending on the air temperature and amount of cooling required by the modules. When the switch is in the FULL position, the fans operate at full speed.

Selecting the Correct Power Cord and Fuse

The Benchtop Chassis comes standard with two power cords and three fuses. Before installing the chassis, you must determine the correct fuse and power cord for your application. Use the following information to determine the appropriate power cord and line fuse. This information is important to avoid overloading the power distribution system and to comply with the National Electrical Code.

For card cage loads in the nonshaded region of Figure 2–3, use the power cord with the 15 A plug (Tektronix part number 161-0213-XX) or the power cord with the 20 A plug (Tektronix part number 161-0218-XX). For high card cage loads combined with low input line voltages (shaded region), use only the power cord with the 20 A plug.

Select the proper fuse based on the ranges shown in Figure 2–3.

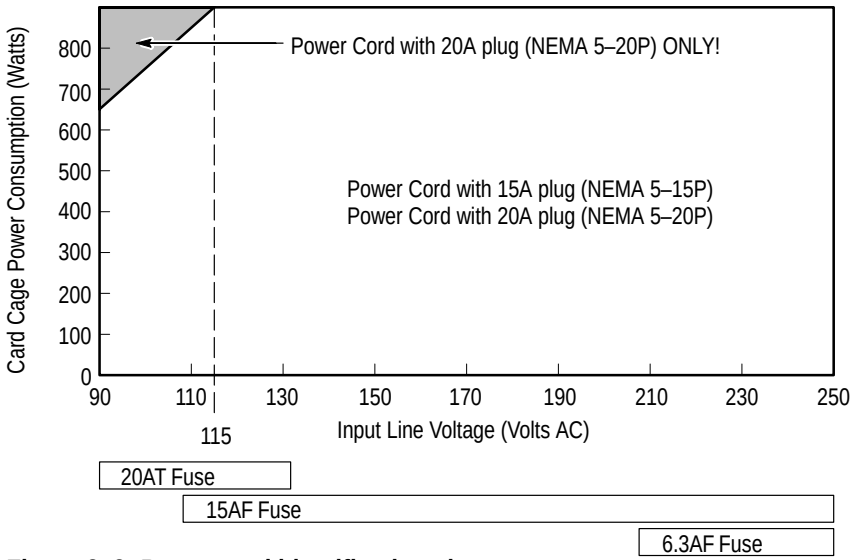


Figure 2–3: Power cord identification chart

Theory of Operation

This section provides a brief overview of the theory of operation for the Benchtop Chassis. Figure 3–1 shows a functional block diagram of the major components.

Standard Chassis

The standard chassis contains the following major components:

- Power supply
- Power Supply Interface board
- Backplane
- Monitor board
- Temperature Sense board
- Blower assembly

Power Supply and Power Supply Interface Board

The power supply provides all voltages and currents to the chassis. The power supply connects to the backplane at J1 and J2 through the Power Supply Interface board.

Backplane

The backplane (A4) provides all the connections to module slots 0 through 12 in the chassis. It also has connections to all other circuit boards and modules in the chassis.

The front panel On/Standby DC switch connects to one of two connectors at the top of the backplane. When the switch is connected to J22, the switch controls the power in the chassis. When the switch is connected to J23, the power-on functions are controlled by an external source through the 25-pin connector on the Monitor board. Although the switch still illuminates when power is applied to the chassis, the on/off function of the switch is disabled. (Refer to *Remote Power Switch Configuration* on page 6–20.)

The backplane connects to the Power Supply Interface board at J20 and J21. A 34-wide ribbon cable at 0J4 on the backplane connects to J16 on the Temperature Sense board. Connectors 0J1, 0J2, and 0P3 carry instrument monitoring information from the backplane to the Monitor board.

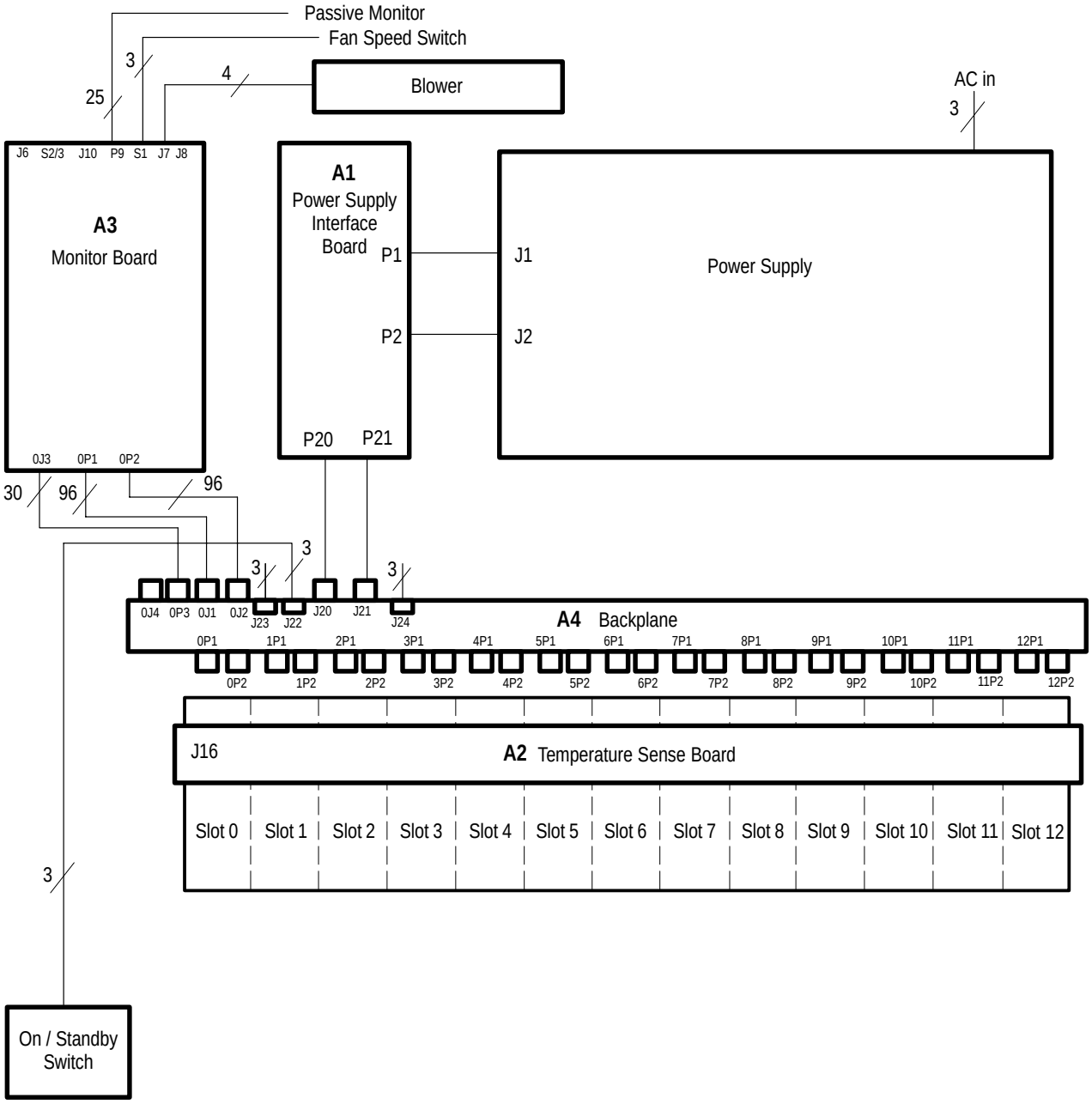


Figure 3–1: Chassis block diagram

Monitor Board

The Monitor board (A3) collects the monitoring information from the power supply, blower, and Temperature Sense board and passes the information to the 25-pin D connector. The Monitor board connects directly to the backplane at 0J3, 0P1 and 0P2.

The 25-pin D Passive Monitor Connector lets you monitor the power supply voltages, blower speed, and the maximum slot temperature rise within the chassis. The connector also provides remote on and off capability and access to the SYSRESET* and ACFAIL* signals. Figure 3–2 shows the pinouts of the Passive Monitor Connector. Table 3–1 describes each of the pins and its function.

WARNING. *Do not connect an RS-232 cable to the 25-pin connector. The connector is not an RS-232 connector. Connecting an RS-232 cable to the connector can result in damage to the equipment.*

The blower connects to the Monitor board at J7 (Fan2) and J8 (Fan1). The Fan Speed switch (S1) lets you select either variable fan speed (VAR) or full speed (FULL).

Temperature Sense Board

The Temperature Sense board (A2) monitors the temperatures for each slot within the chassis. The Temperature Sense board connects to the backplane through the ribbon cable at J16.

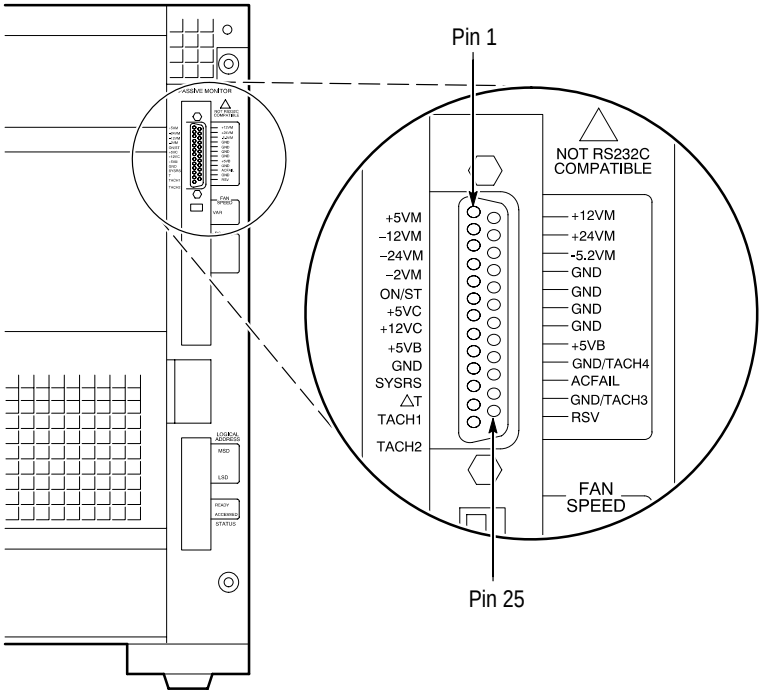


Figure 3–2: Passive monitor connector

Table 3–1: Passive monitor connector pinouts [1]

Pin	Function	Description
1	+5 VM	+5 V for voltage monitoring
2	–12 VM	–12 V for voltage monitoring
3	–24 VM	–24 V for voltage monitoring
4	–2 VM	–2 V for voltage monitoring
5	ON/ST	Remote On/Standby Power Switch
6	+5 VC	+5 V output for running external circuitry. 1 A max
7	+12 VC	+12 V output for running external circuitry. 1 A max
8	+5 VB	Input for +5 V standby current. 1 A max (pins 8 & 21)
9	GND	Logic Ground
10	SYSR	Backplane SYSRESET* signal (input or output). Use of this pin requires adherence to VXI Specifications 1.4 (short extender cable, etc.)
11	ΔT	An analog output signal proportional to the maximum temperature rise of the 13 modules (100 mV/°C rise)

Table 3–1: Passive monitor connector pinouts (Cont.)[1]

Pin	Function	Description
12	TACH1	A square wave output signal whose period is proportional to the speed of fan #1
13	TACH2	A square wave output signal whose period is proportional to the speed of fan #2 when a second fan is used. In the current Benchtop Mainframe only a single blower is used
14	+12 VM	+12 V for voltage monitoring
15	+24 VM	+24 V for voltage monitoring
16	–5.2 VM	–5.2 V for voltage monitoring
17	GND	Logic Ground
18	GND	Logic Ground
19	GND	Logic Ground
20	GND	Logic Ground
21	+5 VB	Input for +5 V standby current. 1 A max (pins 8 & 21)
22	GND/TACH3	Logic Ground OR a square wave output signal whose period is proportional to the speed of fan #3 when a third fan is used. The Benchtop Mainframe currently only utilizes a single blower so this output will be grounded
23	ACFAIL	Backplane ACFAIL* signal (input or output). Use of this pin requires adherence to VXI Sys Specifications 1.4 (short extender cable, etc.)
24	GND/TACH4	Logic Ground OR a square wave output signal whose period is proportional to the speed of fan #4 when a fourth fan is used. The Benchtop Mainframe currently only utilizes a single blower so this output will be grounded
25	RSV	Reserved as per the VXI Sys Specification 1.4

1 25-pin Sub-D connector provided on the upper left of the rear panel corner (referenced from front of instrument) to provide access for power supply, temperature, and fan speed control monitoring.

Performance Verification

The performance verification procedures for the TLA711 Benchtop Chassis are located in the *TLA 700 Series Performance Verification and Adjustment Technical Reference Manual*. There are no calibration (certification) procedures.

Adjustment Procedures

There are no adjustment procedures for the TLA711 Benchtop Chassis.

Maintenance

This chapter provides procedures for inspecting and cleaning the Benchtop Chassis, removing and replacing internal chassis components, and isolating problems to module levels.

- The *Maintenance* section provides general information on preventing damage to internal circuit boards when doing maintenance and cleaning external and internal parts.
- The *Removal and Installation Procedures* (page 6–5) provide procedures for removing and installing circuit boards.
- *Troubleshooting* (page 6–23) provides information for isolating faulty circuit boards and probes.
- *Repackaging Instructions* (page 6–31) provides packaging information for shipment or storage.

You must accomplish instrument-level repairs by exchanging faulty modules with known-good modules or parts. This chapter does not provide component-level procedures.

Related Maintenance Procedures

The following chapters contain information/procedures related to maintenance.

- The *Operating Information* chapter provides instructions for operating the Benchtop Chassis in order to perform the maintenance procedures within this manual.
- The *Theory of Operation* chapter contains a circuit description to the board, or block, level.
- The *Performance Verification* chapter references the *Performance Verification and Adjustment Technical Reference* manual. That manual contains tests that may be useful in isolating problems by testing Benchtop Chassis performance.
- The *Diagrams* chapter contains a block diagram using individual boards as blocks and an interconnection diagram showing connections between the circuit boards.
- The *Mechanical Parts List* chapter lists all field replaceable parts by part number.

The *TLA 700 Series Installation Manual* may contain maintenance procedures not included in this manual.

Preparation

The information in this chapter is designed for use by qualified service personnel. Read the *Safety Summary* at the front of this manual before attempting any procedures in this chapter. Refer to the *Operating Basics* chapter for information on the location of controls, indicators, and connectors used with the chassis.

Preventing ESD

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

CAUTION. *Many components within the chassis are susceptible to static-discharge damage. Service the chassis only in a static-free environment. Observe standard handling precautions for static-sensitive devices while servicing the chassis. Always wear a grounded wrist strap, or equivalent, while servicing the chassis.*

1. Minimize handling of static-sensitive circuit boards.
2. 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.
3. Discharge the static voltage from your body by wearing a grounded antistatic wrist strap while handling these circuit boards. Do service of static-sensitive circuit boards only at a static-free work station.
4. Nothing capable of generating or holding a static charge should be allowed on the work station surface.
5. Handle circuit boards by the edges when possible.
6. Do not slide the circuit boards over any surface.
7. Avoid handling circuit boards in areas that have a floor or work-surface covering capable of generating a static charge.

