DSA8300 Digital Serial Analyzer
80A00, 80C00, 80E00 Sampling Modules

Service Manual

077-0572-01

Tektronix

DSA8300 Digital Serial Analyzer
80A00, 80C00, 80E00 Sampling Modules

Service Manual

Revision A June 2015

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.

www.tektronix.com

077-0572-01

Tektronix

Contacting Tektronix

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

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Important safety information

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

To safely perform service on this product, additional information is provided at the end of this section. (See page vii, *Service safety summary*.)

General safety summary

Use the product only as specified. Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. Carefully read all instructions. Retain these instructions for future reference.

Comply with local and national safety codes.

For correct and safe operation of the product, it is essential that you follow generally accepted safety procedures in addition to the safety precautions specified in this manual.

The product is designed to be used by trained personnel only.

Only qualified personnel who are aware of the hazards involved should remove the cover for repair, maintenance, or adjustment.

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

This product is not intended for detection of hazardous voltages.

Use personal protective equipment to prevent shock and arc blast injury where hazardous live conductors are exposed.

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

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

To avoid fire or personal injury

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

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

Do not use the provided power cord for other products.

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

Power disconnect. The power cord disconnects the product from the power source. See instructions for the location. Do not position the equipment so that it is difficult to disconnect the power cord; it must remain accessible to the user at all times to allow for quick disconnection if needed.

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

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

The measuring terminals on this product are not rated for connection to mains or Category II, III, or IV circuits.

Do not operate without covers. Do not operate this product with covers or panels removed, or with the case open. Hazardous voltage exposure is possible.

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

Do not operate with suspected failures. If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Disable the product if it is damaged. Do not use the product if it is damaged or operates incorrectly. If in doubt about safety of the product, turn it off and disconnect the power cord. Clearly mark the product to prevent its further operation.

Before use, inspect voltage probes, test leads, and accessories for mechanical damage and replace when damaged. Do not use probes or test leads if they are damaged, if there is exposed metal, or if a wear indicator shows.

Examine the exterior of the product before you use it. Look for cracks or missing pieces.

Use only specified replacement parts.

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

Do not operate in wet/damp conditions. Be aware that condensation may occur if a unit is moved from a cold to a warm environment.

Do not operate in an explosive atmosphere.

Keep product surfaces clean and dry. Remove the input signals before you clean the product.

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

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

Provide a safe working environment. Always place the product in a location convenient for viewing the display and indicators.

Avoid improper or prolonged use of keyboards, pointers, and button pads. Improper or prolonged keyboard or pointer use may result in serious injury.

Be sure your work area meets applicable ergonomic standards. Consult with an ergonomics professional to avoid stress injuries.

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

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

Use only the Tektronix rackmount hardware specified for this product.

Service safety summary

The *Service safety summary* section contains additional information required to safely perform service on the product. Only qualified personnel should perform service procedures. Read this *Service safety summary* and the *General safety summary* before performing any service procedures.

To avoid electric shock. Do not touch exposed connections.

Do not service alone. Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect power. To avoid electric shock, switch off the product power and disconnect the power cord from the mains power before removing any covers or panels, or opening the case for servicing.

Use care when servicing with power on. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

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

Terms in this manual

These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

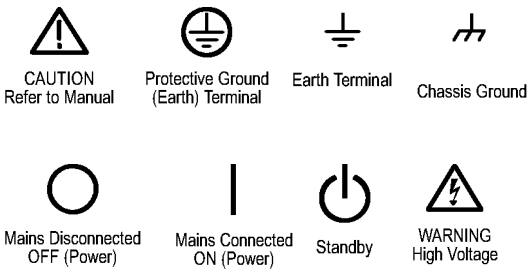
Symbols and terms on the product

These terms may appear on the product:

- DANGER indicates an injury hazard immediately accessible as you read the marking.
- WARNING indicates an injury hazard not immediately accessible as you read the marking.
- CAUTION indicates a hazard to property including the product.

When this symbol is marked on the product, be sure to consult the manual to find out the nature of the potential hazards and any actions which have to be taken to avoid them. (This symbol may also be used to refer the user to ratings in the manual.)

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



Compliance information

See the *DSA8300 Digital Serial Analyzer Quick Start User Manual* for information on instrument compliance.

Environmental considerations

See the *DSA8300 Digital Serial Analyzer Quick Start User Manual* for information on instrument environmental considerations.

Preface

This is the service manual for the DSA8300 Digital Serial Analyzer and the modules that install in the instrument (except for the 80A03 module).

NOTE. *The 80A03 instruction manual contains its own specifications and servicing information.*

Read this preface to learn how this manual is structured, what conventions it uses, and where you can find other information related to servicing this product. Read the *Introduction* following this preface for safety and other important background information needed before servicing this product.

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

Manual conventions

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

Assemblies and modules

This manual uses the term *assembly*. An assembly is a related collection or unit of electrical and mechanical assemblies, circuit cards, interconnecting cables, and a user-accessible front panel. References to an assembly are different than references to a module such as "Sampling modules," "Phase Reference modules," or "Accessory modules," which are products installed in the instrument compartments.

Replaceable parts

This manual refers to any field-replaceable assembly or mechanical part by its name or generically as a replaceable part. In general, a replaceable part is any circuit board or assembly, such as a hard disk drive, or a mechanical part, such as I/O port connectors, that is listed in the replaceable parts list.

Safety

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

Related documentation

Table i: Related documentation

Document [1]	Tektronix part number
DSA8300 Quick Start User manual.	071-2897-XX
DSA8300 Application Help. A help document accessed from the instrument Help menu.	N/A
DSA8300 Programmer Manual. A document accessed from the instrument Help menu.	077-0570-XX
DSA8300 Specifications Technical Reference.. Available for download from the Tektronix Web site.	077-0571-XX
DSA8300 Performance Verification Technical Reference. Available for download from the Tektronix Web site.	077-0682–XX
DSA8300 Service Manual (this document). Available for download from the Tektronix Web site.	077-0572-XX
80C00 and 80E00 Series Optical and Electrical Sampling Modules User manual.	071-3059-XX
80A01 Trigger Prescale Limiting Preamplifier Module User manual.	071-0873-XX
80A02 EOS/ESD Protection Module Instructions.	071-1317-XX
80A03 TekConnect Probe Interface Module Instructions.	071-1298-XX
82A04B Phase Reference Module User manual.	077-3124-XX
Rackmount Kit Instructions.	071-0696-XX

[1] Check the Tektronix Web site (www.tek.com/downloads) for the most current version of these documents.

Operating information

CAUTION. *Keep the bottom of the instrument clear of obstructions to allow proper cooling.*

Windows safe mode

If the instrument is turned off before the operating system boots, or if you have installed a third-party product with a driver that is not compatible with the instrument start-up, Windows 7 prompts you to either start normally or to start in Safe mode. Use a USB or PS/2 keyboard to make the selection.

NOTE. *The touch screen does not operate if you start in Safe mode*

Where to find user information

CAUTION. *Be sure to read all safety information, warnings, and cautions in the user manuals that relate to the information you use there.*

Some topics of interest when servicing the product are listed in the following table. The manuals are available at www.tek.com/downloads.

Location of user topics

Manual	Topic
DSA8300 Quick Start User Manual, Tektronix part number 071-2897-XX	Environmental requirements (site considerations, operating requirements, rackmount requirements)
	Module configuration
	Connecting peripherals such as monitor, printer, keyboard, and mouse
	Powering the instrument on and off
	System hard drive rebuild
	Diagram of rear-panel connectors
80C00 and 80E00 Series Sampling Modules User Manual, Tektronix part number 071-3059-XX	Installing sampling modules, connecting cables, cleaning optical connectors
DSA8300 Specifications Technical Reference, Tektronix part number 077-0571-XX	Instrument and module specifications

Location of user topics

Manual	Topic
DSA8300 Performance Verification Technical Reference, Tektronix part number 077-0682-XX	System and module performance verification procedures
Product software install instructions, Tektronix part number 071-2050-XX Shipped with the product software disc.	System hard drive rebuild procedure
	Software release notes
	Software installation
	Operating system reinstallation

Theory of operation

This chapter describes the electrical operation of the instrument and sampling modules.

The instrument contains many digital logic circuits. This manual refers to these circuits with standard logic symbols and terms. Unless otherwise stated, all logic functions are described using the positive-logic convention: the more positive of the two logic levels is the high (1) state, and the more negative level is the low (0) state. Signal states may also be described as "true", meaning their active state, or "false", meaning their nonactive state. The specific voltages that constitute a high or low state vary among the electronic devices.

The instrument control system is a dual Wintel/PowerPC based processor board. The platform features XGA resolution flat-panel display, transparent touch screen and user front-panel with direct access to commonly used oscilloscope functions. The instrument is also equipped with a mouse and keyboard for access to more advanced functions.

Mainframe overview

This mainframe overview describes the basic operation of each functional circuit block as shown in the following figure:

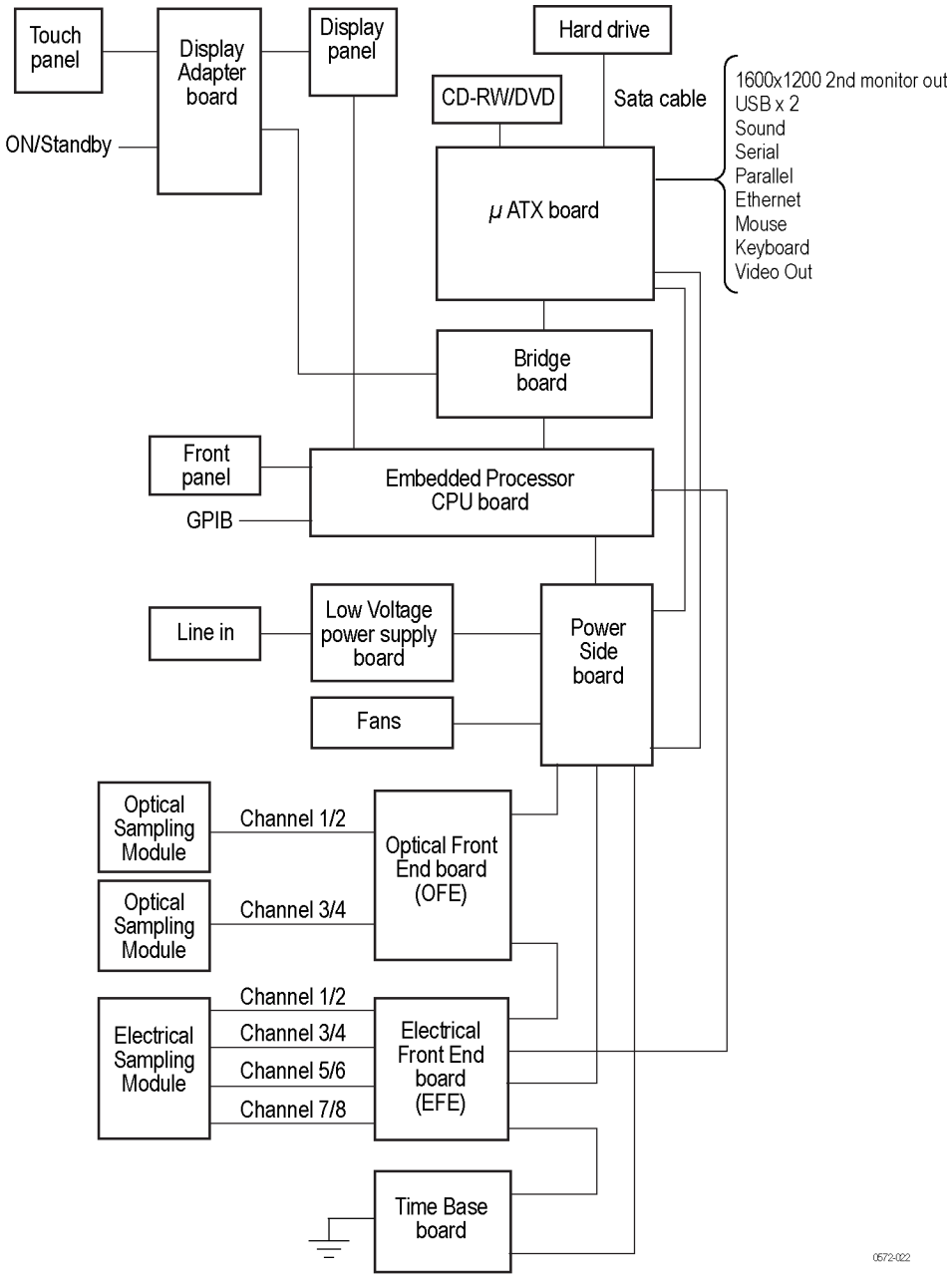


Figure 1: DSA8300 block diagram

Input signal path

A signal enters the instrument through a direct coaxial connection to the input connector on a sampling module, or a real time probe connected to the sampling module channel.

Acquisition system. The acquisition system conditions the input signals, samples them, converts them to digital signals, and controls the acquisition process under direction of the processor system.

The acquisition system includes the multi-source trigger, acquisition time base, and acquisition mode generation and control circuitry. The acquisition boards are located in the bottom compartment of the instrument and can accommodate four small slot sampling plug-ins, two large slot plug-ins and a trigger/holdoff subsystem. Up to eight vertical channels are accommodated simultaneously. Channels 1, 2, 3, and 4 can be either large or small slots. The presence of an assembly in one or both large slots displaces the small slot functionality in the corresponding small slots. The external trigger and all small slot channels feature a Tekprobe Level 2 probe power connector for additional front end signal conditioning functions like high input-impedance real-time probes, if equipped on the sampling module.

Processor system. The processor system contains a dual Wintel/PowerPC

The basic instrument configuration supports up to eight channels labeled Ch 1 through Ch 8, provides two external trigger inputs for direct and prescaled/clock triggering through built-in prescaler and is able to support four optional internal trigger sources associated with the large slot channels.

Display panel

Color LCD display Active-matrix touch panel.

Display system. The display system sends the text and waveform information to the display panel

Touch panel. The touch panel sends information to the processor. Any changes in their settings are reported to the processor system.

Front panel

The front panel board reads the front-panel switches and knob sensors. Any changes in their settings are reported to the Windows system. The front panel board also turns the LEDs on. USB port access is also available from the front panel.

Front-panel menu switches are also read by the front-panel microcontroller. The microcontroller sends any changes in menu selections to the Windows system. The ON/STBY switch is one of the menu switches. However, it is not read by the front panel board, but passes through the front panel board to the Wintel motherboard.

The CD-RW/DVD drive enables you to load software to customize your instrument for your measurement needs and to save data to a writable CD.

Rear panel

The removable hard drive contains the product software and operating system software. It also provides capability to store and access waveform data. The GPIB allows for external control of the instrument.

You can make hard copies on the GPIB and RS-232 ports. Other ports are outputs from the ATX board: DVI-I, USB (4), sound, serial, Ethernet, mouse, and keyboard.

Low voltage power supply

The low voltage power supply is a switching power converter with active power factor control. It supplies power to all of the circuitry in the instrument.

The principal POWER switch, located on the rear panel, controls all power to the instrument including the Low Voltage Power Supply. The ON/STBY switch, located on the front panel, also controls all of the power to the instrument except for part of the circuitry in the Low Voltage Power Supply and stand-by power on the motherboard.

The power supply sends a power fail (~PF) warning to the processor system if the power is going down.

Fans

The fan assembly provides forced air cooling for the instrument. The fans are controlled by the PPC processor.

Electrical sampling modules

80E01, 80E02, 80E03, 80E03NV, 80E04, 80E06, 80E07/B, 80E09/B, 80E11, 80E11X1 sampling modules (nonTDR)

For two-channel electrical modules, a single strobe, delivered from the instrument mainframe to both acquisition channels, controls the timing of the strobe assertion to both channels. If channel-to-channel deskew is zero and the channel delays (if equipped) are matched, the sampling coincidence between channels is very close. Acquisition deskew function is accomplished either by making separate acquisitions over individual acquisition windows or by adjusting Channel Delay (if equipped).

For one-channel electrical modules, an individual strobe delivered from the instrument mainframe to the acquisition channel controls the timing of the strobe assertion to the channel. Acquisition deskew function is carried out by moving the strobe timing for the channel to a unique acquisition window or by adjusting Channel Delay (if equipped).

Most electrical channels feature a Tekprobe Level 2 probe power connector for attachment of a real time probe. The control of this probe is a mainframe function.

All module calibration signals are derived from a 2.5 V precision voltage reference internal to the sampling module. Settings derived from this reference are stored in a nonvolatile EEPROM in the sampling module, although the responsibility for the execution of these settings is with the mainframe.

80E04, 80E08/B, and 80E10/B sampling modules (TDR capable)

The TDR capable electrical sampling modules are low noise samplers, with each channel capable of generating its own Time Domain Reflectometry (TDR) step.

For these modules, a single strobe, delivered from the instrument mainframe to both acquisition channels, controls the timing of the strobe assertion to both channels. If channel-to-channel deskew is zero and the channel delays (if equipped) are matched, the sampling coincidence between channels is very close. Acquisition deskew function is accomplished by making separate acquisitions over acquisition windows or by adjusting Channel Delay (if equipped).

Each electrical channel features a Tekprobe Level 2 probe power connector for attachment of a real time probe. The control of this probe is a mainframe function.

All module calibration signals are derived from a 2.5 V precision voltage reference internal to the sampling module. Settings derived from this reference are stored in a nonvolatile EEPROM in the sampling module, although the responsibility for the execution of these settings is with the mainframe.

When used in the acquisition mode (that is, with the TDR step generator turned off) each channel functions as a normal sampling input. In the TDR mode, a fast rise time step is generated internally for each channel and applied to the input signal path for that channel. The acquisition part of the TDR/sampling module remains functional for monitoring the primary step and its reflected components. The sampling module provides two self-contained TDR channels. You can select the polarity of the output step independently for each channel. This allows differential or common mode testing of two coupled lines and independent testing of isolated lines.

Optical sampling modules

The optical modules share the same mechanical package and are built with similar circuit boards. Different functionality within the modules (current and future modules) is achieved by installing different O/E modules, filters and clock recovery boards along with setting the sampler bandwidth. The optical module key features are:

- A one channel, low noise, adjustable bandwidth sampler allowing multiple bandwidth settings for optimizing noise versus bandwidth demands.
- An amplified or nonamplified O/E converter.
- Support for internal RF switches in the signal path with a straight-through path and three hardware-filtered reference receiver paths between the O/E converter and the sampler.
- An averaging optical power meter.

- Integral clock recovery option on some models with internal coaxial connection to the mainframe trigger, front panel clock and data output (not all have data).
- Communication with the mainframe for identification, control and calibration/compensation storage.

The "system response" depends on the response of all of the components in the signal path, from the front panel to the sampler. Bandwidth and reference receiver responses are calibrated at the factory with a sub-picosecond optical impulse applied to the front panel connector or with an optical heterodyne system. This ensures that all instrument and module components are included, but also means that instrument or module components cannot be replaced without performing calibration.

Compensation performs a DC transfer curve characterization for each bandwidth/reference receiver setting of a module. The curve data is stored in the module EEPROM and is used to generate a look-up table in the mainframe. This data corrects for linearity, gain and offset errors in the sampler.

Reference receivers can be created in any of the following ways:

- A hardware filter inserted between the O/E and the sampler and dominates the response.
- No filter is used, but the bandwidth of the sampler is adjusted.
- The O/E bandwidth is adjusted and dominates the response.

The power monitor is a second measure of the photo-diode current that is independent of the sampler signal path. Analog circuitry continuously senses the current flowing into the bias side of the photo diode. The signal is amplified by a programmable gain amplifier and input to an 8-bit AD converter. The AD converter and amplifier are controlled through the I^2C interface.

Power meter compensation performs two functions:

- Two offset inputs are adjusted in the amplifier so that the signal stays in range for all of the gain settings.
- Offset is measured for all gain settings and stored so it can be subtracted from the raw measured current. Because the measurements are made through independent paths the power monitor is useful in debugging module/mainframe problems.

Clock recovery

Many 80C00 modules have integral clock recovery (standard or as an option), with internal coaxial connection of the recovered clock signal to the mainframe trigger, front panel clock and data output connectors (not all have data).

The recovered clock is routed to the rear connector of the module and sent to the Optical Front End board in the mainframe. The Optical Front End board has a switch that selects which modules clock is applied to the trigger. The control signal for that switch comes from the optical module.

The main board of the optical module provides power and control bits to the clock recovery board. A small fraction of the input signal is split off internally and applied to the clock recovery components. The type of splitter for each module is shown in the following table.

Internal optical/electrical split for clock recovery

Module	Optical Split	Electrical Split
80C01	•	
80C02	•	
80C03		•
80C04	•	
80C07/B		•
80C08/B/C/D		•
80C09	•	
80C10/B/C [1]		
80C11/B	•	
80C12/B [1]		

[1] No clock recovery option available.

Some optical modules (such as the 80C10C and 80C15) have an optional clock recovery trigger pickoff (CRTP) function that provides a second, high-sensitivity optical input to drive electrical differential DATA and $\overline{\text{DATA}}$ outputs. These differential data signals are connected to the BERTScope CR286A Clock Recovery instrument for clock recovery or error detection

80A01 trigger prescale preamplifier module

The 80A01 module is designed to increase the sensitivity of the prescale trigger input of the DSA8300 to ≤200 mV_{p-p}.

The major function block of the module is a high sensitivity, high gain RF amplifier. The input and output to this amplifier are routed to two identical SMA, female connectors, labeled Input and Output at the module front panel.

The module receives power from the main instrument through a single connector at the rear of the module. The power LED indicates the module is receiving power through the interface connector.

80A02 EOS/ESD protection module

The 80A02 EOS/ESD (Electrical Over Stress/Electro-Static Discharge) protection module works with any DSA8300 instrument and provides static electricity damage protection to vulnerable sampling head input stages and/or other sensitive elements.

The 80A02 EOS/ESD module has a 26 GHz bandwidth, making it possible to provide static protection to a sensitive single input channel of a sampling oscilloscope with very minimal speed degradation.

The 80A02 EOS/ESD module is designed to work with the Tektronix P8018 probe for manual and automated test station static protection.

80A05 electrical clock recovery module

The electrical clock recovery module can perform clock recovery on the input signal (signal input must meet data rate and format requirements), and provides this signal as a trigger source to the DSA8300.

Front panel connectors provide a duplicate of the recovered clock signal.

The module uses one of two separate clock recovery circuits depending on the specified data rate. The single-ended or complementary input signals are split with a 1:2 divider and routed to the two circuits.

The low bandwidth circuit recovers clock and data from input data in the 50 Mb/s to 2.7 Gb/s range. The recovered clock from this circuit is routed directly to the front panel and internal trigger.

The high bandwidth circuit recovers clock and data from input data in the 2.7 Gb/s to 12.6 Gb/s range. The recovered clock to the front panel and internal trigger signals are always clock/16.

With option 10G, the 10G recovered clock is also routed to the front panel.

There is one front panel indicator LED - Clock Recovery Enable. It indicates the clock recovery circuitry is on and programmed to the requested bit rate.

82A04B phase reference module

The 82A04B Phase Reference Module is designed to decrease horizontal position uncertainty with data signals, when a reference clock signal synchronized to the data signal, is available. It consumes a small slot, and displaces operation of both channels in that slot.

