MSO70000/C/DX, MSO5000/B Series Mixed Signal Oscilloscopes
DSA70000B/C/D Series Digital Signal Analyzers
DPO70000B/C/D/DX Series Digital Phosphor Oscilloscopes
DPO7000/C, DPO5000/B Series Digital Phosphor Oscilloscopes

Service Manual

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Tektronix

MSO70000/C/DX, MSO5000/B Series Mixed Signal Oscilloscopes
DSA70000B/C/D Series Digital Signal Analyzers
DPO70000B/C/D/DX Series Digital Phosphor Oscilloscopes
DPO7000/C, DPO5000/B Series Digital Phosphor Oscilloscopes

Service Manual

Revision B

This document applies to firmware version 1.0 and above.

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.

Tektronix

Contacting Tektronix

Tektronix, Inc.
14150 SW Karl Braun Drive
P.O. Box 500
Beaverton, OR 97077
USA

For product information, sales, service, and technical support:
- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

Warranty

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

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

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

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[W2 – 15AUG04]

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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 x, *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

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.

Do not disable the power cord grounding connection.

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

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

Use only insulated voltage probes, test leads, and adapters supplied with the product, or indicated by Tektronix to be suitable for the product.

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 exceed the Measurement Category (CAT) rating and voltage or current rating of the lowest rated individual component of a product, probe, or accessory. Use caution when using 1:1 test leads because the probe tip voltage is directly transmitted to the product.

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

Do not float the common terminal above the rated voltage for 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.

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.

Probes and test leads

⚠ *WARNING. To prevent electrical shock, do not exceed the maximum measurement or maximum floating voltage for the oscilloscope input BNC connector, probe tip, or probe reference lead.*

Connect and disconnect properly. Connect the probe output to the measurement product before connecting the probe to the circuit under test. Connect the probe reference lead to the circuit under test before connecting the probe input. Disconnect the probe input and the probe reference lead from the circuit under test before disconnecting the probe from the measurement product.

Inspect the probe and accessories. Before each use, inspect probe and accessories for damage (cuts, tears, or defects in the probe body, accessories, or cable jacket). Do not use if damaged.

Ground-referenced oscilloscope use. Do not float the reference lead of this probe when using with ground-referenced oscilloscopes. The reference lead must be connected to earth potential (0 V).

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:

CAUTION Refer to Manual   Protective Ground (Earth) Terminal   Earth Terminal   Chassis Ground

Mains Disconnected OFF (Power)   Mains Connected ON (Power)   Standby
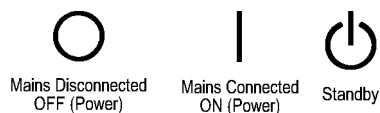
WARNING High Voltage

Preface

This manual contains service information for your instrument. Read this preface to learn how this manual is structured, the conventions it uses, and where to find additional supplemental information related to servicing this product.

You should also read the General and Service safety summaries before servicing the product.

Manual Structure

This manual is divided into sections, which are made up of related subordinate topics. These topics can be cross referenced as sections.

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

Manual Conventions

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

Product-Specific Information

This manual contains information that is necessary to service the following products:

- MSO5000 Series
- MSO5000B Series
- MSO70000 Series
- MSO70000C Series
- MSO70000DX Series
- DSA70000B Series
- DSA70000C Series
- DSA70000D Series
- DPO5000 Series
- DPO5000B Series
- DPO7000 Series
- DPO7000C Series
- DPO70000B Series

- DPO70000C Series

- DPO70000D Series

- DPO70000DX Series

Check for a specific product designation in the header at the top of the page, in a heading, table or figure title, or within text. Material that does not have any specific product designation applies to all products in the manual.

Modules   Throughout this manual, any replaceable component, assembly, or part is referred to as a *module*.

Replaceable Parts   This manual refers to any field-replaceable assembly or mechanical part specifically by its name or generically as a replaceable part. In general, a replaceable part is any circuit board or assembly, (such as the hard disk drive), or a mechanical part, (such as the I/O port connectors), that is listed in the replaceable parts list. (See page 5-1, *Replaceable Parts Overview*.)

Safety   Symbols and terms related to safety appear in the *General Safety Summary* and the *Service Safety Summary*.

Getting Started

Where to Find Operating Information

For information on installing, operating, and networking the instrument, refer to the online help or user manual that was provided with your oscilloscope. You can also find the manual at www.tektronix.com/manuals, by searching for your product.

Theory of Operation

Theory of Operation

This section describes the electrical operation of the instrument. The following figures show the module interconnections for the following instruments:

- DPO7000/C Series (See Figure 2-1 on page 2-4.)

- DSA/DPO70000B Series (See Figure 2-2 on page 2-5.)

- DSA/DPO70000C/D and DPO70000DX Series (See Figure 2-3 on page 2-6.)

- MSO70000/C/DX Series (See Figure 2-4 on page 2-10.)

Logic Conventions

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 inactive state. The specific voltages that constitute a high or low state vary among the electronic devices.

Module Overviews (DPO7000/C Series, DSA/DPO70000B/C/D, and DPO70000DX Series)

Module overviews describe the basic operation of each functional circuit block.

A Microsoft Windows processor system is the primary controller of the instrument. The instrument features an XGA resolution flat-panel display, a transparent touch screen, and a front-panel with direct access to commonly used instrument functions. You can also make complete use of the instrument with a mouse and keyboard.

Input Signal Path A signal enters the instrument through a connection to the input connector on the front panel.

Acquisition Board. The acquisition board conditions the input signals and converts them to digital signals, then processes the data into a form that is handled by the display system. The acquisition system includes the multi-source trigger system, a time base, and acquisition control circuitry, as well as a calibration reference system for internal calibration purposes. The acquisition board is located in the bottom compartment of the instrument. All input channels feature a probe interface system with the ability to recognize the probe type for proper unit display and for calibration out to the probe tip.

Processor System. The processor system contains a processor board with microprocessor that controls the entire instrument. The basic configuration supports input channels, provides an external trigger input, a trigger output, and a probe compensation output.

Each acquisition channel is equipped with a processor that uses its own host interface which communicates with the command interface processor.

Display Panel
Waveforms and menus are displayed on a color, active-matrix LCD display with touch panel.

Display System. Text and menu image information from the Windows system is merged with the waveform images and processed by the display circuitry. The display system sends the combined graphical image to the active-matrix LCD display.