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

Inspection and Cleaning

The chassis 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 the chassis for physical damage incurred during transit. Retain the chassis 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 of the chassis and cleaning the fan filter. Periodic cleaning reduces instrument breakdown and increases reliability. Clean the chassis as needed, based on the operating environment. Refer to your module documentation for information on cleaning the individual TLA 700 Series modules.

Interior Cleaning

Use a dry, low-velocity stream of air to clean the interior of the chassis. 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 water.

Exterior Cleaning

Clean the exterior surfaces of the chassis with a dry lint-free cloth or a soft-bristle brush. If any dirt remains, use a 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 compounds on any part of the chassis.

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

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

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 chassis. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

Removal and Installation Procedures

This section describes how to remove and install the major mechanical and electrical modules. It provides the following information:

- *List of Replaceable Parts* on page 6–5 describes where to locate a list of replaceable parts.
- *Summary of Procedures* on page 6–6 lists the procedures for removal and installation of replaceable parts.
- *Tools Required* on page 6–6 describes the tools needed to perform the procedures.
- Beginning with *Removing the Blower Assembly* on page 6–7, detailed procedures describe the removal and installation of replaceable parts.

Preparation — Please Read

Please read the following warning statement. Then read the following general instructions before removing a part.

WARNING. *Before doing this or any other procedure in this manual, read the* General Safety Summary *and* Service Safety Summary *found at the beginning of this manual. Also, to prevent possible damage to electrical components, read* Preventing ESD *on page 6–2.*

Read the *Summary of Procedures* on page 6–6 to understand how the procedures are grouped. Then read *Tools Required* on page 6–6 for a list of tools needed to remove and install replaceable parts in the benchtop chassis.

List of Replaceable Parts

The *Mechanical Parts List* section provides a list of all replaceable parts.

Summary of Procedures

The procedures are listed below in the order in which they appear in this section:

- *Removing the Blower Assembly*
- *Removing the Monitor Board*
- *Removing the Power Supply*
- *Removing the Card Guides*
- *Removing the Top and Bottom Nut Rails*
- *Removing the Temperature Sense Board*
- *Removing the Backplane*

Tools Required

Table 6–1 lists the tools needed to to disassemble the Benchtop Chassis:

Table 6–1: Tools required for parts replacement

Item Number	Name	Description
1	Flat Blade Screwdriver	Small flat blade screwdriver
2	Cutters	Diagonal cutters (for removing cable ties)
3	Screwdriver handle	Accepts Torx® driver bits
8	T-15 Torx tip	Torx® driver bit for T-15 size screw heads
9	T-20 Torx tip	Torx® driver bit for T-20 size screw heads
10	Allen wrench	A 3/32-inch Allen wrench (hex wrench)
11	Phillips screwdriver	Phillips #1 screwdriver

Module Removal and Replacement

The following procedures describe how to remove and replace Benchtop Chassis modules. Refer to the parts lists and exploded view illustrations beginning on page 10–8 for an overview of chassis assembly and disassembly.

Removing the Blower Assembly

To remove the blower assembly, refer to Figure 6–2 and Figure 6–3 while performing the following steps:

1. From the back of the chassis, loosen the five 8-32 captive screws including the safety ground using a Phillips #1 screwdriver (refer to Figure 6–1 for the screw locations).
2. Remove the Chassis Ground screw (if installed) using a T-20 tip.
3. Gently pivot the blower assembly outward from the chassis far enough to access the blower cable on the right side of the chassis.
4. Unplug the blower cable and set the blower assembly aside on a clean working surface.
5. To remove the blower, remove the ten 8-32 screws (with the Allen wrench) holding the shroud part of the blower assembly to the chassis part of the assembly. Set the shroud aside. There are three screws on each side and four on the bottom. See Figure 6–3.
6. Remove the two sheet metal screws at the top of the blower.
7. Remove the four 8–32 screws that hold the blower to the chassis part of the blower assembly.
8. For convenience, replace the two sheet metal screws from step 6 onto the top of the blower.

NOTE. *When reconnecting the blower cables to the chassis, verify that you connect the blower cable to the proper connector*

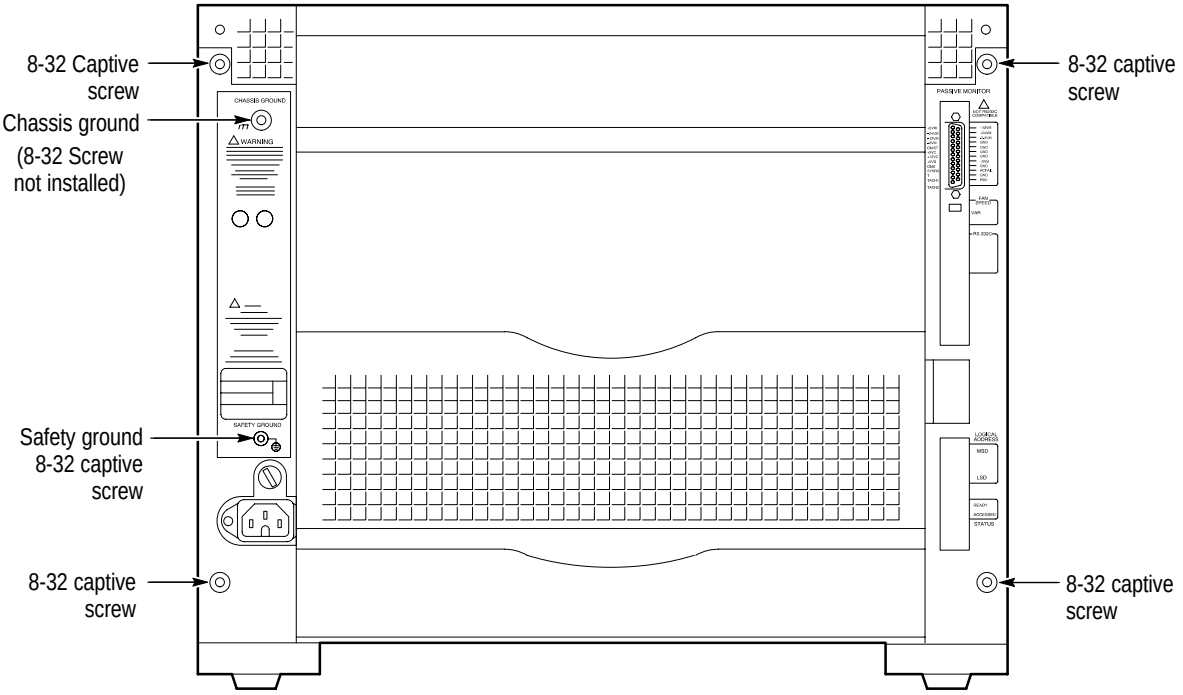


Figure 6–1: Location of blower assembly screws on the rear of the chassis

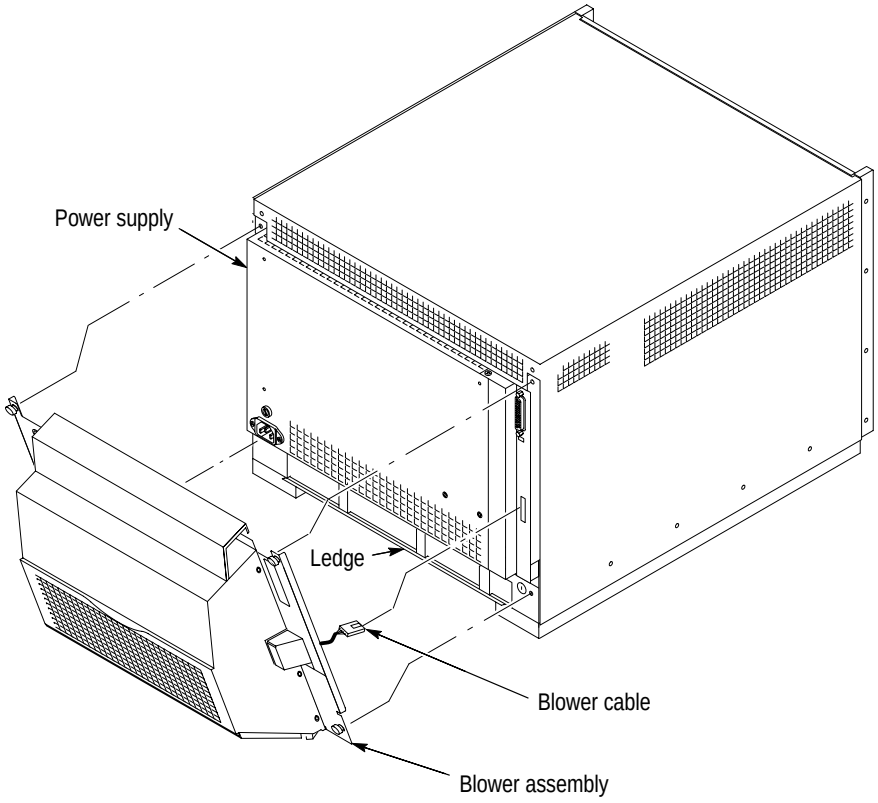


Figure 6–2: Removing the blower assembly

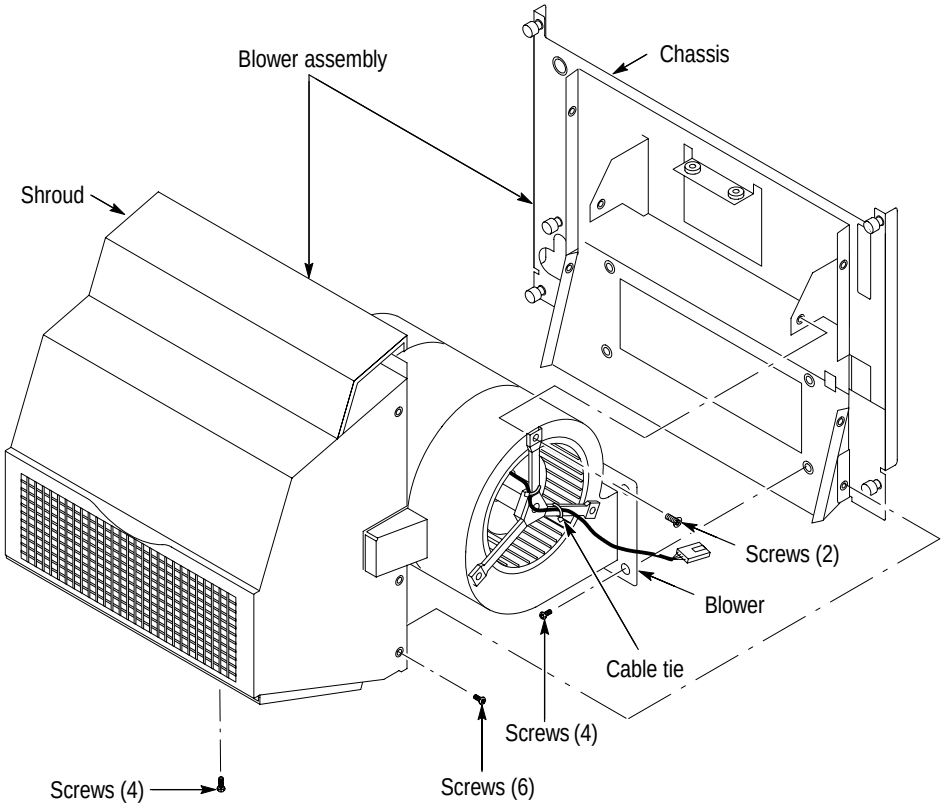


Figure 6–3: Removing the blower

Removing the Monitor Board

To remove the Monitor board, perform *Removing the Blower Assembly* and then refer to Figure 6–4.

Grasp the cable tie loop and pull the monitor board until it comes loose from the backplane. Then slide the board out of the right side of the chassis.

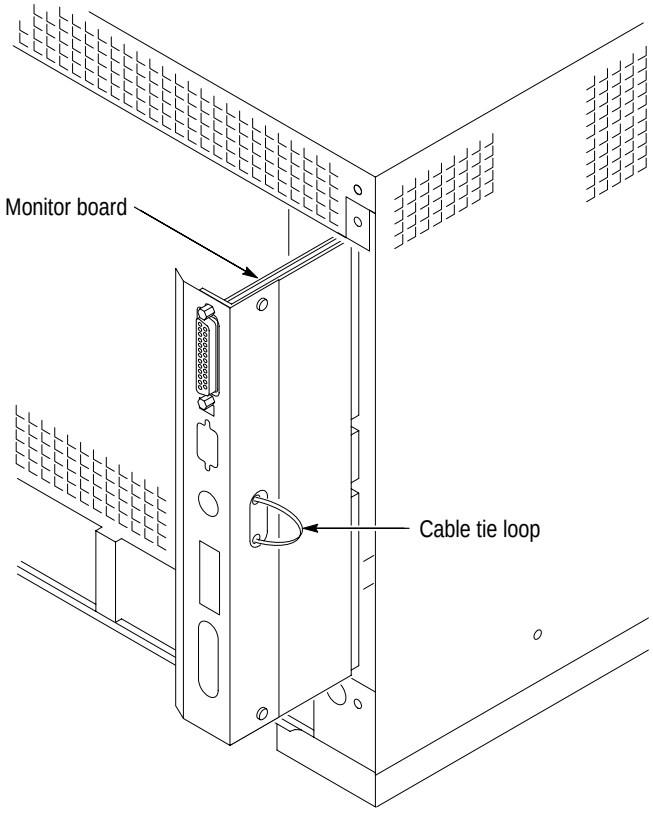


Figure 6–4: Removing the Monitor board

Removing the Power Supply

To remove the power supply from the chassis, perform steps 1 through 4 of the *Removing the Blower Assembly* procedure to remove the blower assembly. Perform the *Removing the Monitor Board* procedure to remove the Monitor board; then continue with the following steps:

1. Look in the recess in the chassis side of the blower assembly. You should find in the recess the power supply handle and the two screws holding the handle.
2. Remove the two screws and the power supply handle.
3. Reinstall the handle and the screws on the power supply. See Figure 6–5.

