

Instructions



Option FHD Front Hard Drive

071-1223-00

Warning

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

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

To Avoid Fire or Personal Injury

Use Proper Power Cord. Use only the power cord specified for this product and certified for the country of use.

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

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

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

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

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

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

Wear Eye Protection. Wear eye protection if exposure to high-intensity rays or laser radiation exists.

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

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

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

Symbols and Terms

Terms in this Manual. These terms may appear in this manual:



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



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

Terms on the Product. These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

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



CAUTION
Refer to Manual



WARNING
High Voltage



Protective Ground
(Earth) Terminal



Mains Disconnected
OFF (Power)



Mains Connected
ON (Power)



Standby

Service Safety Summary

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

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

Disconnect Power. To avoid electric shock, switch off the instrument power, then disconnect the power cord from the mains power.

Use Care When Servicing With Power On. Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.

Description and Operation

Option FHD is a removable hard-disk drive at the front of the instrument. With this option the hard drive at the rear of the instrument and the floppy drive at the front of the instrument are not available.

All instrument functions that require the floppy drive are unavailable. All instrument functions that require a hard disk use the removable hard drive located in the front panel. All other instrument functions remain the same as the standard instrument.



CAUTION. Do not lift or support the instrument by the hard-drive handle.

Moving the Disk

If you move the hard disk to another instrument, you must perform a signal path compensation.

1. To compensate the signal path, select Utilities and then Instrument Calibration.
2. Read the Calibration Instructions.
3. Press the Calibrate button.
4. After the calibration successfully completes, the Status is Pass.

Disk Removal

To remove the disk drive from the instrument, do the following procedure:

1. Set the oscilloscope so that its bottom is down on the work surface and its front panel is facing you. See Figure 1-1 on page 1-2.



CAUTION. Do not remove the replaceable hard disk drive when the instrument is powered on. The replaceable hard disk drive may be permanently damaged if it is removed while the instrument is powered on.

- a. Verify that the oscilloscope is powered off.

- b. To unlock the hard drive assembly, rotate both thumb screws counter-clockwise.
 - c. Grasp the hard disk drive assembly by its handle, and pull the assembly out of the instrument.
2. *Reinstallation:* Do in reverse step 1 to reinstall the hard disk drive assembly.

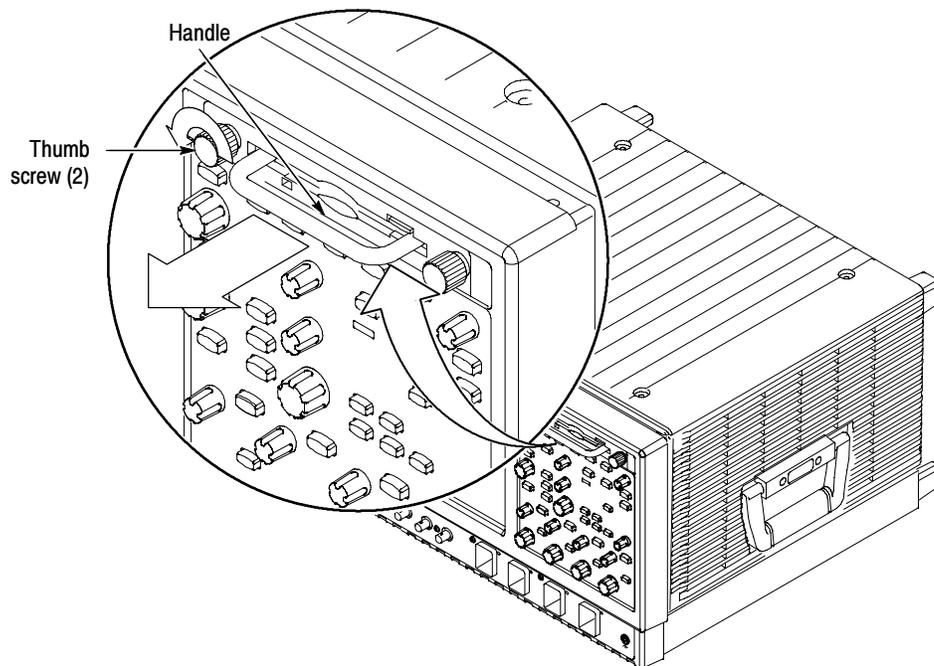


Figure 1- 1: Hard disk drive removal

WARNING

The following servicing instructions are for use only by qualified personnel. To avoid injury, do not perform any servicing other than that stated in the operating instructions unless you are qualified to do so. Refer to all safety summaries before performing any service.



Removal and Installation Procedures

This subsection contains procedures for removal and installation of all mechanical and electrical modules.



WARNING. Before doing this or any other procedure in this manual, read the Safety Summaries found at the beginning of this manual.

This subsection contains the following items:

- List of tools required to remove and disassemble all modules.
- Procedures for removal and reinstallation of the electrical and mechanical modules.



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

Equipment Required. Most modules 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 2-1: Tools required for module removal

Item no.	Name	Description	General tool number
1	Screwdriver handle	Accepts Torx-driver bits	620-440
2	T-10 Torx tip	Used for removing the electrical or optical module chassis. Torx-driver bit for T-10 size screw heads	640-235
3	T-15 Torx tip	Used for removing most instrument screws. Torx-driver bit for T-15 size screw heads	640-247
4	1/8 inch flat-bladed screwdriver	Screwdriver for unlocking cable connectors	Standard tool
5	#0 Phillips screwdriver	Screwdriver for removing small Phillips screws	Standard tool
6	MA-800G Soldering Aid	Used to remove the front-panel trim	Standard tool

Procedures for External Modules

The following procedures are found here and are listed in order presented.

- Hard disk drive
- Trim (all)
- Bottom cover
- Left and Right covers
- Line Fuse and Line Cord

Disk Drive

To remove the hard disk drive from the cartridge, do the following procedure:

1. Remove the hard disk from the instrument. See Disk Removal on page 1-1.
2. *Remove the hard disk drive from the cartridge:* See Figure 2-1 on page 2-2.
 - 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, and remove the cable assembly from the connector on the hard disk drive.