Touch Panel. The touch information from the touch screen is processed by a Windows driver, actively placing the pointer at the touched location. Actions from a mouse and actions from the touch panel are interchangeable, and treated alike by the user interface software.

Front Panel
Front-panel push-button and knob encoder switches are read by an embedded micro controller, which sends the button and knob change information to the Windows system over the Universal Serial Bus path.

ON/STBY. The ON/STBY switch in the lower left corner of the instrument front is connected directly to the μATX board which, in turn, controls the off-line power supply system. This allows Windows to control the power based on standard Windows operating behavior.

μATX Board
The μATX board provides standard Windows functionality and I/O port interfaces on a side or rear panel. Possible ports include RS-232, Centronics, Ethernet, USB, DVI-I, DVI-D, and eSATA ports.

The μATX board receives input from the Front Panel and Touch Panel, and implements the appropriate changes. Video display data, containing waveform and graphical menu information, is transferred to the Windows system through the PCIe bus interface.

The hard drive/solid state drive is connected to the μATX board through the SATA interface, while the CD/DVD is connected to the Windows system through the IDE parallel interface. The hard drive/solid state drive and CD provide access to stored waveform data and software to customize your instrument with your measurement needs.

Interface Board

This board coordinates the flow of data through the Windows PCI port from the various devices that communicate with the μATX system. The devices include the display system, GPIB, TekLink, and a direct DMA path to the acquisition system.

The GPIB permits external control of the instrument both as a controller and as a slave device.

The acquisition system analog power supplies are generated on this interface board, from DC voltages supplied by the off-line power supply unit.

Power System

The off-line power supply is a switching power converter with active power factor control. It auto detects the line voltage. It supplies power to all of the circuitry in the instrument.

No switch completely disconnects the line power from the instrument. The ON/STBY switch controls the power to the instrument through the μATX board circuitry. When in the "power off" condition, there is still a low power standby circuit to allow the system to monitor the ON/STBY switch.

Fans

For cooling, the instrument fans draw air out of the instrument, for a negatively pressured instrument. The fans are controlled by an embedded processor on the acquisition board and are regulated by monitoring the temperature of the acquisition board circuitry. Cooling air enters the instrument through specific locations on the covers, where it flows directly over the heat sinks of each high wattage component.

Figure 2-1: Block diagram (DPO7000/C Series)

Touch screen   XGA Display   Backlight Inverter

Front Panel   J7   Display Adapter

J2

Rear Chassis   TekLink

Front Mount
USB 2.0   GPIB

Video

On/Standby
J1   J1451   J700   J1610   J1440
Video   GPIB   TekLink I/O   Display/
Front Panel

USB 1.0 — J1000

μATX Motherboard   **PCI Backbone
Board**

Rear Motherboard I/O:
keyboard, mouse,
serial, parallel,
VGA, USB,
audio, Ethernet

PCI

Edge Connector

**Acquisition
Board**

2 x 2   2 x 10

SATA3   J1375

IDE   J6
(PATA)

J8   Motherboard Power   J5   J2660

J9   Motherboard CPU   J4   J2650

Hard Drive   J15   **Power Distribution
Board**

DVD   J2   HD/CD Power   Fan Power

Line Trigger   J10   Fan Tray
J14

Capacitively Coupled   0076-009

Line In Filter   **Power
Supply**

Figure 2-2: Block diagram (DSA/DPO70000B Series)
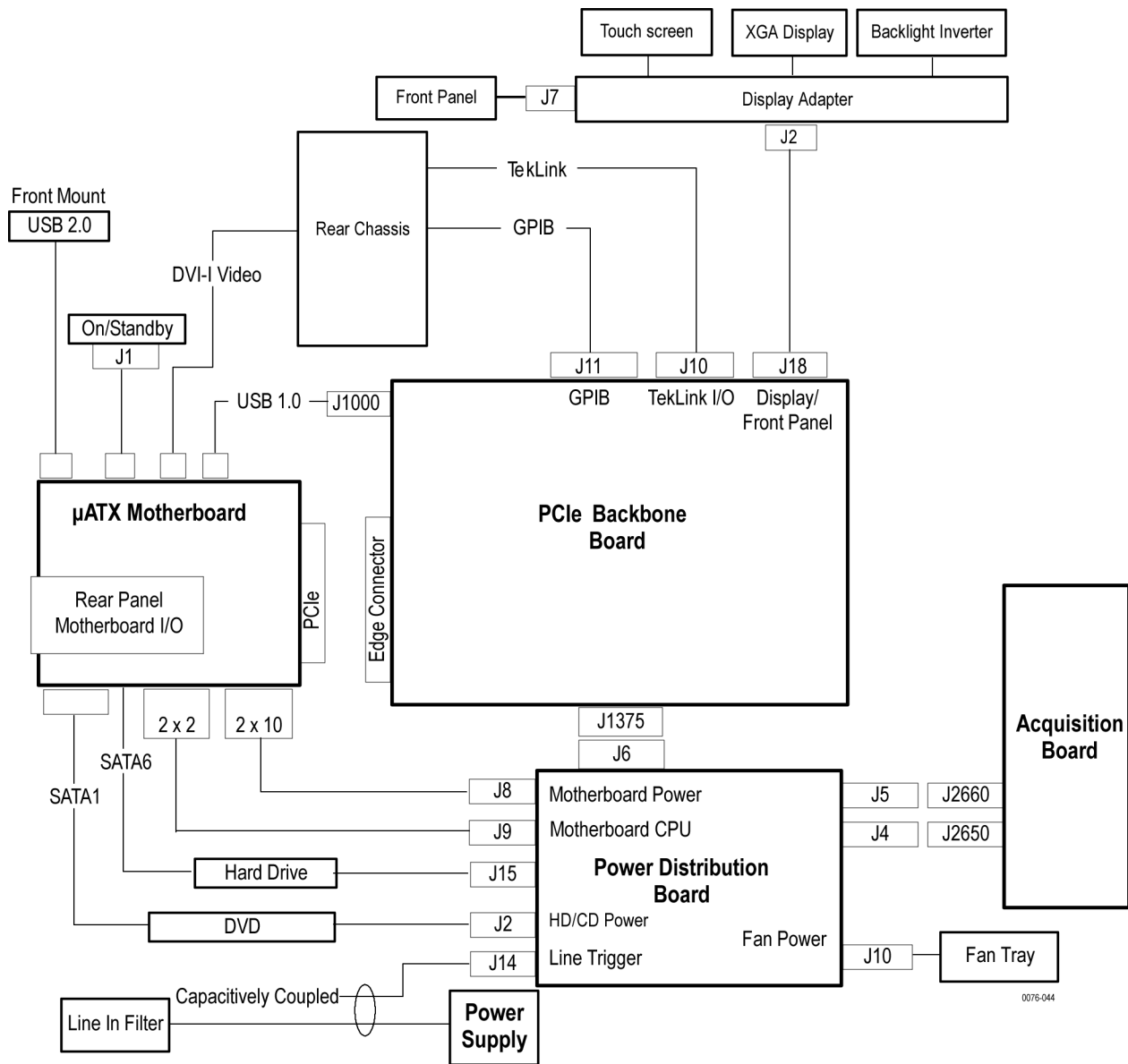
Figure 2-3: Block diagram (DSA/DPO70000C/D and DPO70000DX Series)