The available Phase Correction modes are free run (where the module provides unit circle location information for the phase of the data sample) and triggered (where the module, with the trigger signal, provides both base positioning, and refined positioning, for the data sample).

The input connector is a precision 1.85 mm connector. Phase correction works over the range of 2.5 GHz - 25 GHz (82A04B), or 2.5 GHz - 60 GHz (82A04B-60G).

The LED on the module indicates that the module is being used for phase correction.

Adjustment procedures

This section contains an adjustment procedure for your instrument. The purpose of this procedure is to return the instrument conformance to its specifications.

Adjustment interval. The voltage and timing references inside the instrument are very stable over time and should not need routine adjustment. The only time you should perform the *Adjustment Procedures* is if the instrument fails any of the mainframe performance verification checks provided in the *DSA8300 Performance Verification Technical Reference* manual.

Adjustment environment. The instrument must be adjusted in a 20°C to 30 °C ambient temperature environment. The instrument and signal source must warm up at least 20 minutes in this environment before you begin the adjustment procedure.

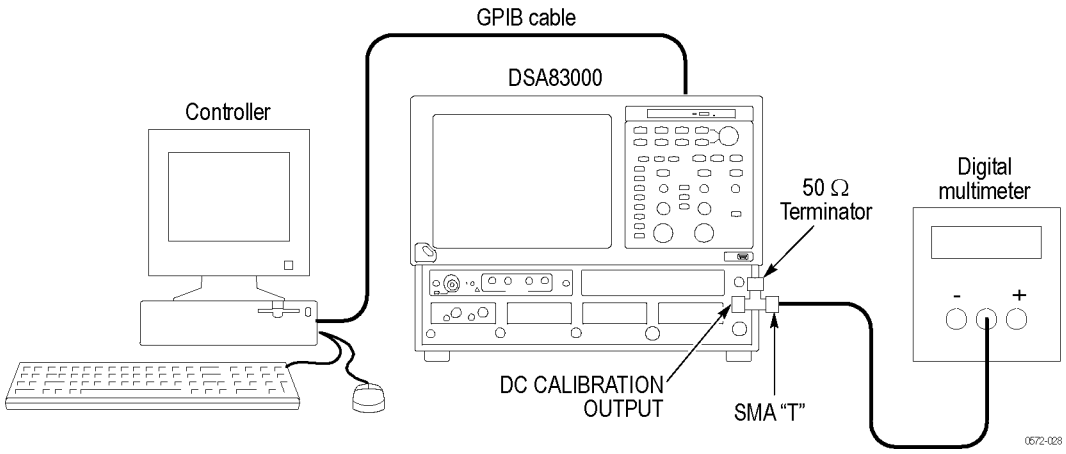
Required equipment

The adjustment procedure requires the specific test equipment and materials listed in the following table.

Category	Specific equipment required	Quantity
Signal source	Signal generator 50 MHz to 1 GHz, ≤ 1 ppm frequency accuracy	1
Frequency counter	Frequency resolution 12 digits	1
Meter	Digital Multimeter, with 6.5 plus digits	1
Instrument controller (only one of these configurations required)	PC-compatible computer with National Instruments GPIB Controller card and software, running Windows XP, Vista, or 7	1
	National Instruments USB GPIB Controller card for Windows XP, Vista, or 7, and National Instruments NI-488.2 for Windows software (to install in the instrument)	1
Divider	Power, 50Ω, SMA "T" male Tektronix 015-0565-00	1
Adapter	SMA "T", male to 2 SMA female Tektronix part number 015-1016-00	1
Adapter	SMA male to BNC female, Tektronix part number 015-0554-00	1
Adapter	BNC to dual banana plug, Tektronix part number 103-0095-00	1
Coaxial cables	50Ω, male-to-male SMA connectors	3
GPIB cable	GPIB cable, 1 m min length, Tektronix part number 002-0991-01	1

Equipment hookup

1. Connect the equipment as shown in the following figure:



2. Set the National Instruments GPIB Interface command software to enable GPIB communications between the PC controller and the DSA8300.
3. Allow the test equipment and DSA8300 to warm up for at least 20 minutes before starting the adjustment procedures.

Main instrument adjustments

Compensate the DSA8300

CAUTION. *To prevent incorrect calibration values, make sure that the instrument and test equipment have warmed up for at least 20 minutes before performing this procedure.*

1. Click **Utilities > Compensation**.
2. Select **Mainframe**.
3. Select **Compensate and Save**.
4. Click **Execute**.
5. Click **OK** in dialog box.
6. Click **Close** when the compensation procedure is complete.

Adjust DC calibration

1. Use the equipment connection shown in the preceding figure.
2. Verify communication between the controller and DSA8300 by entering the following GPIB command:
   `*IDN`

   The instrument should respond with Tektronix and Firmware Version information.
3. Turn off the DSA8300 cal constant protection by entering the following GPIB command:
   `SYST:PROT OFF`
4. Set the DSA8300 DC calibrator offset cal constant to 0 by entering the following GPIB command:
   `CALCOMP:DOUBLE "DcCalOffsetAdj",0.0`
5. Wait 8 seconds, and then set the instrument DC calibrator Lsb cal constant to 1.0 by entering the following GPIB command:
   `CALCOMP:DOUBLE "DcCalLsbAdj",1.0`
6. Wait 8 seconds, and then set the instrument DC calibrator output to 0 Volts by entering the following GPIB command:
   `CALIBRATE:DCCALIBRATOR 0.0`
7. Record the DMM reading.
8. Set the instrument DC calibrator offset cal constant to -1 * DMM reading by entering the following GPIB command:
   `CALCOMP:DOUBLE "DcCalOffsetAdj",(-1.0 * the DMM reading)`

   Example: `CALCOMP:DOUBLE "DcCalOffsetAdj", 3.2e-4`
9. Set the instrument calibrator to 1.0 V by entering the following GPIB command:
   `CALIBRATE:DCCALIBRATOR 1.0`
10. Record the DMM reading (*reading1*).
11. Set the instrument calibrator to -1.0 V by entering the following GPIB command:
    `CALIBRATE:DCCALIBRATOR -1.0`
12. Record the DMM reading (*reading2*).
13. Calculate the cal constant using the following equation: (–1.0 * Reading2 + Reading1) ÷ 2.
14. Set the instrument calibrator Lsb cal constant by entering the following GPIB command:
    `CALCOMP:DOUBLE "DcCalLsbAdj", (cal constant calculated in previous step)`

15. Wait 8 seconds, and then save the DC adjustments by entering the following GPIB command:
    `CAL:SAVE:FACT:MAIN`
16. Update the mainframe calibration time/date/temperature stamp by entering the following GPIB command:
    `CAL:UPDATEINFO:MAIN`
17. Turn on the instrument cal constant protection by entering the following command:
    `SYST:PROT ON`

Verify DC calibrator adjustment

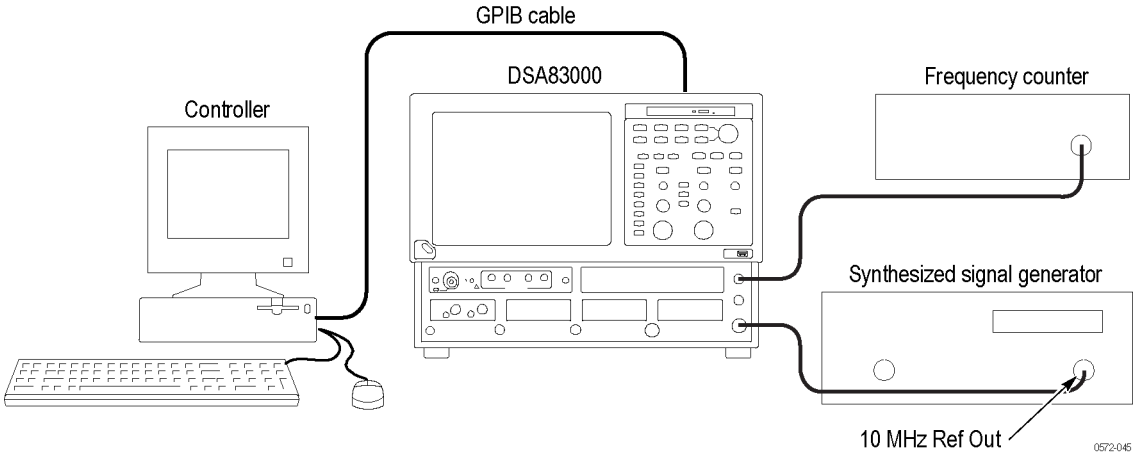
To verify that the DC calibration adjustment was successful, do the following:

1. Set the instrument DC calibrator to -1.0 V by entering the following GPIB command:
   `CALIBRATE:DCCALIBRATOR -1.0`
2. Verify that the DMM reads **-1.0 V** (±1 mV).
3. Set the instrument DC calibrator to 1.0 V by entering the following GPIB command:
   `CALIBRATE:DCCALIBRATOR 1.0`
4. Verify that the DMM reads **1.0 V** (±1 mV).
5. Set the instrument DC calibrator to 0.0 V by entering the following GPIB command:
   `CALIBRATE:DCCALIBRATOR 0.0`
6. Verify that the DMM reads **0.0 V** (±0.1 mV).

Internal 10 MHz adjust

CAUTION. *To prevent incorrect calibration values, make sure that the DSA8300 and test equipment have warmed up for at least 20 minutes before performing this procedure, and that compensation was run on the DSA8300 since the last power-up or if temperature has deviated by 5 °C since the last compensation.*

1. Connect the DSA8300 to a signal generator and frequency counter as shown in the following figure:



2. Set the signal generator as follows:
   - Frequency: **1 GHz**
   - Amplitude: **1.0 V peak to peak**
   - Output: **On**
3. Set the frequency counter as follows:
   - Frequency: **200 kHz**
   - Number of digits: **9**
4. Set the DSA8300 as follows:
   - Trigger source to **TDR** (**Setup > Mode/Trigger**: select **TDR** for Trigger Source)
   - TDR trigger source clock rate to **200 kHz**
   - TDR Trigger mode to External (**Setup > Mode/Trigger > Advanced Trigger Setup**: select **External** for TDR 10 MHz Reference)
5. Enter the following GPIB command to turn the instrument cal constant protection off:
   "`SYST:PROT OFF`"

6. Set the calibration value to the default by entering the following GPIB command:
   “CALCOMP:DOUBLE "Internal10MHzRefFreq", 10e6
7. Record the TDR Clock Out frequency (Reading 1).
8. Set the DSA8300 TDR 10 MHz Reference trigger mode to **Internal**.
9. Record the TDR Clock Out frequency (Reading 2).
10. Enter the following GPIB command: “CALComp:DOUBLE “Internal10MHzRefFreq”, (Reading2/Reading1 * 10M)
11. Measure the TDR Clock Out frequency. (Recheck)
12. Verify that the reading is**10 MHz** (±1 kHz).
13. If all readings are correct, entering the following GPIB command to save the new calibration constants to the mainframe factory settings memory:
   “CAL:SAV:FACTORY:MAIN”
14. Update the mainframe calibration time/date/temperature stamp by entering the following GPIB command:
   “CAL”UPDATEINFO:MAIN”
15. Enter the following GPIB command to turn the instrument cal constant protection on:
   SYST:PROT ON

End of Procedure

Maintenance

This section contains the information needed to do periodic and corrective maintenance on the mainframe, electrical modules, and optical modules, and repackaging instructions for returning the products to Tektronix for service.

Preventing ESD

Before servicing this product, read the *General Safety Summary* and *Service Safety Summary* at the front of the manual.

CAUTION. *Electrostatic discharge can damage semiconductor components in the instrument or modules.*

When performing any service that requires internal access to the instrument, adhere to the following precautions to avoid damaging internal assemblies and their components due to electrostatic discharge:

- Minimize handling of static-sensitive circuit boards and components.
- Transport and store static-sensitive assemblies in their static protected containers or on a metal rail. Label any package that contains static-sensitive boards.
- Discharge the static voltage from your body by wearing a grounded antistatic wrist strap while handling these assemblies. Service static-sensitive assemblies only at a static-free work station.
- Discharge cables to ground before connecting them to the instrument or modules.
- Do not create an ESD antenna by leaving cables attached to the instrument or modules with the other end of the cable open.
- Do not place anything capable of generating or holding a static charge on the work station surface.
- Remove sampling modules or module extenders from the DSA8300 before performing removal or installation procedures on the instrument.
- Handle circuit boards by the edges when possible.
- Do not slide the circuit boards over any surface.
- Avoid handling circuit boards in areas that have a floor or work-surface covering capable of generating a static charge.

Inspection and cleaning

Inspection and cleaning are done as preventive maintenance. Preventive maintenance, when done regularly, may prevent instrument malfunction and enhance its reliability.

Preventive maintenance consists of visually inspecting and cleaning the instrument and using general care when operating it.

How often to do maintenance depends on the severity of the environment in which the instrument is used. A proper time to perform preventive maintenance is just before instrument adjustment.

General care

The cabinet helps keep dust out of the instrument and should normally be in place when operating the instrument.

WARNING. *To avoid personal injury due to electric shock, power off the instrument and disconnect it from line voltage before performing any procedure that follows.*

Flat panel display cleaning

The mainframe display is a soft plastic display and must be treated with care during cleaning.

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

To avoid damage, do not use abrasive cleaners or commercial glass cleaners to clean the display surface.

Do not spray liquids directly on the display surface.

Do not scrub the display with excessive force.

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

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

Exterior cleaning

CAUTION. *To prevent getting moisture inside the instrument during external cleaning, use only enough liquid to dampen the cloth or applicator.*

Do not use chemical cleaning agents that might damage the plastics used in this instrument. Use only deionized water when cleaning the menu buttons or front-panel buttons. Use a 75% isopropyl alcohol solution as a cleaner and rinse with deionized water. Before using any other type of cleaner, consult your Tektronix Service Center or representative.

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 that might damage the chassis.

Clean the On/Standby switch using a dampened cleaning towel. Do not spray or wet the switch directly.

Exterior inspection

Use the following table to inspect the outside of the instrument for damage or missing parts. Immediately repair defects that could cause personal injury or lead to further damage to the instrument.

External inspection checklist

Item	Inspect for	Repair action
Cabinet, front panel, and cover	Cracks, scratches, deformations, damaged hardware.	Repair or replace defective assembly.
Front-panel knobs	Missing, damaged, or loose knobs.	Repair or replace missing or defective knobs.
Connectors	Broken shells, cracked insulation, and deformed contacts. Dirt in connectors.	Repair or replace defective assemblies. Clear or wash out dirt.
80CXX male fiber connections	Lint or dust on all male fiber connections.	Clean all male fiber connections with a lint-free cleaning cloth.
Carrying handle and cabinet feet	Correct operation.	Repair or replace defective assembly.
Accessories	Missing items or parts of items, bent pins, broken or frayed cables, and damaged connectors.	Repair or replace damaged or missing items, frayed cables, and defective assemblies.

Interior inspection

To access the inside of the instrument for inspection and cleaning, refer to the removal and installation procedures. (See page 24, *Removal and installation*.)

Inspect the internal portions of the instrument for damage and wear, as shown in the following table. Repair defects immediately.

CAUTION. *To prevent damage from electrical arcing, make sure that the circuit boards and components are dry before applying power to the instrument.*

NOTE. *If you repair or replace any circuit board, check to see if it is necessary to adjust the instrument. (See Table 4 on page 68.)*

Internal inspection checklist

Item	Inspect for	Repair action
Circuit boards	Loose, broken, or corroded solder connections. Burned circuit boards. Burned, broken, or cracked circuit-run plating.	Remove and replace damaged circuit board.
Resistors	Burned, cracked, broken, blistered condition.	Remove and replace damaged circuit board.
Capacitors	Damaged or leaking cases. Corroded solder on leads or terminals.	Remove and replace damaged circuit board.
Wiring and cables	Loose plugs or connectors. Burned, broken, or frayed wiring.	Firmly seat connectors. Repair or replace modules with defective wires or cables.
Chassis	Dents, deformations, and damaged hardware.	Straighten, repair, or replace defective hardware.

Interior cleaning

1. Blow off dust with dry, low-pressure, deionized air (approximately 9 psi).
2. Remove any remaining dust with a lint-free cloth dampened in isopropyl alcohol (75% solution) and rinse with warm deionized water. (A cotton-tipped applicator is useful for cleaning in narrow spaces and on circuit boards.)

NOTE. *If, after performing steps 1 and 2, an assembly is clean upon inspection, skip the remaining steps.*

3. Gain access to the parts to be cleaned by removing easily accessible shields and panels. (See page 24, *Removal and installation*.)

4. Spray wash dirty parts with the isopropyl alcohol and wait 60 seconds for the majority of the alcohol to evaporate.
5. Use hot (120 °F to 140 °F) deionized water to thoroughly rinse them.
6. Dry all parts with low-pressure, deionized air.
7. Dry all components and assemblies in an oven or drying compartment using low-temperature (125 °F to 150 °F) circulating air.

Lubrication

There is no periodic lubrication required for this instrument.

Removal and installation

WARNING. *Before performing any procedure in this section, disconnect the power cord from the line voltage source. Failure to do so could cause serious injury or death.*

Only Qualified personnel should perform service procedures. Before performing this procedure, read the General and Service Safety summaries at the beginning of this manual.

CAUTION. *Perform all DSA8300 removal and installation procedures in a static-controlled environment, following the precautions listed in the Preventing ESD section. (See page 19.)*

NOTE. *Read the cleaning procedure before disassembling the instrument for cleaning.*

If you replace any circuit board, check to see if it is necessary to adjust the instrument. (See Table 4 on page 68.)

Required equipment

Most assemblies in this instrument can be removed with a screwdriver handle mounted with a size T-15, Torx® screwdriver tip. Use this tool whenever a procedure step instructs you to remove or install a screw unless a different size screwdriver is specified in that step.

Table 1: Required equipment for removal and replacement

Item No.	Name	Description	Part number
1	Screwdriver handle	Accepts Torx®-driver bits	General Tool: 620-440
2	Screwdriver handle, extended length, 10.5 to 12 inches	Accepts Torx®-driver bits and 3/16 socket tip. Used for removing the T-10 screws and 3/16 inch hex posts from the electrical and optical module slots.	Standard tool or Xcelite 99X10 V N/S#48706
3	T-10 Torx tip	Torx®-driver bit for T-10 size screw heads, used for removing the electrical or optical module chassis.	General Tool: 640-235
4	T-15 Torx tip	Used for removing most the screws. Torx®-driver bit for T-15 size screw heads.	General Tool: 640-247
5	T-20 Torx tip	Used for removing the handle hardware. Torx®-driver bit for T-20 size screw heads.	General Tool: 640-250
6	3/16 inch socket tip	Used for removing the 3/16 inch hex posts from the electrical and optical module slots.	Standard tool
7	1/8 inch flat-bladed screwdriver	Screwdriver for unlocking cable connectors.	Standard tool

Table 1: Required equipment for removal and replacement (cont.)

Item No.	Name	Description	Part number
8	#0 phillips screwdriver	Screwdriver for removing small phillips screws, CD and hard drive.	Standard tool
9	Angle-Tip Tweezers	Used to remove front panel knobs.	Standard tool
10	3/16 inch open-end wrench	Used to remove the rear panel nut posts.	Standard tool
11	5/16 inch open-end wrench	Used to remove the rear panel nut posts.	Standard tool
12	Coaxial cable connector tool	Used to remove coaxial connectors from d-subminiature connector housings.	Amp: 58095-1

External assemblies

WARNING. *Before performing any procedure in this section, disconnect the power cord from the line voltage source. Failure to do so could cause serious injury or death.*

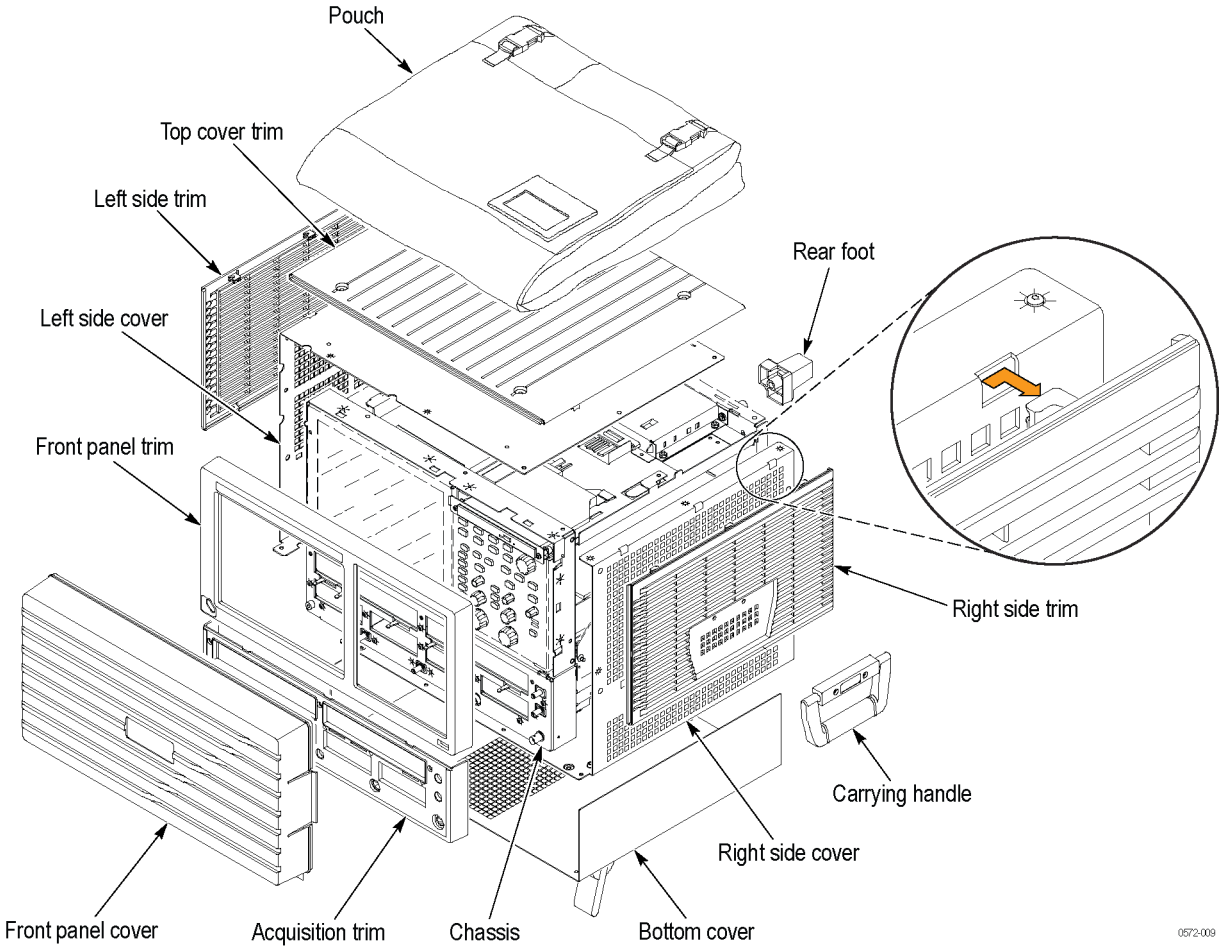


Figure 2: External assemblies

Line fuses and AC power cord

You will need a flat-bladed screwdriver.