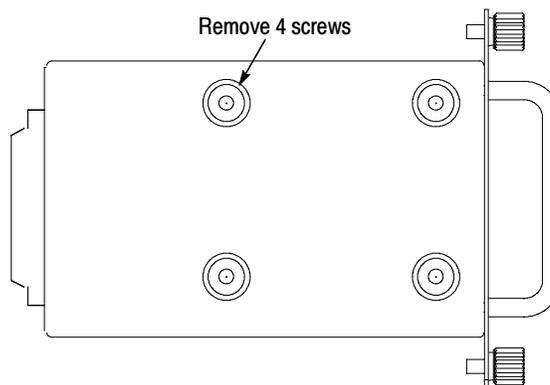


Figure 2- 1: Removing the hard disk drive from the cartridge

Trim and Carrying Handle

1. *Locate module to be removed:* Locate the Trim in the locator diagram. See Figure 2-2 on page 2-4.
2. *Remove the front-panel trim:* Use Figure 2-2 on page 2-4 as a guide.
 - a. To prevent the power button from falling out of the front-panel trim, place a piece of tape over the button.

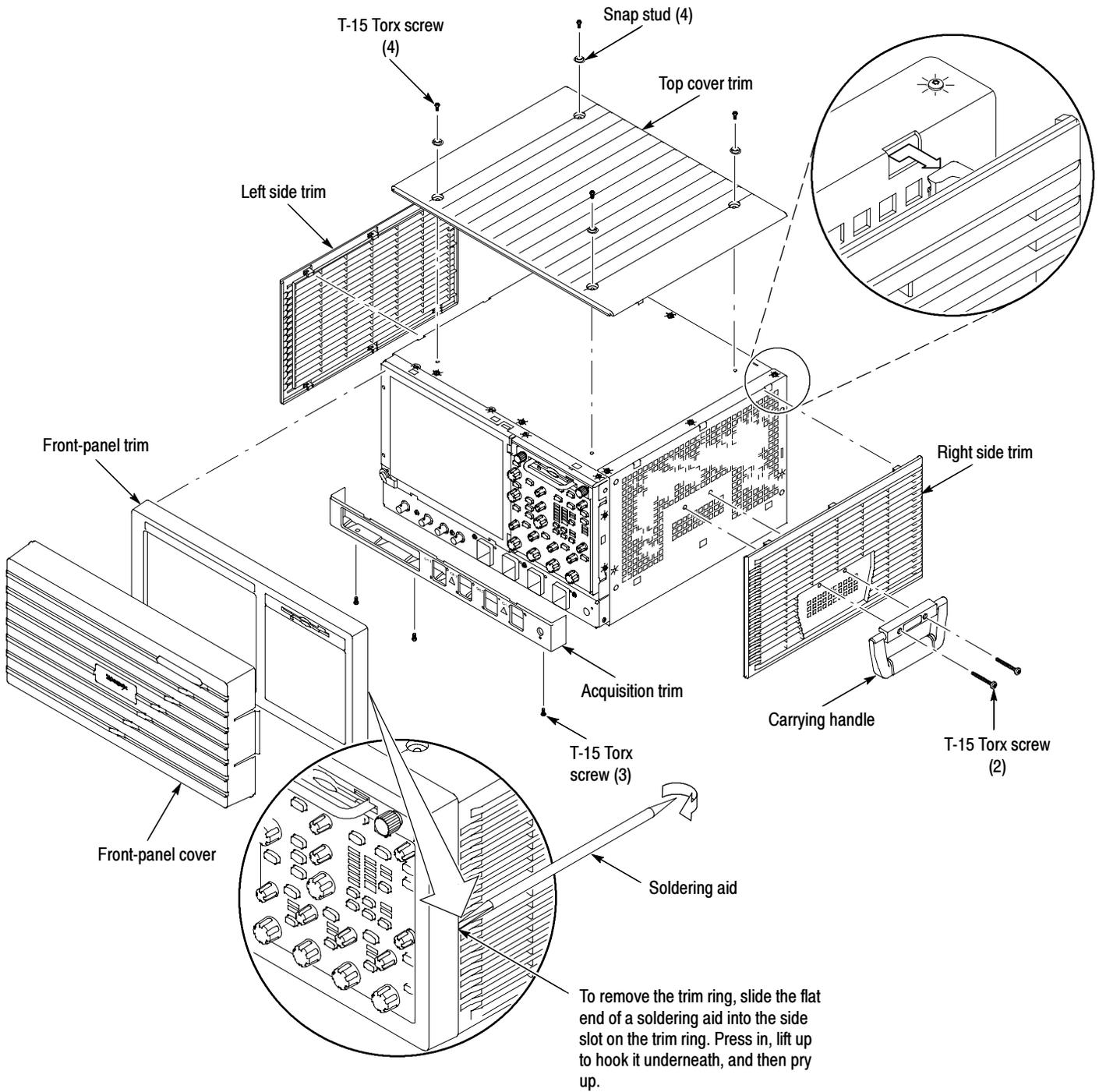


Figure 2-2: Trim removal

- Bottom Cover**
1. *Remove the bottom cover:* See Figure 2-3 on page 2-5.
 2. *Orient the instrument:* Set the instrument so that its top is down on the work surface and its bottom is facing you.
 - a. Remove the four T-15 Torx screws that secure the bottom cover to the instrument.
 - b. Remove the bottom cover from the instrument.
 3. *Reinstallation:* Do in reverse steps a and b to reinstall the bottom cover.