Module Overviews (MSO70000/C/DX Series)

Module overviews describe the basic operation of each functional circuit block. (See Figure 2-4 on page 2-10.)

A Microsoft Windows processor system is the primary controller of the instrument. The instrument features a flat-panel display, a transparent touch screen, and a front-panel with direct access to commonly used instrument functions. You can also make complete use of the instrument with a mouse and keyboard.

Input Signal Path   An analog signal enters the instrument through a connection to the input connector on the front panel.

Acquisition Board. The acquisition board conditions the input signals and converts them to digital signals, then processes the data into a form that is handled by the display system. The acquisition system includes the multi-source trigger system, a time base, and acquisition control circuitry, as well as a calibration reference system for internal calibration purposes. The acquisition board is located in the bottom compartment of the instrument. All input channels feature a probe interface system with the ability to recognize the probe type for proper unit display and for calibration out to the probe tip.

Processor System. The processor system contains a processor board with microprocessor that controls the entire instrument. The basic configuration supports input channels, provides an external trigger input, a trigger output, and a probe compensation output.

Each acquisition channel is equipped with a processor that uses its own host interface which communicates with the command interface processor.

MSO Module. The MSO module contains a digital acquisition system and a word recognizer. This module processes digital signals obtained by the 17-channel Logic Probe (16 data channels, 1 Clk/Q channel). The logic channels from the front panel are applied to the word recognizer, and are also routed to the analog acquisition board. The MSO module applies each channel to three paths:

- An analog path, which goes to an analog multiplexer that selects any four of the 17 logic probe channels to use for the iCapture display.

- A digital path, which acquires a digitized version of each of the channels and stores it in memory.

- A digital WORD trigger path, where the user can specify a trigger condition that will trigger the oscilloscope. This trigger condition, or word, can consist of any boolean combination (using AND, NAND, OR, and NOR) of the 16 digitally acquired channels. In addition, the Clk/Q channel can be used to qualify the WORD trigger.

  The word trigger pattern values are 0, 1, and DON'T CARE.

For more information on using the WORD trigger, please refer to the online help or user manual, which were provided with your product. You can also find the manual at www.Tektronix.com/manuals, by searching for your product.

Display Panel   Waveforms and menus are displayed on a color, active-matrix LCD display with touch panel.

Display System. Text and menu image information from the Windows system is merged with the waveform images and processed by the display circuitry. The display system sends the combined graphical image to the active-matrix LCD display.

Touch Panel. The touch information from the touch screen is processed by a Windows driver, actively placing the pointer at the touched location. Actions from a mouse and actions from the touch panel are interchangeable, and treated alike by the user interface software.

Front Panel   Front-panel push-button and knob encoder switches are read by an embedded micro controller, which sends the button and knob change information to the Windows system over the Universal Serial Bus path.

ON/STBY. The ON/STBY switch in the lower left corner of the instrument front is connected directly to the μATX board which, in turn, controls the off-line power supply system. This allows Windows to control the power based on standard Windows operating behavior.

μATX Board   The μATX board provides standard Windows functionality and I/O port interfaces on the rear panel. Possible ports include DVI-1 DVI-D, RS-232, Centronics, Ethernet, USB, and eSATA ports.

The μATX board receives input from the Front Panel and Touch Panel, and implements the appropriate changes. Video display data, containing waveform and graphical menu information, is transferred to the Windows system through the PCIe bus interface.

The hard drive/solid state drive and the CD/DVD are connected to the μATX board through SATA interfaces. The hard drive/solid state drive and CD provide access to stored waveform data and software to customize your instrument with your measurement needs.

Interface Board   This board coordinates the flow of data through the Windows PCIe port from the various devices that communicate with the μATX system. The devices include the display system, GPIB, TekLink, and a direct DMA path to the acquisition system.

The GPIB permits external control of the instrument both as a controller and as a slave device.

The acquisition system analog power supplies are generated on this interface board, from DC voltages supplied by the off-line power supply unit.

Power System   The off-line power supply is a switching power converter with active power factor control. It auto detects the line voltage. It supplies power to all of the circuitry in the instrument.

No switch completely disconnects the line power from the instrument. The ON/STBY switch controls the power to the instrument through the µATX board circuitry. When in the "power off" condition, there is still a low power standby circuit to allow the system to monitor the ON/STBY switch.

Fans   For cooling, the instrument fans draw air out of the instrument, for a negatively pressured instrument. The fans are controlled by an embedded processor on the acquisition board and are regulated by monitoring the temperature of the acquisition board circuitry. Cooling air enters the instrument through specific locations on the covers, where it flows directly over the heat sinks of each high wattage component.

Figure 2-4: Block diagram (MSO70000/C/DX Series)

Module Overviews (MSO/DPO5000/B Series)

The module overviews describe the basic operation of each functional circuit block. (See Figure 2-5 on page 2-14.)

A Microsoft Windows processor system is the primary controller of the instrument. The instrument features a flat-panel display, a transparent touch screen, and a front-panel with direct access to commonly used instrument functions. You can also make complete use of the instrument with a mouse and keyboard.

Input Signal Path   An analog signal enters the instrument through a connection to an input connector on the front panel.

Main Acquisition Board.

Each channel on the Analog board comes onto the Main board and is routed to two of the analog-to-digital converters (A/Ds) on the Main board. Triggers from the Analog board go to the trigger ASIC. The A/D digitizes your signal and sends it to one or two of the four demuxes on the Main board. The demux sends the data to on-board DDR2 acquisition memory.