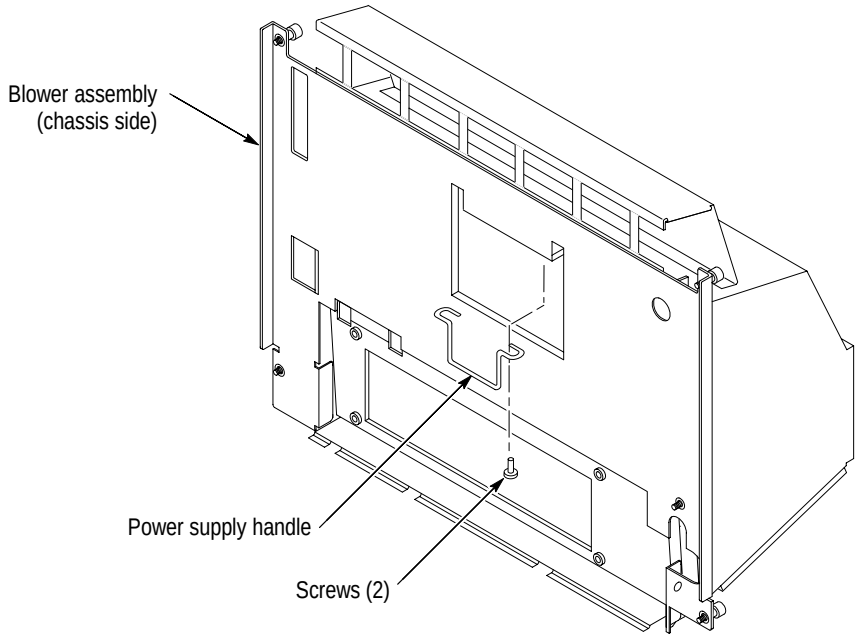


Figure 6–5: Removing the power supply

4. Using the handle on the power supply, firmly pull out the power supply from the rear of the chassis.
5. Set the power supply assembly on a clean working surface.

NOTE. *Step 6 is necessary only if you intend to replace the Power Supply Interface board. This step is normally not necessary because the Power Supply and the Power Supply Interface board can be replaced as a single unit.*

6. Refer to Figure 6–6 and remove the Power Supply Interface board from the power supply module as shown.

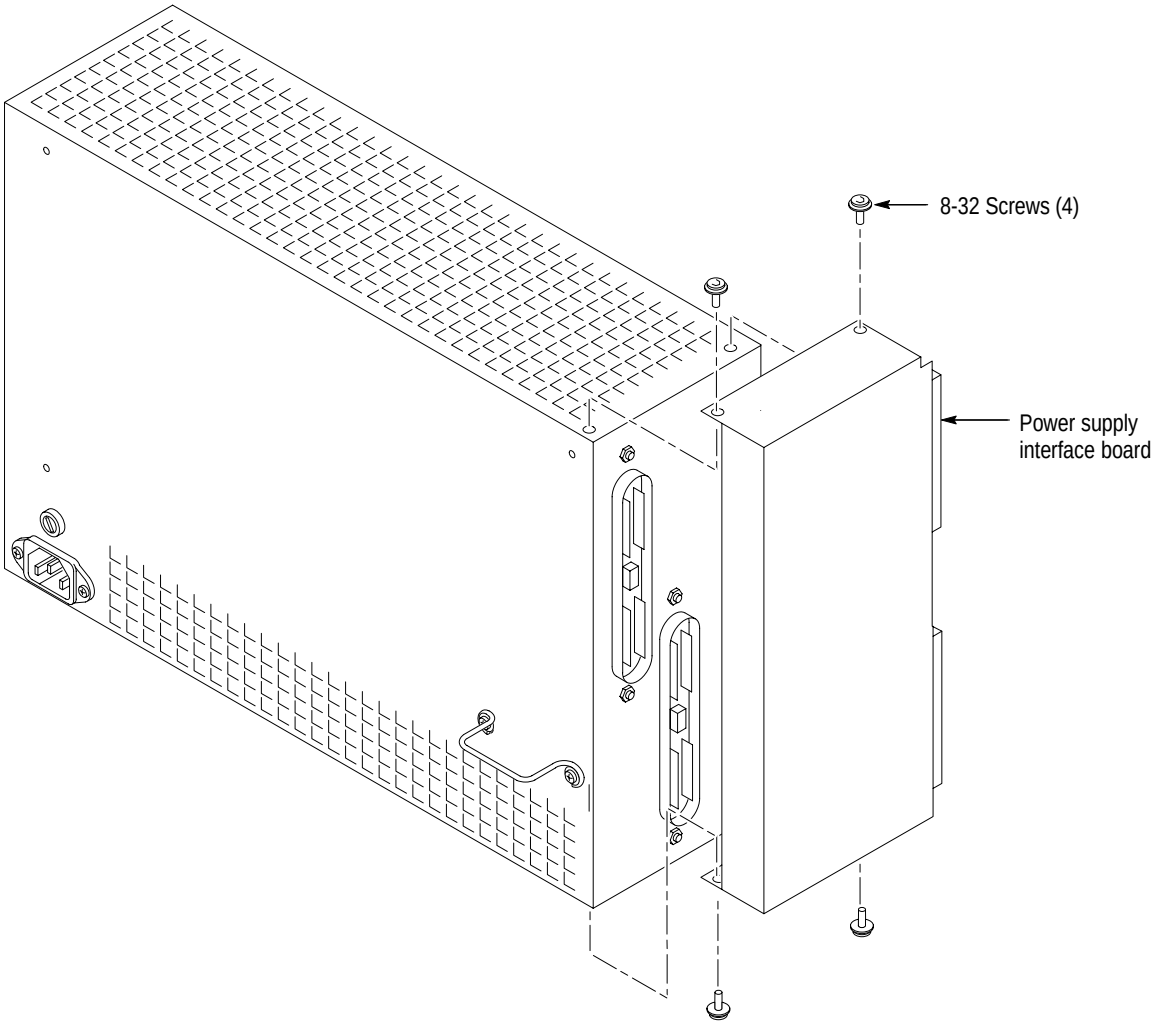


Figure 6–6: Removing the Power Supply Interface board

Removing the Card Guides

The card guides at the top and bottom of the chassis are very similar. The main difference is that the bottom guides include the spring-loaded shutters to redirect air into the chassis. The procedure for removing both guides is identical. Refer to Figure 6–7 while performing the following steps:

1. Use a small flat blade screwdriver to pry up the tab of the card guide at the front of the chassis being careful not to damage the card guide or the chassis.
2. Gently pull the card guide forward until it pops out of place.
3. Remove the card guide.

***NOTE**. The bottom card guides are replaced as a unit. These guides are not intended to be disassembled.*

To replace a card guide, slide the card guide towards the rear of the chassis and allow the front of the card guide to snap into place.

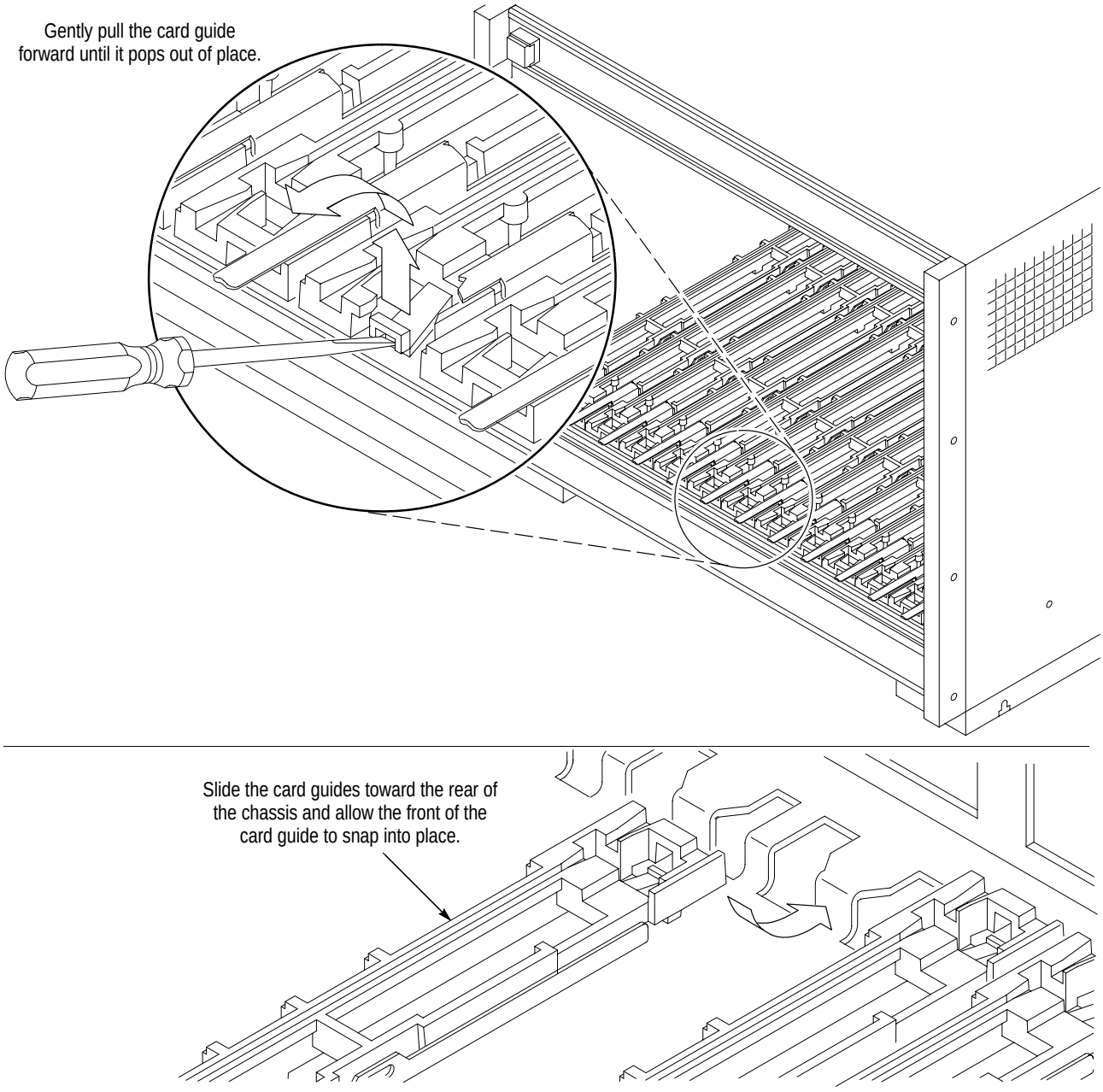


Figure 6–7: Removing the top and bottom card guides

The nut rails at the top and the bottom of the front of the Benchtop Chassis allow you to securely install the modules in the chassis by screwing the top and bottom of the modules to the front of the chassis. Refer to Figure 6–8 to remove these nut rails.

1. Loosen all module retaining screws (it may be necessary to slide the modules partially out of the chassis).
2. Remove the 12 screws holding the top cover to the chassis using a 3/32-inch Allen wrench.
3. Slide the top cover of the chassis back far enough to expose the hole just inside the top and bottom extrusions.
4. Slide the nut rail out of the hole on the side of chassis.

Replace the nut rail by sliding it back in the side of the chassis and pushing it into place.

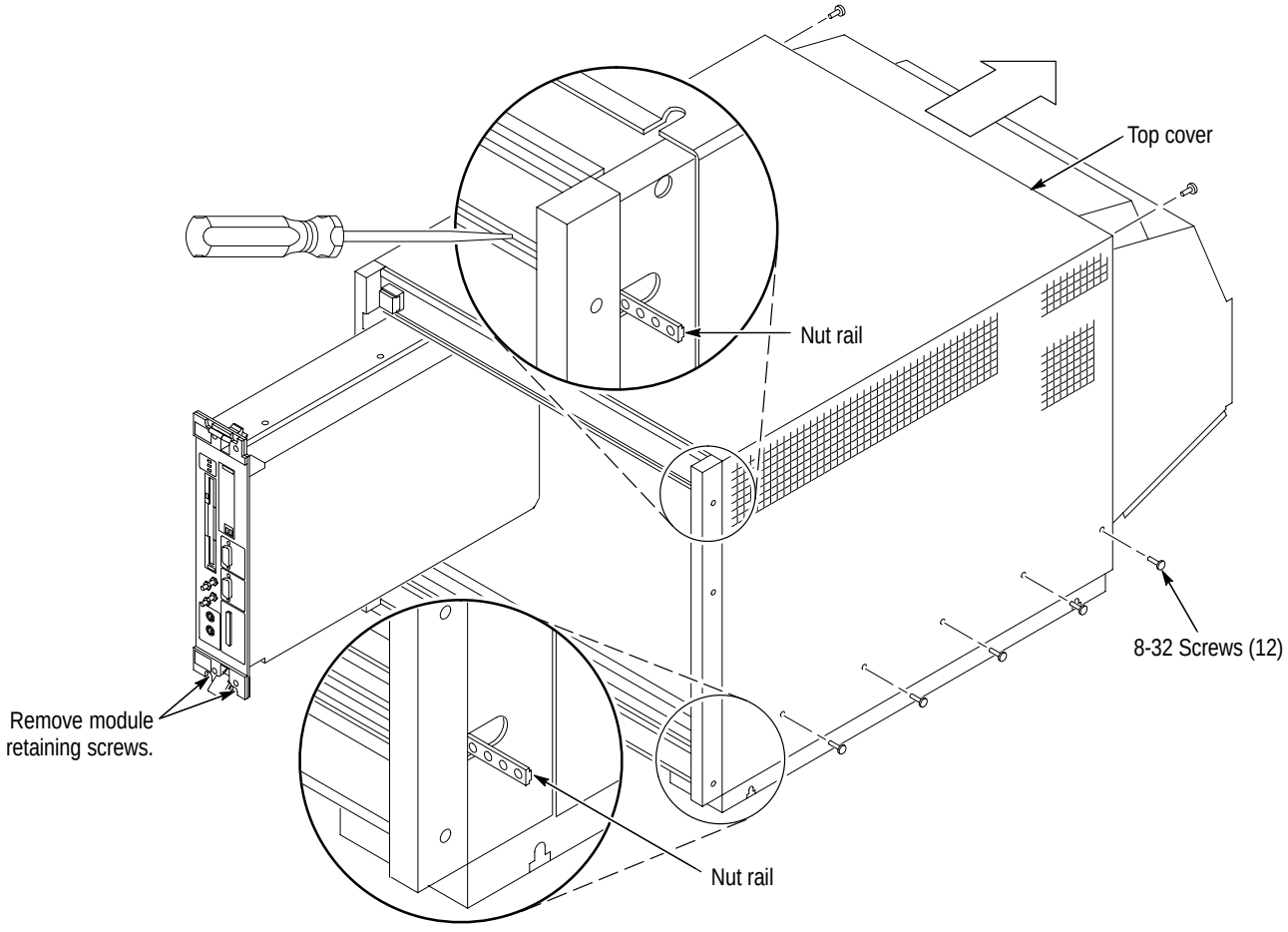


Figure 6–8: Replacing the top and bottom nut rails

Removing the Temperature Sense Board

To remove the Temperature Sense board, remove the chassis cover and then perform the following steps:

1. Disconnect the ribbon cable from the Temperature Sense board.
2. Refer to Figure 6–9 and gently pry back on each retainer holding the Temperature Sense board in place.
3. Lift the board out of the holes at the top of the chassis being careful not to damage any components on the circuit board.