CAUTION. *Power off the instrument before servicing the line fuses or power cord. Power off the instrument using the Windows shut down procedure, and then turn off the power switch located on the rear of the instrument (or remove the power cord). Powering down the instrument without using the Windows shut down procedure can corrupt the software on the hard disk.*

1. Power off the instrument using the Windows shut-down process, and then push the rear panel power switch or disconnect the AC power cord, to remove power from the mainframe.
2. Place the bottom of the instrument on the work surface, with the rear facing you. Locate the two line fuse caps and the AC power cord near the center of the rear panel.
3. *To remove line fuses:* Remove both fuse caps by turning them counterclockwise using a flat-bladed screwdriver, and remove the line fuses. Reverse the procedure to reinstall.
4. *To remove line cord:* Pull the AC power cord from the rear-panel connector to remove the AC power source.

Front-Panel knobs

You will need angled-tip tweezers.

NOTE. *If you are not removing the front panel, you do not need to remove the front-panel knobs; you can go to trim removal.*

1. *To remove a knob:*
   a. Hold the knob that you want to remove and pull it straight out from the front panel about 1/4 inch to create some clearance between the base of the knob and the front panel.
   b. Insert the angled-tip tweezers between the knob and front panel and use them to remove the knob. (See Figure 3 on page 28.)
   c. For replacement knob part numbers, refer to the exploded view and replaceable parts table. (See Figure 22 on page 78.)

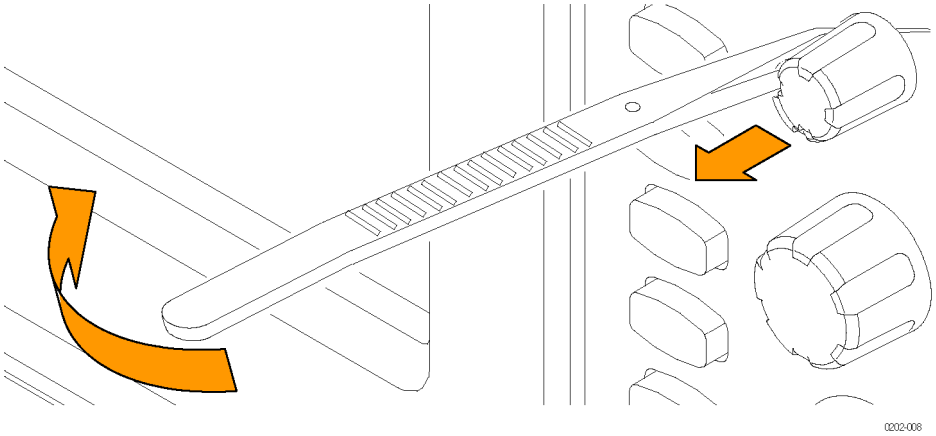


Figure 3: Knob removal

CAUTION. *To prevent damage to the encoders located on the circuit board, apply pressure to the backs of the encoders while pushing the knob on the shaft.*

3. *To reinstall a knob:*
   a. Align the knob to the shaft.
   b. While applying pressure to the back of the encoder, push the knob in until it snaps.

Trim and carrying handle

You will need a T-15 Torx driver and a T-20 Torx driver.

1. *To remove the top cover trim:*
   a. Remove the accessory pouch; it snaps off. (See Figure 2 on page 26.)
   b. Remove the four T-15 Torx drive screws that attach the top cover trim to the instrument. The T-15 Torx drive screws also attach the snap studs to the top cover. (See Figure 20 on page 74.)
   c. Hold the back of the top cover trim and swing it upward and toward you to release it from the front panel trim.
   d. Pull the front cover trim away from you and remove it from the instrument.
2. *To remove the carrying handle and the right and left side trim panels:*
   a. Remove the two T-20 Torx drive screws that attach the handle to the instrument. Remove the handle from the instrument.
   b. Slide the side trim panels toward the rear of the instrument allowing the tabs to clear the cover openings, then pull out to remove the panels from the instrument.
3. *To remove the front panel trim:*
   a. Hold the trim ring by its top edge and pull toward you to detach the three plastic snaps. (Alternatively, you can use a flat-bladed screwdriver or other small prying tool to help you detach the snaps.)
   b. Swing the bottom of the ring up and off the front panel.
4. *To remove the acquisition trim:*
   a. Remove the six T-15 Torx drive screws that attach the acquisition trim to the instrument. (See Figure 20 on page 74.)
   b. Remove the knobs from the electrical and optical ejector levers (hold the knobs with your fingers and pull straight out).
   c. Remove the acquisition trim from the instrument.

⚠ ***CAUTION.*** *Over-tightening the handle screws may cause the handle to break off from the cabinet. Use a torque wrench to tighten the screws to 8-10 in.lb.*

5. *To reinstall the covers and handle:* Reverse the steps. Use a torque wrench to tighten the handle screws to 8–10 in. lb.

Bottom cover

You will need a T-15 Torx driver.

1. *To remove the bottom cover:* (See Figure 2 on page 26.)
   a. Place the top of the instrument on the work surface, with the bottom facing you.
   b. Remove the five T-15 Torx drive screws that attach the bottom cover to the instrument. (See Figure 20 on page 74.)
   c. Remove the bottom cover from the instrument.
2. *To reinstall the bottom cover:* Reverse the steps.

Left and right covers

You will need a T-15 Torx driver.

1. *To access the covers, remove these assemblies:*
   - Trim (all) (See page 29.)
   - Bottom cover (See page 30.)
2. *Remove the left and right covers as follows:*

NOTE. *All mounting screw holes are indicated by a star etched around the mounting hole.*

   a. Place the rear of the instrument on the work surface, with the front facing you.
   b. Remove the thirteen T-15 Torx drive screws that attach the covers to the top and both sides of the chassis. (See Figure 20 on page 74.)
   c. Remove the nine T-15 Torx drive screws that attach the covers to the bottom of the chassis.
   d. Pull the bottom-right cover down and slide to the right to remove from the instrument.
   e. Pull the top-left cover upward and slide to the left to remove from the instrument.

CAUTION. *Be careful not to bind or snag the covers on the internal cabling of the instrument as you remove or install the covers.*

3. *To reinstall the left and right covers:* Reverse the steps.

Internal assemblies

Before removing internal assemblies, you must remove the external assemblies. (See page 25, *External assemblies*.)

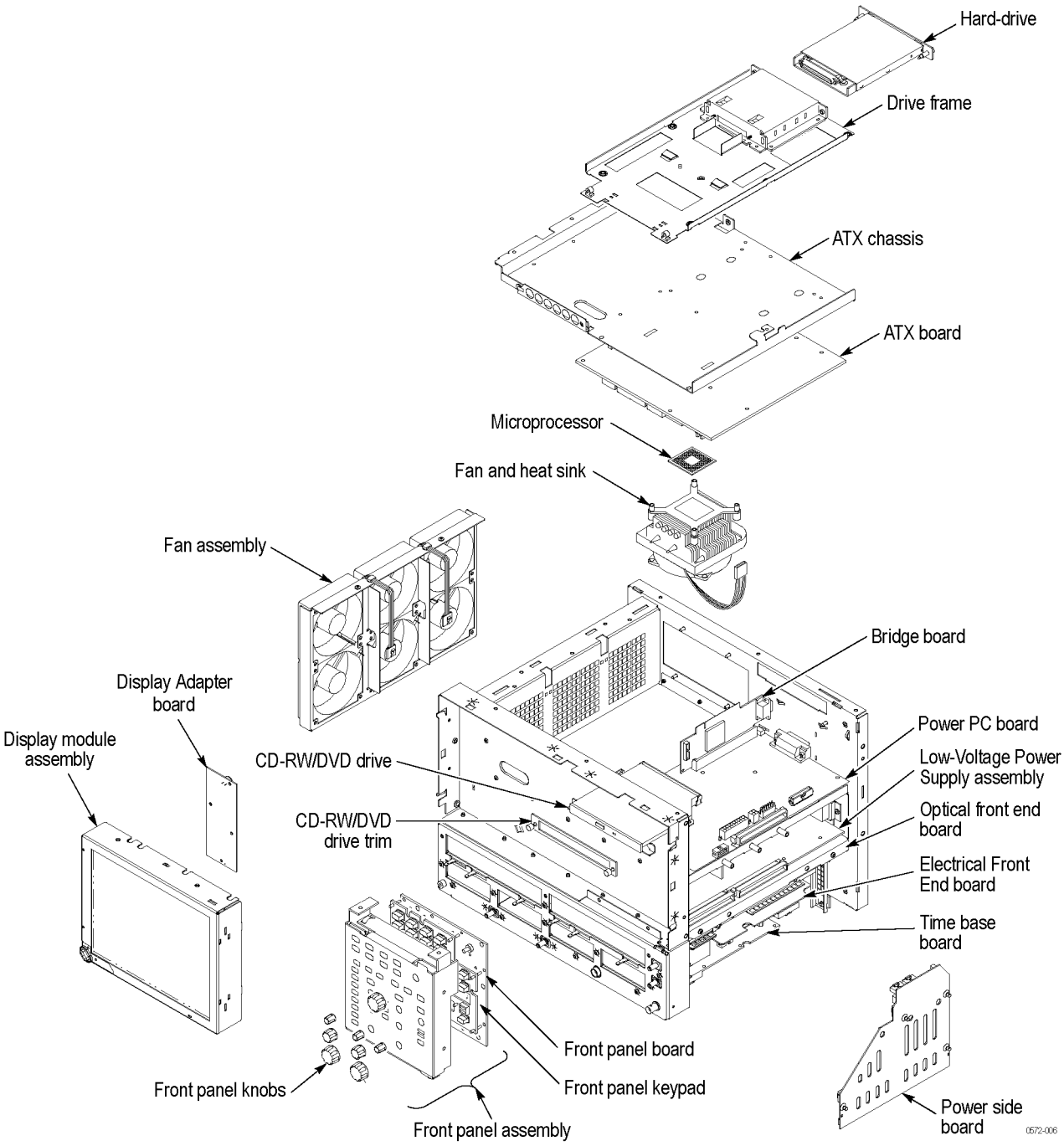


Figure 4: Internal assemblies

Front-Panel assembly

You will need a flat-bladed screwdriver to hold up the metal tab that holds the USB port in place, and a 1/8 inch flat-bladed screwdriver.

1. *To access the assembly, remove these assemblies:*
   - Front-Panel trim (See page 29.)
   - DVD-RW drive and trim (See page 41.)
2. *To remove the Front-Panel assembly:* (See Figure 4 on page 31.)
   a. Place the bottom of the instrument on the work surface, with the front panel facing you.
   b. Remove the six T-15 Torx drive screws that attach the Front-Panel assembly to the front chassis. (See Figure 22 on page 78.)
   c. Hold the bottom of the Front-Panel assembly and pull it toward you until it catches.
   d. From the side, insert the tip of a flat-blade screwdriver directly above the USB port and below the Front-Panel assembly. There is a piece of flexible metal there that keeps the front panel from slipping over the USB port.
   e. Push up on the flexible piece of metal as you pull the Front-Panel assembly forward and away from the instrument.
   f. Use the1/8 inch flat-bladed screwdriver to carefully lift up the J1 cable connector lock. Pull up on the J1 flex cable to disconnect it from the display module assembly. (See Figure 5 on page 33.) Note the position of the pin 1 index mark on the connector and the black stripe on the cable for later reassembly.
   g. Pull the Front-Panel assembly forward and remove it from the instrument.
3. *To reinstall the Front-Panel assembly:* Reverse the steps.

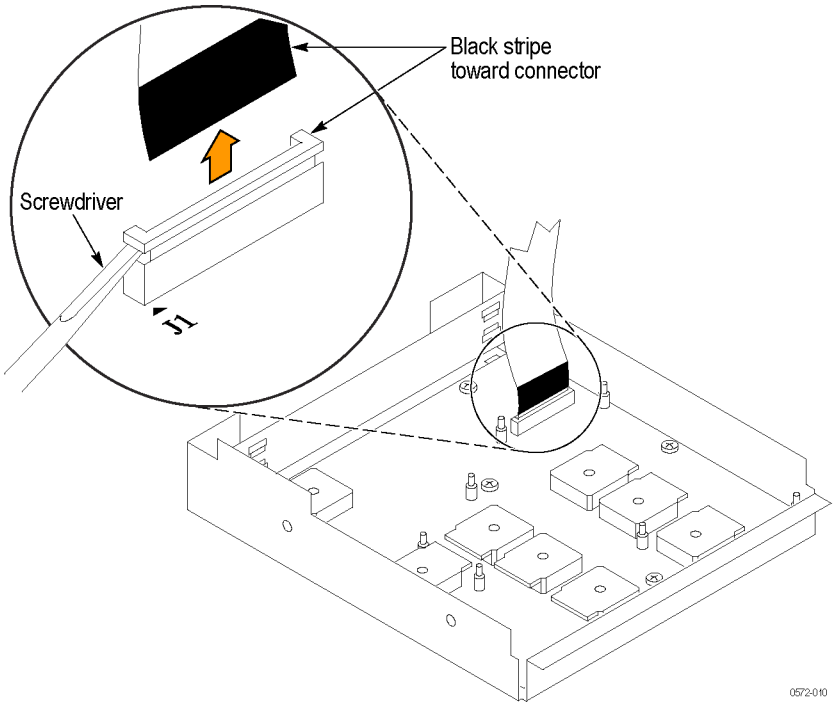


Figure 5: J1 flex cable connector removal

Front panel board

You will need a small flat-bladed screwdriver for prying, and a T-15 Torx driver.

1. *To access the board, remove these assemblies:*
   - Front-Panel knobs (See page 28.)
   - Front-Panel trim (See page 29.)
   - CD-RW/DVD drive and trim (See page 41.)
   - Front-Panel assembly (See page 32.)
2. *To remove the Front Panel circuit board:* (See Figure 4 on page 31.) (See Figure 22 on page 78.)
   a. Remove the eight T-15 Torx drive screws that attach the Front-Panel board to the Front-Panel assembly.
   b. Pry the board up off the alignment studs. Place a flat bladed screwdriver in the pry point access holes to pry the board up from the assembly.
   c. Remove the board from the assembly.
3. *To reinstall the Front-Panel board:* Reverse the steps. Verify that the plastic bezel is flush against the sheet metal. If it is not, the board might not be seated properly over the plastic posts.

Front panel keypad

You will need a pair of tweezers or equivalent tool.

1. *To access the assembly, remove these assemblies:*
   - Front-Panel knobs (See page 28.)
   - Front-Panel trim (See page 29.)
   - CD-RW/DVD drive and trim (See page 41.)
   - Front-Panel assembly (See page 32.)
   - Front-Panel board (See page 33.)

CAUTION. *When removing or installing the keypad, make sure you do not touch the switch contact with your fingers. The oils in your fingers will degrade or damage the switch contacts. To help prevent damage to the keypad use cotton gloves when removing or installing the keyboard pad.*

2. *To remove the Front Panel keypad:*
   a. Use the tweezers to pull on each of the keypad support guides and separate the keypad from the Front-Panel board.
   b. Remove the keypad from the Front-Panel board. (See Figure 22 on page 78.)
3. *To reinstall the front panel keypad:* Reverse the steps. Make sure that the keypad is properly aligned on the Front-Panel board and that the ribbon cable is routed correctly when installing the Front-Panel in the chassis. Refer to the cable connections table for information about where to connect cables. (See page 72, *Cable connections*.)

Display assembly

You will need a T-15 Torx driver.

NOTE. *You can replace the entire* ***Display assembly****. You can also replace the* ***Display Adapter circuit board*** *individually (it is also a part of the Display assembly).*

Other components that make up the Display assembly (such as the LCD display and the Standby/On switch flex circuit) cannot be individually ordered or replaced. If there is a problem with one of these components, return the instrument to Tektronix for repair. See the Contacting Tektronix information at the front of this manual.

1. *To access the assembly, remove these assemblies:*
   - Front-Panel trim (See page 29.)
   - Top trim (See page 29.)
2. *To remove the Display assembly:* (See Figure 6 on page 36.)
   a. Place the bottom of the instrument on the work surface, with the front panel facing you.
   b. Remove the four T-15 Torx drive screws that attach the Display assembly to the chassis.
   c. Hold the top and bottom edges of the Display assembly and pull forward far enough to allow access to the ribbon cable connector.
   d. Disconnect the J2 and J3 ribbon cables from the Display assembly.

CAUTION. *Do not set the Display assembly on a work surface. Sliding the instrument over the edge of the work surface could break off the Standby/On switch assembly.*

   e. Remove the Display assembly from the instrument.
   f. *To reinstall the Display assembly:* Reverse the steps. Refer to the cable connections table for information about where to connect cables. (See page 72, *Cable connections*.)

g. *To reinstall the Display assembly:* Reverse the steps. Refer to the cable connections table for information about where to connect cables. (See page 72, *Cable connections*.)

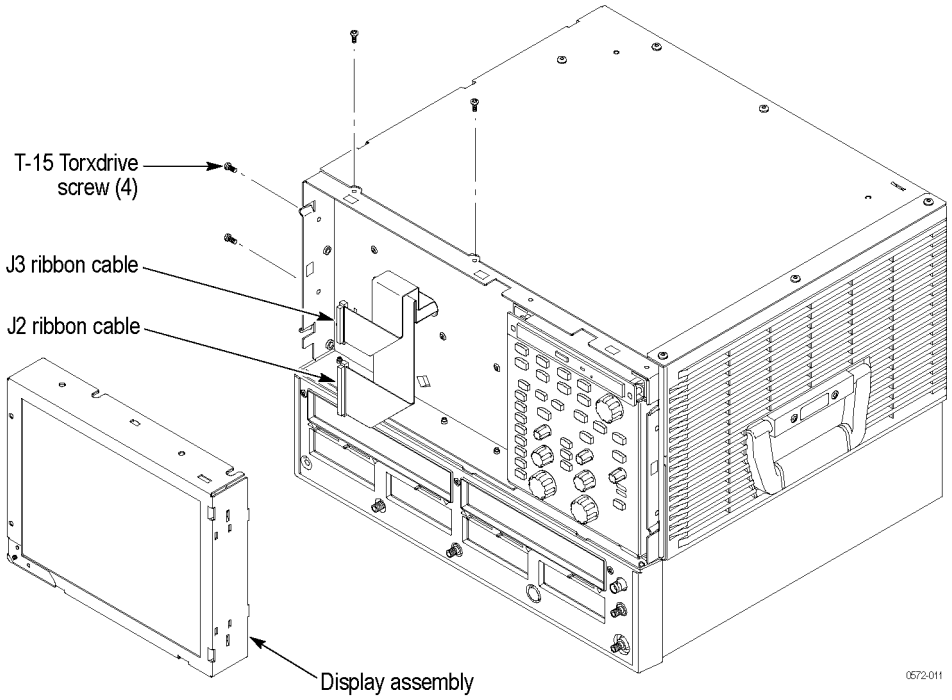


Figure 6: Display assembly removal

Display adapter board

You will need a T-15 Torx driver.

1. *To access the board, remove these assemblies:*
   - Display assembly (See page 34.)
2. *To remove the Display Adapter Board from the Display assembly:*
   a. Disconnect the cables from the Display Adapter board. (See Figure 7.)
   b. Remove the four T-15 Torx drive screws that attach the Display Adapter board to the Display assembly. (See Figure 22.)
   c. Remove the Display Adapter board from the Display assembly.
3. *To reinstall the Display Adapter board:* Reverse the steps. (See Figure 8.)

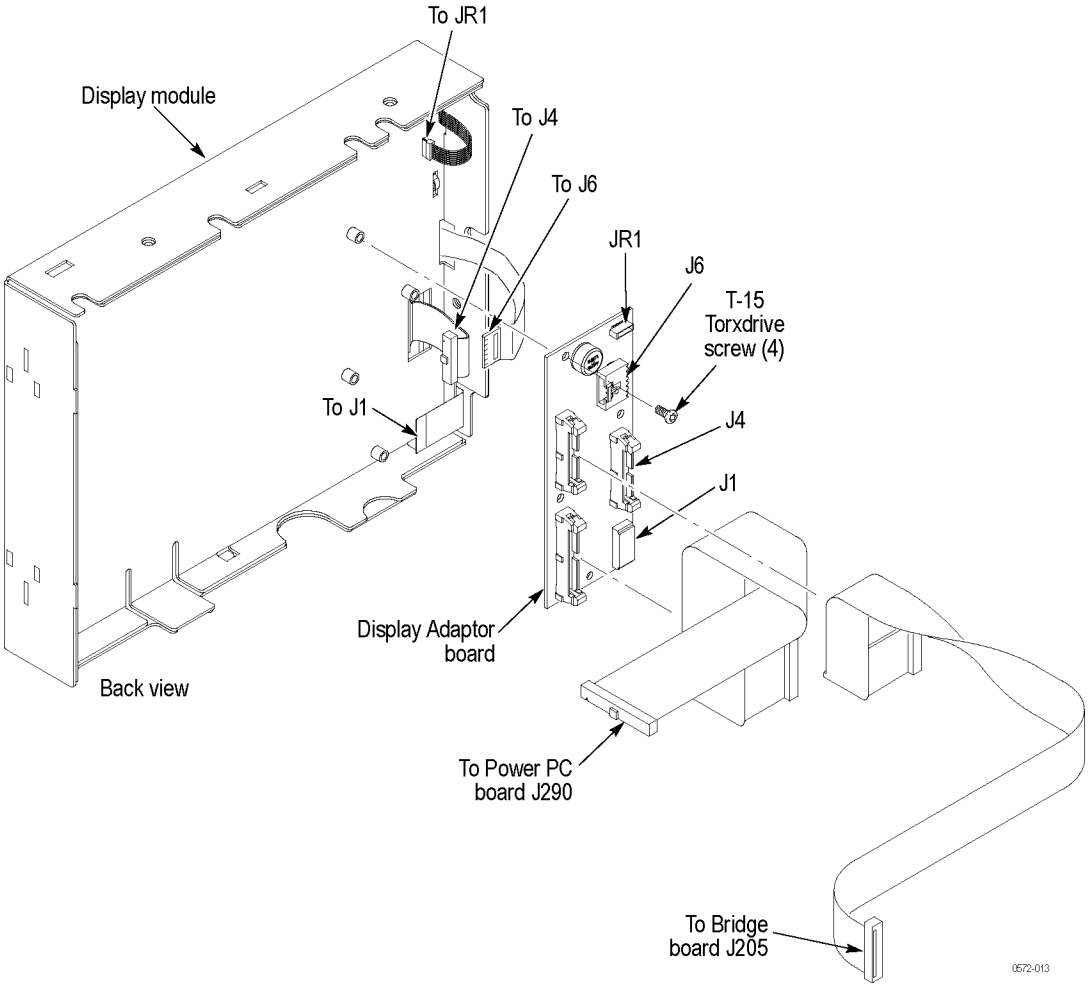


Figure 7: Display adaptor board removal

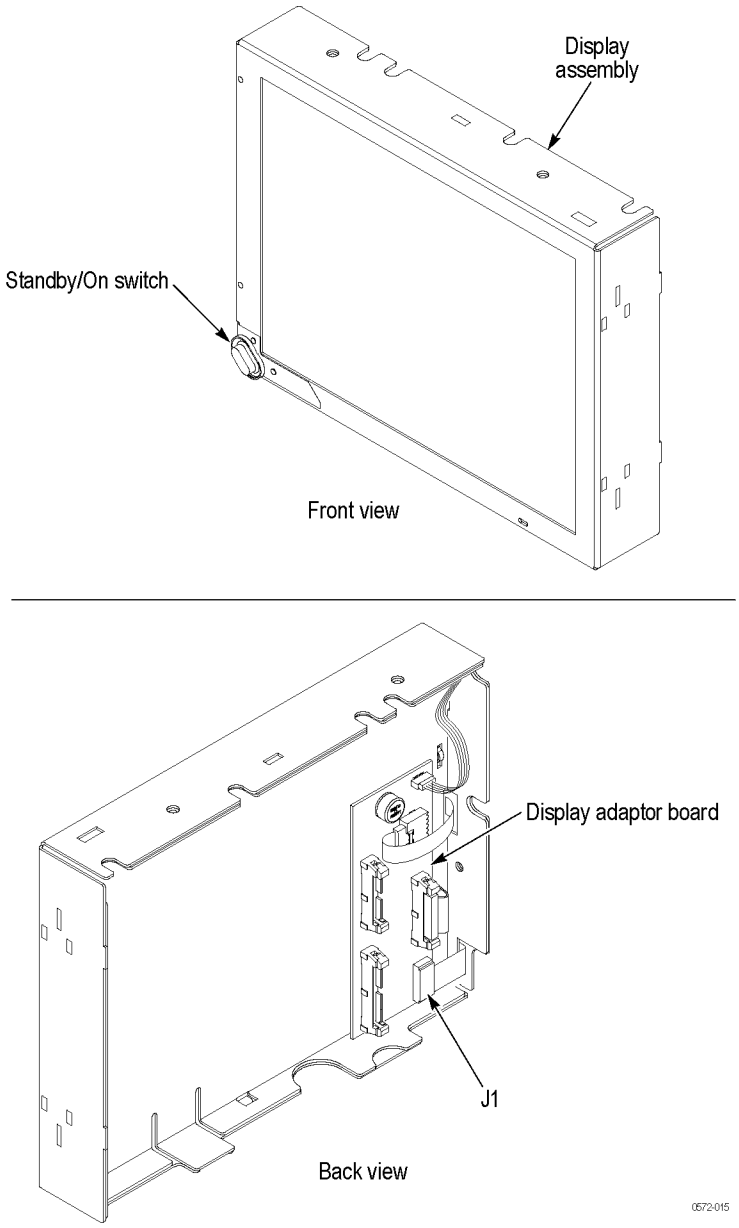


Figure 8: Display adaptor board replacement

Standby/On switch flex circuit

The Standby/On switch flex circuit is a part of the Display assembly, and is not individually customer-replaceable. If this component must be replaced, you must return the instrument to Tektronix for repair. See the Contacting Tektronix information at the front of this manual. For reference, refer to the exploded view. (See Figure 22.)