The demuxes are tied together through two busses, an LVDS ring bus (IDC) and a 3.3 V parallel bus (PA). The demux interacts with the trigger ASIC and also performs display functions. For MSO models, the trigger ASIC also performs the acquisition function for the digital probe, which connects directly to the Main board. The acquisition data and display data are sent by the IDC and PA buses to the SMIA FPGA, which controls various acquisition functions. The SMIA controls acquisition devices through the SPI, IIC, PA, IDC, and GPIO busses. The SMIA communicates through a local bus to the PLX device. The PLX device provides a PCIe interface to the host computer module. The Main board contains many local switching power supplies to support all of the acquisition and trigger ASICs.

Analog Acquisition Board.

The signal enters the instrument through a front-panel BNC connector, which is connected to the Analog board. The Analog board contains the 50 Ω and 1M Ω paths to the pre-amp ASIC (preamp). The higher bandwidth boards have two preamps per channel, and the lower bandwidth boards have one preamp per channel. The 1M Ω path has an attenuator network, which allows the routing of various gain settings into the preamp.

The Analog board has a calibrated voltage reference (CVR), which is used to calibrate the signal path. The Analog board has a microprocessor that handles various communication and calibration algorithms. The Analog board is controlled through the SPI bus. The preamp has outputs that go to the A/D and the trigger ASIC on the Main board. Hardware filters limit the bandwidth of the instrument on the output of the preamps before the signal goes off board to the A/D.

Display Panel   Waveforms and menus are displayed on a color, active-matrix LCD display with touch panel.

Display System. Text and menu image information from the Windows system is merged with the waveform images and processed by the display circuitry. The display system sends the combined graphical image to the active-matrix LCD display.

Touch Panel. The touch information from the touch screen is processed by a Windows driver, actively placing the pointer at the touched location. Actions from a mouse and actions from the touch panel are interchangeable, and treated alike by the user interface software.

Front Panel   The Front-panel board takes input from buttons and knobs and controls the status LEDs. The Front-panel board communicates to the Main board and to the host through an IIC interface. A microcontroller on the Front-panel board performs all of the I/O functions. The Front-panel board interacts with and provides power for the probes, through the VPI interface. The Front-panel board also generates probe calibration and compensation signals.

Power. The power switch in the lower left corner of the instrument front is connected via a flex circuit to the Front-panel board, which, in turn, controls the off-line power supply system. This allows Windows to control the power based on standard Windows operating behavior.

COM-E Interface Board   The COM-E Interface board implements the PC I/O functions, such as USB, PS/2, VGA, and Audio. This board also routes the PCIe interface to the Main board for the acquisition system. The instrument hard drive/solid state drive connects directly to this board. The Interface board takes bulk 12 volts power from the power supply and routes it to the Main board. External VPI power is routed through this board, as are the Ref In, Aux Out, and USB device ports. The 5 volt and 3.3 volt local switching power supplies are located on this board. A microcontroller controls power sequencing and power supply monitoring. This microcontroller communicates to devices on the Main board through the IIC interface.

The COM-E Interface board is a carrier board for a COM-E module.

COM-E Module. This module implements the PC that is integrated into the instrument. This module connects to the COM-E Interface board. The module contains the CPU, Memory, and Peripheral Controller Hubs (such as PCH, North Bridge, and/or South Bridge). The module conforms to the COM-E specification maintained by the PCMIG consortium with a Type-2 connector system. The module is connected to the system through two board-to-board 220-pin mezzanine connectors. The power, PCIe, USB, and video connect to the COM-E Interface board through this connector. A high-performance heat sink cools the main heat-generating devices on this board.

Power System   A 250 W power supply generates a switched 12 volt bulk supply as well as a 5 volt standby supply.

No switch completely disconnects the line power from the instrument. The power switch controls the power to the instrument through the COM-E board circuitry. When the instrument is in the "power off" condition, there is still a low power standby circuit to allow the system to monitor the power switch.

Fans   There are two instrument fans: the system fan, which is mounted on the rear chassis, and a smaller fan, which is mounted on the COM-E module. For cooling, the system fan draws air into the instrument, for a positively pressured instrument. The system fan is controlled by an embedded processor on the Main board and is regulated by monitoring the temperature of the Analog acquisition board circuitry. Cooling air enters the instrument through specific locations on the covers, where it flows directly over the heat sinks of each high wattage component. The COM-E fan cools the COM-E module.

Analog Inputs (BNC)

JR201	JR601	JR1001	JR1401	JR2101
Ch1	Ch2	Ch3	Ch4	Aux

Analog Board

Probe VPI Connectors

J701	J702	J703	J704	J705
Ch1	Ch2	Ch3	Ch4	Aux

Front Panel Board

J501

Flex Circuit
Bezel Buttons, Power Button, Power LED

Gnd   Prote Comp

J1911	J1912	J1913

| J301 | J606 | J605 |

174-5809-00

Probe Compensation

| J1401 | J1402 | J1403 | | J9201 | | J1201 |

Pre-Amp to A/D and Tigger Signals   JTAG   Font Panel

Touch Screen   J7601   Touch Screen

Main Acquisition Board

LCD Data/PWR   J7402   XGA Display

LCD Backlight   J7501

(MSO 5000 Series)
Ch D 15-D0

| J601 | J9701 | | J7401 | | J2201 |

174-5704-00   J100   J101

Edge Connector   Edge Connector

Digital Probe Input

Front I/O (USB)

System Fan   Hard Drive

| J15 | | | | | J20 | J12 | J13 | | J9 | | J8 |

DC Power   Rear I/O, IIC Power Seq   Touchscreen LCD Data, PCIe   LPC Debug Port   USB Host   USB Host   System

COM-E Interface Board

Aux Out Ref In   J1   Rear I/O

USB Device   J3

4X USB Host   J5

Audio
Line In
Line Out   J7
Mic In

VGA
Line Trigger   DC In   Module I/O   CPU Fan   VPI Power   PS/2 PS/2   Ethernet

| J16 | J10 | J11 | J11 | J14 | J2 | J6 | J4 |

Rear I/O

AC Line Cable
174-5808-00

J1
DC Out

Line Filter   Power Supply Board   COM-E Computer Module   CPU Fan   Probe VPI Power Supply

0076-035

Figure 2-5: Block diagram (MSO/DPO5000/B Series)

Adjustment Procedures

Adjustment Procedures

This chapter contains information about instrument adjustment.

Adjustment Interval

The voltage and timing references inside the instrument are very stable over time and should not need routine adjustment.