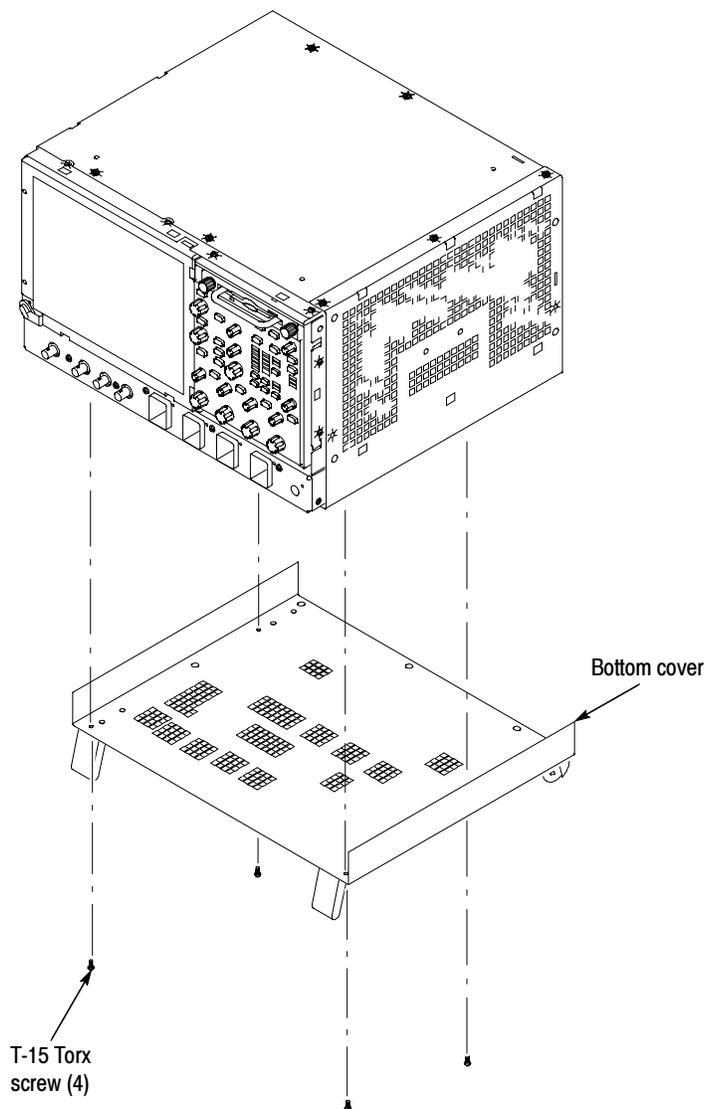


Figure 2-3: Bottom cover removal

- Covers**
1. *Remove the left and right covers:* See Figures 2-4 and 2-5 on pages 2-7 and 2-8.
 - Trim (all)
 - Bottom cover
 2. *Orient the instrument:* Set the instrument so that its rear is on the work surface and the front of the instrument is facing you.

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

- a. Remove the eleven T-15 Torx screws that secure the covers to the top and both sides of the chassis.
- b. Remove the seven T-15 Torx screws that secure the covers to the bottom of the chassis.
- c. Pull the bottom-right cover down, and slide to the right to remove from the instrument. Pull the top-left cover upward and slide to the left to remove from the instrument.



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

3. *Reinstallation:* Do in reverse steps a through c to reinstall the cabinet covers.