USB assembly

You will need a T-15 Torx driver.

1. *To remove the USB assembly:* (See Figure 9 on page 39.)
   a. Place the bottom of the instrument on the work surface, with the front panel facing you.
   b. Detach the J1 cable.
   c. Remove the T-15 Torx drive screw.
   d. Pull the USB assembly toward you to detach it from the instrument.
2. *To reinstall the USB assembly:* Reverse the steps. Refer to the cable connections table for information about where to connect cables. (See page 72, *Cable connections*.)

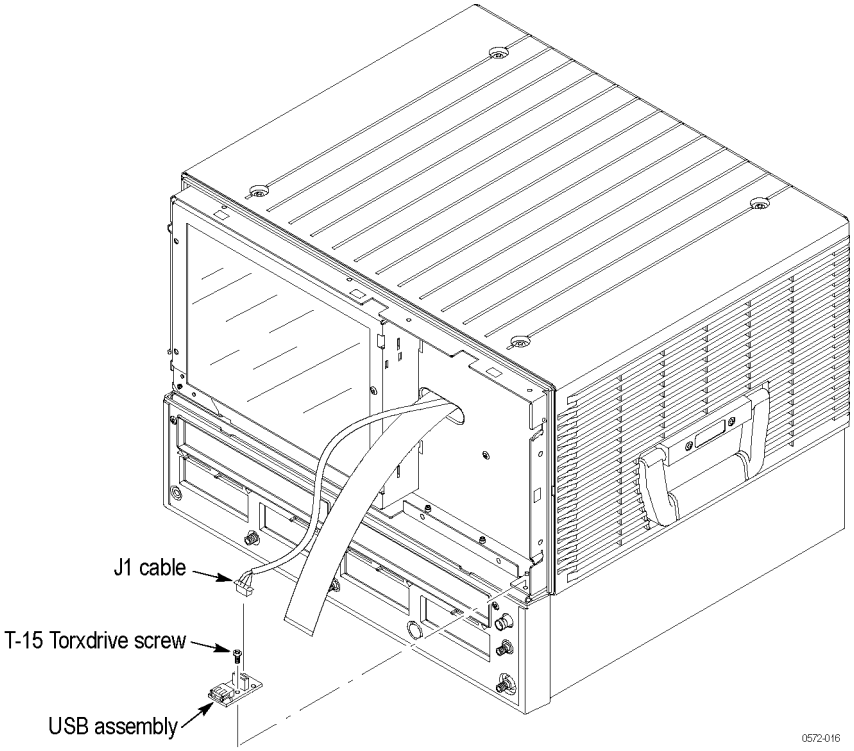


Figure 9: USB assembly removal

Hard disk drive

You will need a #0 Phillips screwdriver.

CAUTION. *Do not remove the replaceable hard disk drive when the mainframe is powered on; if you do so, damage can occur to the drive and mainframe. Power off the instrument and then turn off the power switch located on the rear of the instrument (or remove the power cord).*

2. *To remove the hard disk drive assembly:*
   a. Verify that the chassis is powered down.
   b. Place the bottom of the instrument on the work surface, with the rear panel facing you.
   c. Locate the hard disk drive assembly on the rear panel of the instrument. (See Figure 4 on page 31.)
   d. Remove the two thumbscrews from the front of the hard disk drive assembly.
   e. Hold the hard disk drive assembly and slide it out of the instrument.
3. *To remove the hard disk drive from the assembly:* (See Figure 10 on page 41.)
   a. Remove the four #0 Phillips screws that fasten the hard disk drive to the cartridge.
   b. Carefully remove the hard disk drive from the cartridge.
4. *To reinstall the hard disk drive:*
   a. Verify that the chassis is powered down.
   b. Install the hard disk drive into the cartridge.
   c. Slide the assembly into the instrument.
   d. Install the two thumbscrews to attach the assembly to the instrument.

   Refer to the cable connections table for information about where to connect cables. (See page 72, *Cable connections*.)

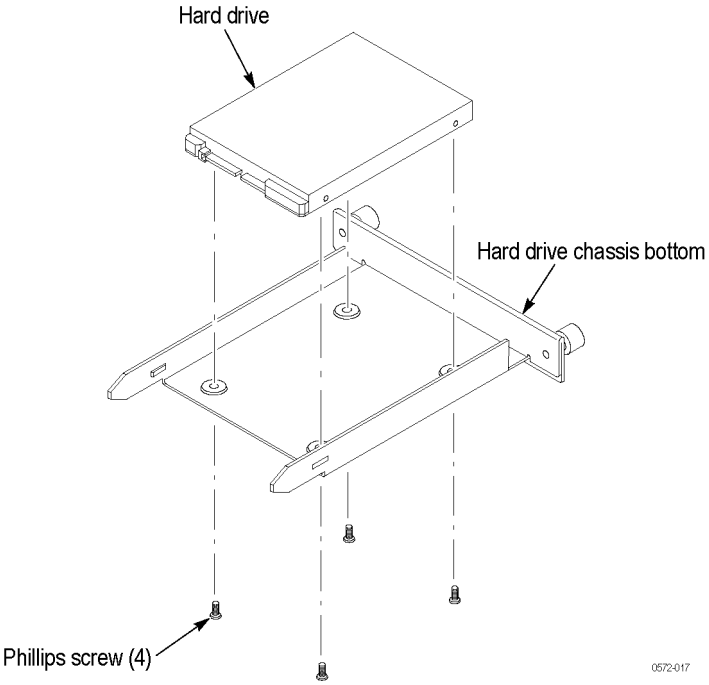


Figure 10: Hard disk drive removal

DVD-RW drive assembly

You will need a #0 Phillips screwdriver.

1. *To access the assembly, remove these assemblies:*
   - Trim (all) (See page 29.)
   - Bottom cover (See page 30.)
   - Left and right covers (See page 30.)
2. *To remove the CD/DVD-RW disk drive assembly:* (See Figure 4 on page 31.) (See Figure 11 on page 42.)
   a. Place the instrument bottom on the work surface, with the front panel facing you.
   b. Remove the two Phillips screws that hold the CD/DVD-RW drive trim to the mounting frame and remove the trim.
   c. Place one thumb on each side of the front of the CD/DVD-RW drive and your forefingers on the back of the drive.

d. Pull the drive straight toward you until the drive detaches from the CD/HD interface board.

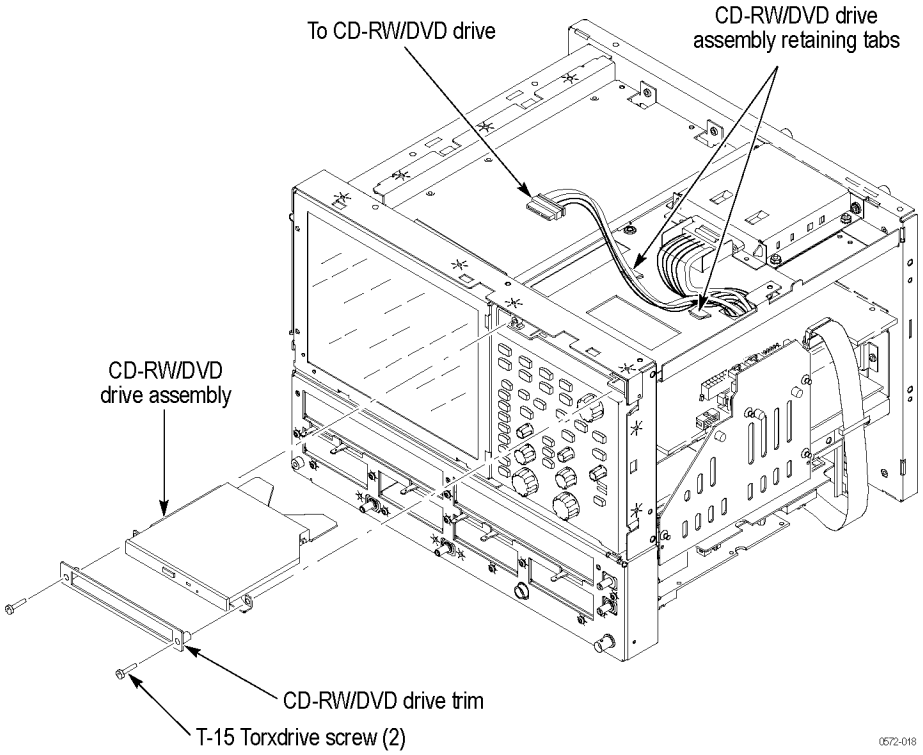


Figure 11: CD-RW/DVD assembly removal

3. *To remove the CD/DVD-RW drive from the cartridge:* (See Figure 12 on page 43.)

a. Remove the four small Phillips screws that fasten the CD/DVD-RW drive to the mounting frame.

b. Remove the drive from the mounting frame.

4. Detach the interface circuit board from the CD/DVD-RW drive.

5. *To reinstall the assembly:* Reverse the steps. Refer to the cable connections table for information about where to connect cables. (See page 72, *Cable connections*.)

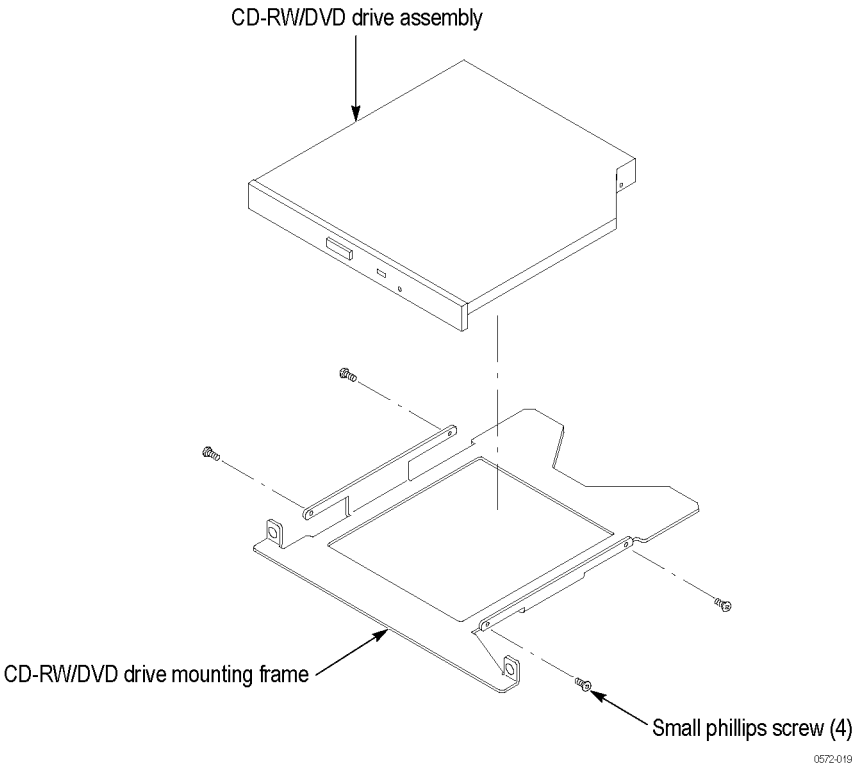


Figure 12: CD/DVD-RW drive removal

CD/DVD-RW and hard disk drive mounting frame

1. *To access the frame, remove these assemblies:*
   - Trim (all) (See page 29.)
   - Bottom cover (See page 30.)
   - Left and right covers (See page 30.)
   - CD/DVD-RW (See page 41.)
   - Hard drive (See page 40.)
2. *To remove the mounting frame:*
   a. Place the instrument bottom on the work surface, so that you can access the mounting drive frame. (See Figure 13.)
   b. Remove the six T-15 Torx drive screws that attach the mounting frame to the ATX chassis.
   c. Remove the CDD/HDD drive cable from the hard drive.
   d. Remove the CD/DVD-RW drive cable from the CD/DVD-RW drive.

e. Hold both far side corners of the drive frame; lift up and toward the rear of the instrument simultaneously.

f. Gently shift the frame from side to side as you pull it to the rear until you can remove it completely.

3. *To reinstall the mounting frame:* Reverse the steps. Refer to the cable connections table for information about where to connect cables. (See page 72, *Cable connections*.)

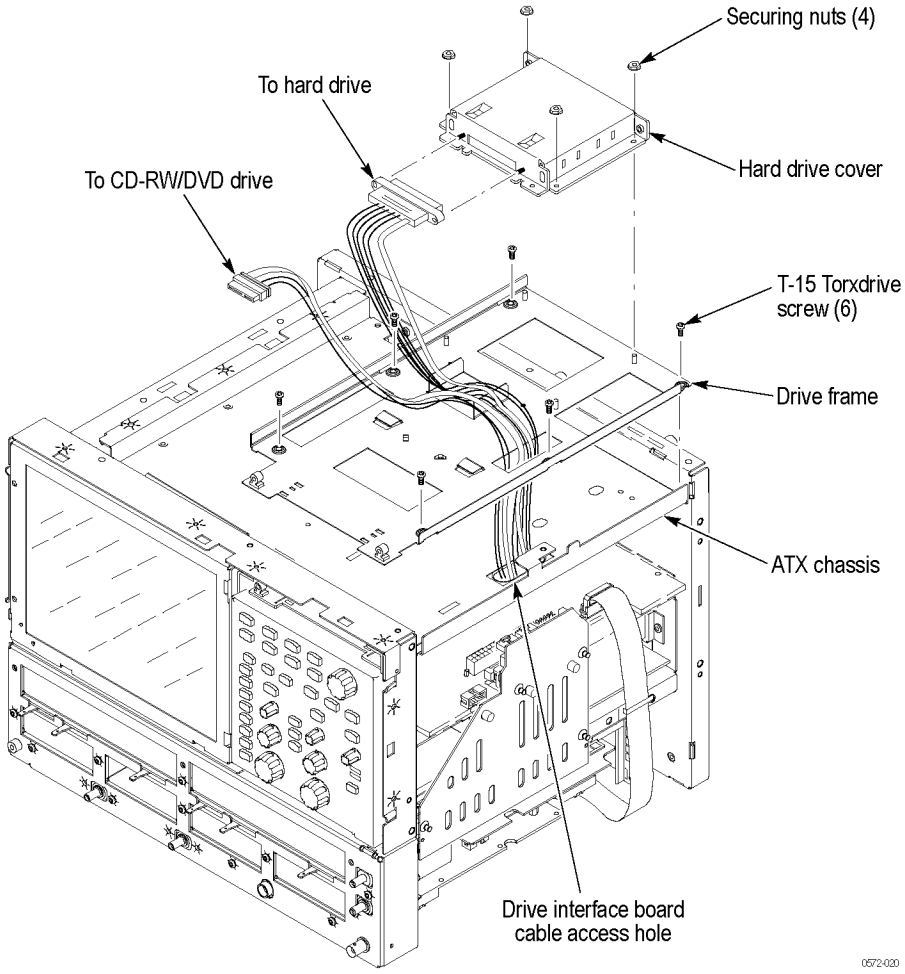


Figure 13: Hard drive and CD-RW/DVD drive mounting frame removal

ATX assembly

You will need a T-15 Torx driver.

You can remove and reinstall the ATX assembly if necessary to gain access to mechanical parts that are replaceable. However, the ATX circuit board is not customer-replaceable and cannot be ordered from Tektronix.

NOTE. *If this circuit board or chassis must be replaced, you must return the product to Tektronix for repair and calibration. See the Contacting Tektronix information at the front of this manual.*

1. *To access the assembly, remove these assemblies:*
   - Trim (all) (See page 29.)
   - Bottom cover (See page 30.)
   - Left and right covers (See page 30.)
   - CD-RW/DVD and hard drive mounting frame (See page 43.)
2. *To remove the ATX Assembly:* (See Figure 14.)
   a. Place the instrument bottom on the work surface, with the side panel facing you.
   b. Remove the three T-15 Torx drive screws that attach ATX assembly to the chassis.
   c. Remove the six T-15 Torx drive screws that attach ATX assembly to the rear chassis.
   d. Hold the front edge of the ATX assembly and pull up on the assembly to disconnect the Riser Adapter from the edge connector of the PC Processor board.
   e. Detach the cable from the USB56 connector on the ATX board.
   f. Detach the cables from the following connectors on the Microprocessor board: J183, J180, J410, and J510.
   g. Remove the ATX assembly from the instrument.
   h. To reinstall the ATX assembly, reverse the steps.

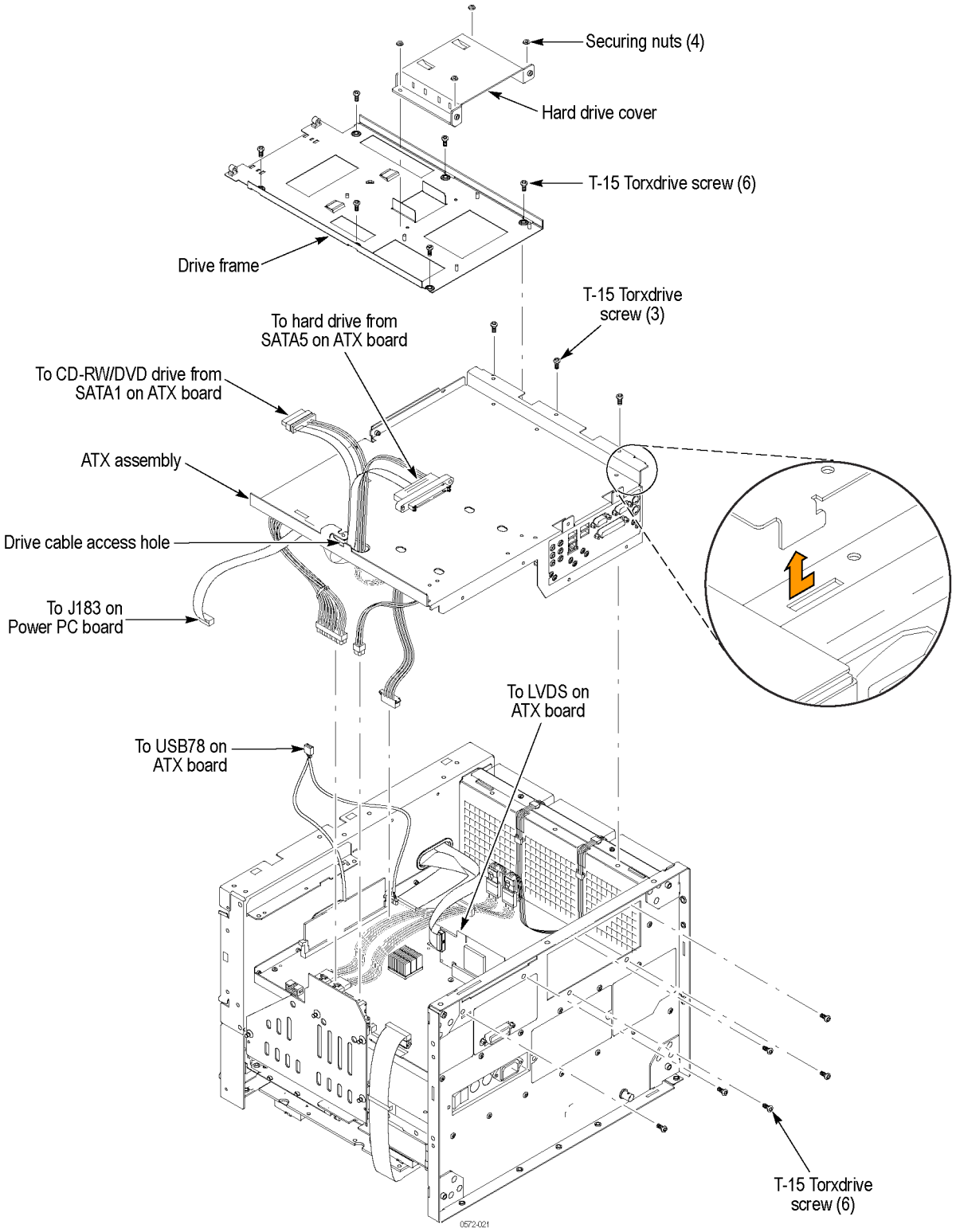


Figure 14: ATX assembly removal

Power PC board

You will need a T-15 Torx driver and a 3/16 inch nut driver.