If the instrument fails the performance tests in the Specifications and Performance Verification manual, adjustment may be required. This manual was provided with your product, and can also be found at www.tektronix.com/manuals by searching for your product.

If periodic calibration is one of your requirements, a general rule is to verify performance and make adjustments (only if needed) every 2000 hours of operation or once a year if the instrument is used infrequently.

Adjustment After Repair

After removal and replacement of a module, you must perform the Performance Verification procedure, found in the Specifications and Performance Verification manual. This manual was provided with your product, and can also be found at www.tektronix.com/manuals by searching for your product.

If the instrument fails the Performance Verification tests, it must be returned to Tektronix for calibration.

Adjustment

Adjustment can be performed only by a Tektronix Service Center. See Contacting Tektronix, following the title page in this manual, for information on contacting Tektronix Service Support.

Maintenance

Maintenance

This section contains information needed to perform periodic and corrective maintenance on the instrument.

Preventing ESD

Before servicing this product, read the *General Safety Summary* and the *Service Safety Summary* at the front of the manual, as well as the following ESD information.

⚠ **CAUTION.** *Static discharge can damage any semiconductor component in this instrument.*

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

1. Minimize handling of static-sensitive circuit boards and components.

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

3. Discharge the static voltage from your body by wearing a grounded antistatic wrist strap while handling these modules. Service static-sensitive modules only at a static-free work station.

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

5. Handle circuit boards by the edges when possible.

6. Do not slide the circuit boards over any surface.

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

Inspection and Cleaning

Inspection and Cleaning describes how to inspect for dirt and damage. It also describes how to clean the exterior and interior of the instrument. 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 perform 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.

Interior Cleaning   Use a dry, low-velocity stream of air to clean the interior of the chassis. Use a soft-bristle, non-static-producing brush for cleaning around components. If you must use a liquid for minor interior cleaning, use a 75% isopropyl alcohol solution and rinse with deionized water.

⚠ *WARNING. To avoid electric shock or damage to the instrument, remove instrument power. Before performing any procedure that follows, power down the instrument and disconnect it from line voltage.*

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

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

⚠ *CAUTION. Avoid the use of chemical cleaning agents which 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.*

Inspection – Exterior.   Inspect the outside of the instrument for damage, wear, and missing parts. (See Table 4-1.) Immediately repair defects that could cause personal injury or lead to further damage to the instrument.

Table 4-1: External inspection checklist

Item	Inspect for	Repair action
Cabinet, front panel, and cover	Cracks, scratches, deformations, damaged hardware	Repair or replace defective module
Front-panel knobs	Missing, damaged, or loose knobs	Repair or replace missing or defective knobs

Table 4-1: External inspection checklist (cont.)

Item	Inspect for	Repair action
Connectors	Broken shells, cracked insulation, and deformed contacts. Dirt in connectors	Repair or replace defective modules. Clear or wash out dirt
Carrying handle and cabinet feet	Correct operation	Repair or replace defective module
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 modules

Flat Panel Display Cleaning   The 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.*

Avoid using abrasive cleaners or commercial glass cleaners to clean the display surface.

Avoid spraying liquids directly on the display surface. Avoid scrubbing 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.

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

Inspection – Interior.   To access the inside of the instrument for inspection and cleaning, refer to the *Removal and Installation Procedures* in this section.

Inspect the internal portions of the instrument for damage and wear. (See Table 4-2.) Defects should be repaired immediately.

If any circuit board is repaired or replaced, you must perform the Performance Verification procedure in the specifications and performance verification manual, which was provided with your instrument. This manual is also available at www.tektronix.com/manuals, by searching for your product name. If the instrument fails the Performance Verification tests, it must be returned to Tektronix for calibration.

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

Table 4-2: 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.

Cleaning Procedure – Interior. To clean the instrument interior, perform the following steps:

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 doing steps 1 and 2, a module is clean upon inspection, skip the remaining steps.

3. If steps 1 and 2 do not remove all the dust or dirt, the instrument may be spray washed using a solution of 75% isopropyl alcohol by doing steps 4 through 8.

4. Gain access to the parts to be cleaned by removing easily accessible shields and panels. (See page 4-7, *Removal and Installation*.)

5. Spray wash dirty parts with the isopropyl alcohol and wait 60 seconds for the majority of the alcohol to evaporate.

6. Use hot (120 °F to 140 °F) deionized water to thoroughly rinse them.

7. Dry all parts with low-pressure, deionized air.

8. 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.

Returning the Instrument for Service

When repacking the instrument for shipment, use the original packaging. If the packaging is unavailable or unfit for use, contact your local Tektronix representative to obtain new packaging.

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

Before returning the instrument for service, contact the Service Center to get an RMA (return material authorization) number, and any return or shipping information you may need.

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

- The RMA number.

- The owner's address.

- Name and phone number of a contact person.

- Type and serial number of the instrument.

- Reason for returning.

- A complete description of the required service.

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

Removal and Installation

⚠ **WARNING.** *Before performing this or any other procedure in this manual, read the safety summaries found at the beginning of this manual. Also, to prevent possible injury to service personnel or damage to the instrument components, read Installation, and Preventing ESD in this section.*

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

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

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 4-3: Required equipment for Removal and Replacement

Item No.	Name	Description	Part number
1	Screwdriver handle	Accepts Torx-driver bits	620-440
2	T-10 Torx tip	Used for removing instrument screws. 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, CDRW & hard drive	Standard tool
6	Angle-Tip Tweezers	Used to remove front panel knobs	Standard tool
7	3/16 inch open-end wrench	Used to remove nut posts	Standard tool
8	9/32 inch open-end wrench	Used to remove nut posts	Standard tool
9	MA-800G Soldering Aid	Used to remove the front panel trim	Standard tool

Module Removal (DPO7000/C Series)

To remove a module, refer to the module locator. (See Figure 4-1.)

You can also refer to the exploded view diagrams.(See page 5-2, *Using the Replaceable Parts List*.)