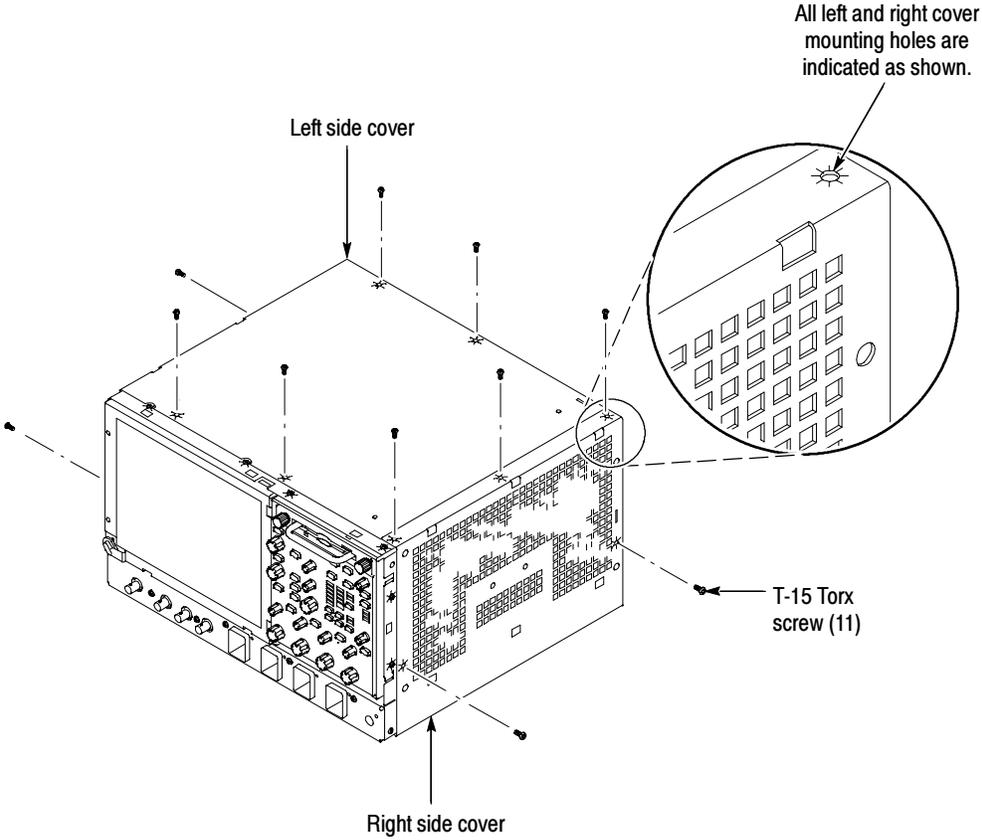


Figure 2-4: Cover removal

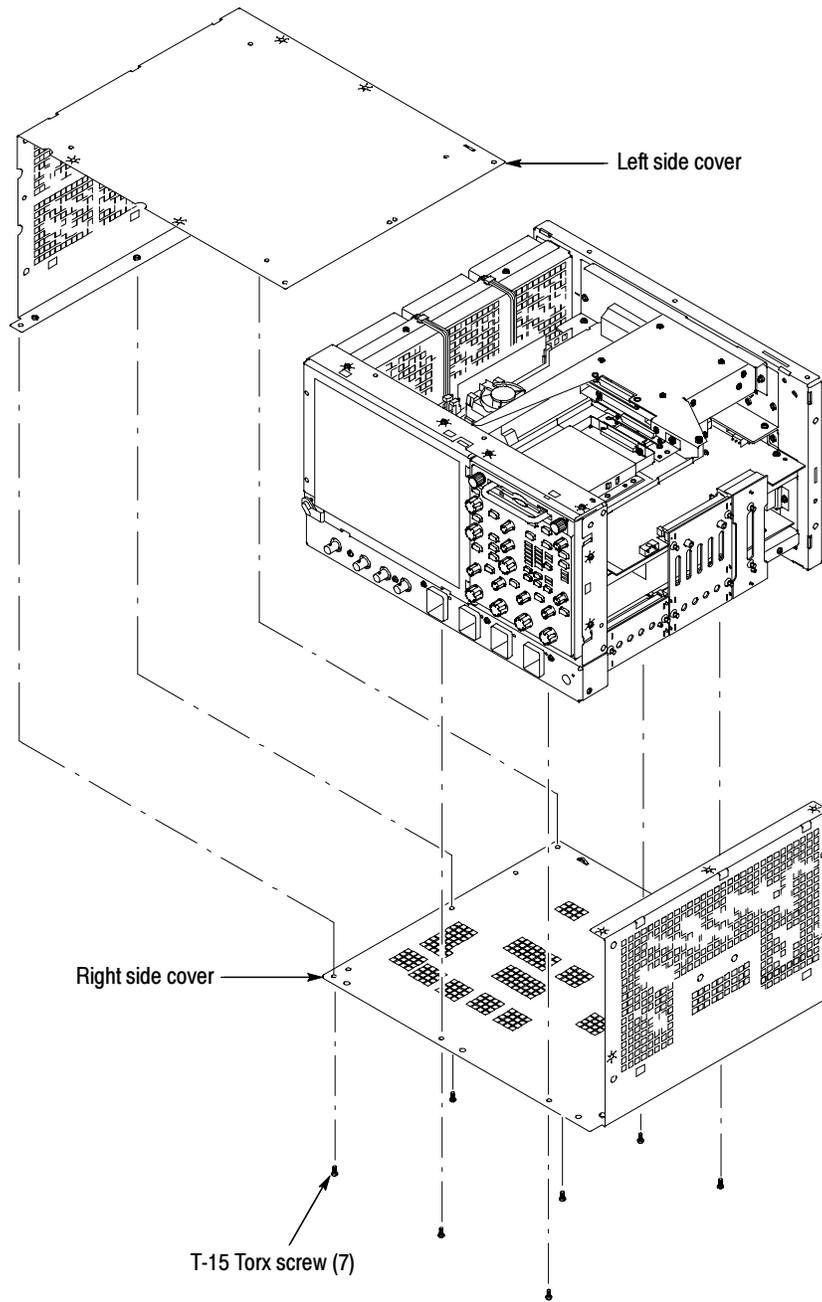


Figure 2-5: Cover removal

Procedures for Modules

You should have completed the *Procedures for External Modules* before doing many of the procedures in this collection. The procedures found here are listed in disassembly order:

- Front Panel assembly
- Hard Disk Drive
- NLX Board
- Acquisition Board

Front Panel Assembly

1. *Locate module to be removed:* Locate the Front-Panel assembly in Figure 2-6 on page 2-10. Additional modules to be Removed:
 - Trim (Front panel)
2. *Remove the Front-Panel assembly:* See Figure 2-6 on page 2-10.
3. *Orient the instrument:* Set the instrument so that its bottom is down on the work surface and its front panel is facing you.
 - a. Remove the six T-15 Torxdrive screws that secure the front-panel assembly to the front chassis.
 - b. Grasp the top of front-panel assembly and pull forward to allow access to the ribbon-cable connector on the front-panel board.
 - c. Use the $\frac{1}{8}$ inch flat-bladed screwdriver to carefully lift the J1 cable connector lock up to disconnect the J1 flex cable from the display module assembly. See Figure 2-7 on page 2-11. Note the connector pin 1 index mark and the black stripe on the cable for later reassembly.
 - d. Pull the Front-Panel assembly forward and remove from the instrument.
4. *Reinstallation:* Do in reverse steps a through d to reinstall the front-panel assembly.