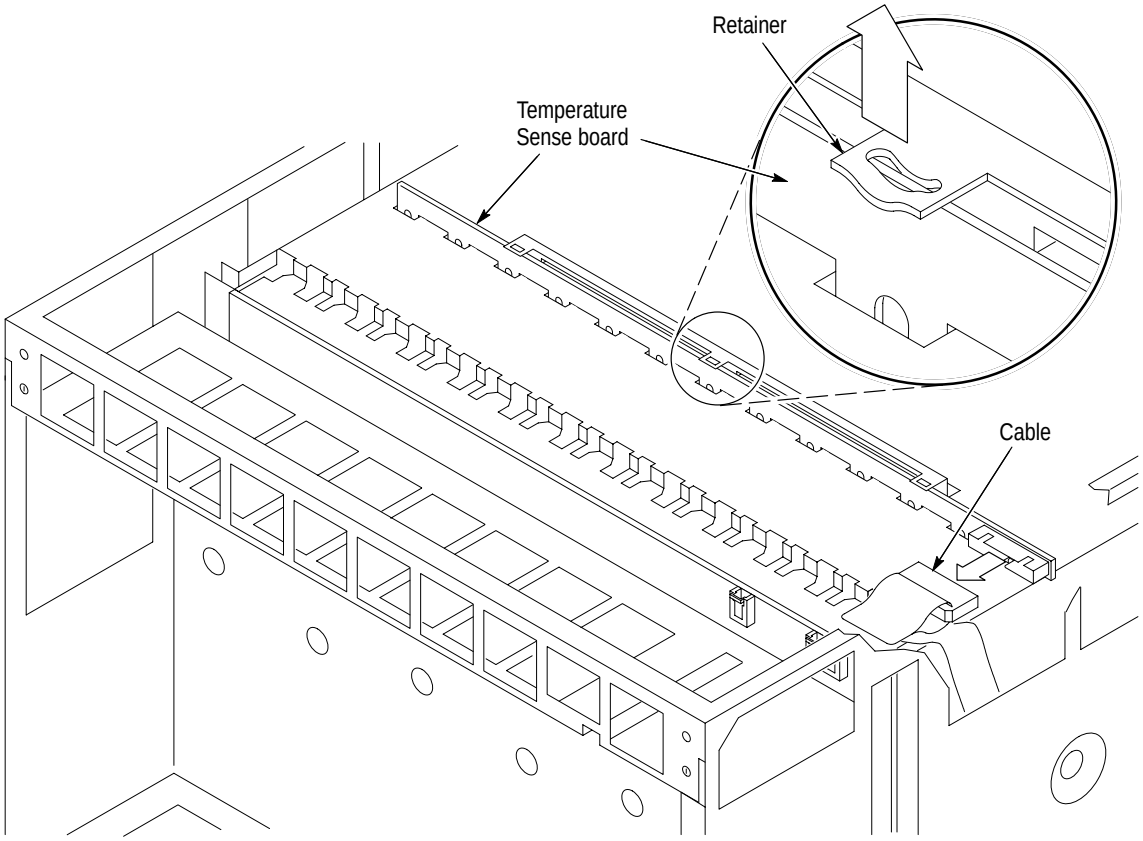


Figure 6–9: Removing the Temperature Sense board

Removing the Backplane

To remove the backplane, perform the *Removing the Blower Assembly, Removing the Monitor Board*, and *Removing the Power Supply* procedures. Refer to Figure 6–10 and then perform the following steps:

1. Remove the top cover of the chassis (see Figure 6–8, if necessary).
2. Disconnect the ribbon cable on the right side of the backplane.

***NOTE**. Before disconnecting the power switch cable, note which connector the cable is connected to (J22, normally, or J23). Remember to reconnect the cable to the correct connector.*

3. Disconnect the power switch cable at J22 (or from J23) at the top of the backplane.
4. From the rear of the chassis, remove the five 6-32 screws on the top of the backplane, seven 6-32 screws from the center, and five 6-32 screws from the bottom.
5. After removing all screws from the backplane, remove the backplane from the chassis by sliding it out of the right side.

Install the backplane by reversing the disassembly procedure.

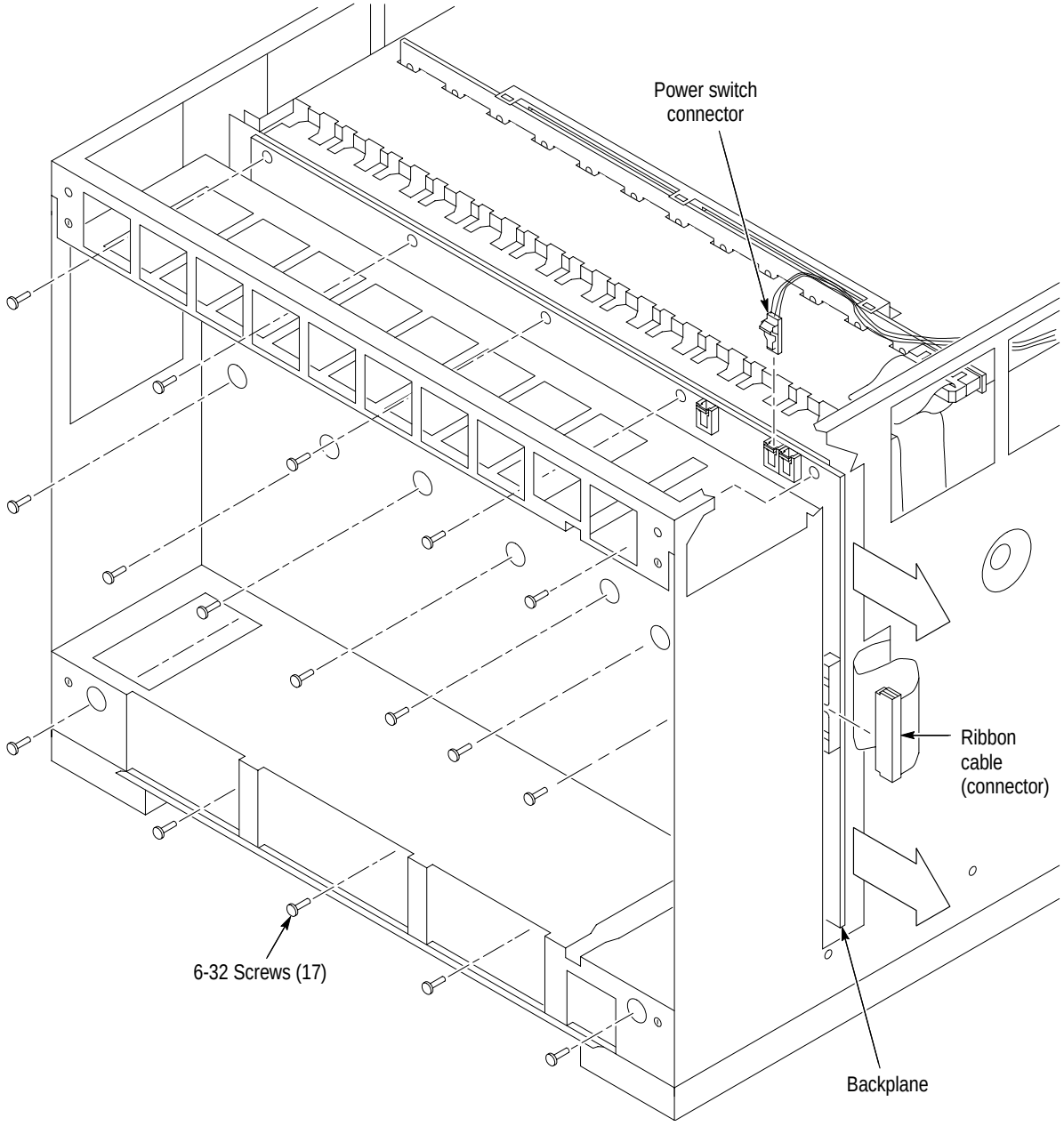


Figure 6–10: Removing the Backplane

Special Configuration Options

This section contains information for configuring your Benchtop Chassis for specific situations not documented earlier in this manual. These special configuration options require you to disassemble parts of the chassis to access jumpers or circuit boards. Refer to the *Maintenance* chapter for detailed information on the assembly and disassembly procedures. You may also need to refer to the exploded views in *Mechanical Parts List*.

The information in this section is intended for use by qualified service personnel. Read the *Safety Summary* at the front of this manual and the static precautions on page 6–2 before attempting any procedures in this appendix. Refer to *Operating Information* for information on the location of controls, indicators, and connectors used with the chassis.

CAUTION. *To avoid damage from high currents on the backplane, always power off the chassis and disconnect the power cord before performing any of the configuration procedures described in this section.*

Remote Power Switch Configuration

You can control the power-on function of the chassis using the front panel On/Standby switch and from a remote momentary switch through the connections of the 25-pin rear panel connector. If you connect a remote switch to pins 5 and 18 (return side) of the 25-pin connector, the remote switch and the front-panel On/Standby switch control the power-on functions of the chassis.

You can also disable the front-panel switch and control the power-on functions from the remote switch only. The backplane has two connectors that control the power-on functions. If the front panel switch is connected to the backplane at J22, the switch controls the power-on functions. If the switch is connected to J23, the front panel switch is disabled, however, the light still illuminates when the chassis is powered on. To configure the chassis to disable the front panel On/Standby switch, perform the following steps:

1. Disconnect the power cord from the chassis.
2. Remove the cover from the chassis.
3. Refer to Figure 6–11 and locate the two connectors at the top of the backplane.
4. Disconnect the On/Standby switch cable at J22 and connect it to J23.
5. Replace the chassis cover.
6. Connect the momentary switch to pins 5 and 18 (return side) of the 25-pin rear panel connector.

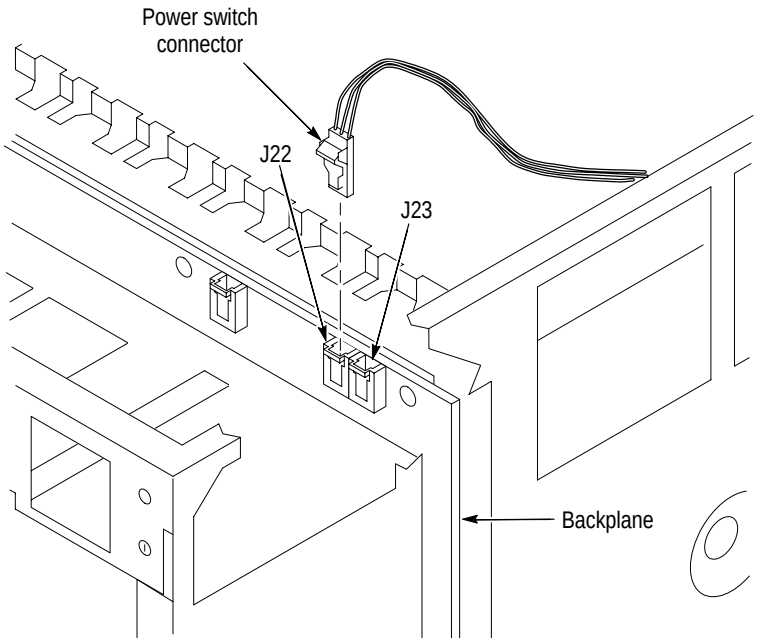


Figure 6–11: Power switch connectors

8°/10° and 13°/15° Jumper on the Monitor board

Jumper J11 on the Monitor board (see Figure 6–12) allows you to further define the temperature sensitivity of the Temperature Sense board. The jumper determines the maximum allowable temperature rise in the chassis. The jumper is shipped in the 8°/10° position.

You can move the jumper to the 13°/15° position if you do not expect a high temperature rise in the modules or when the ambient room temperature will not exceed the chassis maximum temperature. Moving the jumper to the 13°/15° position reduces the fan speed and noise.

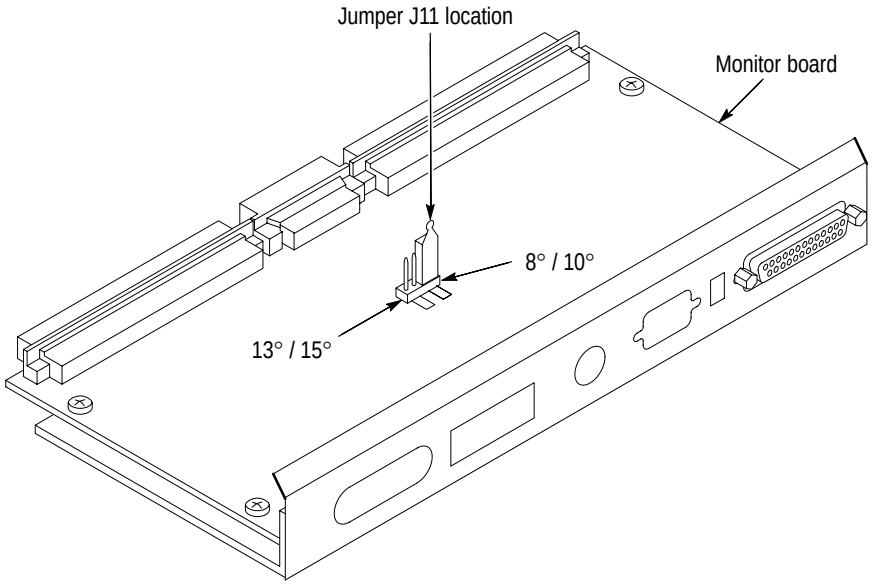


Figure 6–12: 8°/10° and 13°/15° jumper location on the Monitor board

Troubleshooting

WARNING. *Before doing this or any other procedure in this manual, read the* General Safety Summary *and* Service Safety Summary *found at the beginning of this manual. Also, to prevent possible injury to service personnel or damage to electrical components, read* Preventing ESD *on page 6–2.*

This section contains information and procedures designed to help you isolate faults to within the TLA 711 Benchtop Chassis. The process is as follows:

- Do *Check for Common Problems* on page 6–24 to eliminate easy to find problems first.
- Do *Troubleshoot the Benchtop Chassis*, beginning on page 6–25, to isolate locate the failed replaceable part within the module.

If you have replaced a faulty part found using these procedures, you must follow any verification procedures identified in the *TLA 700 Series Performance Verification and Adjustment Technical Reference Manual*.

Service Level

This section supports isolation of faults within the benchtop chassis to the replaceable-part level that's reflected in the replaceable parts list in Chapter 10. In most cases, faults are isolated to circuit boards or assemblies, but not to individual components on those boards. (See *Strategy for Servicing* on page xiii.) Fault isolation is supported to the following replaceable parts:

- Blower
- Monitor board
- Power-supply or Power-supply Interface board
- Backplane board
- Fuses, cables, and other parts

Required Documents

Other TLA 700 manuals may be required to help you isolate faults; other manuals and other sections in this manual contain instructions you will need to complete repairs after locating a faulty part. See the table that follows.