To access the modules, refer to the module removal table. (See Table 4-4 on page 4-10.)
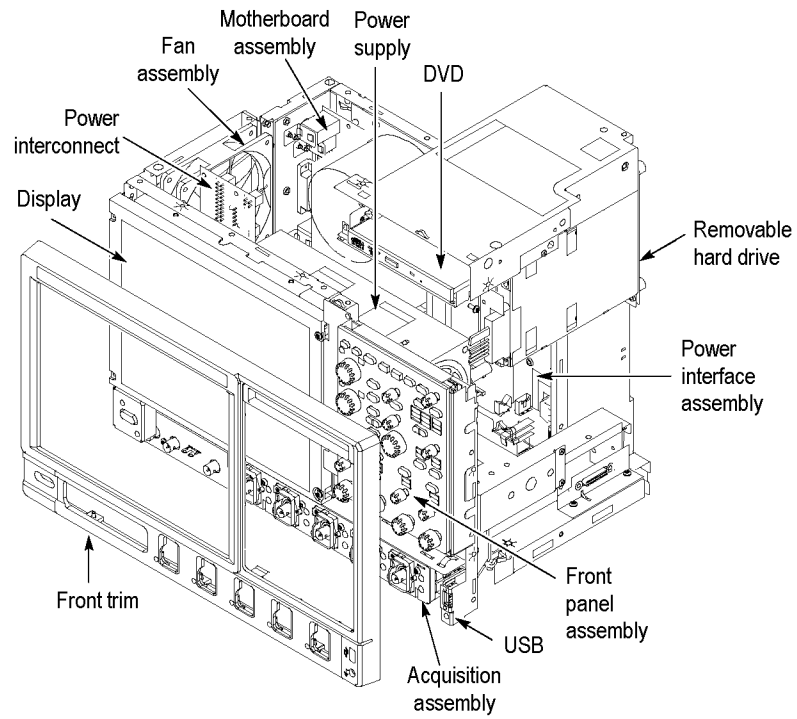
Figure 4-1: DPO7000/C Series module locations

Table 4-4: DPO7000/C Series module removal

	You must first remove					
	Trim & covers	DVD	Hard drive/solid state drive	Acquisition assembly	Power supply	Power interface
Front panel	X					
Display	X					
Front USB	X					
DVD	X					
Hard drive/solid state drive	X	X				
uATX motherboard	X			X		X
Power interface	X			X		
Acquisition assembly	X					
Power supply	X	X	X			
Power interconnect	X	X	X		X	
Fan assembly	X					
Power button	X					

Module Removal (MSO70000/C/DX, DPO70000B/C/D/DX, and DSA70000B/C/D Series)

To remove a module, refer to the module locator. (See Figure 4-2.)

You can also refer to the exploded view diagrams. (See page 5-2, *Using the Replaceable Parts List*.)

To access the modules, refer to the module removal table. (See Table 4-5 on page 4-12.)
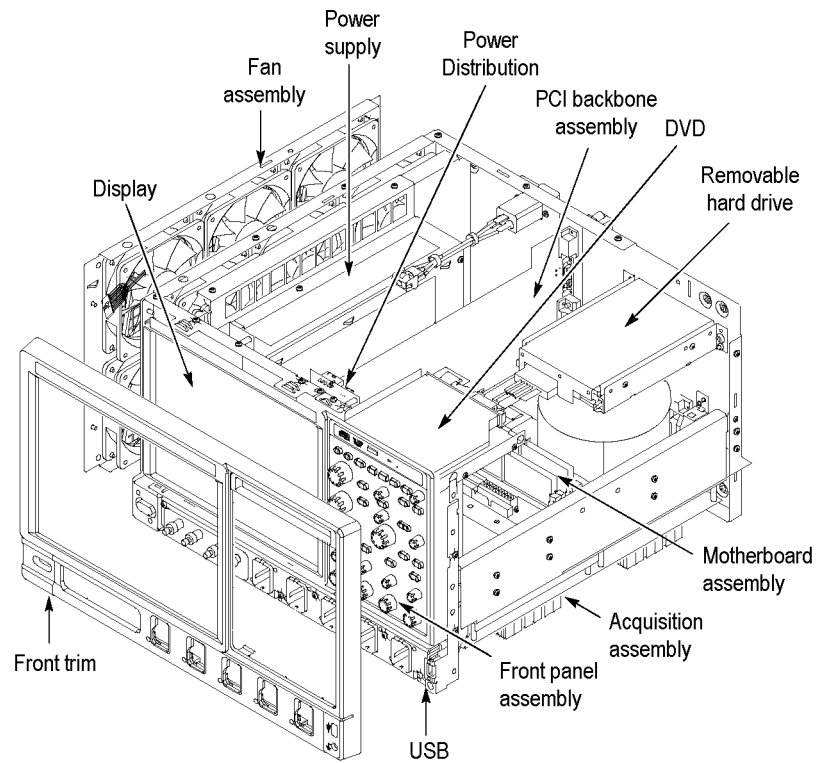
Figure 4-2: Module locations — MSO70000/C/DX, DPO70000B/C/D/DX. and DSA70000B/C/D series ("C" series models shown)

Table 4-5: Module removal (MSO70000/C/DX, DPO70000B/C/D/DX, and DSA70000B/C/D series)

	You must first remove						
	Trim & cosmetic covers	ESD (electrostatic discharge) Covers	DVD	Hard drive/solid state drive	Acquisition assembly	Power supply	PCI backbone
Front panel and Display	X						
Front USB	X	Bottom			X		
DVD	X	Top					
Hard drive cable and bracket	X	Top					
μATX motherboard	X	Top					X
PCI backbone	X	Top					
Acquisition assembly	X	Bottom					
Power supply	X	Top					
Power distribution	X	Both			X	X	X
Fan assembly	X						
Power button	X	Bottom					

μATX and Power Interface Removal (DPO7000/C Series)

Removal of the μATX motherboard and the Power Interface assembly is a complex process. To access or replace either one, remove both the μATX motherboard and the Power Interface board as an assembly. This procedure assumes the Acquisition board has been removed.

1. Working from the top of the instrument, unplug the cables connecting the μATX and Power interface boards to other parts of the instrument. Note where each cable connects.

2. Remove the screw securing the μATX board to the chassis on the right side of the instrument, near the TekLink connector.

3. Remove the eight screws securing the μATX board to the chassis through the back of the instrument.

4. Remove the three screws securing the μATX board to the chassis on the left side of the instrument.

5. Position the instrument on its back, with the bottom facing you.

6. Remove the three screws securing the Power Interface assembly to the chassis, along the top edge of the assembly.

7. Pull the μATX/Power Interface assembly out of the instrument. (See Figure 4-3.) It may take some force to pull it free. Use a soldering aid to pry the assembly free of the connectors near the top corners of the assembly, if necessary.