1. *To access the Power PC board, remove these assemblies:*
   - Trim (all) (See page 29.)
   - Bottom cover (See page 30.)
   - Left and Right covers (See page 30.)
   - CD-RW/DVD and Hard Drive mounting frame (See page 43.)
   - ATX Assembly (See page 45.)
   - Power Side board (See Figure 22.)
2. *To remove the Power PC board:* (See Figure 15.)
   a. Set the instrument with the bottom down on the work surface and the top panel facing you.
   b. Disconnect the ribbon cables from the Power PC board.
   c. Remove the ten T-15 Torx drive screws securing the Power PC board to the chassis support.
   d. Remove the two 3/16 inch securing nuts that attach the GPIB connector to the rear of the support bracket.
   e. Remove the two 3/16 inch securing nuts that attach the Video out connector to the rear of the support bracket.
   f. Lift the Power PC board out of the instrument.
3. *To reinstall the Power PC board:* Reverse the steps. Refer to the cable connections table for information about where to connect cables. (See page 72, *Cable connections*.)

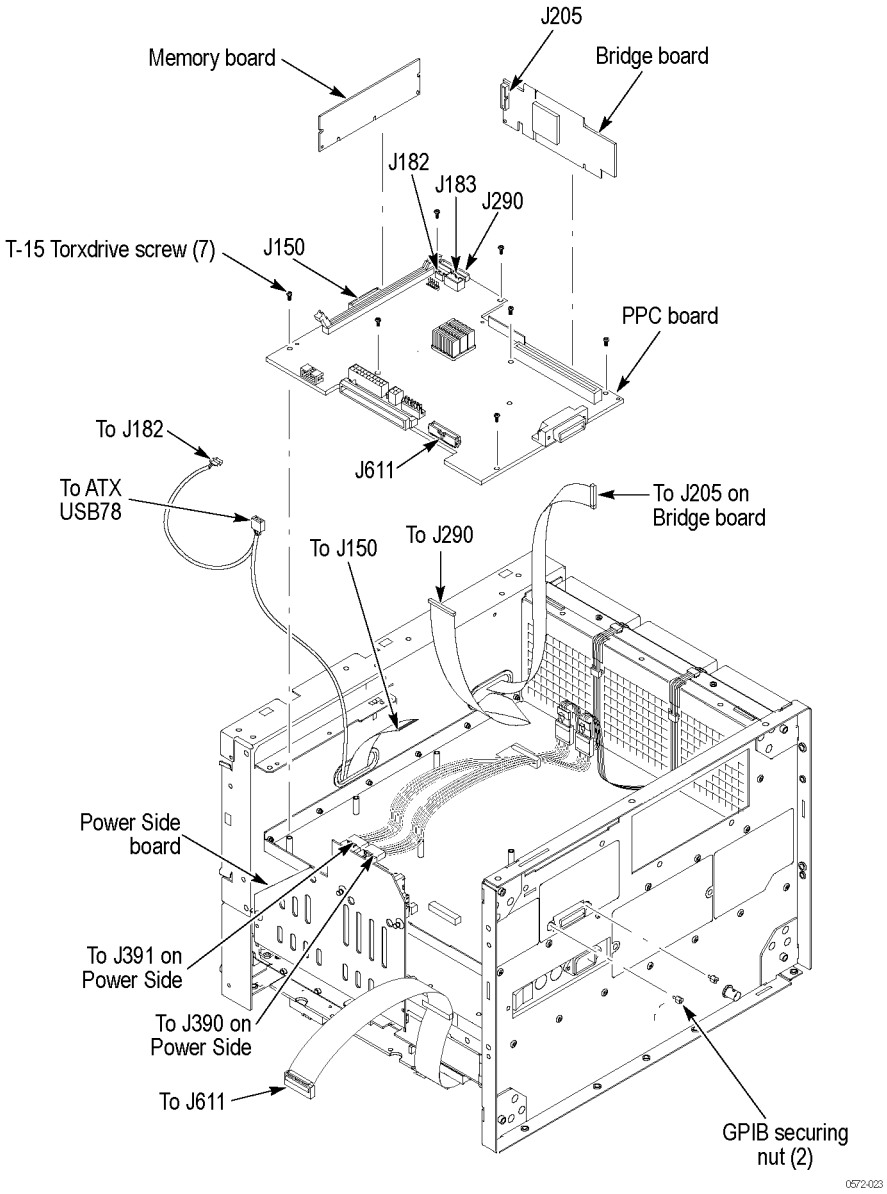


Figure 15: Power PC board removal

Power side board

1. *To access the Power Side board, remove these assemblies:*
   - Right side trim (See page 29.)
   - Bottom cover (See page 30.)
   - Right cover (See page 30.)
2. *To remove the Power Side board:*
   a. Set the instrument with the bottom down on the work surface and the right side facing you.
   b. Pull the Side Power board our far enough so that you can reach the cables on the inside-facing front side of the board. Pull the board straight out, disconnecting it carefully from the Low-Voltage Power Supply and the Power PC board. (See Figure 22 on page 78.)
   c. Disconnect all of the cables from the Power Side board.
   d. Remove the Side Power board completely from the instrument.
3. *To replace the Power Side board:* Reverse the steps. Refer to the cable connections table for information about where to connect cables.(See page 72, *Cable connections*.) Be careful to align the connectors on the Side Power board with the connectors on the Low-Voltage board and the Power PC board.

NOTE. *Make sure that the connectors on J11, J12, and J13 are fully seated and that the latches are engaged.*

Reconnect the Power Side board to the Power PC board and the Low-Voltage Power supply carefully, making sure that all of the pins match up with the connectors and are fully seated.

Bridge board

1. *To access the Bridge board, remove these assemblies:*
   - Trim (all) (See page 29.)
   - Left cover (See page 30.)
   - CD-RW/DVD and Hard Drive mounting frame (See page 43.)
2. *To remove the Bridge board:* (See Figure 16 on page 51.)
   a. Set the instrument with the bottom down on the work surface.
   b. Disconnect the cables from the Bridge board.
   c. Lift the Bridge board up and out from the chassis.
3. *To reinstall the Bridge board:* Reverse the steps. Refer to the cable connections table for information about where to connect cables.(See page 72, *Cable connections*.) Make sure that the cables are fully seated.

Fan assembly

You will need a T15 Torx driver.

1. *To access the fan assembly, remove these assemblies:*
   - Trim (all) (See page 29.)
   - Bottom cover (See page 30.)
   - Left cover (See page 30.)
2. *To remove the fan assembly:* (See Figure 16 on page 51.)

CAUTION. *Be careful when handling the fan assembly; the fan blades are easily to damage.*

   a. Set the instrument with the bottom down on the work surface.

   b. Disconnect the left and right fan cables from the left and right extender cables.

   c. Remove the two T-15 Torx drive screws that attach the fan assembly to the top main chassis.

   d. Lift the fan assembly up and out from the chassis.

3. *To reinstall the fan assembly:* Reverse the steps. Be sure to connect the cable marked “Left” to the cable extender matched with J391. Connect the cable marked “Right” to the cable extender matched with J390. Refer to the cable connections table for more information about where to connect cables. (See page 72, *Cable connections*.)

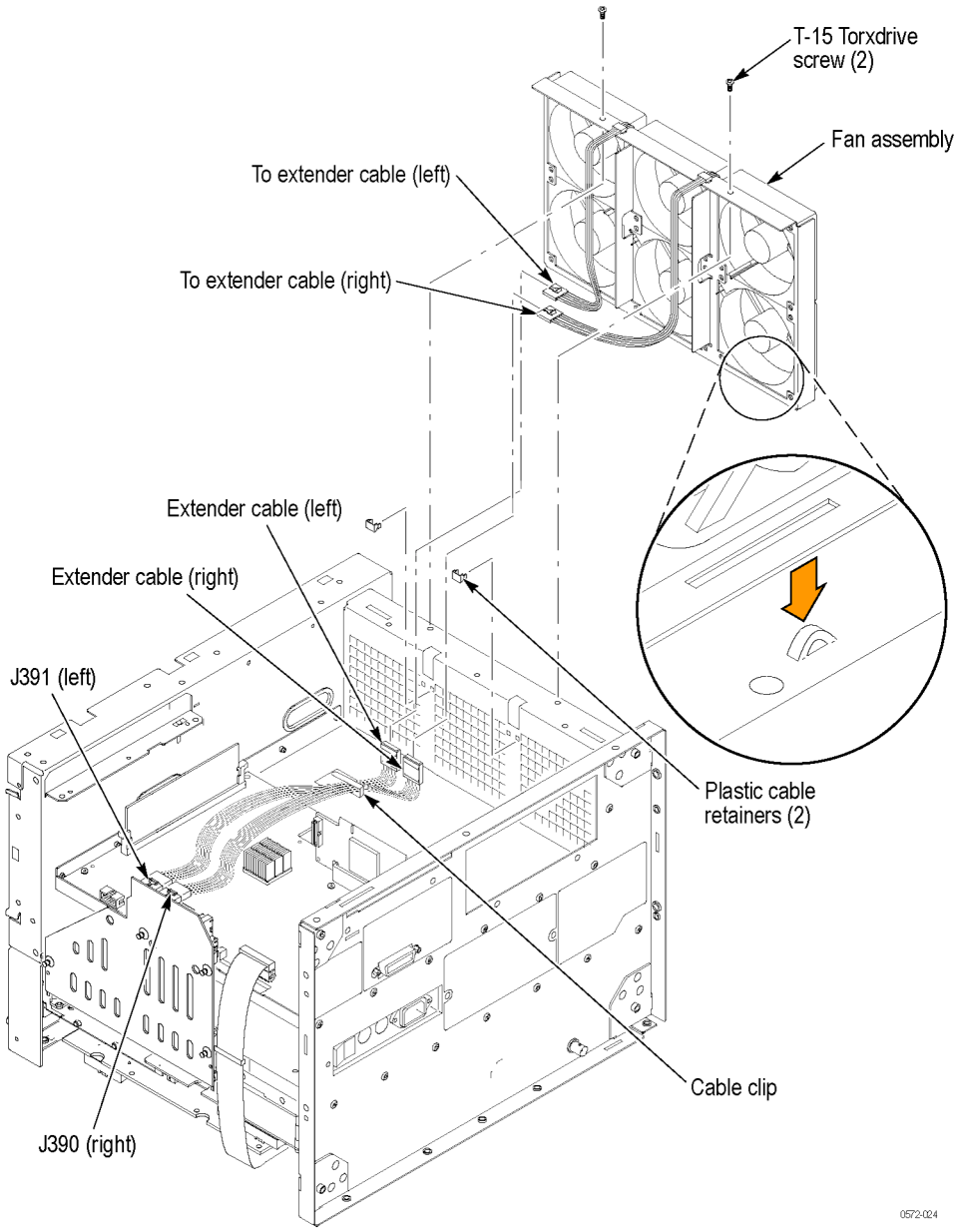


Figure 16: Fan assembly removal

Low-Voltage power supply

You will need a T-15 Torx driver.

NOTE. *See also Checking the Power Supply Voltages in the Troubleshooting section. (See page 65, Checking the power supply voltages.)*

1. *To access the Low-Voltage Power Supply, remove these assemblies:*
   - Trim (all) (See page 29.)
   - Bottom cover (See page 30.)
   - Left and Right covers (See page 30.)
   - Power Side board (See page 49.)
   - Disconnect the cable (Tektronix part number 174-4241-01) from J01 on the Electrical Front-End board, allowing the clip that holds the cable to remain in place.

CAUTION. *Do not remove the clip that holds the cable in place. To do so can cause EMI issues.*

2. *Remove the low-voltage power supply as follows:*
   a. Set the instrument with the bottom on the work surface and the right side facing you.
   b. Disconnect J611 ribbon cable connector from the PC Processor board. (See Figure 23.)
   c. Remove the two T-15 Torx drive screws securing the low-voltage power supply to the right-side chassis support.
   d. Remove the three T-15 Torx drive screws securing the low-voltage power supply to rear chassis.
   e. Hold the low-voltage power supply and carefully slide the assembly out of the mainframe.
3. *To reinstall the power supply:* Reverse the steps. Refer to the cable connections table for information about where to connect cables. (See page 72, *Cable connections*.)

Acquisition system

The Acquisition system consists of the Time Base circuit board and bracket, the Electrical Front-End circuit board and chassis, and the Optical Front-End circuit board and chassis. The circuit boards are not customer replaceable. If any of these circuit boards must be replaced, return the instrument to Tektronix for repair.

Electrical sampling modules

- Do not attempt component-level repair of any sampling modules.
- If your electrical sampling module requires repair or replacement, remove the module cover and keep the cover and the attaching hardware (except for the modules listed in the following bullet). Return the sampling module chassis, using approved antistatic packaging and shipping practices, to Tektronix for service.
- Return 80E07/B, 80E08/B, 80E09/B, and 80E10/B Electrical Remote Sampling modules, as an entire module assembly, to a Tektronix service center for repair. Do not remove front panels or covers.
- You can exchange the sampling module at your local Tektronix service center or through the central Tektronix exchange in Beaverton, Oregon. See the *Contacting Tektronix* information at the front of this manual.
- When the repaired or replacement module chassis is returned to you, install your cover and front panel on the new chassis, using the following instructions in reverse as appropriate.

Removing the cover

NOTE. *The 80E07/B, 80E08/B, 80E09/B, and 80E10/B Electrical Remote Sampling modules should not be disassembled. Return the entire module assembly.*

CAUTION. *Static discharge can damage any semiconductor in the instrument or sampling module. Wear wrist and foot grounding straps while handling sampling modules. Make sure that service is performed only at a static-free work station by a qualified service technician. Minimize handling of static-sensitive components.*

1. Set the sampling module with the left side down on the work surface and the right side facing you. Refer to the exploded views in the next section, if necessary, for details of specific electrical modules.
2. *Remove the cover:* (See Figure 17.)
   a. Remove the screws that attach the front panel to the cover. Remove the front panel.
   b. Remove the screws that attach the cover to the chassis and slide the chassis out toward the rear of the cover.

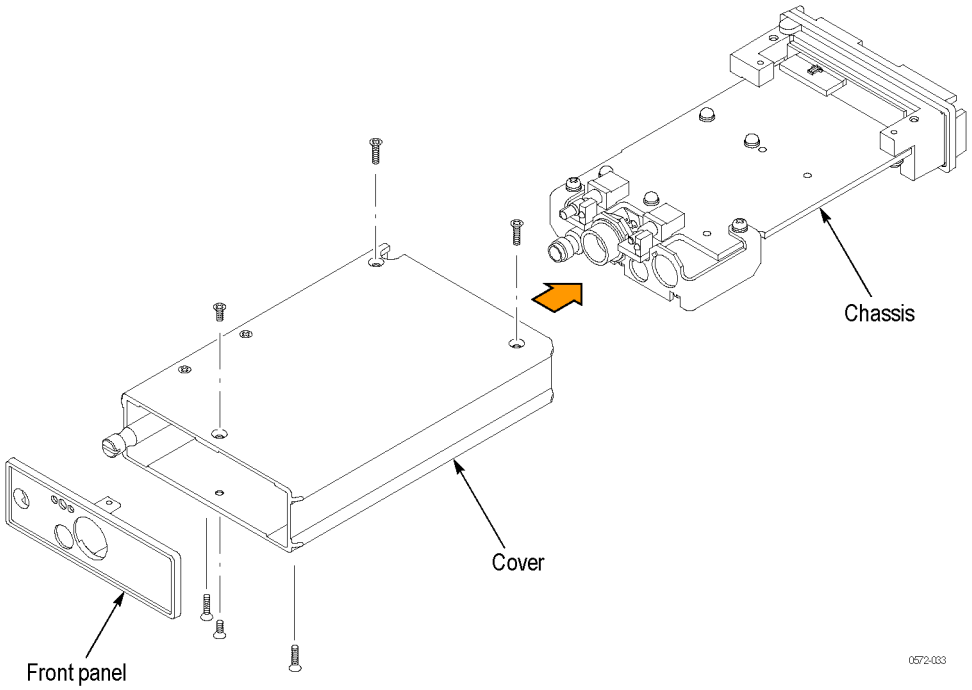


Figure 17: Sample of electrical module hardware removal

Replacing the chassis

CAUTION. *Transport the sampling module chassis with terminations on the inputs.*

Transport the sampling module chassis in the original container and store the sampling modules on a metal or conductive surface.

When handling the exposed chassis sampling module only, do not touch any exposed component on the circuit board. Hold the exposed module by the edges of the circuit board or the rear or front housings.

1. Reinstall the chassis into the cover by reversing the removal procedure. (See page 54, *Removing the cover*.)

WARNING. *Do not install or remove any sampling modules while the instrument is powered on. Electrical shock may occur. Always power the instrument down before attempting to remove or insert any sampling module to avoid potential injury from shock.*

2. Install the electrical sampling module into one of the instrument small module compartments.

3. Connect one end of a GPIB cable to the GPIB port of the instrument. Connect the other end of the cable to the GPIB port of a PC.

CAUTION. *For the next step, make sure that you do not have any user interface dialogs active. Dialogs such as Compensation, System properties will prevent the instrument from responding to GPIB commands.*

5. *Enter the following GPIB commands to program the serial number (printed on the sampling module cover) into the replacement sampling module chassis:*

   a. `SYSTem:PROTect OFF`

   b. `SYSTem:PROPerties:CH(1-8):SERialnum <serialNum_string>`

      Example: `SYST:PROP:CH3:SER "B010123"`

   NOTE. *For a 2-channel sampling module, either channel can be specified in step b. For an 80E01 sampling module, use only the lower numbered channel number, such as CH1 or CH3.*

   c. `SYSTem:PROTect ON`

6. Verify the serial number change: Pull down the **Utility** menu, and then select **System Properties, Sampling Modules.** Click the channel you want to verify, such as **C3 or C4.** This display will confirm the sampling module serial number.

7. Run compensation from the Utilities menu to verify that the instrument meets its accuracy specifications.

Optical sampling modules

Do not attempt component-level repair of any optical sampling modules.

When an optical module requires repair or replacement, return the entire module to Tektronix. Do not remove the cover to reuse the serial number.

80A00 and 82A00 series modules

- Do not attempt component-level repair of these modules.
- If your module requires repair or replacement, remove the front panel and module cover and keep the front panel, cover and attaching hardware. Send the module chassis to Tektronix for service.
- When the repaired or replacement module chassis is returned to you, install your cover and front panel on the repaired or new chassis, using the following instructions in reverse as appropriate.

CAUTION. *Static discharge can damage any semiconductor in the instrument or sampling module. To prevent damage from static discharge, have a qualified service technician do module disassembly/assembly work at a static-free work station, wearing wrist and foot grounding straps at all times while handling the module chassis. Minimize handling of static-sensitive components.*

Removing 80A02 and 82A00 front panels and covers

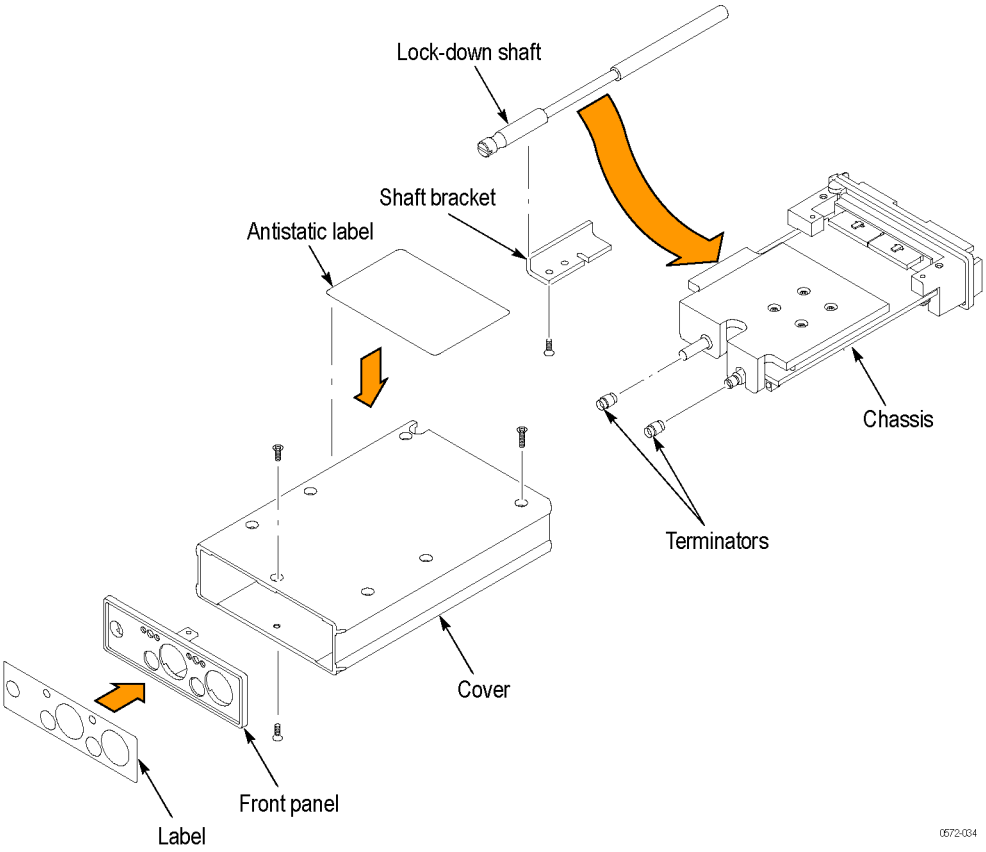


Figure 18: 80A00 and 82A00 series module disassembly

NOTE. *The figure shows a generic module; your module will have a different number of front connectors and cover screws.*

Use the following procedure and refer to the above diagram to disassemble the module front panel and cover:

1. Set the module on the work surface with the front facing you, and the top of the module facing up.
2. *To remove the front panel:*
   a. Remove all coaxial terminators from the front panel connectors.
   b. Remove the screw on the top near the center of the front panel edge. Flip the module on the top side (bottom up).

c. Remove the screw on the bottom near the center of the front panel edge.

d. Remove the front panel.

3. *To remove the cover:*

a. Remove all screws from the top and bottom side of the module that attach the cover to the chassis.

b. Slide the chassis out toward the rear of the cover.

4. *To remove the lock-down shaft and bracket:*

a. Remove the two screws that attach the bracket to its mount. Remove the bracket.

b. Lift out the lock-down shaft.

5. *To reassemble the module:* Perform the disassembly steps in reverse order to reassemble the module, considering the following sub-steps as they apply:

a. If installing a replacement front panel, perform the following steps before installing the front panel:

- Remove the backing from the front panel label.
- Align the holes and attach the label to the new front panel.

b. If installing a replacement cover, perform the following steps before replacing the cover:

- Remove the backing from the antistatic label.
- Install the antistatic label to the replacement cover.

Troubleshooting

This section contains information and procedures designed to help you isolate faulty modules in the instrument. If an assembly must be replaced, follow the removal instructions. (See page 24, *Removal and installation*.)

Check for common problems

Use the following table to isolate possible failures.