Manual or Section	Purpose
TLA 700 Series Performance Verification and Adjustment Procedures	To check and adjust after circuit board or assembly replacement
TLA 700 Series Installation	To remove and reinstall modules in mainframe; to reinstall Windows95 or TLA 700 Software when required
Removal and Replacement Instructions (in this manual)	To remove and reinstall failed replaceable parts.
Repealable Parts List (in this manual)	To order replaceable parts

For a list of all manuals available for the TLA 700 Series Logic Analyzer family, see see *Related Manuals* on page xi of the *Preface* to this manual.

Check for Common Problems

Use Table 6–2 to quickly isolate possible failures. The table lists problems related to the benchtop chassis and possible causes. The list is not exhaustive, but it may help you eliminate a problem that's quick to fix, such as a blown fuse or loose cable.

Table 6–2: Failure symptoms and possible causes

Symptom	Possible Cause(s)
Mainframe does not power on	■ Power connection faulty; check or substitute power cord ■ Fuse blown; check line fuse ■ Mainframe power supply failure; contact local Tektronix service center
Front-panel power switch light comes on (mainframe powers up), but the blower will not operate	■ Faulty blower cable ■ Defective blower ■ Faulty power supply
Monitor does not power on	■ Power connection faulty; check or substitute cord ■ Fuse blown; check line fuse ■ Monitor power supply failure; contact local Tektronix service center
Monitor display is blank	■ Adjust monitor controls for brightness and contrast ■ VGA cable connection faulty; check or substitute VGA cable ■ Monitor failure; contact local Tektronix service center
Mainframe does not boot	■ Non-system diskette or floppy in external drive; make sure computer is booting from hard drive ■ Hard drive failure or corrupted files on hard drive; consult manufacturer or product literature for service information

Table 6–2: Failure symptoms and possible causes (Cont.)

Symptom	Possible Cause(s)
Digitizing Oscilloscope or Logic Analyzer module *and* controller do not power on	■ Modules not fully inserted; make sure front of module is flush with front panel ■ Mainframe not configured properly; consult manufacturer or product literature for information ■ Mainframe power supply failure; contact local Tektronix service center
Controller does not power on	■ Module not fully inserted; make sure front of module is flush with front panel ■ Mainframe not configured properly; consult manufacturer or product literature for information ■ Module failure; contact local Tektronix service center

Eliminate Other Problem Sources

The benchtop chassis is part of the TLA 700 Series Logic Analyzer, which comprises modules installed in one of two mainframes (in this case, the TLA 711 Benchtop Chassis). If power-on diagnostics indicate that a TLA Controller, LA or DSO module test failed, troubleshoot the module using the TLA service manual for that module.

Troubleshoot the Benchtop Chassis

Follow the procedure in this section to identify the failed part within the benchtop chassis.

Equipment Required

The following test equipment is recommended to perform these procedures.

- Digital Voltmeter (Tektronix DM250 series digital voltmeter)
- Oscilloscope, 20 MHz BW, with 10x Probe with < 1-inch ground lead, (Tektronix TDS400A or TDS500A series oscilloscope)

Preparation

The fault isolation procedure requires that you:

- recognize if the front-panel Standby/On button lights up.
- recognize if the blower operates.
- measure voltages.

Front-Panel Standby/On button. The Standby/On switch in the upper-right of the front panel should light up when pressed. The blower in the rear should power on.

Self Calibration. The Benchtop Chassis does not include self calibration.

Power On Diagnostics. The Benchtop Chassis does not include power on diagnostics.

Extended Diagnostics. The Benchtop Chassis does not include extended diagnostics.

Fault Isolation Procedure

This section contains a troubleshooting chart on page 6–27 that will help you locate faulty benchtop chassis replaceable parts:

To begin the procedure, simply turn on the chassis.

NOTE. *Before replacing circuit boards, be sure to inspect all associated cables and connectors for damage and proper installation.*

If needed, use the *Removal and Installation Procedures* that begin on page 6–5 to replace the faulty circuit board.

Troubleshooting Procedure

This section contains a troubleshooting chart (see Figure 6–13) that will help you locate faults within the chassis.

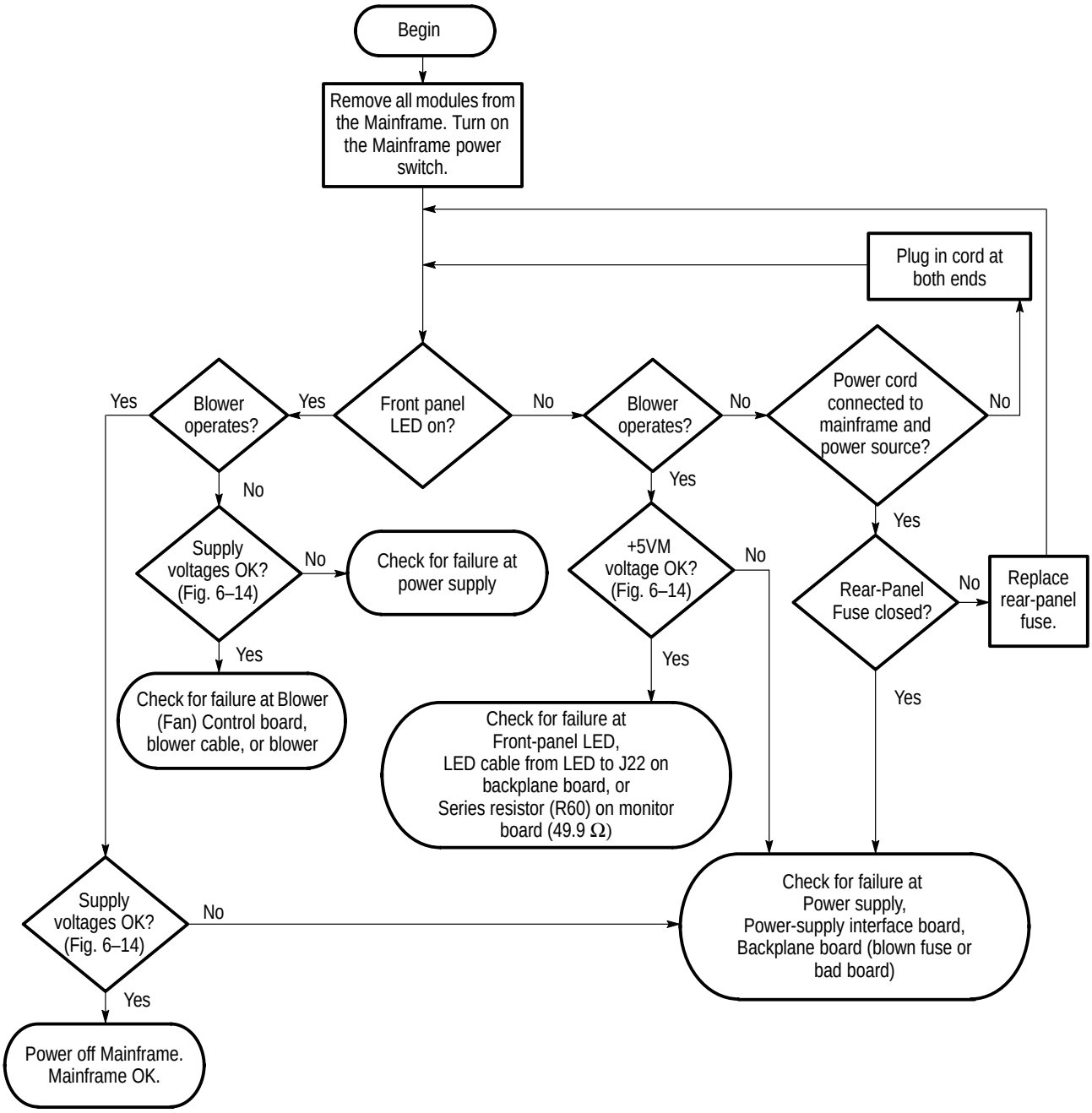


Figure 6–13: Primary troubleshooting procedure

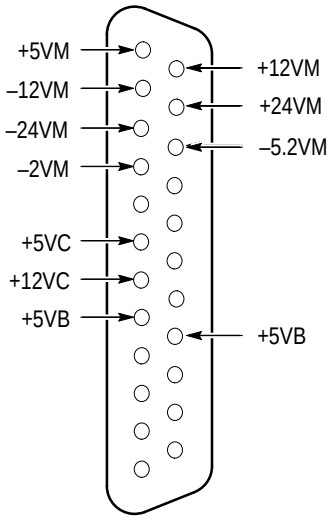


Figure 6–14: Rear-panel connector diagram

To begin the procedure, perform the following steps:

1. Use the *Primary Troubleshooting Procedure* chart on page 6–27 to determine how to proceed.

NOTE. *Before replacing circuit boards, be sure to inspect all associated cables and connectors for damage and proper installation.*

---

2. If needed, use the *Removal and Installation Procedures* that begin on page 6–5 to replace the faulty replaceable part.

Diagnostic Tests Table

The Benchtop Chassis does not include diagnostic tests.

Overview of Procedures

Table 6–3 provides a brief overview of the troubleshooting and verification procedures.

Table 6–3: Troubleshooting overview

Procedure	Recommended interval	Purpose	Documented
Incoming test	When you initially receive the unit and open the packing box	Verifies unit is not dead on arrival	*TLA 700 Series Performance Verification and Adjustment Technical Reference Manual*
Performance verification	After board replacement	Verifies advertised performance specifications	*TLA 700 Series Performance Verification and Adjustment Technical Reference Manual*
Troubleshooting	When unit fails to work correctly		*Troubleshoot the Benchtop Chassis*, page 6–25

Adjustment After Repair

The benchtop chassis requires no adjustments.

Repackaging Instructions

This section contains the information needed to repackage the benchtop chassis for shipment or storage.

Packaging

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.

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

- The owner's address
- Name and phone number of a contact person
- Type and serial number of the instrument
- Reason for returning
- A complete description of the service required

Seal the shipping carton with an industrial stapler or strapping tape.

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

Storage

The benchtop chassis should be stored 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 40,000 feet (12,190 meters)

See Table 1–5 on page 1–7 for a complete listing of the environmental characteristics.

Options

This chapter lists the advertised options for the TLA 711 Benchtop Chassis. Refer to the *Replaceable Mechanical Parts* chapter for a list of standard and optional accessories for the chassis.

***NOTE**. Service options are listed on the Tektronix Service Options page that precedes the Table of Contents in this manual.*

Tektronix will ship the options shown in Table 7–1:

Table 7–1: Options

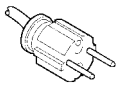
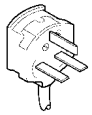
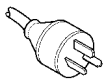
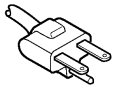
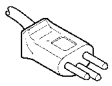
	Option #	Label	Description
	A1	Universal European power cord	220 V, 50 Hz, 16A power cord Delete standard power cord
	A2	UK power cord	240 V, 50 Hz, 13A power cord Delete standard power cord
	A3	Australian power cord	240 V, 50 Hz, 10A power cord Delete standard power cord
	A4	North American power cord	240 V, 60 Hz, 15A power cord Delete standard power cord
	A5	Switzerland power cord	220 V, 50 Hz, 10A power cord Delete standard power cord
	1S	Sub MF Kit	32 MB DRAM/2.16 GB Hard Disk Upgrade Delete: Controller w/16 MB DRAM/840 MB HD Add: Controller w/32 MB DRAM/2.16 GB HD Note: All current TLA 700 Series SW installed on HD (Windows 95 SW, QA Plus SW, and TLA 700 Applications SW; Windows 95 manuals also included)
	1A	Add LAN PC Card	10BaseT and 10Base2 Add: LAN Package

Table 7–1: Options (Cont.)

	Option #	Label	Description
	1M	Add 17 inch Monitor	Add: 17” color monitor (includes 5’ monitor cable) Same 15A power cord ordered with TLA 711
	2M	Add 21 inch Monitor	Add: 21” color monitor (includes 5’ monitor cable) Same 15A power cord ordered w/TLA 711
	1K	Add LACART	Add LACART
	95	Add Cal Report	Add: Cal (Test Data) Report

Electrical Parts List

Refer to the *Mechanical Parts List* chapter for a complete listing and description of replaceable parts for the TLA711 Benchtop Chassis.

Diagrams

This chapter contains the block diagram and the interconnection diagram for the benchtop chassis.