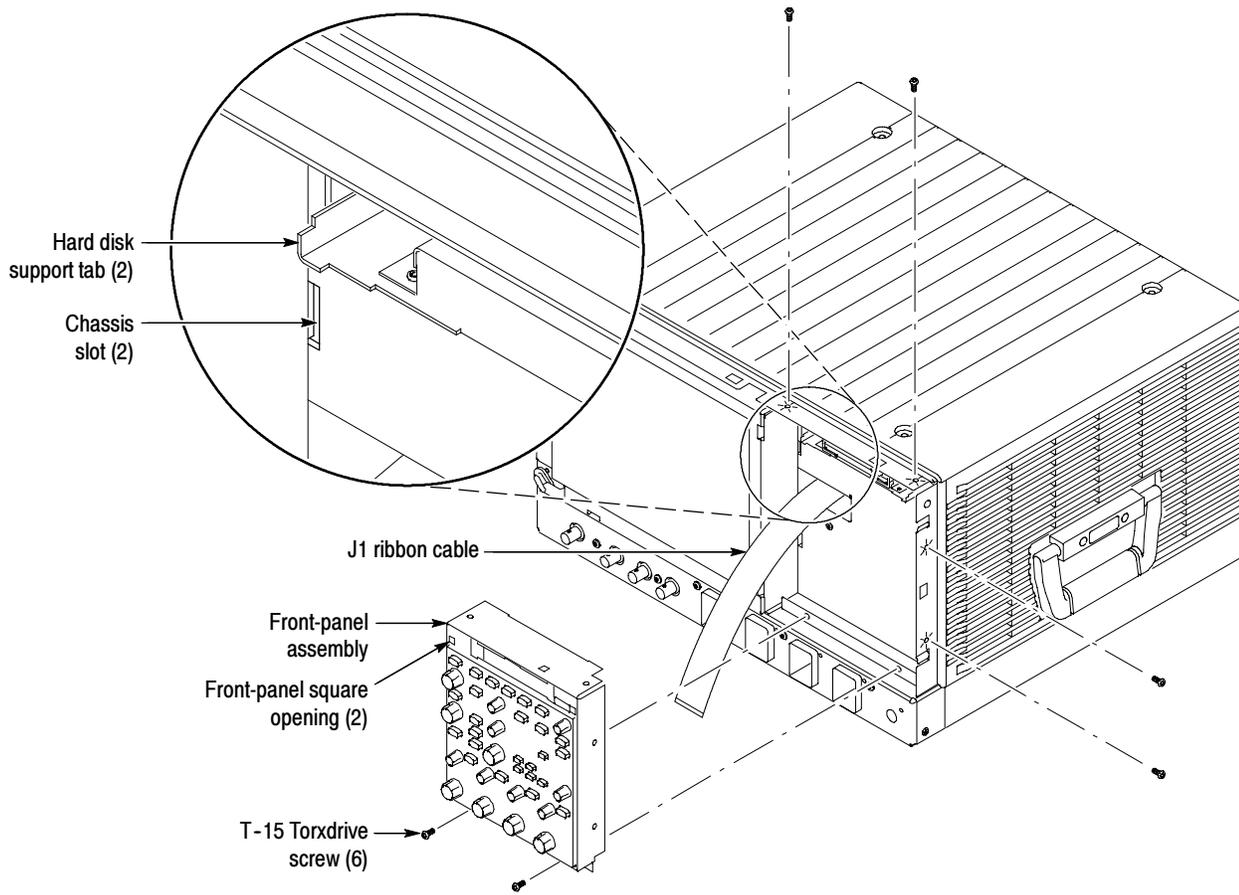


Figure 2-6: Front-panel assembly removal

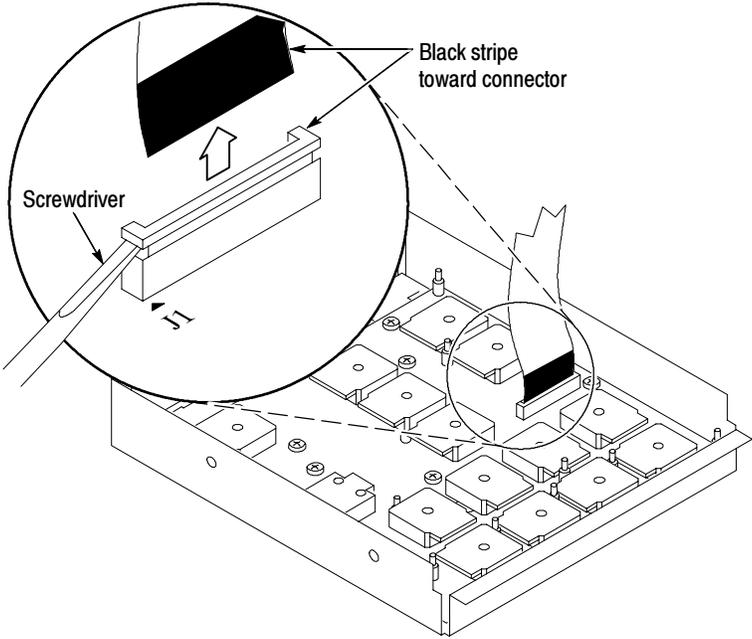


Figure 2-7: J1 flex cable connector removal

Hard Disk Drive Bracket

1. *Locate modules to be removed:* Locate the Hard Disk Drive in the locator diagram *Internal Modules*, Figure 2-8 on page 2-13. Additional modules to be Removed:
 - Trim (front panel and top)
 - Front Panel assembly
2. *Remove the Hard disk drive assembly:* Use Figure 2-9 on page 2-15 as a guide.
3. *Orient the instrument:* Set the instrument so that its bottom is down on the work surface and its front panel is facing you.
 - a. Remove the two T-15 Torx screws that secure the Hard disk drive assembly to the bracket.
 - b. Remove the T-15 Torx screw that secures the hard disk drive assembly to the CD drive bracket.
 - c. Slide the hard drive assembly out toward the front of the instrument far enough to allow you to disconnect the ribbon cable connector.
 - d. Remove the hard drive bracket from the instrument.
4. *Reinstallation:* Do in reverse steps a through c to reinstall the hard disk drive assembly.

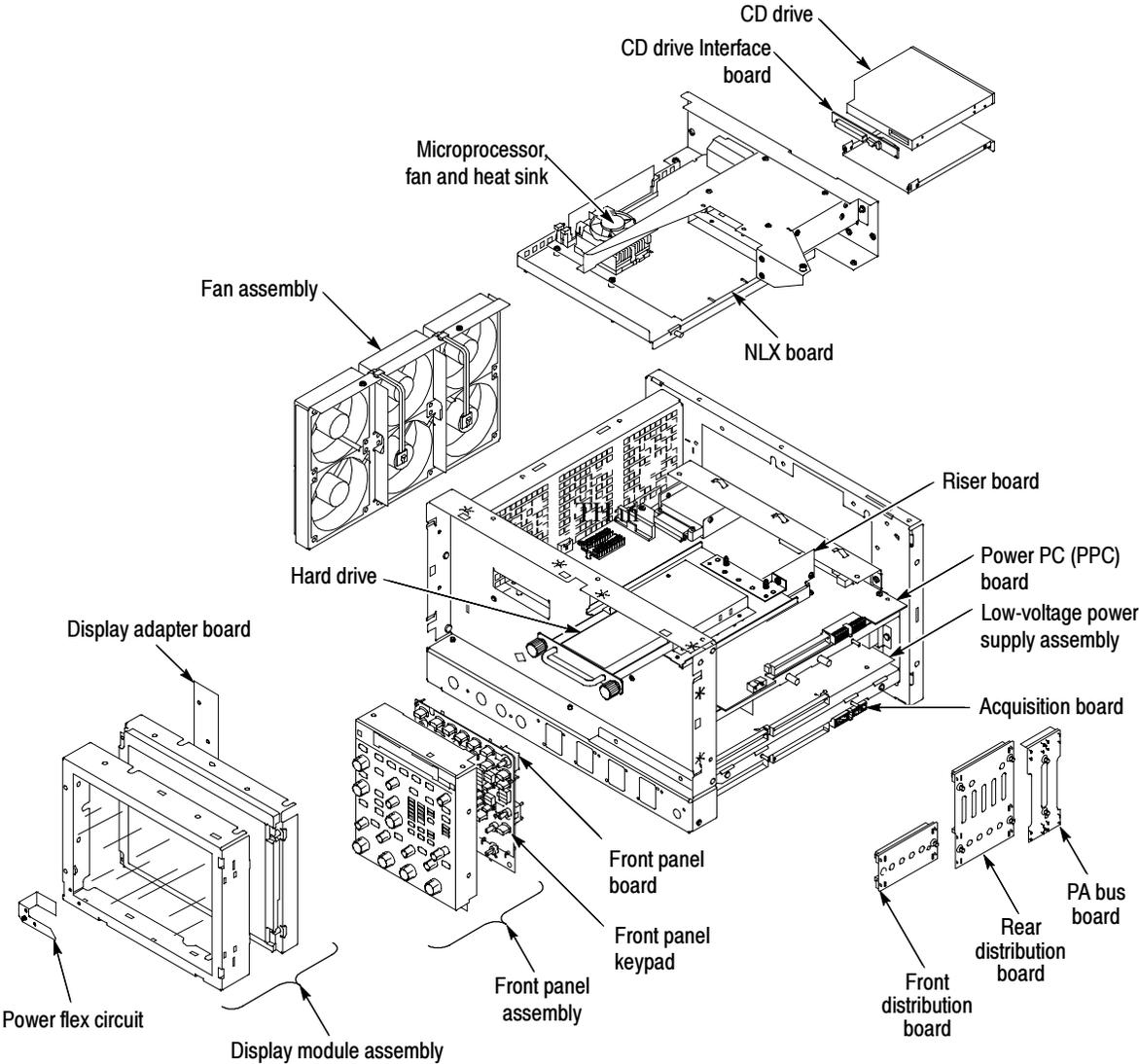


Figure 2-8: Internal modules

NLX Board

1. *Locate module to be removed:* Locate the NLX Board in the locator diagram *Internal Modules*, Figure 2-8, on page 2-13. Additional modules to be removed:
 - Trim (all)
 - Bottom cover
 - Left and Right covers
 - Front Panel
 - Hard Drive assembly
2. *Remove the NLX Board assembly:* See Figure 2-9 on page 2-15.
3. *Orient the instrument:* Set the instrument so that its bottom is down on the work surface and its top is facing you.
 - a. Remove the five T-15 Torxdrive screws that secure NLX board assembly to the chassis.
 - b. Remove the five T-15 Torxdrive screws that secure NLX board assembly and the rear cover plate to the rear chassis. Remove the cover plate from the instrument.
 - c. Grasp the front edge of the NLX board assembly and pull up on the assembly to disconnect the Riser Adapter from the Processor board edge connector.
 - d. Remove the NLX board assembly from the instrument.