Table 2: Possible causes of instrument failure

Failure symptom	Possible cause(s) / solutions
Mainframe will not power on	■ Power cord not plugged in. ■ Failed fuse. ■ Faulty power supply. ■ Faulty modules. ■ Main power switch (rear panel) not on. ■ Front panel power switch not on. ■ Monitor not connected properly.
Front panel light comes on (mainframe powers on), but one or more fans will not operate	■ Faulty fan cable. ■ Defective fan assembly. ■ Faulty power supply.
Mainframe powers on but no signal displayed	■ Wrong channel is selected; select correct channel from front-panel channel selector or vertical setup menu. ■ Module not fully installed in the slot. ■ Signal cable not connected properly. ■ Wrong trigger input; check trigger cable connection to either direct or prescale trigger input and make sure that the corresponding trigger source is selected in the Trigger Setup menu.
Controller appears "dead"; power light comes on, but monitor screen(s) is (are) blank	■ SO DIMMs incorrectly installed or missing. ■ Defective ATX board.

Table 2: Possible causes of instrument failure (cont.)

Failure symptom	Possible cause(s) / solutions
Flat LCD panel display blank	■ Check for a defective cable from Front-Panel board to Bridge board. ■ Check for a defective cable from Power PC board to Front-Panel board. If an external monitor is plugged in to the DVI-I rear-panel output connector, check for a display on the external monitor: ■ If there is no display, verify that the monitor is powered on. If the monitor is powered on, the ATX circuit board assembly might need to be replaced. ■ If there is a display, the LCD assembly or the Power PC assembly might need to be replaced.
Front panel LEDs do not light	■ Replace the Front-Panel board.
Hard disk drive related symptoms	■ Defective hard disk drive. ■ Replaceable hard disk drive not installed. ■ Power supply failure. ■ Replaceable hard disk drive or optionally field installed fixed hard disk drive not configured as bootable (slave) master hard disk drive. ■ Faulty benchtop controller.
CD-RW/DVD related symptoms	■ Defective CD-RW/DVD. ■ Defective CD-RW/DVD drive cable.
Diagnostic errors	■ Remove all electrical and optical modules from the instrument, then run diagnostics again. If the instrument passes diagnostics, check for the electrical and optical module that is causing the failures. Then run diagnostics again. ■ If the instrument still fails the diagnostics without the installed modules, contact Tektronix Customer Support.
Compensation errors	■ Verify that each module is completely installed in the slot. ■ Remove all electrical and optical modules from the instrument, and then run compensation again. If the instrument passes compensation, check for the electrical and optical module that is causing the failure. ■ If the instrument still fails compensation, contact Tektronix Customer Support.
Modules not recognized	■ Module firmware incompatible with mainframe software version. ■ Module not fully installed in the slot. Reseat module (power down instrument before reseating). ■ Faulty module. Contact Tektronix Customer Service for help.

Table 2: Possible causes of instrument failure (cont.)

Failure symptom	Possible cause(s) / solutions
80C0X modules have no signals displayed	■ Module not fully installed in the slot. Reseat module (power down instrument before reseating). ■ Wrong channel is selected; check Waveform Selector and Setup menus. ■ Signal cable not connected properly. ■ Possible optical cable problems. ■ Possible optical module or Time Base assembly problems. Contact Tektronix Customer Service for help.
80C0X modules; poor noise performance	■ Male fiber-fiber connections need to be cleaned.
80C0X modules; frequency response exhibits a steep negative "droop" in its plot.	■ Bad internal O/E RF amplifier de-coupling. Contact Tektronix Customer Service for help.
BIOS error messages	■ Refer to the BIOS error message table. (See Table 3.)
Instrument locks up	■ Power off the instrument, and then restart. If the instrument has the same problem, contact Tektronix Customer Support. ■ Replace the Power PC circuit board assembly.

Isolating failures to the 80EXX/80CXX modules or the mainframe

To determine if the sampling module or the mainframe failed, do the follwing:

1. Perform the module compensation.
2. Perform the measurement procedures you require to make your test.
3. If the instrument fails to complete the measurement, remove the sampling module and install it in another slot.
4. Repeat steps 1 and 2, and then take the following action:
   - If the instrument successfully completes the measurement, there is a good chance that the mainframe channel has failed. Perform other mainframe diagnostics in this section.
   - If the instrument fails to complete the measurement, there is a good chance the sampling module has failed. Return the module to Tektronix for repair.

Isolating to a board if power will not come up

If the DSA8300 power is on, a red light is visible through the right side of the instrument.

If the on/standby pin (TP6 on the Power Side board) is low, the instrument determines that power is on.

If the instrument determines that power is on, a red light means that there is an over-current condition.

Remove boards one at a time to locate a fault. the Display Adapter board, the CD-RW/DVD assembly, the Time Base board, the Optical Front-End board, the Electrical Front-End board, The Power Side board, the ATX board, and the Bridge board. (See Figure 4 on page 31.)

If you remove the ATX board, you must jumper the debug power-on pin. This pin, J401 is on the front of the Power Side board (which faces to the inside of the instrument). Locate the “Force Power” label on the back of the board (which faces you), and then reach around the edge of the board to jumper the pins. (See Figure 19.)

The Power PC board and the Power Side board are required for power to come up.

If removing the boards did not find the problem, replace the Low Voltage Power Supply board.

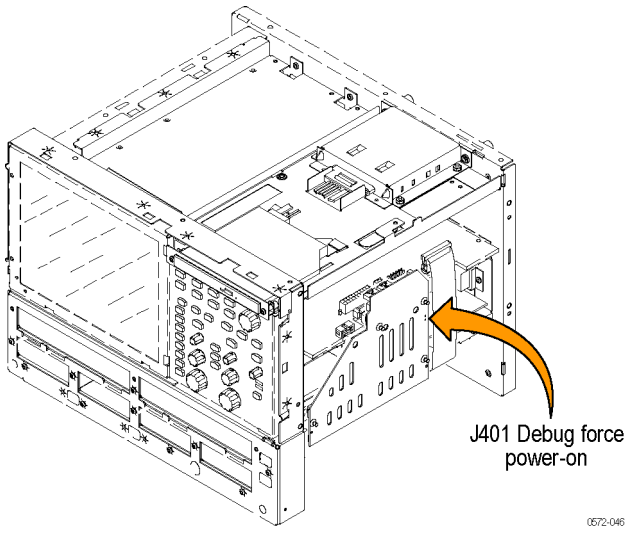


Figure 19: Location of debug pins

Checking the power supply voltages

You will need a digital voltmeter to check power supply voltages.

1. Power off the mainframe and remove any modules installed in it.
2. Power on the instrument.
3. Connect the reference lead of a digital voltmeter to chassis ground, such as the top of the power supply.
4. Attach a 0.025 inch square pin to the probe tip of the other lead and insert it into a pin on one of the connectors. The voltages at the pins are labeled on the back of the Power Side board, and are listed in the following table:

Power supply voltages

Power Side board connector	Voltage (labeled on back of board)
via	Ground
via	+ 12 VD
via	+ 5 VD
via	+ 3.3 VD
via	+ 5 SB
via	On/STBY
P2 (A24, B24, C24)	+5 VA
P2 (A17, B17, C17)	-5 VA
P2 (A15, B15, C15)	+15 VA
P2 (A13, B13, C13)	-15 VA

5. Measure the power supply voltages with the voltmeter and compare each reading to the values listed in the table. If the voltages are within about 5% of the nominal voltages, your power supply is functional. For more information about the power supply, refer to the description of the low voltage power supply. (See page 6.)

If the instrument will not boot

If a monitor connected to the DVI-I port shows instrument information, but the instrument LCD does not turn on or display boot-up information, replace the display assembly (LCD, lamps, and cable).

If there is no display:

1. Connect a monitor to the external DVI-I port. Make sure that the external monitor is turned on.
2. At boot time and while using an external monitor connected to the external video port, repeatedly press **DEL** to enter the instrument BIOS setup.
3. Select the **Chipset** menu.
4. Select the **North Bridge Configuration** menu.

5. Select **Video Function Configuration** and
6. Verify that the Boot Display Device is set to **[CRT+LVDS]**.
7. Exit the BIOS setup menu (if you changed settings, make sure to save changes as part of the exit process).
8. Restart the DSA8300.
9. If the display is configured correctly in the BIOS, and there is still no display, the Display Adapter board may be bad.

Booting into windows

If the instrument will not boot, insert the OS Restore DVD and select the **Repair** option. After it finishes, remove the DVD and reboot.

If the instrument still will not boot, contact your nearest Tektronix Service Center. For contact information, see *Contacting Tektronix* at the front of this manual.

PPC and ATX PC diagnostics

The primary diagnostics for the instrument are the power-on diagnostics and the instrument diagnostics, as described in the following paragraphs.

Power-On diagnostics

The power-on diagnostics check the basic functionality of the instrument at every power on. If any failures occur at power on, the screen displays the calibration and diagnostics property page.

The power-on tests verify that hardware is installed and can be accessed by the software. The tests provide limited diagnostic information. They do not provide any performance information.

The power on tests check the generic hardware including the keyboard, mouse, memory, CPU, and associated peripherals. The interrupt lines and trigger lines are also checked.

Instrument diagnostics

The instrument diagnostics provide more extensive tests than the power-on diagnostics. The instrument executes a set of internal diagnostics at every power-up. The results can be viewed from the Utilities > Diagnostics dialog.

BIOS beep codes

When the ATX board powers on, several BIOS checkpoints generate an audible 'beep' code on failure, using the standard PC speaker.

Table 3: BIOS beep codes

Number of beeps	Error message	Troubleshooting
1	Memory refresh timer error	Reseat the memory, or replace with known good modules.
2	Parity error	Reseat the memory, or replace with known good modules.
3	Main memory read/write test error	Reseat the memory, or replace with known good modules.
4	Motherboard timer not operational	Fatal error indicating a serious problem with the system. Contact your Tektronix field office.
5	Processor error	Fatal error indicating a serious problem with the system. Contact your Tektronix field office.
6	Keyboard controller BAT test error	Fatal error indicating a serious problem with the system. Contact your Tektronix field office.
7	General exception error	Fatal error indicating a serious problem with the system. Contact your Tektronix field office.
8	Display memory error	If the system video adapter is an add-in card, replace or reseat the video adapter. If the video adapter is an integrated part of the system board, the board might be faulty.
9	ROM checksum error	Fatal error indicating a serious problem with the system. Contact your Tektronix field office.
10	CMOS shutdown register read/write error	Fatal error indicating a serious problem with the system. Contact your Tektronix field office.
11	Cache memory bad	Fatal error indicating a serious problem with the system. Contact your Tektronix field office.

Firmware updates

To update the firmware, install the firmware disc in your instrument and follow the displayed instructions.

To download the latest firmware, got to www.tek.com/downloads, enter **DSA8300** in the **Manuals, Data Sheets, Software, and More** field, and select **Software** from the **Select Download Type** field. Select the latest firmware version to download.

To order a firmware update, contact your Tektronix service center.

After repair

After removal and replacement of an assembly due to electrical failure, you may need to perform an adjustment or software update as indicated in the following table.

Table 4: Action required for assembly replaced

Action required for assembly replaced

Assembly replaced	Adjustment required	Software update required
Front panel assembly	No	None
Time Base board	Yes	None
Optical Front-End board	Yes	None
Electrical Front-End board	Yes	None
Power PC board	Yes	Boot ROM and authorization code
ATX processor assembly	No	Windows, instrument application
Display panel or display system	No	None
Low Voltage Power supply	No	None
Fans	No	None

Reloading instrument model and serial number

If you have replaced the Power PC board in the instrument, you must reload the instrument model and serial number. If you have installed an exchange sampling head, you must reload the correct sampler serial number.

1. *Install a model or serial number into the instrument as follows:*

CAUTION. *Make sure that the unique identifier does not end in all zeros before generating or setting the key.*

   a. Connect a PC with a GPIB interface to the GPIB interface of the instrument.

   b. Enter the following GPIB commands to install a new instrument model number:

```
SYST:PROT OFF

SYST:PROP:MAI:MODE "DSA8300"

SYST:PROT ON
```

NOTE. *These commands take effect immediately.*

   c. Enter the following GPIB commands to install a new instrument serial number:

```
SYST:PROT OFF

SYST:PROP:MAI:SER <serial number string>, for example,
"B010100"

SYST:PROT ON
```

2. *To verify that the commands took effect, check the mainframe properties: Utilities>System Properties.*

Repackaging instructions

This section contains the information needed to repackage the portable mainframe for shipment or storage.

Packaging

When repacking the instrument or sampling modules for shipment, use the original packaging. If the packaging is unavailable or unfit for use, contact your local Tektronix representative to obtain new packaging. Refer to *Contacting Tektronix* at the front of this manual for the address, email address, and phone number.

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

Shipping to the service center

1. Contact the Service Center to get an RMA (return material authorization) number and any return or shipping information you may need.
2. If the instrument is being shipped to a Tektronix Service Center, enclose the following information:
   - The RMA number
   - The owner's address
   - Name and phone number of a contact person
   - Type and serial number of the instrument
   - Reason for returning
   - A complete description of the service required
3. Mark the address of the Tektronix Service Center and the return address on the shipping carton in two prominent locations.

Replaceable parts list

This section contains a list of the replaceable assemblies for the instrument. Use this list to identify and order replacement parts.

Parts ordering information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest circuit improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- 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.

Module servicing

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

Module exchange. In some cases you may exchange your module for a remanufactured module

These modules cost significantly less than new modules and meet the same factory specifications. For more information about the module exchange program, contact Tektronix. See the *Contacting Tektronix* information at the front of this manual.

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 similarly as other replacement parts.

Using the replaceable parts list

This section contains a list of the mechanical and/or electrical components that are replaceable for the instrument. Use this list to identify and order replacement parts.

The following table describes each column in the parts list:

Parts list column descriptions

Column	Column name	Description
1	Figure & Index Number	The figure and index numbers indicate where each component listed in the table can be viewed. For example, 5-1-1 indicates item 1 on figure 5-1.
2	Tektronix Part Number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial Number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entries indicates the part is good for all serial numbers.
5	Qty	This indicates the 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 as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.

Abbreviations

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

Exploded views

The index numbers in the following tables correspond to the index numbers in the exploded view illustrations.

Cable connections

Cable connections are shown in the exploded views, where possible. For additional details about where cables are used, refer to the following table:

From	To	Cable	Illustrations
ATX SATA1	CD-RW/DVD DRIVE	174-5650-00	(See Figure 21.) Item 12
ATX SATA5	HARD DRIVE	174-5349-00	(See Figure 21.) Item 13
BRIDGE J205	DISPLAY ADAPTER J3	174-4793-00	(See Figure 15.) Item 25
USB J1	ATX USB78	174-4808-00	(See Figure 23.) Item 5

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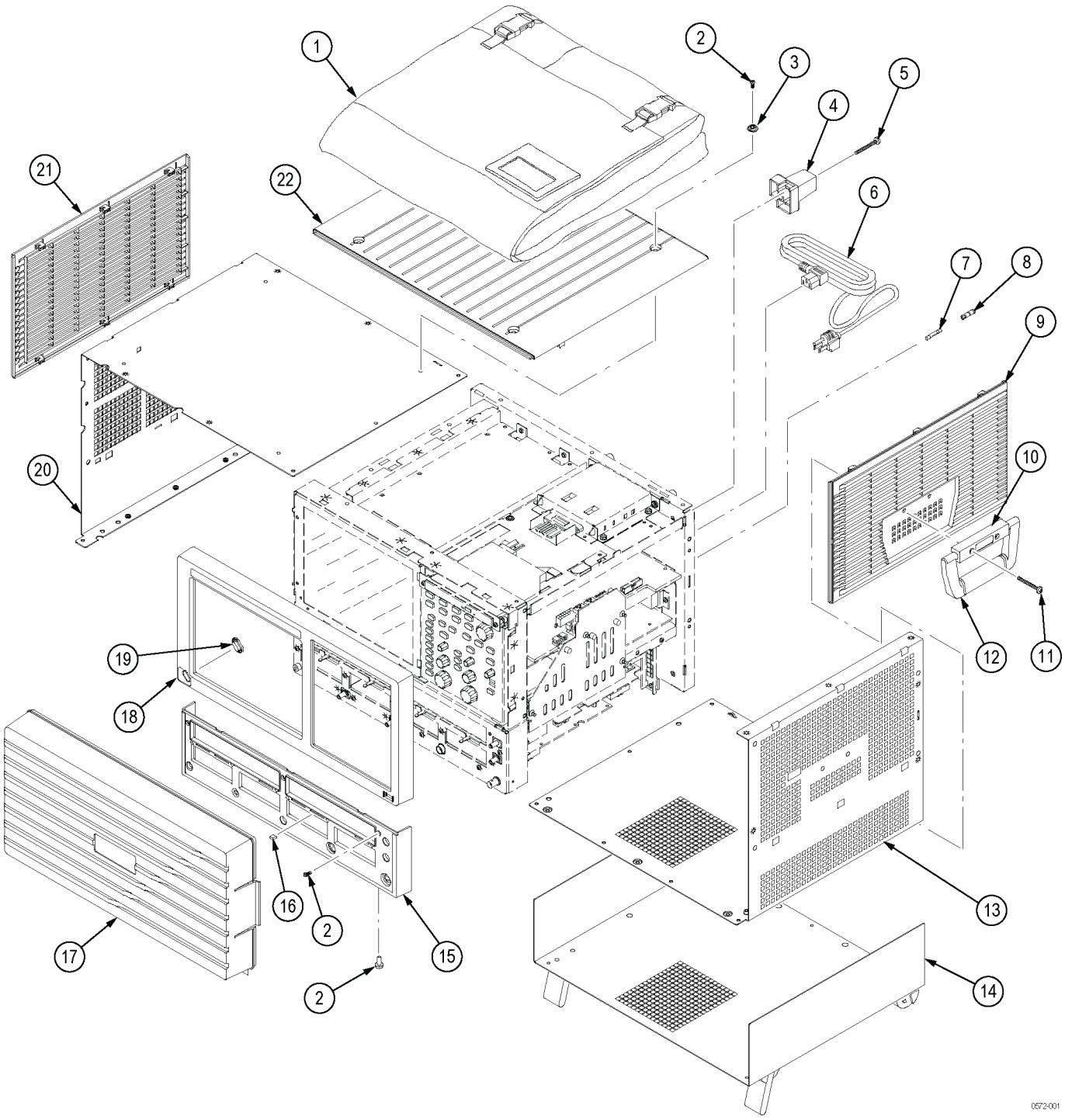

Figure 20: External parts

Table 5: External replaceable parts

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
20- 1	016-1441-01			1	ACCESSORY POUCH: BLACK CORDURA
-2	211-1050-00			12	SCREW, MACHINE: 6-32 X 0.312 L, PNH, STL CAD, T15
-3	355-0298-00			4	STUD, SNAP: 0.570 DIA, 0.165 THK, STAINLESS
-4	348-1648-00			4	FOOT: REAR W/CORD WRAP, THERMOPLASTIC
-5	211-0935-00			4	SCREW, MACHINE; 6-32 X 0.50, PNH, T-15 TORX, STEEL, ZINC FINISH
-6	161-0104-00			1	CA ASSY, PWR: 3,18 AWG, 92 L, SVT, (STANDARD ACCESSORY)
-7	159-0046-00			2	FUSE, CARTRIDGE: 3AG, 8A, 250 V, 15SEC, CER
	159-0381-00			2	FUSE, CARTRIDGE: 5 X 20 MM, 6.3A, 250 V, FAST BLOW, HIGH BREAKING CAPACITY
-8	200-2264-00			2	CAP, FUSEHOLDER: 3AG FUSES (AMERICAN)
	200-2265-00			2	CAP, FUSEHOLDER: 5 X 20MM FUSES (EUROPEAN)
-9	200-4522-00			1	RIGHT SIDE TRIM, BLUE
-10	407-4887-00			1	BRACKET; HANDLE BASE, PC/ABS ALLOY, BLUE
-11	212-0232-00			2	SCREW, MACHINE: 8-32 X 1.125L, PNH, STL, BLACK OXIDE, T-20
-12	367-0528-00			1	HANDLE, CARRYING: POLYPROPYLENE VINYL GRIP SECTION
-13	200-5117-00			1	RIGHT SIDE COVER, ALUMINUM
-14	200-5116-00			1	BOTTOM COVER, INCLUDING FEET
-15	101-0167-00			1	ACQUISITION TRIM
-16	200-4519-00			1	FRONT PANEL COVER
-17	101-0168-00			1	FRONT PANEL TRIM RING
-18	260-2719-00			1	SWITCH, KEYPAD: ELASTOMERIC, FRONT PANEL, ON/OFF
-19	200-4555-00			1	LEFT SIDE COVER, ALUMINUM
-20	200-4521-00			1	LEFT SIDE TRIM, BLUE
-21	200-4520-00			1	TOP TRIM, BLUE