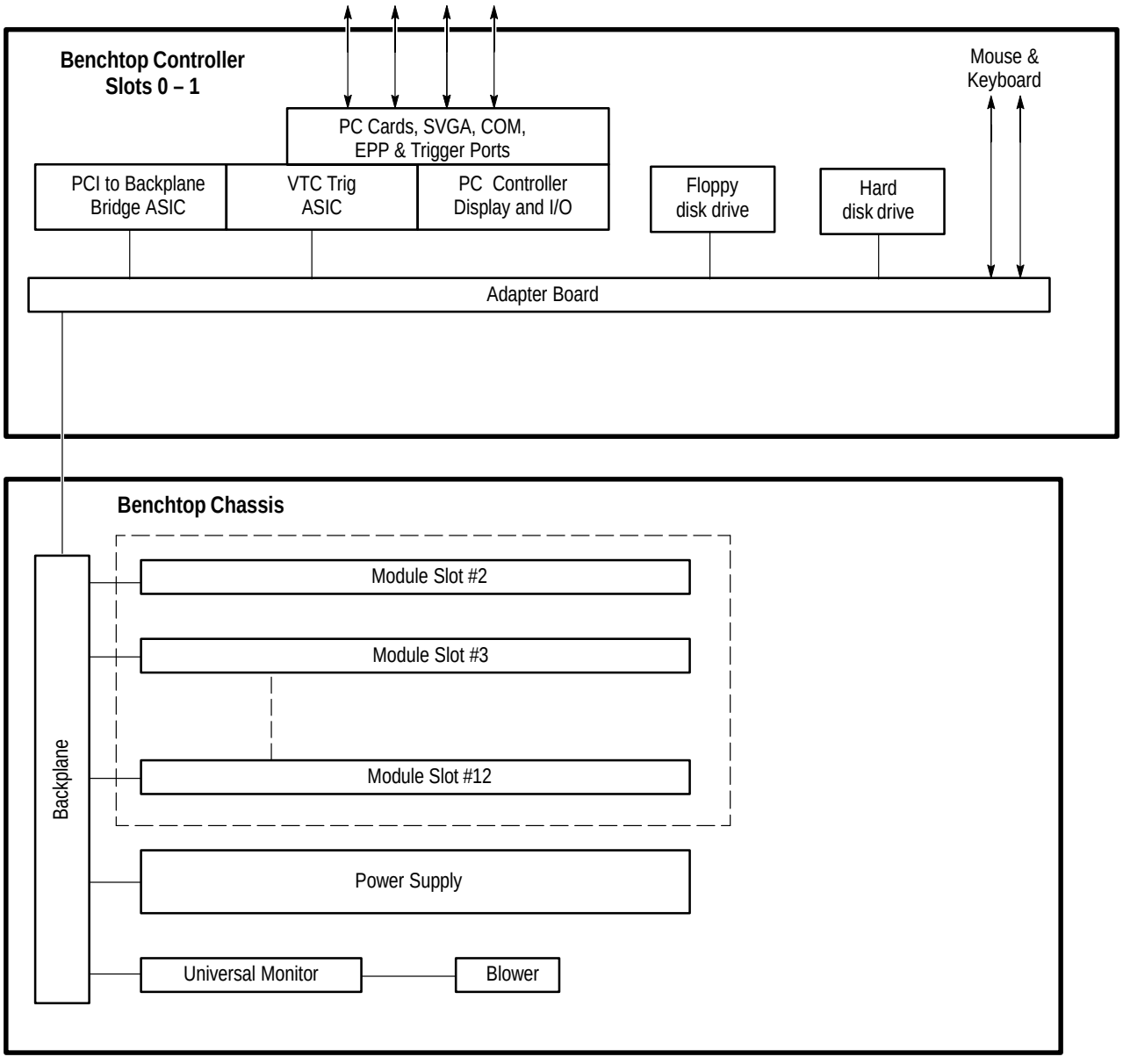


Figure 9–1: Interconnections

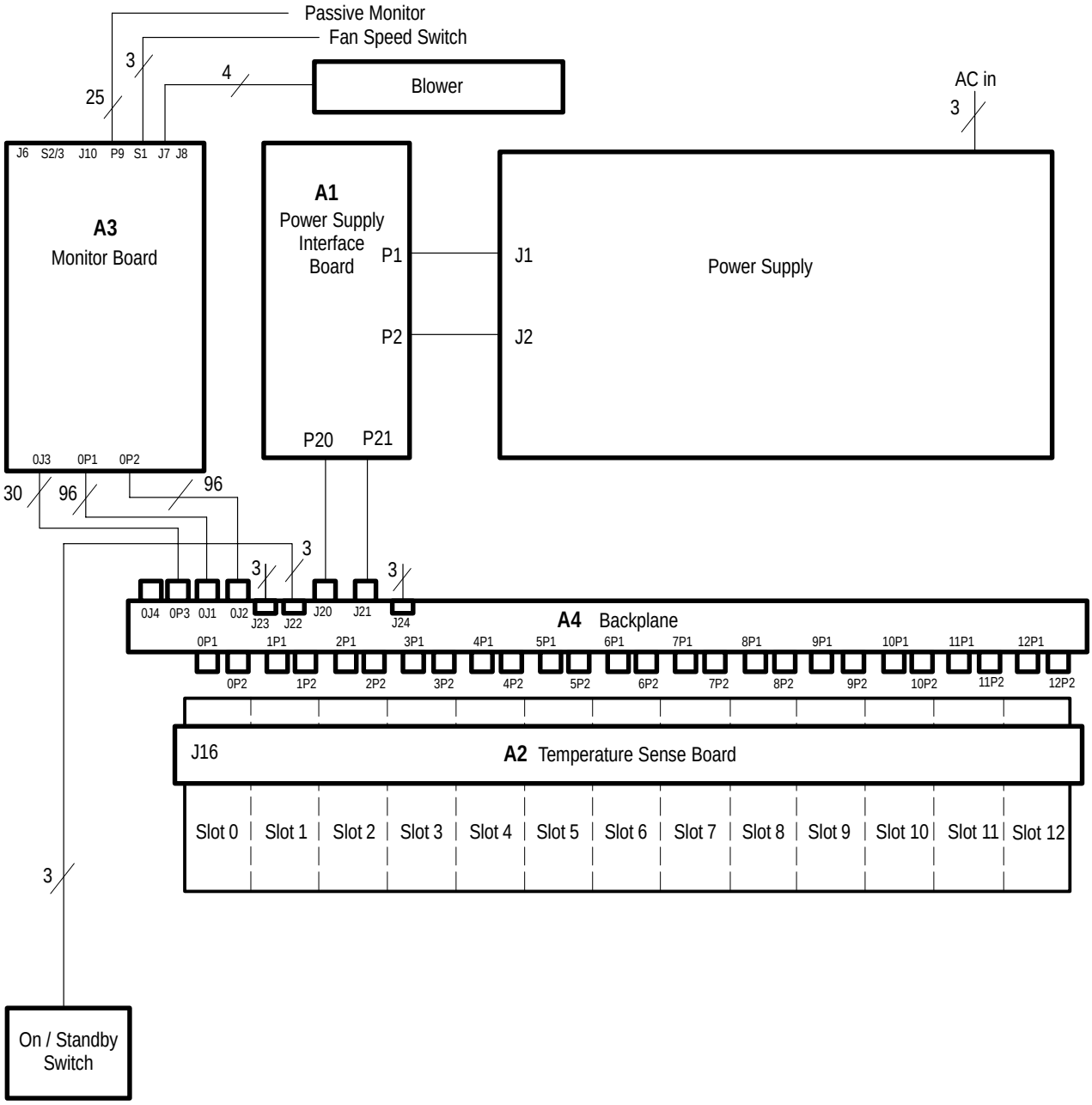


Figure 9–2: Chassis block diagram

Mechanical Parts List

This chapter contains a list of standard accessories, optional accessories, and replaceable parts for the Benchtop Chassis. Use this information to identify and order accessories and replacement parts.

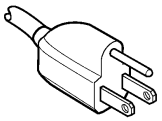
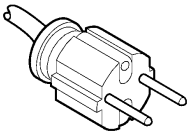
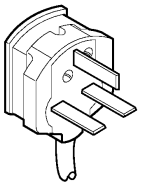
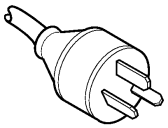
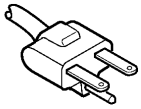
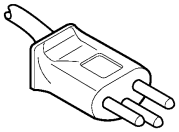
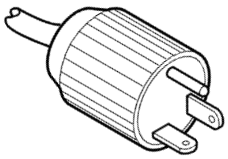
Standard Accessories

The Benchtop Chassis comes standard with the accessories listed in Table 10–1.

Table 10–1: Standard accessories

Accessory	Part Number
102-key Win95 Keyboard (US), PS2 mini DIN	119-5193-00
Tek Mouse, 3-button, PS2 mini-DIN	119-4330-02
Dual-wide Slot Panel Fillers (5)	333-4206-00
Single-wide Slot Panel Filler	333-4205-00
SMB-to-BNC cable (2)	P6041
Female-to-Female BNC	103-0028-00
Printer Adapter Cable, 3 feet	012-1512-00
Windows 95 Package (SW & Manual)	Not orderable from Tektronix
QA Plus SW	063-2506-00
TLA 700 Application SW	063-1967-00
Jumper with pull-tab (used for flashing module FW) (5)	131-4356-00
TLA 700 User Manual	070-9775-00
TLA 700 Installation Manual	070-9774-00
Certificate of Traceable Calibration	
Power Cord, North American, Straight (15 A)	161-0213-00
Power Cord, North American, Straight (20 A)	161-0218-00
Fuse, 6.3A	159-0381-00
Fuse, 20A	159-0379-00
Power Cord, North American, Straight (for optional monitor)	161-0066-00
TLA 711 Shipping List	

Table 10–2: Power cord identification

Plug configuration	Normal usage	Option number
	North America 125 V/15A Plug NEMA 5-15P	Standard
	Europe 230 V	A1
	United Kingdom 230 V	A2
	Australia 230 V	A3
	North America 230 V	A4
	Switzerland 230 V	A5
	North American 125V/20A Plug NEMA 5-20P	1A

Optional Accessories

You can also order the optional accessories listed in Table 10–3.

Table 10–3: Optional accessories

Accessory	Part Number
RS-232 Serial Interface Cable	012-1241-00
TLA 711 Benchtop Mainframe Rackmount Kit	020-2197-00
Option A1 Power cords for the external supply	161-0209-00 161-0066-09
Option A2 Power cords for the external supply	161-0210-00 161-0066-10
Option A3 Power cords for the external supply	161-0211-00 161-0066-11
Option A4 Power cords for the external supply	161-0208-00 161-0066-12
Option A5 Power cords for the external supply	161-0212-00 161-0154-00

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.

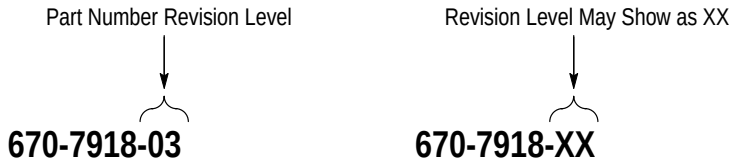
- Part number (see Part Number Revision Level below)
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

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.

Change information, if any, is located at the rear of this manual.

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.



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.

Module Servicing

Modules can be serviced by selecting one of the following options. Contact your local Tektronix service center or representative for repair assistance.

Module Repair and Return. You may ship your module to us for repair, after which we will return it to you.

New Modules. You may purchase replacement modules in the same way as other replacement parts.

Common Replaceable Parts

Table 10–4 provides a quick reference list of parts that you are most likely to replace. For more detailed information refer to the individual parts lists in this chapter.

Table 10–4: Common replaceable parts

Name	Description	Tektronix Part Number
Fuse	Fuse, cartridge:20A,250V,5 Sec Min @ 200%,0.25 X 1.25,US REC:326020	159-0379-00
Fuse	Fuse, cartridge:5MM X 20MM,250V,6.3A,High Breaking capacity,ceramic;VDE	159-0381-00
Bottom Card Guide with Shutters	Baffle,VXI Slot:0.040 AL,Formed Sheet Metal with Perforations	378-2074-XX
Card Guide	Guide:Plastic Guide,ECB,VXI Molded Ckt Bd Guide, VXI Form Factor,VXI410	351-0962-XX
Blower (fan)	FAN, DC:BLOWER,48V,DUAL INLET, 450 CFM,177 W,60 DBA,W/PROGRAMMABLE TACHOMETER OUT,7.0” L,	119–5199–00

Using the Replaceable Parts List

The rest of this chapter contain lists of the replaceable mechanical and/or electrical components of the Benchtop Chassis. Use these lists to identify and order replacement parts. The following table describes each column in the lists.

Table 10–5: Parts lists 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.
7	Mfr. Code	Manufacturer code.
8	Mfr. Part Number	Manufacturer's or vendor's part number.

Abbreviations

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

Mfr. Code to Manufacturer Cross Index

The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

Manufacturers cross index

Mfr. Code	Manufacturer	Address	City, State, Zip Code
06383	PANDUIT CORP	17303 RIDGELAND AVE	TINLEY PARK, IL 60477–3048
0B445	ELECTRI–CORD MFG CO INC	312 EAST MAIN STREET	WESTFIELD, PA 16950
0J9P4	DELTA ENGINEERING & MFG. CO.	19500 SW TETON	TUALATIN, OR 97062
0KB01	STAUFFER SUPPLY CO	810 SE SHERMAN	PORTLAND, OR 97214–4657
0KB05	NORTH STAR NAMEPLATE INC	5750 NE MOORE COURT	HILLSBORO, OR 97124–6474
0L0L7	RADISYS CORPORATION	5445 NE DAWSON CREEK DRIVE	HILLSBORO, OR 97124
0VF15	TOTAL TECHNOLOGIES LTD	2110 S ANNE ST	SANTA ANNA, CA 92704
0ZQ35	3COM CORPORATION .	5353 BETSY ROSS DRIVE	SANTA CLARA, CA 95052–8145
1GM54	ZYTEC CORP	7575 MARKET PLACE DR	EDEN PRAIRIE, MN 55344
24931	BERG ELECTRONICS INC	BERG ELECTRONICS RF/COAXIAL DIV 2100 EARLYWOOD DR PO BOX 547	FRANKLIN, IN 46131
26742	METHODE ELECTRONICS INC	BACKPLAIN DIVISION 7444 WEST WILSON AVE	CHICAGO, IL 60656–4548
2W733	BELDEN WIRE & CABLE COMPANY	2200 US HWY 27 SOUTH PO BOX 1980	RICHMOND, IN 47374
2W944	PAPST MECHATRONIC CORP	AQUIDNECK INDUSTRIAL PARK	NEWPORT, RI 02840
51506	ACCURATE SCREW MACHINE CO	19 BALTIMORE ST	NUTLEY, NJ 07110–1303
52152	3M COMPANY	INDUSTRIAL TAPE DIVISION 3M CENTER	ST PAUL, MN 55144–1000
5F520	PANEL COMPONENTS CORP	PO BOX 115	OSKALOOSA, IA 52577–0115
60128	MICROSOFT CORPORATION	ONE MICROSOFT WAY DEPARTMENT 101	REDMOND, WA 98052–8300
61081	ELECTRONIC SOLUTIONS	6790 FLANDERS DR	SAN DIEGO, CA 92121
63426	NKK SWITCH	NIHON KAIHEIKA IND CO LTD 7850 E GELDING DRIVE	SCOTTSDALE, AZ 85260
71400	BUSSMANN	DIVISION COOPER INDUSTRIES INC PO BOX 14460	ST LOUIS, MO 63178
75915	LITTELFUSE INC	800 E NORTHWEST HWY	DES PLAINES, IL 60016–3049
7X318	KASO PLASTICS INC	11013 A NE 39TH	VANCOUVER, WA 98662
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077–0001
80126	PACIFIC ELECTRICORD CO	747 WEST REDONDO BEACH PO BOX 10	GARDENA, CA 90247–4203
8X345	NORTHWEST SPRING MFG CO	5858 WILLOW LANE	LAKE OSWEGO, OR 97035
S3109	FELLER U.S. CORPORATION	72 VERONICA AVE UNIT #4	SOMERSET, NJ 08873
TK2208	NORTHWEST RUBBER EXTRUDERS INC	16748 SW 72ND AVE	PORTLAND, OR 97224
TK2469	UNITREK CORPORATION	3000 LEWIS & CLARK HWY SUITE 2	VANCOUVER, WA 98661
TK2541	AMERICOR ELECTRONICS LTD	UNIT–H 2682 W COYLE AVE	ELK GROVE VILLAGE, IL 60007

Replaceable parts list

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
					CABINET AND CHASSIS ASSEMBLY		
10-1–1	212–0193–00			12	SCREW,EXT RLV:8–32 X 0.375 BUTTON HEAD,HEX DRIVE,STAINLESS STEEL,BLACK OXIDE FINISH,0.093 DRIV	0KB01	212–0193–00
–2	200–4313–00			1	COVER:MAINFRAME COVER,0.050 ALUM,16.72 X 13.18 X 18.48,PAINTED SILVER GRAY,APOLLO	80009	200–4313–00
-3	441–2107–00			1	CHASSIS:MAINFRAME CHASSIS ASSY,SHEET METAL,PAINTED SILVER GRAY,APOLLO	80009	441–2107–00
-4	426–2537–00			2	RAIL,FOOT:FOOT RAIL CHASSIS,ALUM SHEET METAL,TV GRAY,APOLLO	80009	426–2537–00
-5	348–0001–00			4	FOOT,CABINET:BLACK RUBBER	TK2208	ORDER BY DESCRIPTION
–6	212–0193–00			4	SCREW,EXT RLV:8–32 X 0.375 BUTTON HEAD,HEX DRIVE,STAINLESS STEEL,BLACK OXIDE FINISH,0.093 DRIV	0KB01	212–0193–00
-7	212–0158–00			8	SCREW,MACHINE:8–32 X 0.375,PNH,STL,CDPL,T–20 TORX DR	0KB01	ORDER BY DESCRIPTION