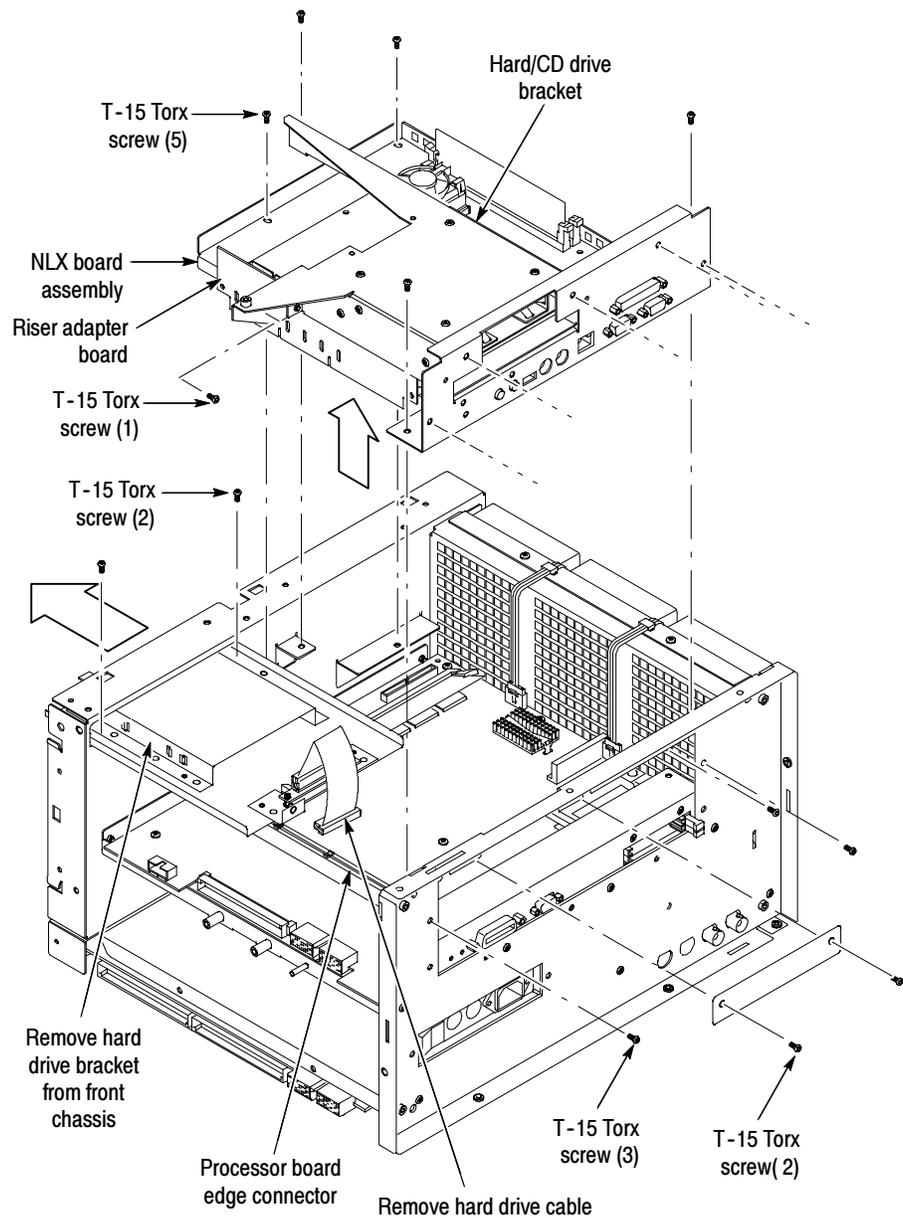


Figure 2-9: NLX assembly and hard disk drive removal

4. *Remove the Riser Adapter and NLX Boards:* See Figure 2-10 on page 2-17.
 - a. Remove the two T-15 Torxdrive screws that secure Riser Adapter board to the NLX support bracket.
 - b. Disconnect the ribbon cable connectors from the hard drive and CD drive.

- c. Grasp the Riser board and pull it straight out to disconnect J510 edge card connector from the NLX board. Remove the Riser Adapter board from the NLX board assembly.
 - d. Remove the four T-15 Torxdrive screws that secure NLX board to the NLX support bracket.
 - e. Remove the six 3/16 nut posts that secure the three connectors to the rear of the support bracket. Then remove the NLX board from the support bracket.
 - f. Remove the NLX board from the support bracket.
5. *Reinstallation:* Do in reverse steps 3 and 4 to reinstall the NLX board.