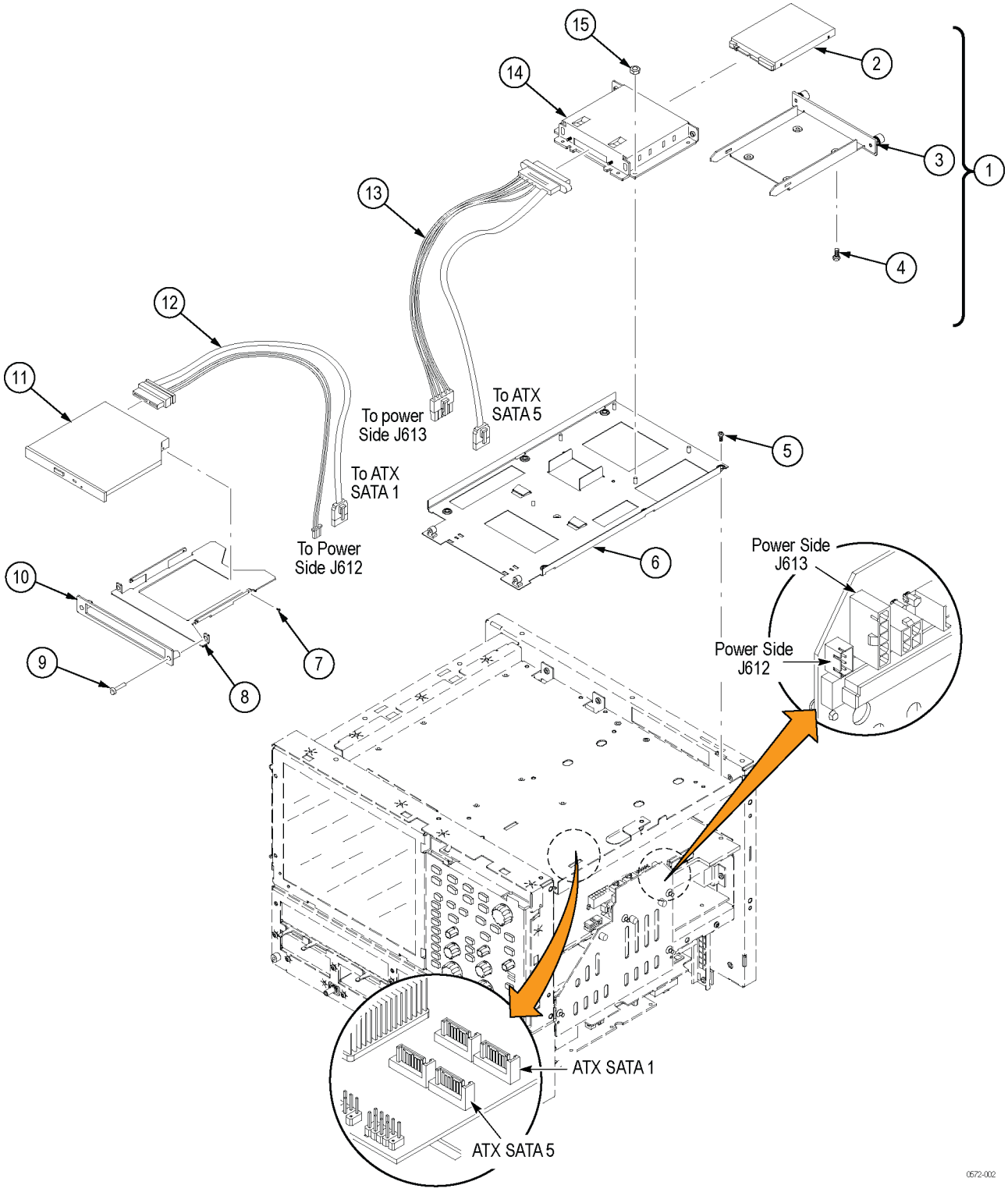

Figure 21: Drives

Table 6: Drives replaceable parts

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
21- 1	065-0890-00			1	HARD DRIVE ASSEMBLY KIT: INCLUDES ITEMS 2, 3, and 4
-2	650-5395-00			1	DRIVE ASSEMBLY: HARD DRIVE, PROGRAMMED 1197673XX
-3	407-5555-00			1	BRACKET; REMOVABLE HD BOTTOM
-4	211-1081-00			4	SCREW, MACHINE; M3 X 0.5 X 3.5MM, FLAT WAFER HD W/SERRATIONS STRESS RELIEVED, PHL, ZINC PLATED STEEL
-5	211-1050-00			2	SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15
-6	441-2636-00			1	CHASSIS; DRIVE FRAME BOTTOM
-7	211-0950-00			2	SCREW,MACHINE; M2X.4X3L,PHL, PNH, STL NI PL
-8	407-5288-00			1	BRACKET,DVD-CD/RW;SATA ADAPTER FOR SLIMLINE
-9	211-0738-00			2	SCREW,MACHINE; 6-32 X 0.625,PNH,STL BLK ZI,TORX
-10	200-5079-00			1	COVER; CD
-11	065-0807-01			1	DISK DRIVE;OPTICAL, CD-RW/DVD R/RW, 16.7 MB/SEC, 650MEG/8.5GIG, SATA/ATAPI
-12	174-5650-00			1	CA ASSY, SATA-DVD, DATA AND POWER;
-13	174-5349-00			1	CA ASSY; SATA COMBO, HARD DRIVE CABLE WITH LATCH;
-14	441-2550-00			1	CHASSIS; DRIVE FRAME CHASSIS TOP
-15	210-0457-00			4	NUT, PL, ASSEM WA; 6-32 X 0.312, W/LOCKWASHER, STEEL, ZINC FINISH

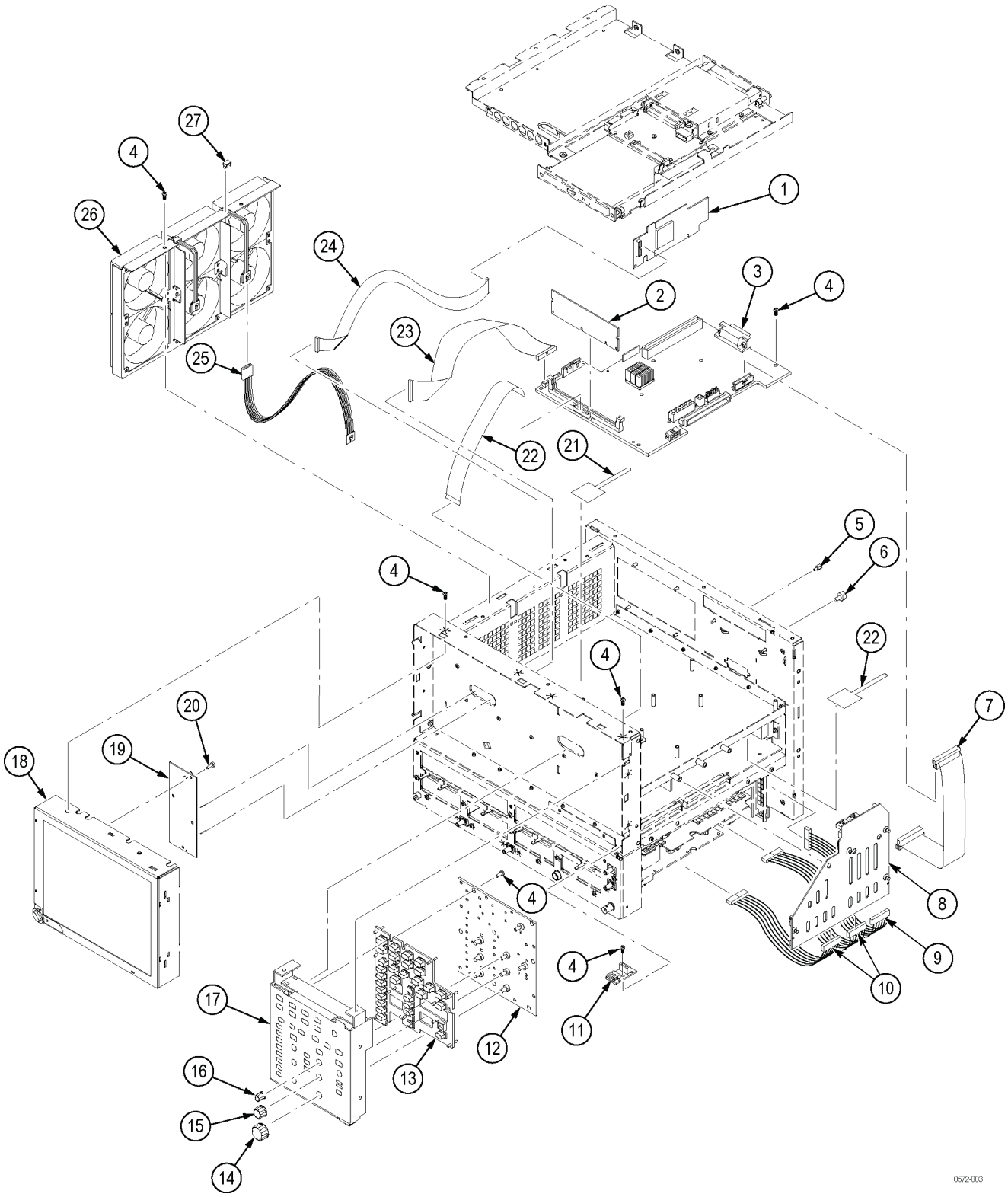

Figure 22: Front panel and processors

Table 7: Front panel and processors replaceable parts list

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
22- 1	679-6477-00			1	CIRCUIT BD ASSY: BRIDGE
-2	156-9484-00			1	IC,MEMORY; CMOS, SDRAM; 64MEG X 64, 512MEG, SYNC, UNBUFFERED, 3.3 V
-3	878-0567-00			1	CIRCUIT BD ASSY; POWER PC
-4	211-1050-00			20	SCREW, MACHINE: 6-32 X 0.312 L, PNH, STL CAD, T15
-5	214-3903-00			2	JACKSCREW ; 4-40 X 0.312 LONG, 0.188 H HEX HEAD STAND OFF, 4-40 INT THD, X 0.312 THD
-6	213-1061-00			2	JACKSCREW; 6-32 X 0.320 EXT THD,M3.5 X 0.6-6 INT THD X 0.215L,GPIB,BLACK OXIDE
-7	174-4241-01			1	CA, ASSY: RIBBON, BUS, IDC, 32 AWG, 17.00L, 60POS
-8	878-0247-00			1	CKT BD SUBASSY: POWER SIDE
-9	174-5625-00			1	CABLE, POWER, 24 CONDUCTOR, 8 IN
-10	174-5624-00			2	CABLE, POWER, 24 CONDUCTOR, 5 IN
-11	679-5660-00			1	CIRCUIT BD ASSY: USB
-12	679-6297-00			1	CIRCUIT BD ASSY: FRONT PANEL
-13	260-2724-01			1	SWITCH, KEYPAD: ELASTOMERIC, FRONT PANEL
-14	366-0770-00			3	KNOB, CAP: 0.925 DIA
-15	366-0771-00			2	KNOB, CAP; SILVER GRAY, 0.650 DIA X 0.520 H
-16	366-0772-00			3	KNOB, CAP: SIVER GRAY, 0.425 DIA X 0.520 H
-17	333-4642-00			1	FRONT PANEL BRACKET
-18	650-5304-00			1	LCD MODULE ASSEMBLY
-19	878-0414-00			1	CIRCUIT BD ASSY: DISPLAY ADAPTER BOARD
-20	211-0504-00			2	SCREW, MACHINE; 2-56 X 0.125, PNH, STL CRM PL, POZ
-21	343-0549-00			2	STRAP, TIEDOWN; 0.098 W X 4.0 L, ZYTEL
-22	174-4321-00			1	CA ASSY; FLAT FLEX, 26POS, 10.440L
-23	174-5087-00			1	CA ASSY; DISPLAY ADAPTER
-24	174-4793-00			1	CA ASSY; BRIDGE
-25	174-5824-00			2	CA ASSY: FAN EXTENDER, 6 POS, LATCHING
-26	437-0486-01			1	ASSY, FAN: SIX FANS
-27	343-1681-00			2	CABLE,CLAMP: FLAT, NYLON

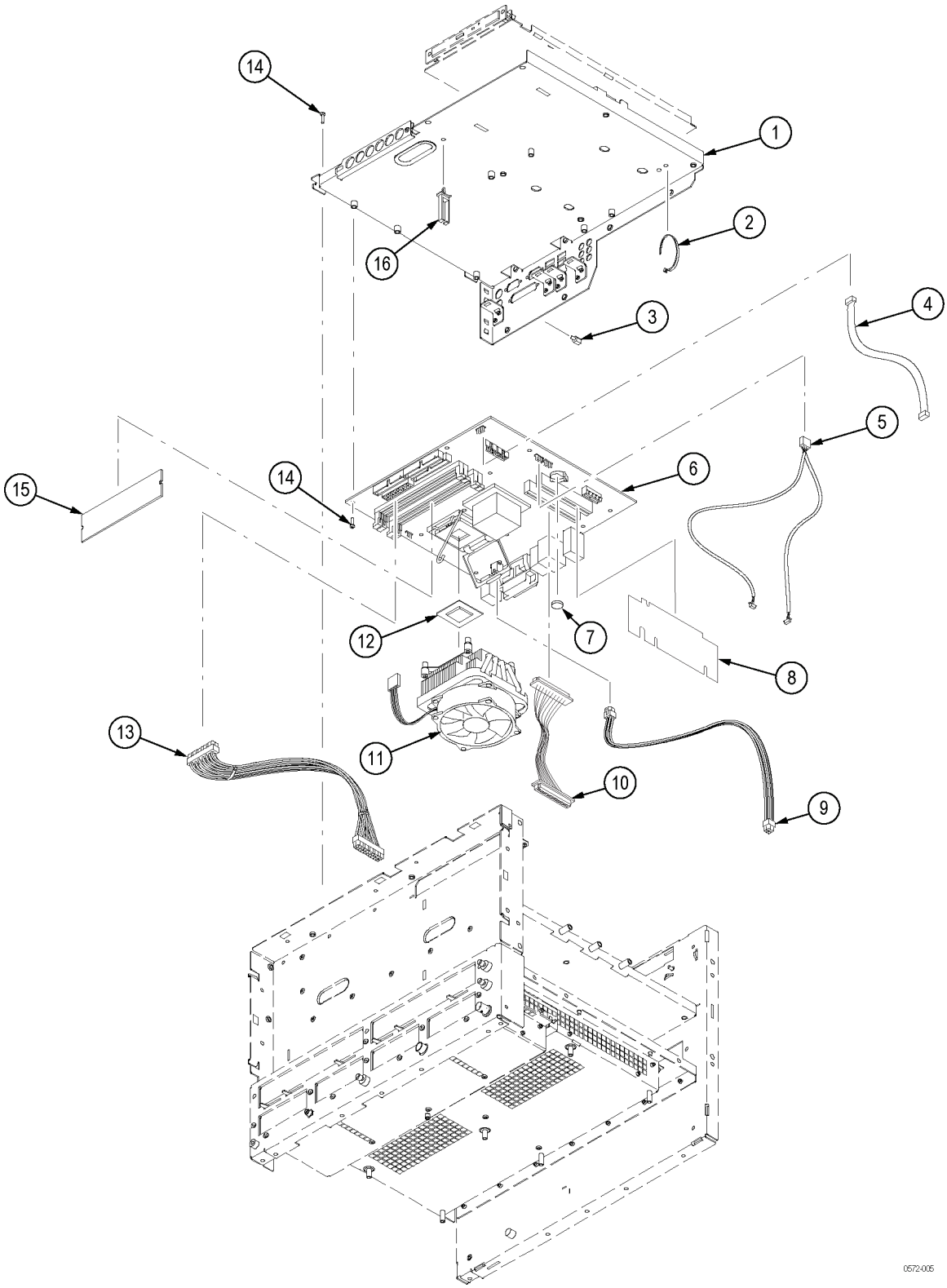

Figure 23: ATX assembly

Table 8: ATX assembly replaceable parts list

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
23- 1	441-2587-00			1	CHASSIS, ASSEMBLY, ATX, FINISHED
-2	343-0549-00			1	STRAP, TIEDOWN; 0.098 W X 4.0 L,ZYTEL
-3	214-3903-00			6	SCREW, JACK: 4-40 X 0.312 LONG, 0.188 H HEX HEAD STANDOFF, 4-40 INT THD, X 0.312 THD
-4	174-4807-00			1	CA ASSY: ATX USB; BETWEEN PPC J183 & ATX F PANEL
-5	174-4808-00			1	CA ASSY: USB 2.0, DUAL HEAD, 16.0 L;
-6	- - - - -			1	CIRCUIT BD ASSY: ADVANTECH COMPUTER BOARD. Contact Tektronix if replacement is needed.
-7	- - - - -			1	BATTERY, DRY; 3.0 V, LITHIUM MANGANESE DIOXIDE, COINCELL, CR2032
-8	679-6477-00			1	CIRCUIT BD ASSY: BRIDGE
-9	174-4798-00			1	CA ASSY; 4 PIN P4 POWER
-10	174-4348-00			1	CA ASSY, RF; COAXIAL,50 OHM
-11	119-7333-00			1	P4 LGA775 FAN-SINK-BRACKET FROM AVC. SAFETY CONTROLLED
-12	- - - - -			1	PROCESSOR; INTEL CORE 2 DUO, 3.0 GHZ, W/O FAN & HEATSINK. Contact Tektronix if replacement is needed
-13	174-4797-00			1	CA ASSY; 20 PIN ATX POWER
-14	211-1050-00			8	SCREW,MACHINE:6-32 X 0.312 L, PNH, STL, ZINC FINISH, T15
-15	167-1493-00			1	IC, MEMORY: 256MBIT X 64, 2GB DDR2 1.8 V, 6-6-6, 800 MT/S; MT16HTF25664AY-800, DIMM240, PC6400
-16	343-1683-00			1	CLAMP, VERTICAL WIRE SADDLE, NYLON 6/6, SNAPS INTO .185 DIA HOLE, 0.74 MAX CABLE DIAMETER

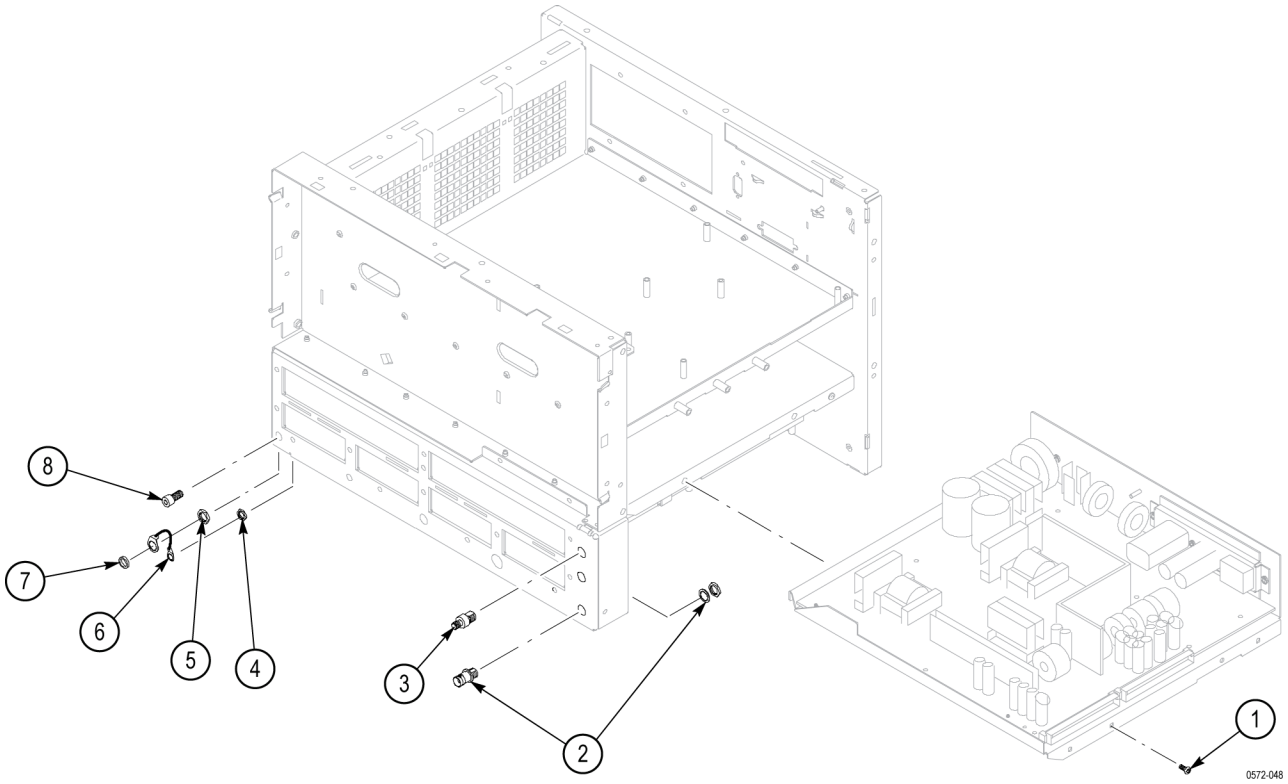

Figure 24: Front panel connectors

Table 9: Front panel connectors replaceable parts list

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
24--1	211-1050-00			8	SCREW, MACH: 6-32 X 0.312 L, PNH, T15
-2	131-8257-00			1	CONN, PANEL MOUNT; BNC TO MCX
-3	131-0850-00			2	CONN, JACK, RF; SMA, FEED THRU; DUAL FEMALE, STR, 50 OHM, 0.25 MTG W/ 0.375 HEX, 0.59 X 0.24 MLG
-4	210-0457-00			1	NUT, PL, ASSEM WA: 6-32 X 0.312, W/LCKWSHR
-5	210-0465-00			1	NUT, PLAIN, HEX: 0.25-32 X 0.375
-6	650-4086-00			1	CA ASSEMBLY: ELECT, ANTI STATIC
-7	210-1443-00			1	WASHER, FLAT: 0.25 ID X 0.375 OD X 0.265
-8	136-0140-00			1	JACK, TIP: BANANA, CHARCOAL GRAY

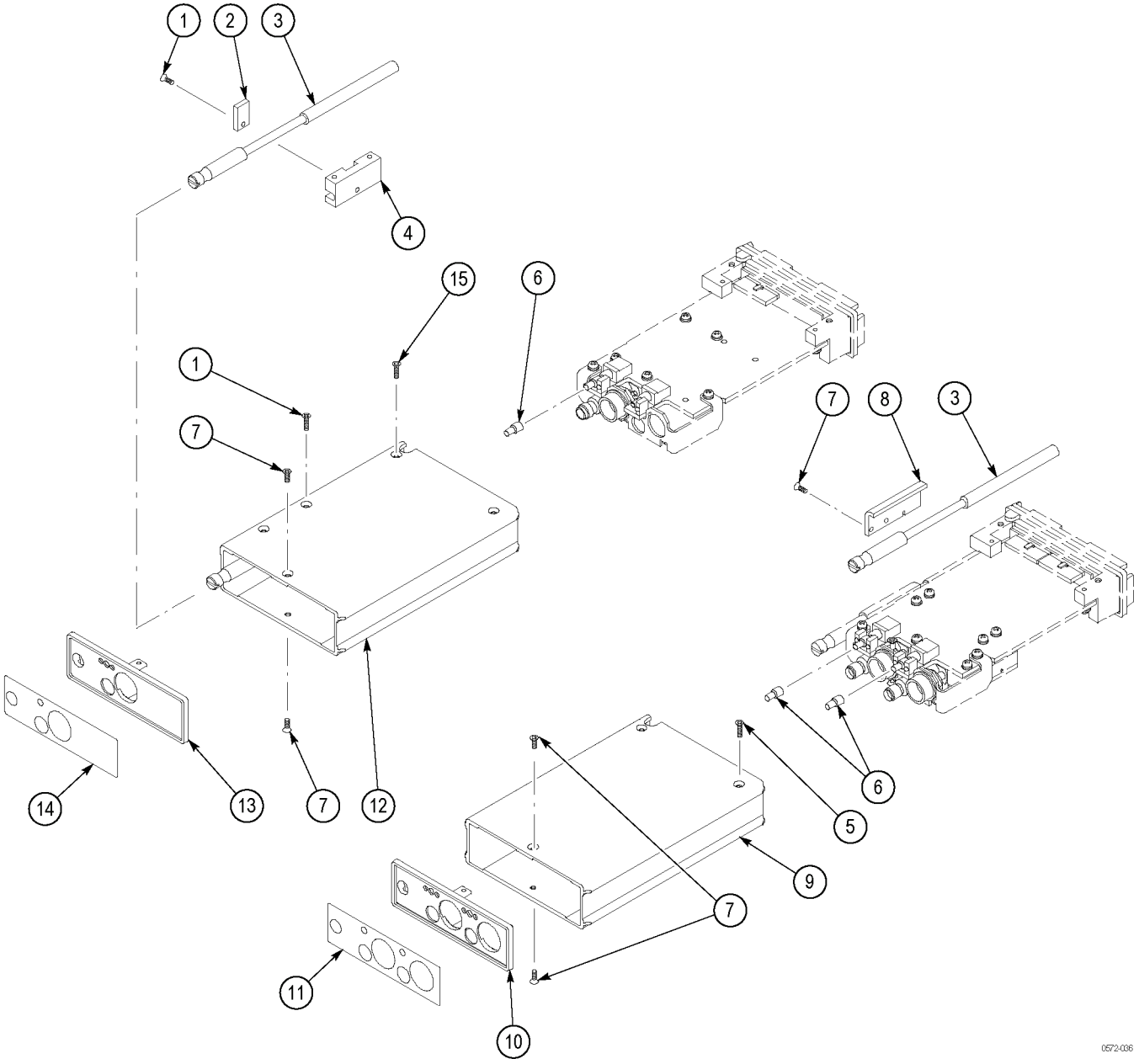

Figure 25: 80E01, 80E02, 80E03, and 80E04 modules

Table 10: 80E01, 80E02, 80E03, and 80E04 modules replaceable parts list

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
25- 1	211-0088-00			3	SCREW,MACHINE:2-56 X 0.281,FLH,82 DEG,STL BK OXD,POZ
-2	386-7293-00			1	PLATE, FRICTION
-3	384-1838-00			1	SHAFT; SCREW LOCKDOWN, 303 SST, R05HDSCR
-4	391-0239-00			1	LOCK SCREW: MOUNTING BLOCK
-5	211-0088-00			4	SCREW,MACHINE:2-56 X 0.281,FLH,82 DEG,STL BK OXD,POZ
-6	366-0804-00			1	KNOB:PUSH BUTTON, 0.11 OD, 0.33L, DELRIN, GRAY, 80E01
	366-0804-00			2	KNOB:PUSH BUTTON, 0.11 OD, 0.33L, DELRIN, GRAY, 80E02, 80E03, 80E04
-7	211-0087-00			2	SCREW,MACHINE:2-56 X 0.188,FLH,82 DEG SST,POZ
-8	214-4081-00			1	MTG,SCR LOCKDWN:ALUMINUM
-9	380-1132-00			1	HOUSING:SAMPLING HEAD,AL, 80E02
-10	333-4340-00			1	PANEL,FRONT:ALUMINUM,CHROMATE,W/TEK SILVERGRAY
-11	335-0151-00			1	MARKER,IDENT:LABEL,0.010 POLY,W/ADHESIVE,80E02
	335-0152-00			1	MARKER,IDENT:LABEL, 0.010 POLY,W/ADHESIVE,80E03
	335-0153-00			1	MARKER,IDENT:LABEL,0.010 POLY,W/ADHESIVE,80E04
-12	380-1138-00			1	HOUSING:ALUMINUM,SAMPLING HEAD 80E01
-13	333-4371-00			1	PANEL,FRONT:ALUMINUM,CHROMATE,W/TEK SILVERGRAY
-14	335-0339-00			1	MARKER,IDENT:LABEL,0.010 POLY,W/ADHESIVE, 80E01