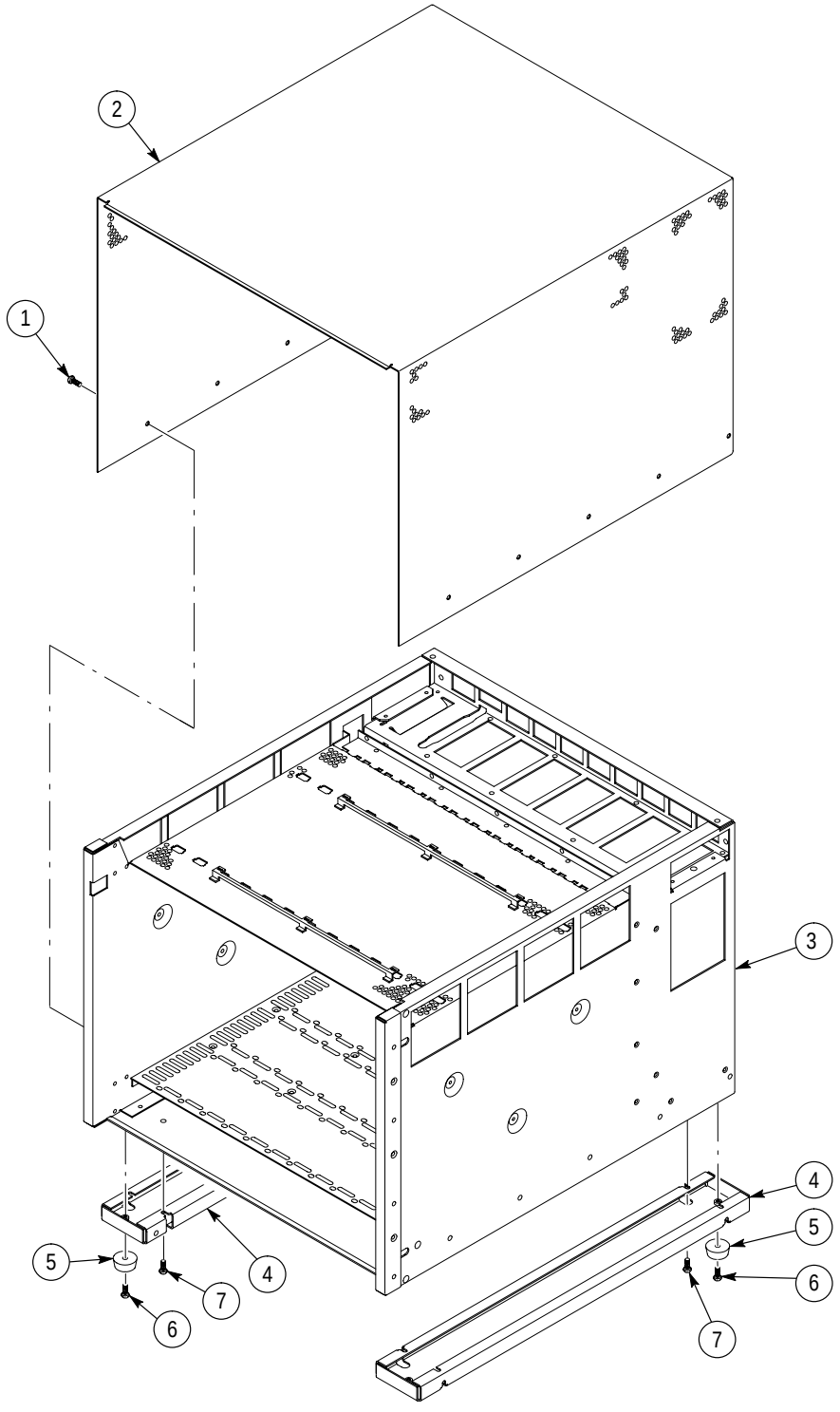


Figure 10–1: Cabinet and chassis assembly

Replaceable parts list

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
					CIRCUIT BOARDS AND CHASSIS PARTS		
10-2-1	260–2618–00			1	SWITCH,PUSH:SPST,MOM,GOLD OVER NICKEL CONTACTS,0.4V AT 28V,ILLUM BUTTON,PANEL MNT W/C	63426	YB15KKG01–04F–J B
–2	343–0549–00			2	STRAP,TIEDOWN,E:0.098 W X 4.0 L,ZYTEL	06383	PLT1M
–3	334–9267–00			1	MARKER,IDENT:FRONT TOP PRODUCT ID LABEL, 1.0 X 15.6, 0.010 LEXAN,3 COLOR,BACKGROUND SILVER GR	80009	334–9267–00
–4	251–1905–00			1	EXTRUSION:UPPER,CUT EXTRUSION,15.6 LONG, PAINTED SILVER GRAY	80009	251–1905–00
–5	343–0775–00			2	CABLE,CLAMP:RIBBON,1.0 X 1.0,GRAY,POLYVINYL,W/URETHANE FOAM TAPE BACKING	52152	80610029243/3484–1000
–6	174–3424–00			1	CA ASSY,SP:RIBBON,IDC,34,28 AWG,SPLIT&FOLDED,2X10,RCPT,0.1CTR	TK2469	174–3424–00
–7	671–3219–00			1	CIRCUIT BD ASSY:TEMP SENSE,389–1876–XX WIRED,TESTED	80009	671–3219–00
–8	211–0720–00			17	SCR,ASSEM WSHR:6–32 X 0.500,PNH,STL,CDPL,T–15 TORX DR,MACHINE	0KB01	ORDER BY DESCRIPTION
–9	118–9449–00			1	CIRCUIT BD ASSY:BACKPLANE BOARD,13–SLOT,C–SIZE WITH ELECTRONIC AUTOMATIC BUS GRANT SENSING/GROUN	61081	V1213J1J2X–7059
–10	020-2194--00			1	COMPONENT KIT:BACKPLANE,EMI SHIELD KIT CONTAINS DIN SHIELD & SCREWS,TLA704,TLA711	80009	020–2194–00
–11	213–0882–00			12	SCREW,TPG,TR:6–233 X 0.437,PNH,STL,CDPL,TYPE TT,T–15,TORX DR	0KB01	ORDER BY DESC
–12	220–0199–01			2	NUT BAR:VME/VXI NUTBAR,M2.5 THREADS,CUT TO 15.97LONG	80009	220–0199–01
–13	251–1906–00			1	EXTRUSION:LOWER,CUT EXTRUSION 15.6 LONG, PAINTED SILVER GRAY	80009	251–1906–00
–14	334–9266–00			1	MARKER,IDENT:FRONT BOTTOM SLOT LABEL,0.010 LEXAN,1.00 X 15.60, 3 COLOR,BACKGROUND SILVER GRAY	80009	334–9266–00
–15	378–2074–01			13	BAFFLE ASSEMBLY:VXI SLOT,0.040 AL,FORMED SHEET METAL W/PERFORATIONS,PLASTIC,& SPRING,	80009	378–2074–01
	214–4754–00			1	SPRING:SPRING,0.025 SST,SUBPART OF 378–2074–01 ASSY:VX1410	80009	214–4754–00
	337–3884–00			1	SHIELD,BAFFLE:SHUTTER,0.040 AL ALLOY,SUBPART OF 378–2074–01 ASSY,VX1410	80009	337–3884–00
	351–0962–00			1	GUIDE:PLASTIC GUIDE,ECB,VXI MOLDED CKT BD GUIDE,VXI FORM FACTOR,VXI410,SAFETY	7X318	351–0962–00
–16	351–0962–00			13	GUIDE:PLASTIC GUIDE,ECB,VXI MOLDED CKT BD GUIDE,VXI FORM FACTOR,VXI410,SAFETY	7X318	351–0962–00
–17	333–4206–00			5	PANEL,FRONT:FRONT PANEL,BLANK,DOUBLE WIDE,EMI,ALUM, SILVER GRAY	80009	333–4206–00
–18	333–4205–00			1	PANEL,FRONT:FRONT PANEL,BLANK VXI,SINGLE,ALUM,EMI, SILVER GRAY,APOLLO	80009	333–4205–00
–19	334–9326–00			1	MARKER,IDENT:LABEL,MICROSOFT WINDOWS 95,TLA704	60128	334–9326–00

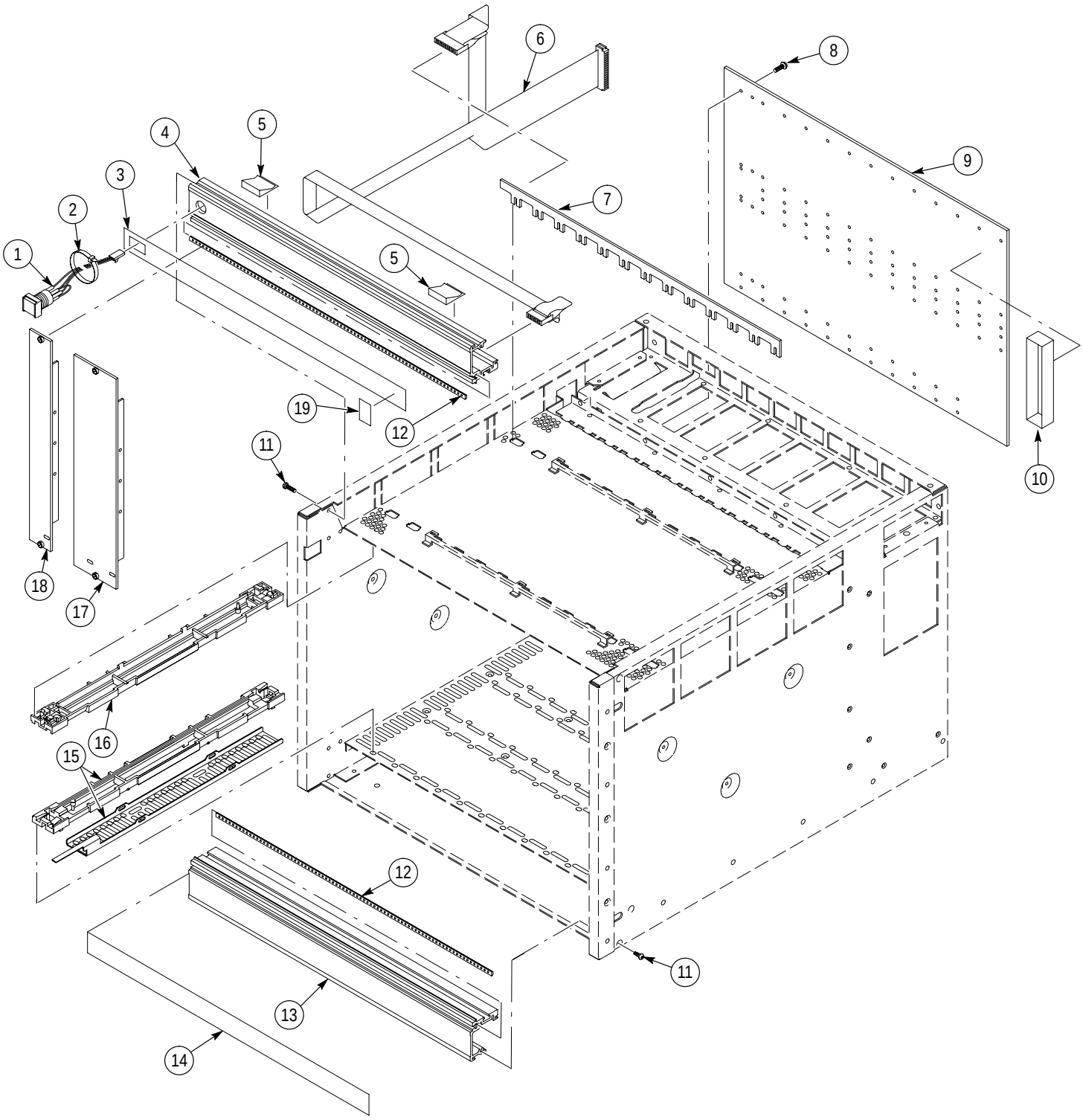


Figure 10–2: Circuit boards and chassis parts

Replaceable parts list

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
					POWER SUPPLY AND BLOWER ASSEMBLY		
10-3-1	671–3984–00			1	CKT BD ASSY:STANDARD MONITOR, 389– –00 WIRED	80009	671–3984–00
–2	211–0501–00			2	SCREW,MACHINE:6–32 X 0.125,PNH,STL CD PL,POZ	0KB01	211–0501–00
–3	337–4053–01			1	SHIELD,EMI:EMI SHIELD,OUTPUT CONNECTORS ON ENHANCED MONITOR BOARD,0.010 SST,VX1410	0J9P4	337–4053–01
–4	343–0549–00			1	STRAP,TIEDOWN,E:0.098 W X 4.0 L,ZYTEL	06383	PLT1M
–5	407–4331–00			1	BRACKET:0.062 ALUM SHEET,MOUNTS MONITOR ECB,VXI410	0J9P4	407–4331–00
–6	214–3903–01			2	SCREW,JACK:4–40 X 0.312 EXT THD,4–40 INT THD,0.188 HEX,STEEL,CADPLATE	0KB01	214–3903–01
–7	Not field replaceable			1	CKT BD:STANDARD MONITOR, 389– –00 WIRED	80009	
–8	211–0747–00			4	SCREW,MACHINE:6–32 X 0.188,PNH,STL,CDPL,T–15 TORX DR	0KB01	ORDER BY DESCRIPTION
–9	671–3216–01			1	CIRCUIT BD ASSY:POWER SUPPLY INTERFACE,TESTED,389–1879–01,VX1410	80009	671–3216–01
–10	200–4207–00			1	COVER:0.050 AL,COVER,ECB,PWR SPLY I/F,SHEET METAL,MOUNT PWR SPLY I/F ECB TO PWR SPLY,V	80009	200–4207–00
–11	212–0158–00			10	SCREW,MACHINE:8–32 X 0.375,PNH,STL,CDPL,T–20 TORX DR	0KB01	ORDER BY DESCRIPTION
–12	Not field replaceable			1	CIRCUIT BD:POWER SUPPLY INTERFACE,TESTED,389–1879–01,VX1410	80009	
–13	211–0846–00			4	SCREW:SCREW,SHLDR,6–32 X 0.156,HEX SOCKET SHOULDER SCREW,0.156 DIA X 0.125 SHANK	51506	67515–S–12–VT
–14	119–4783–03			1	POWER SUPPLY:VXI MAINFRAME POWER SUPPLY,	1GM54	22923000
–15	367–0466–00			1	HANDLE:WIREFORM,0.125 SST,ELECTRO POLISH,1 X 2 INCH,VX1410	8X345	367–0466–00
–16	334–9268–00			1	MARKER,IDENT:REAR I/O LABEL,0.010 LEXAN,1.500 X 9.515,BACKGROUND COLOR TV GRAY,APOLLO,SAFETY	80009	334–9268–00
–17	212–0400–00			4	SCREW,8-32x.250,PNH,STL,T-20		212–0400–00
–18	119–5199–00			1	FAN, DC:BLOWER,48V,DUAL INLET,656 CFM,177 W,60 DBA,W/PROGRAMMABLE TACHOMETER OUT,7.0" L,	2W944	D1G133–AB11–08A
–19	380–1109–00			1	HOUSING,FAN:FAN HOUSING ASSY,SHEET METAL,PAINTED TV GRAY,APOLLO	80009	380–1109–00
–20	Not field replaceable			1	MARKER,IDENT:REAR POWER RATING LABEL,0.010 LEXAN,1.500 X 7.500,BACKGROUND COLOR TV GRAY,APOLL		