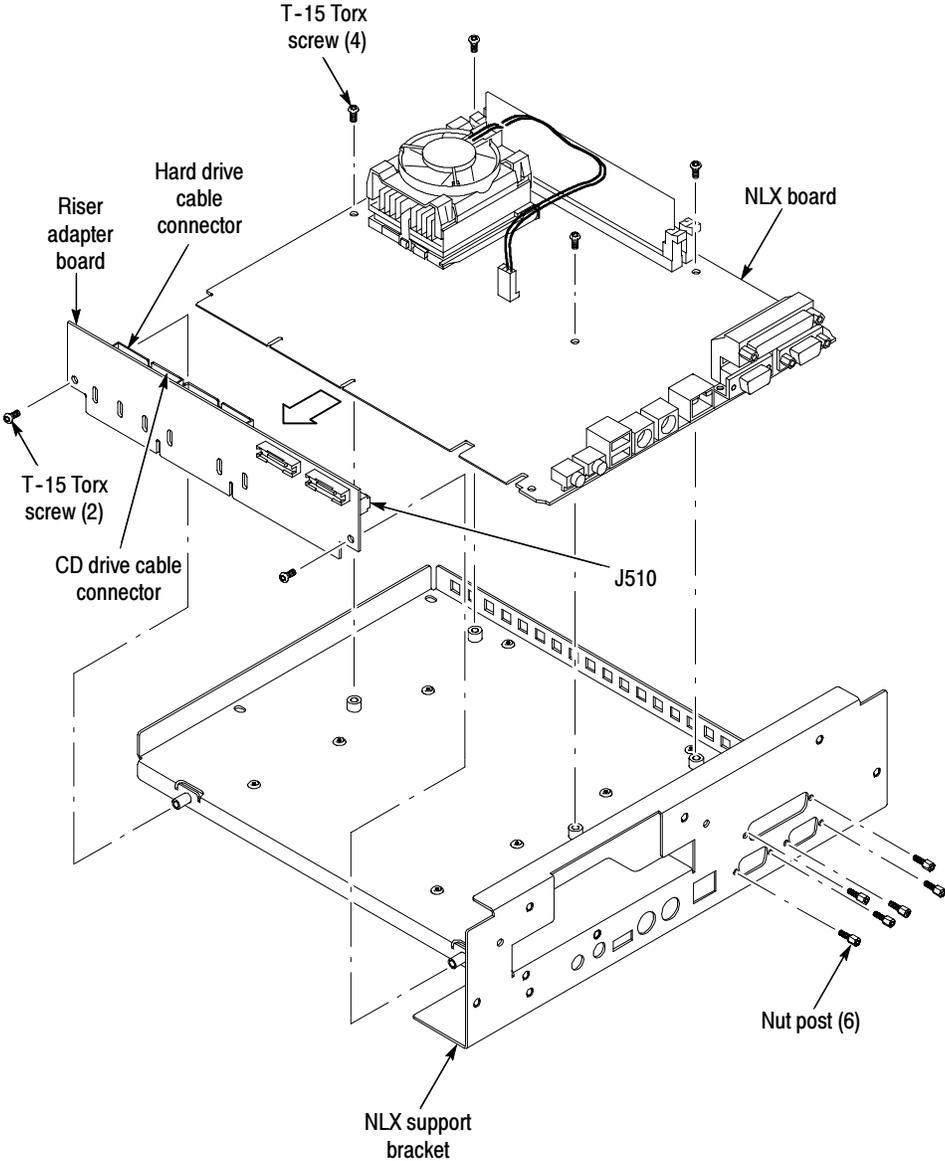


Figure 2-10: Riser adapter and NLX board removal

Mechanical Parts List

This section contains a list of the replaceable modules for Option FHD. Use this list to identify and order replacement parts. See your instrument service manual for all other replacement parts

Mfr. Code to Manufacturer Cross Index

The following table cross indexes codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

Manufacturers cross index

Mfr. code	Manufacturer	Address	City, state, zip code
060D9	TENSOLITE COMPANY	PRECISION HARNESS AND ASSEMBLY 3000 COLUMBIA HOUSE BLVD #120	VANCOUVER, WA 98661
0KB01	STAUFFER SUPPLY CO	810 SE SHERMAN	PORTLAND, OR 97214-4657
22670	GM NAMEPLATE INCORPORATED	2040 15TH AVE WEST	SEATTLE, WA 98119-2783
57924	BOURNS INC	INTEGRATED TECHNOLOGY DIV. 1400 NORTH 1000 WEST	LOGAN, UT 84321
7X318	KASO PLASTICS INC	5720-C NE 121ST AVE, STE 110	VANCOUVER, WA 98682
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077-0001
9F560	IBM CORPORATION	420 E SOUTH TEMPLE ST	SALT LAKE CITY, UT 84145
TK1943	NEILSEN MANUFACTURING INC	3501 PORTLAND RD NE	SALEM, OR 97303

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
1-1	200-4794-00			1	COVER,FRONT:PROTECTIVE,FR110,TEK BLUE,TDS7404,TDS7154	7X318	200-4794-00
-2	101-0161-01			1	TRIM,FRONT:PCABS,17.200W X 8.450H,SILVER GRAY	7X318	2TEK1648