Figure 4-3: Removing the μATX/Power Interface assembly

8. Install the μATX/Power Interface assembly by performing these steps in reverse order.

Module Removal (MSO/DPO5000/B Series)

To work on the instrument, place it face down in its protective front cover. You can remove the tabs from the cover if you want to make it easy to move the instrument in and out of the cover while working on it.

To remove a module, refer to the module locator. (See Figure 4-4.)
You can also refer to the exploded view diagrams and parts lists. (See page 5-66, *Replaceable Parts (MSO/DPO5000/B Series).*) The parts lists show how many of each type of screw are used to attach each replaceable assembly.

Requirements when removing assemblies:

- To remove any of the assemblies, except the removable hard drive/solid state drive, you must first remove the rear cover and separate the front chassis from the rear chassis.

- To remove the COM-E Interface board assembly (which includes the COM-E module), you must first disconnect the bracket under the board from the rear chassis. Screws attach this bracket from both the top and the bottom. You should not need to separate the COM-E module from the COM-E Interface board; however, the module fan is replaceable. The part numbers and attaching screws are shown in the replaceable parts list. (See Table 5-31 on page 5-70.)

- To remove the Front Panel board assembly or the front panel case assembly, you must first remove the Main board, the Analog board, and the front chassis.

NOTE. Contact Tektronix if troubleshooting shows that you need to have either the Analog board or the Main board replaced. The instrument must be returned to Tektronix to have the board or boards replaced.

Rear cover

Rear chassis

Power supply

COM-E
Module

COM-E
Interface board

Main board

Front chassis

Display

System fan assembly

Analog board

Removable hard drive

Front panel board

Front case assembly
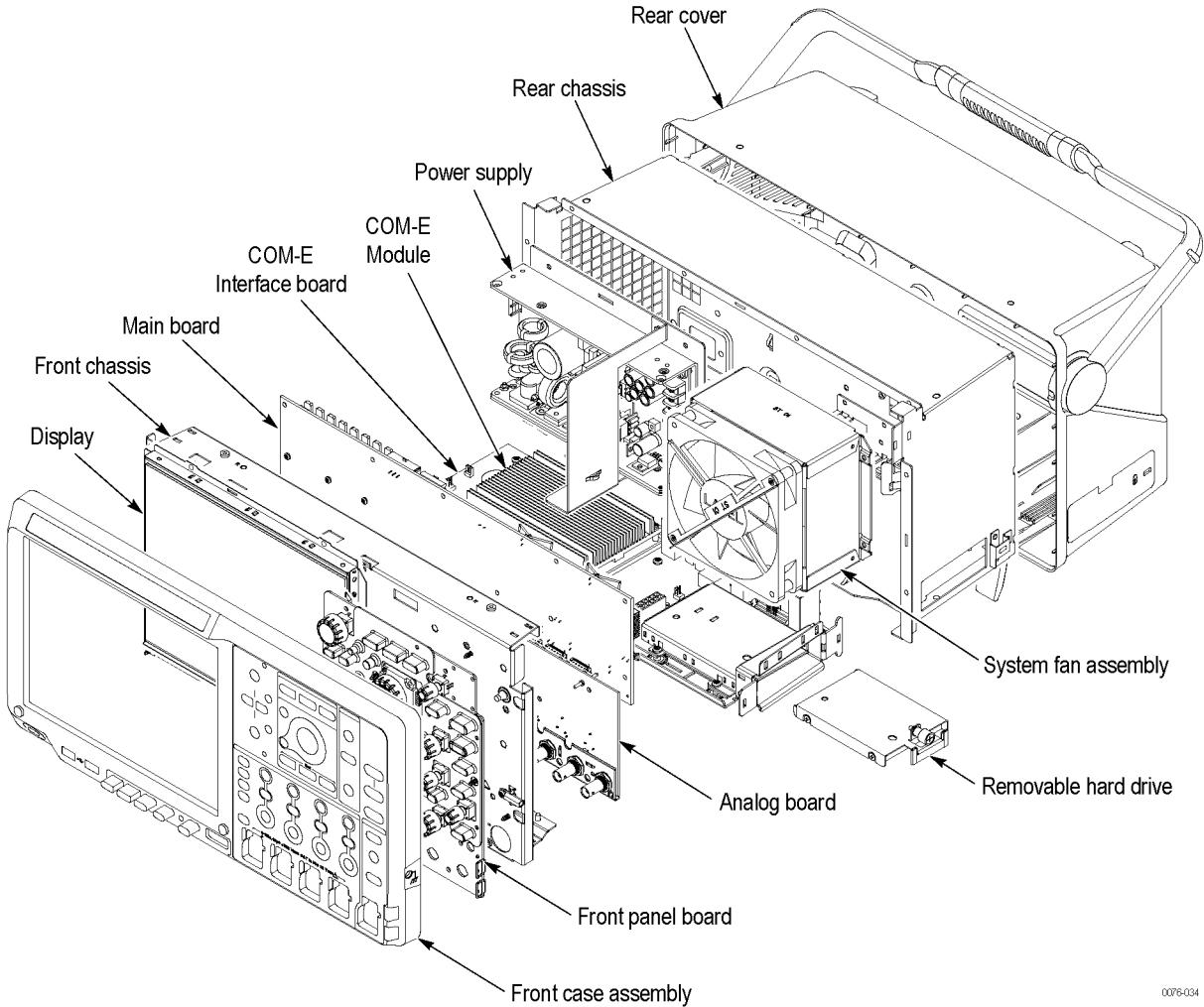
0076-034

Figure 4-4: Module locations (MSO/DPO5000/B Series)

TekScope Recovery Report Utility

The TekScope Recovery Report Utility is designed to gather logs and other files that may contain data useful to Tektronix in the diagnosis of TekScope Errors, and it creates a .zip file on the desktop to hold all of the gathered data. This compressed file is easily copied from the desktop to a removable flash drive, or the file can be sent to Tektronix as an email attachment.

If you contact Tektronix for help in diagnosing TekScope Errors, you may be asked to run this utility and supply Tektronix with the .zip file.