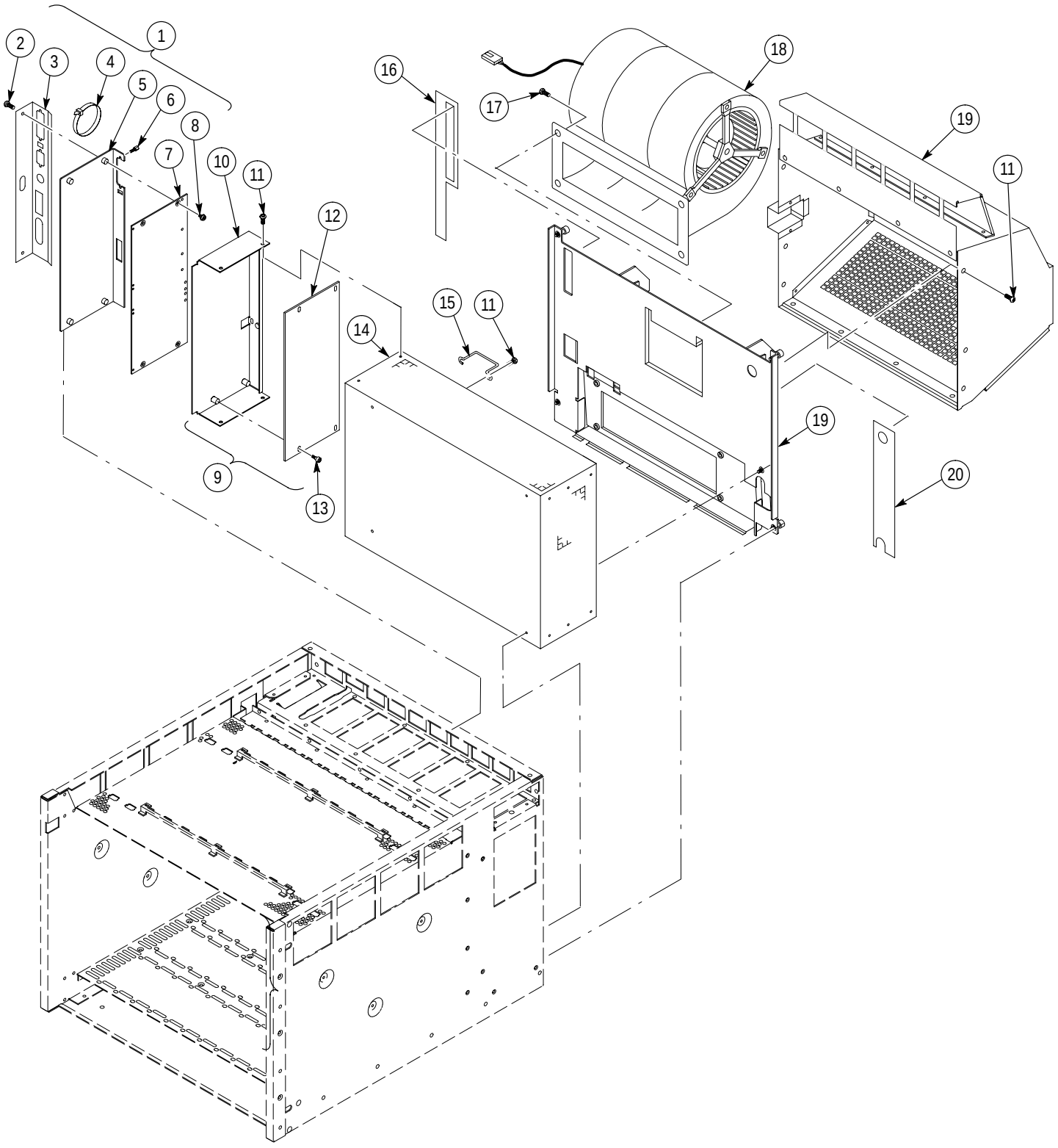


Figure 10–3: Power supply and blower assembly

Replaceable parts list

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
					1R RACKMOUNT ASSEMBLY		
10-4-0	020–2197–00			1	COMPONENT KIT:RACKMOUNT KIT, SILVER GRAY, TLA711	80009	020–2197–00
–1	950–0991–00			2	HANDLE ALUMINUM BLK	80009	950099100
–2	212–0157–00			14	SCREW,MACHINE:8–32 X 0.5,FLH,100 DEG,STL CDPL,TORX	0KB01	ORDER BY DESC
–3	407–4481–00			2	BRACKET:RACKMOUNT BRACKET,0.125 CRS,1010.1018 ALLOY,EG COATED,SILVER GRAY,TLA711	0J9P4	OBD
–4	212–0671–00			4	SCREW,MACHINE:10–32 X 0.625,FLH,100 DEG,STL,CD PL, TORX	0KB01	ORDER BY DESC
–5	351–0800–00			1	GUIDE,SLIDE:CHASSIS TRACK,, (PAIR)	06666	CTS–124
	070–9839–00			1	TLA 711 BENCHTOP MAINFRAME RACKMOUNT INSTALLATION INSTRUCTIONS	80009	070-9839-00

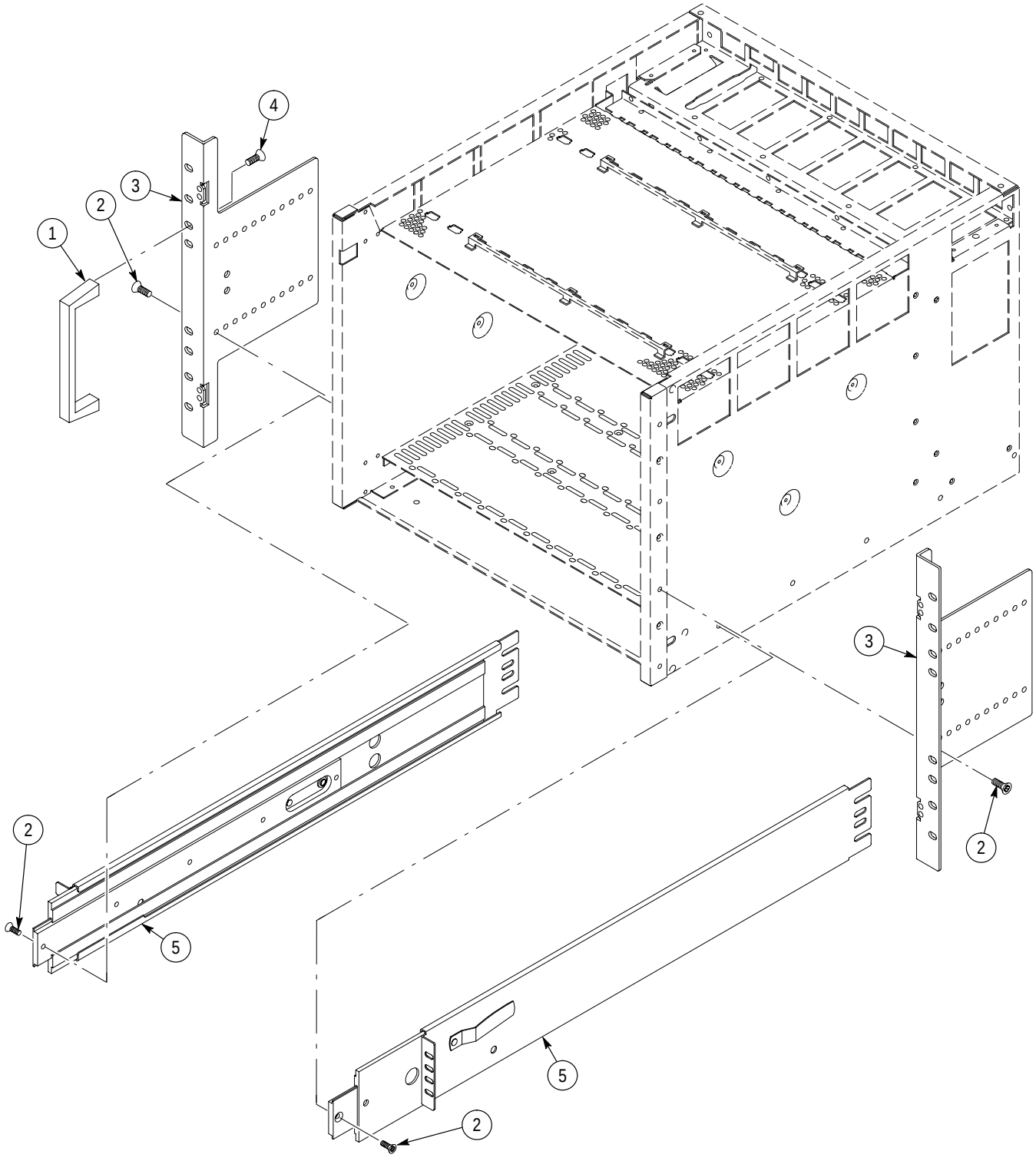


Figure 10–4: 1R rackmount assembly

Replaceable parts list

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
					STANDARD ACCESSORIES		
	161–0213–00			1	CABLE ASSY,PWR:3,16 AWG,2.5 METER,SJT,GREY,105 DEG C,MCA–3T X BME–3S,13A/250V,NORTH AMERICAN,	0B445	161–0213–00
	161–0218–00			1	CABLE ASSY,PWR:3,14 AWG,100 L,SJT,BLK,60 DEG C,5–20P X BME–3S,15A/125V,	0B445	161–0218–00
	063–1967–00			1	SOFTWARE PKG:APOLLO SYSTEM SOFTWARE,3.5 FLOPPY(1.44MEG)	80009	063–1967–00
	012–1512–00			1	CABLE,INTCON:SHLD CMPST,IEEE1284,CRC,25,28 AWG,17 TWPR,1 METER, 25 POS,FEMALE DSUB DB25F X 36	0VF15	012–1512–00
	063–2506–00			1	SOFTWARE PKG:QA PLUS, 3.5" FLOPPIES	80009	063–2506–00
	070–9774–00			1	MANUAL,TECH:INSTALLATION,TLA700 SERIES,DP	80009	070–9774–00
	070–9775–00			1	MANUAL,TECH:USERS,TLA700 SERIES,DP	80009	070–9775–00
	119–4330–02			1	TEK MOUSE, 3-BUTTON, PS2 MINI–DIN		
	119–5193–00			1	KEYBOARD,ASSY:WINDOWS 95 SOLUTION KEYBOARD WITH 4–PIN MINI DIN CONNECTOR	80009	119–5193–00
	159–0379–00			1	FUSE,CARTRIDGE:20A,250V,5 SEC MIN @ 200%,0.25 X 1.25,UL REC,326020,	75915	326 020
	159–0381–00			1	FUSE,CARTRIDGE:5 X 20 MM,6.3A,250V,FAST BLOW,HIGH BREAKING CAPACITY,UL REC,SEMKO,	71400	GDA–6.3
	016–1524–00			1			
	P6041			2	SMB–to–BNC cable	80009	P6041

Replaceable parts list (Cont.)

Fig. & Index Number	Tektronix Part Number	Serial No. Effective	Serial No. Discont'd	Qty	Name & Description	Mfr. Code	Mfr. Part Number
					OPTIONAL ACCESSORIES		
	161–0066–09			1	CA ASSY,PWR:3,0.75MM SQ,250V/10A,99 INCH,STR,IEC320,RCPT,EUROPEAN,SAFTEY CONTROLLED,	2W733	ORDER BY DESCRIPTION
	161–0066–10			1	CA ASSY,PWR:3,1.0 MM SQ,250V/10A,2.5 METER,STR,IEC320,RCPT X 13A,FUSED UK PLUG(13A FUSE),UNI	TK2541	ORDER BY DESCRIPTION
	161–0066–11			1	CA ASSY,PWR:3,1.0MM SQ,250V/10A,2.5 METER,STR,IEC320,RCPT,AUSTRALIA,SAFTEY CONTROLLED,	80126	ORDER BY DESCRIPTION
	161–0066–12			1	CA ASSY,PWR:3,18 AWG,250V/10A,98 INCH,STR,IEC320,RCPT X NEMA 6–15P,US,SAFTEY CONTROLLED,	S3109	ORDER BY DESCRIPTION
	161–0154–00			1	CA ASSY,PWR:3,1.0MM SQ,250V/10A,2.5 METER,STR,IEC320,RCPT,SWISS,SAFTEY CONTROLLED,	5F520	86515030
	119–5510–00			1	LAN PC CARD:ETHERNET PCMCIA ADAPTER W/CE MARK, 3COM ETHERLINK III LAN PC CARD, 10 BASE–T & 1	0ZQ35	3C589
	119–5430–00			1	DISPLAY,MONITOR:17 INCH,COLOR,30–86KHZ MULTI SYNC, 0.27MM DOT PITCH,FLAT CRT,PWR SAVING,ON SCREE	80009	119–5430–00
	119–5422–00			1	DISPLAY,MONITOR:21 INCH COLOR MULTI–SYNC MONITOR, 30–95 KHZ,	80009	119–5422–00
	070–9773–XX			1	MANUAL,TECH:SERVICE,TLA711 BENCH TOP CHASSIS,DP	80009	070–9773–XX
	070–9775–XX			1	MANUAL,TECH:USER,TLA 700 SERIES LOGIC ANALYZER ,DP	80009	070–9775–XX
	070–9776–XX			1	MANUAL,TECH:TECHNICAL REFERENCE,TLA700 SERIES PERFORMANCE VERIFICATION AND ADJUSTMENT,DP	80009	070–9776–00
	070–9777–XX			1	MANUAL,TECH:SERVICE,TLA704 PORTABLE MAINFRAME,DP	80009	070–9777–XX
	070–9778–XX			1	MANUAL,TECH:SERVICE,TLA711,BENCHTOP CONTROLLER,DP	80009	070–9778–00
	070–9779–XX			1	MANUAL,TECH:SERVICE,TLA7LX/TLA7MX SERIES LOGIC ANALYZER MODULE,DP	80009	070–9779–XX
	070–9780–XX			1	MANUAL,TECH:SERVICE,TLA7D1,TLA7E1 DIGITIZING OSCILLOSCOPE MODULE,DP	80009	070–9780–XX