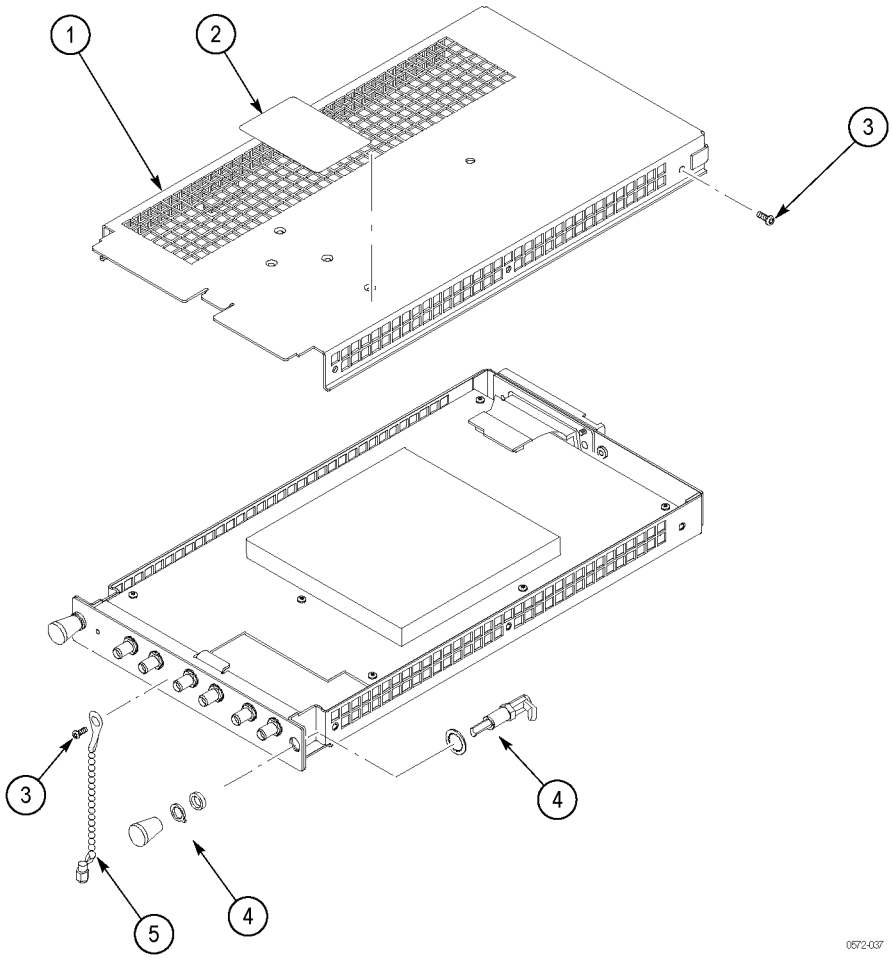

Figure 26: 80A05 module (Option 10G shown)

Table 11: 80A05 module replaceable parts list

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
26-1	200-4568-00			1	COVER: OPTICAL MODULE, 0.050 AL
-2	335-0370-00			1	MARKER, IDENT: ANTI-STATIC LABEL
-3	211-0373-00			12	SCREW, MACHINE: 4-40 X 0.250, PNH, STL CD PLT,T10
				13	SCREW, MACHINE: 4-40 X 0.250, PNH, STL CD PLT, T10 (OPTION 10G)
-4	105-1115-00			2	LATCH: ADJUSTABLE GRIP
-5	011-0176-00			5	TERM, RF; SMA, PLUG, STR, SST
				6	TERM,RF; SMA, PLUG, STR, SST (OPTION 10G)

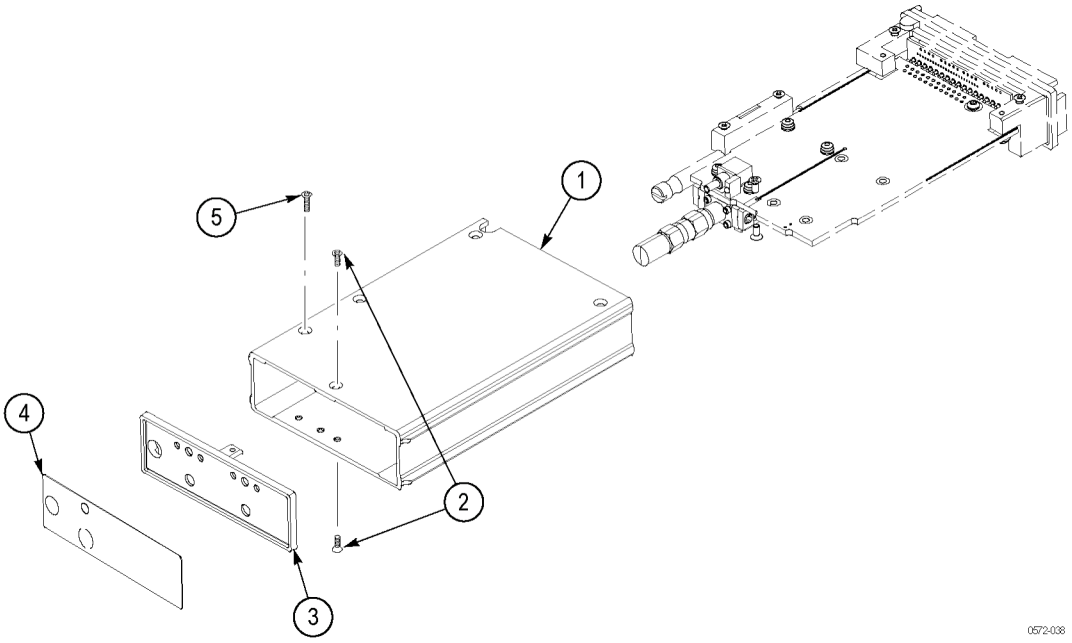

Figure 27: 80E06 module

Table 12: 80E06 module replaceable parts list

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
27- 1	380-1159-00			1	HOUSING: SAMPLING HEAD, ALUMINUM, 80E06, SAFETY CONTROLLED
-2	211-0087-00			2	SCREW, MACHINE: 2-56 X 0.188, FLH, 82 DEG SST, POZ
-3	- - - - -			1	PANEL, FRONT: NSD HEADS, BLANK, 386-5603-00, 80E06
-4	335-0863-00			1	MARKER, IDENT: SAMPLING HEAD, 2.760 X 0.810, 0.010 POLY, W/ADHESIVE, 80E06, SAFETY CONTROLLED
-5	211-0088-00			4	SCREW, MACHINE: 2-56 X 0.281, FLH, 82 DEG, STL BK OXD, POZ

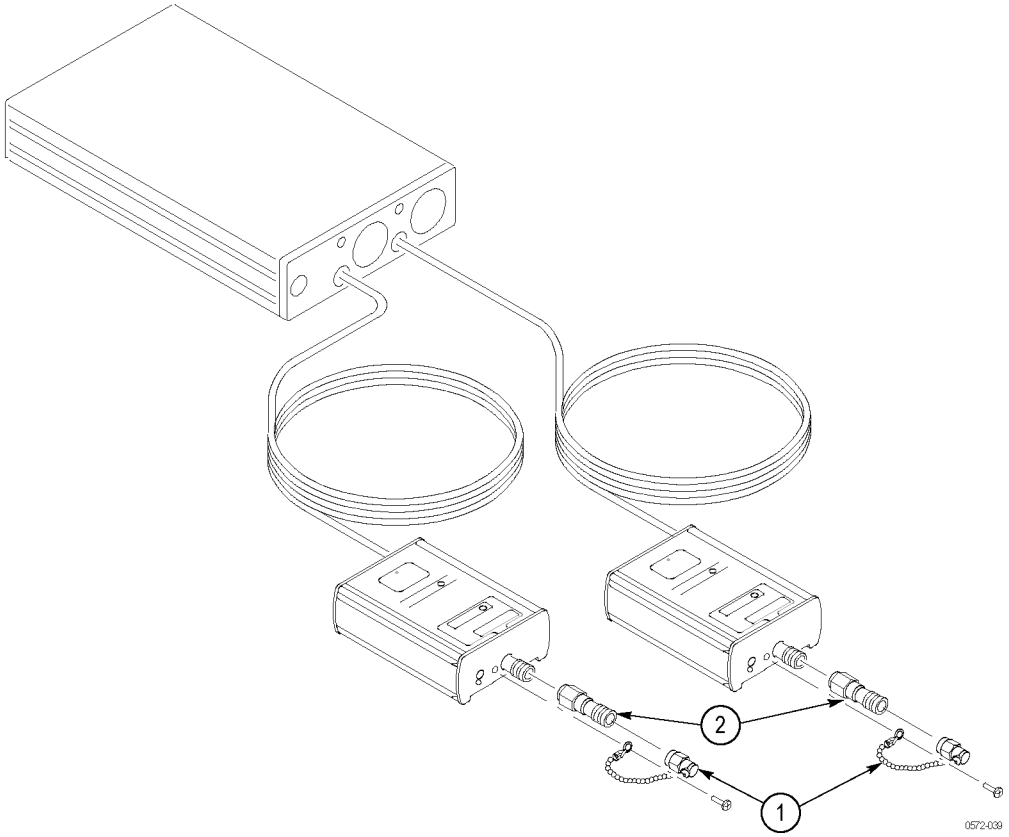

Figure 28: 80E07/B, 80E08/B, 80E09/B, and 80E10/B modules

Table 13: 80E07/B, 80E08/B, 80E09/B, and 80E10/B modules replaceable parts list

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
28-1	011-0176-00			2	TERM, RF; SMA, PLUG, STR, SST, W/BEAD CHAIN
-2	011-0157-00			2	ADAPTER, RF, PRCN; 2.4MM OR 1.85 MM MALE TO 2.92 MM FEMALE (80E08 AND 80E10 ONLY)

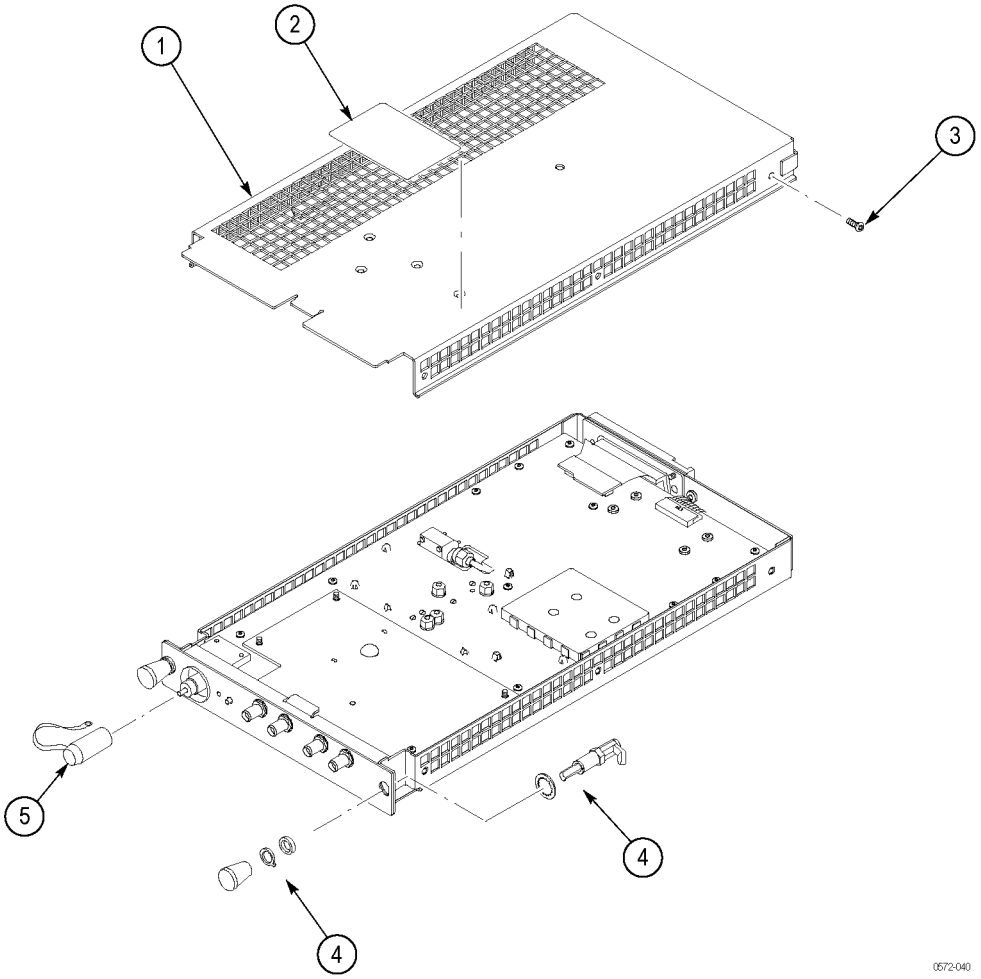

Figure 29: Optical modules (all)

Table 14: 80C00 Optical modules replaceable parts list (all optical modules)

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
29-1	200-4568-00			1	COVER: OPTICAL MODULE, 0.050 AL
-2	335-0370-00			1	MARKER, IDENT: ANTI-STATIC LABEL, 0.005 POLY
-3	211-0373-00			7	SCREW, MACHINE 4-40 X 0.250, PNH, STL CD PLT, T10
-4	105-1115-00			2	LATCH: ADJUSTABLE GRIP, 16-10-511-16
-5	200-4104-00			1	CAP, DUST: ELAY M75-M80 SHORE, BLACK MATT TEXTURED

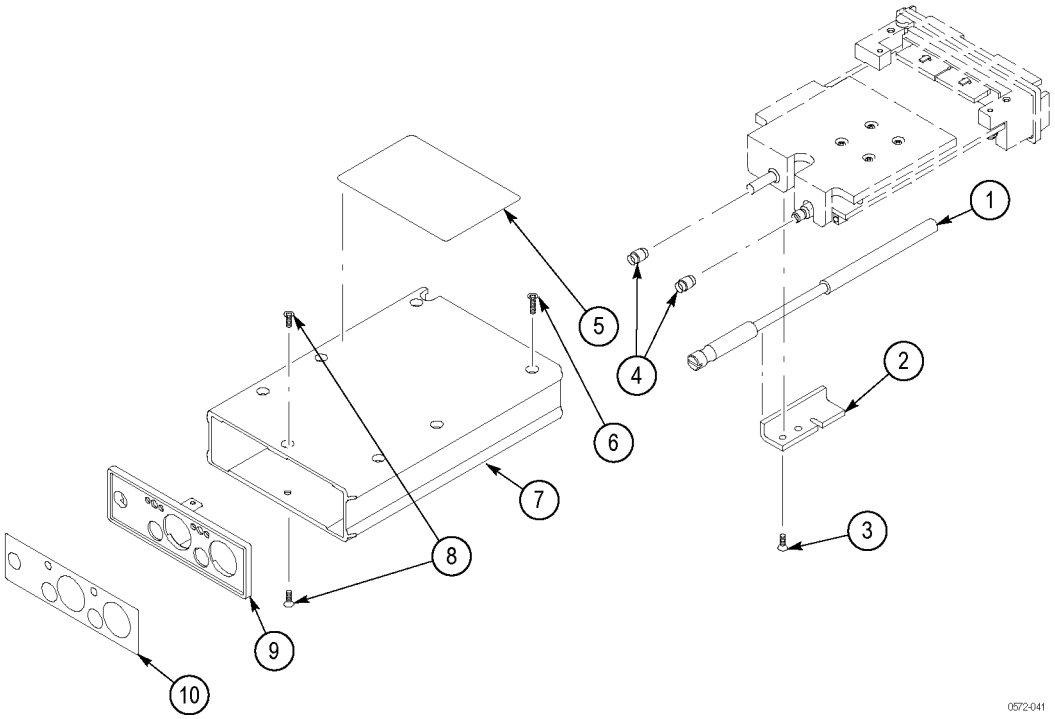

Figure 30: 80A01 module

Table 15: 80A01 module replaceable parts list

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
30-1	384-1838-00			1	SHAFT: SCREW LOCKDOWN, 303 SST R05HDSCR
-2	214-4081-00			1	LOCKDOWN: SCREW MOUNT, 0.080 AL
-3	211-3008-00			2	SCREW, MACHINE: 2-56 X 0.281, PNH, SST, PASS, POZI DR
-4	015-1022-01			1	TERMINATOR: COAXIAL, 50 OHM, 0.5W, SMA
-5	335-0370-00			1	MARKER, IDENT: ANTI-STATIC LABEL, 0.005 POLY
-6	211-0088-00			8	SCREW, MACHINE: 2-56 X 0.281, FLH, 82 DEG, STL BK OXD, POZ
-7	380-1151-00			1	HOUSING: SAMPLING MODULE, TRIGGER PRESCALE LIMITING PREAMP
-8	211-0087-00			2	SCREW, MACHINE:2-56 X 0.188, FLH, 82 DEG SST, POZ
-9	333-4392-00			1	PANEL,FRONT: TRIGGER PRESCALE LIMITING PREAMP, AL ALLOY
-10	335-0485-00			1	MARKER, IDENT: LABEL, MKD 80A01 PRESCALE MODULE, 2.760 X .810, LEXAN

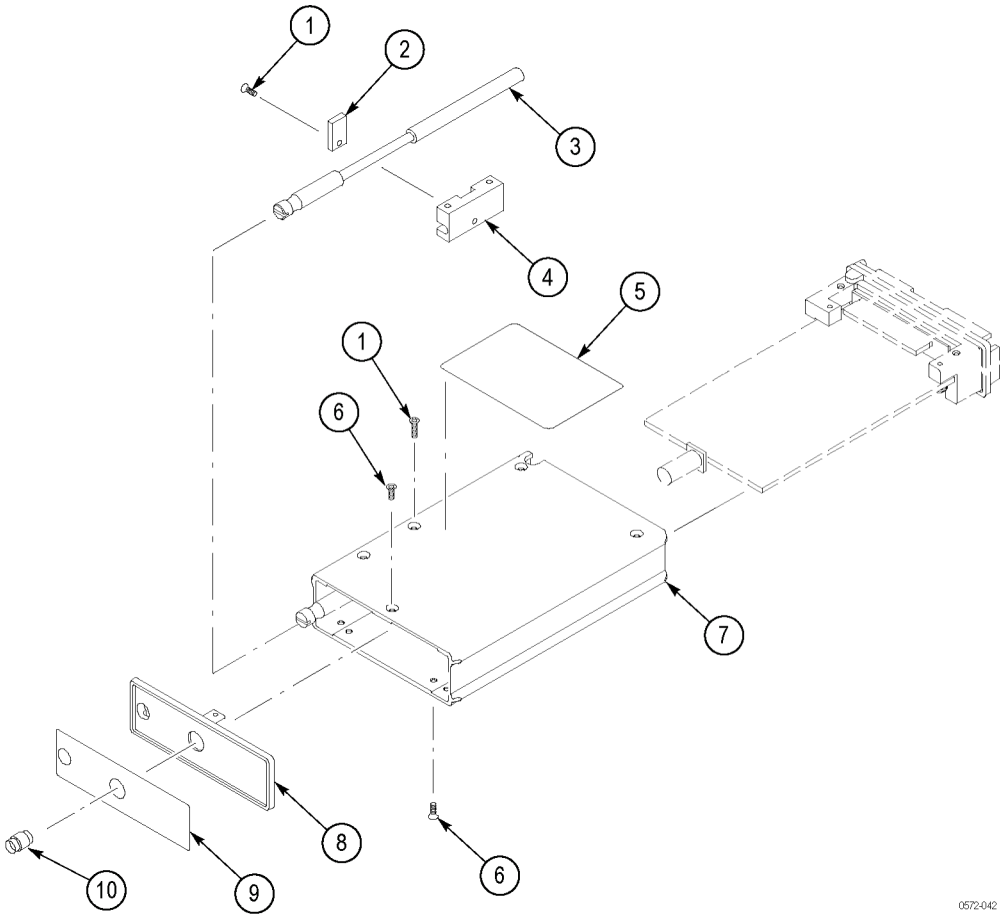

Figure 31: 82A04B module

Table 16: 82A04B module replaceable parts list

Fig. & index number	Tektronix part number	Serial number effective	Serial number discont'd	Qty	Name & description
31-1	211-0088-00			8	SCREW, MACH:2-56 X 0.281, FLH, POZ
-2	386-7293-00			1	PLATE, FRICTION
-3	384-1838-00			1	SHAFT; SCREW LOCKDOWN, 303 SST, R05HDSCR
-4	391-0239-00			1	LOCK SCREW: MOUNTING BLOCK
-5	335-0370-00			1	MARKER, IDENT: ANTI-STATIC LABEL
-6	211-0087-00			3	SCREW, MACH: 2-56 X 0.188, FLH, POZ
-7	380-1171-00			1	HOUSING: SAMPLING HEAD, ALUMINUM
-8	333-4476-00			1	PANEL, FRONT: PHASE REF MODULE
-9	335-1036-00			1	MARKER, IDENT: LABEL, 82A04 MODULE
-10	015-1022-01			1	TERMINATOR: COAXIAL, 50 OHM, 0.5W, SMA

❖ End of service manual ❖