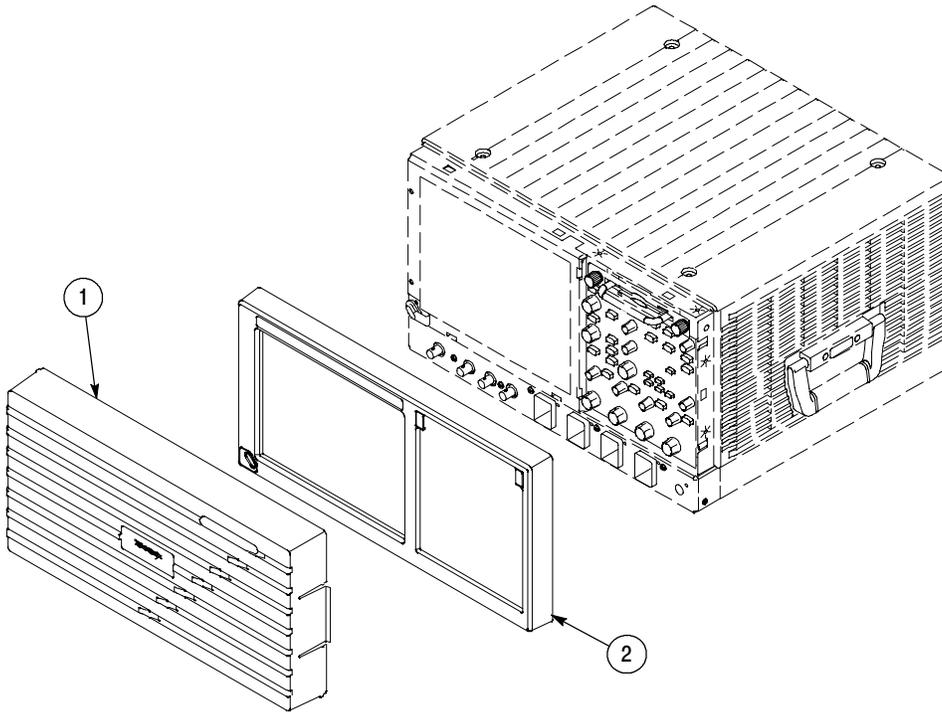


Figure 3-1: External parts

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discount'd	Qty	Name & description	Mfr. code	Mfr. part number
2-1	441-2183-02			1	CHASSIS ASSY:REAR DRIVE BAY,HD & CD,0.050 AL	TK1943	441-2183-02
-2	200-4782-00			1	COVER, REAR HD PLATE	7X318	200-4782-00
-3	441-2302-00			1	CHASSIS ASSY:SHEET METAL,TDS7404, TDS7154	TK1943	441-2302-00
-4	614-2762-00			1	PANEL ASSEMBLY:FRONT (ITEMS 5 THROUGH 10)	80009	614-2762-00
-5	679-5366-00			1	CKT BD SUBASSY:FRONT PANEL	57924	3777S-TEK-030
-6	260-2762-00			1	SWITCH,KEYPAD:ELASTOMERIC,FRONT PANEL	22670	260-2762-00
-7	366-0821-00			7	KNOB,CAP:0.650 D,PC/ABS,SILVER GRAY	22670	366-0821-00
-8	366-0820-00			7	KNOB,CAP:0.425 DIA,PC/ABS,SILVER GRAY	22670	366-0820-00
-9	366-0819-00			1	KNOB,EPS:PUSH BUTTON,PC/ABS,SILVER GRAY	22670	366-0819-00
-10	333-4439-00			1	SUBPANEL ASSY:OFF SET,W/BEZEL,TDS7404	7X318	333-4439-00
	333-4444-00			1	SUBPANEL ASSY:OFF SET,W/BEZEL, TDS7154	7X318	333-4444-00
-11	650-4498-00			1	RHDD ASSEMBLY:W/O SW (ITEMS 12 THROUGH 17)	80009	650-4498-00
-12	674-4378-00			1	CKT BD SUBASSY:HARD DISK DRIVE INTERFACE	80009	679-4378-00
-13	679-4378-00			1	CKT BD SUBASSY:HARD DISK DRIVE INTERFACE	80009	679-4378-00
-14	437-0506-00			1	CABINET ASSY:REMOVEABLE HARD DISK DRIVE HOLDER	7X318	437-0506-00
-15	211-1081-00			4	SCREW,MACHINE:M3 X 0.5 X 3.5MM,FLAT WAFER HD,PHL,0.0002 STL ZI PL	0KB01	211-1081-00
-16	119-6733-00			1	DISK DRIVE:WINCHESTER,2.5 IN,20GB,SINGLE PLATTER	9F560	07N8325
-17	174-4747-00			1	CA ASSY,SP:RIBBON,44,28 AWG,1MM,1.0 L,2 X 22	060D9	174-4747-00
-18	407-4917-00			1	BRACKET:FLOPPY DRIVE,6.064 X 5.075,AL	TK1943	407-4917-00

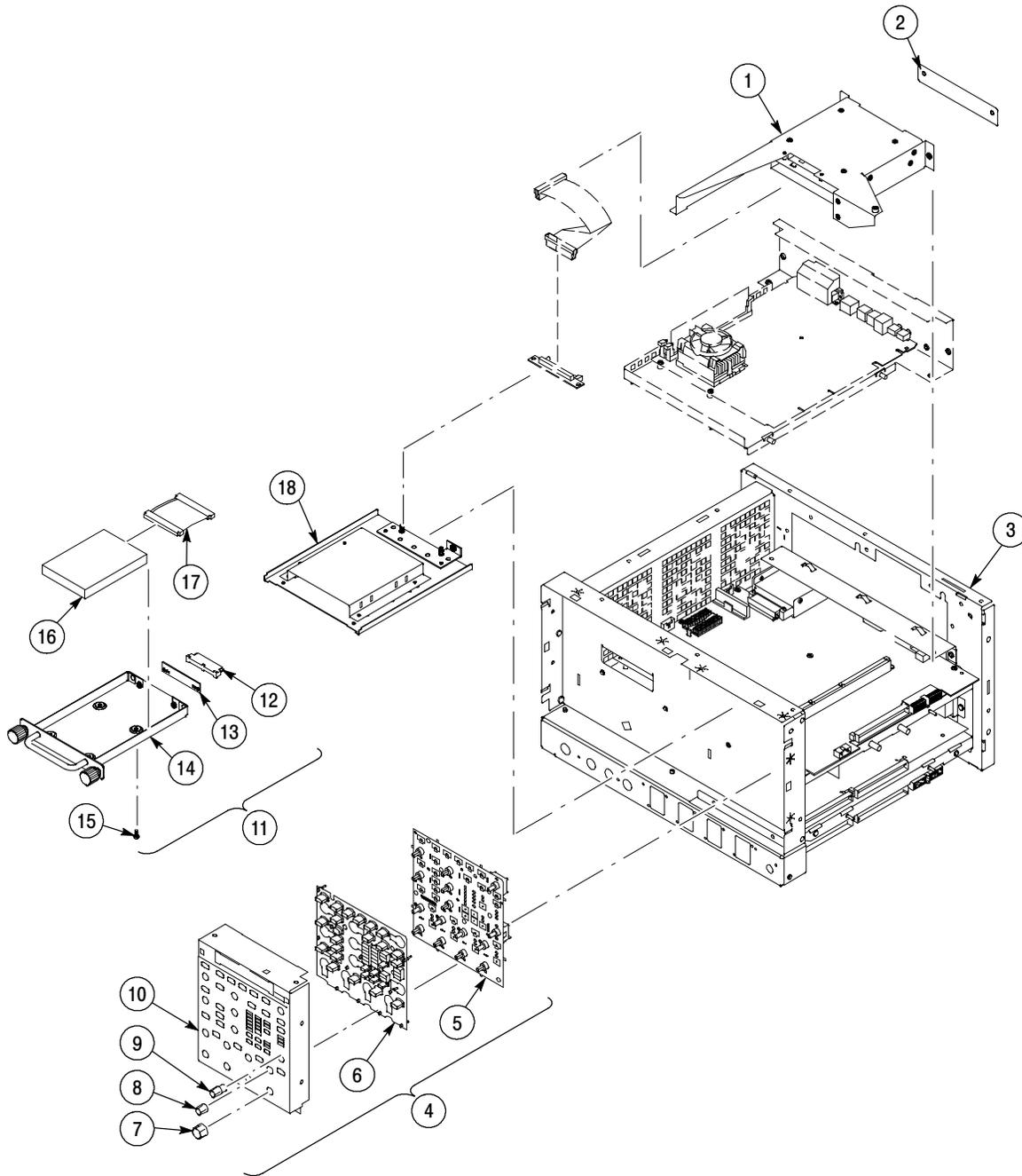


Figure 3-2: Front panel and drives