NOTE. *The utility will erase temporary data created under the account of the user that runs the utility. This allows TekScope to generate fresh files the next time it starts.*

Finding the utility

A link to the utility can be found under the Start\All Programs\Tektronix\TekScope\ directory.
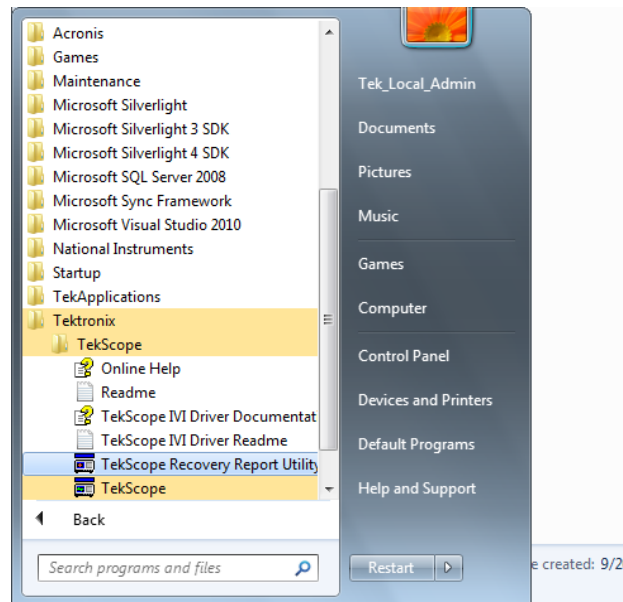
Running the utility

Click on the utility link.

If TekScope is running when the utility is invoked, the utility will warn the user that TekScope must be stopped. This is necessary to allow the utility to access some of the files. The utility will automatically stop TekScope after it queries the serial number of the instrument. Click Yes to allow the utility to stop TekScope and collect files for the report.
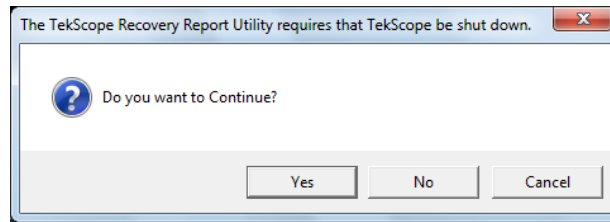
If TekScope is not running, the recovery utility will still run and will collect files for the report.

Finding the report

When the utility is finished running, the zipped report file is on the desktop.

- a) In the case where TekScope was running when the utility was invoked, the name of the .zip report file created on the desktop will contain the type of instrument and the serial number. For example: `TekScope_Recovery_Report_MSO71254C_123456789.zip`.

- b) However, if TekScope was not running when the utility was invoked, the name of the .zip report file will not contain the serial number. For example: `TekScope_Recovery_Report_MSO71254C.zip`

Data contained in the report

When the utility is finished running, if these files exist on the instrument, the report will contain copies of these specific files:

```
C:\Windows\Sysnative\winevt\logs\Application.evtx
C:\programdata\tektronix\ISD.XML
C:\programdata\Tektronix\TekScope\Calibration\console.log
C:\programdata\Tektronix\TekScope\Calibration\console.logOld
C:\programdata\Tektronix\TekScope\Calibration\calSPCConst.dat
C:\programdata\Tektronix\TekScope\Calibration\caldiag.log
C:\programdata\Tektronix\TekScope\Calibration\caldiag.logOld
C:\programdata\Tektronix\TekScope\Calibration\error.log
```

When the utility is finished running, the zipped report file will also contain copies of all files found in the following directories:

```
C:\programdata\Tektronix\TekScope\Internal\*.*
C:\programdata\Tektronix\TekScope\Calibration\
CalDramDump\*.*
C:\programdata\Tektronix\TekScope\Calibration\
CalDramDumpFact\*.*
```

Data deleted by the utility

Running this utility will delete the following files:

```
C:\users\<current_user>\AppData\LocalLow\Tektronix\
tekScope\Internal\*.*
```

Because TekScope was having difficulties, some files may have been corrupted. Deleting these files will allow TekScope to regenerate them on the next start-up. Deleting these files may resolve the initial problem.

The utility log file   You can see a log file of the operation performed by the recovery report utility at: `C:\Temp\TekScopeRecoveryReportUtility_log.txt`

Troubleshooting (DPO7000/C, MSO70000/C/DX, DSA70000B/C/D, and DPO70000B/C/D/DX Series)

⚠ **CAUTION.** *Before performing this or any other procedure in this manual, read the General Safety Summary and Service Safety Summary found at the beginning of this manual.*

To prevent possible injury to service personnel or damage to electrical components, please read information on Preventing ESD. (See page 4-1, Preventing ESD.)

This section contains information and procedures designed to help you isolate faults to a module.

This section requires that service personnel have the appropriate skills to work on this instrument, including PC troubleshooting and Microsoft Windows operating system skills. Details of PC and Windows operation and service are not in this manual.

For assistance, contact your local Tektronix Service Center.

Service Level

This subsection contains information and procedures designed to help you isolate faulty modules in the instrument. If a module needs to be replaced, follow the Removal and Installation Procedures located in this section.

Check for Common Problems

Use the following table to quickly isolate possible failures. The table lists problems and possible causes. The list is not exhaustive, but it may help you eliminate a problem that is quick to fix, such as a blown fuse or loose cable.

Table 4-6: Failure symptoms and possible causes

Symptom	Possible cause(s)
Instrument will not power on	■ Power cord not plugged in
	■ Faulty power supply
	■ Faulty power interconnect board
Front panel light comes on (instrument powers on), but one or more fans will not operate	■ Faulty fan cable
	■ Defective fan assembly
	■ Faulty power supply
	■ Faulty μATX Motherboard
	■ Faulty CPU
	■ μATX Motherboard power problem

Table 4-6: Failure symptoms and possible causes (cont.)

Symptom	Possible cause(s)
Hard disk drive/solid state drive related symptoms	■ Defective disk drive
	■ Incorrect hard disk type selected in the BIOS setup
	■ Replaceable disk drive not installed
	■ Power supply failure
	■ Corrupted BIOS module firmware, reinstall firmware
	■ Loose cable
	■ Corrupted OS image
DVD-ROM related symptoms	■ Defective CDRW-ROM
	■ Defective CDRW-ROM drive cable
	■ Defective CDRW-ROM board
	■ Incorrect CDRW-ROM configuration in the BIOS setup
Flat-panel display blank	■ Video adapter set to Integrated (connect monitor to µATX VIDEO port, enter BIOS, set Video Adapter = PCI)
	■ BIOS setting not Advance > Video Configuration > Primary Video Adapter = PCI
	■ Defective cable from display adapter board to power interface board
	■ Defective cable from inverter board to display adapter board
	■ Defective cable from inverter board to backlighting display lamp
	■ Defective backlighting display lamp
	■ Faulty display
	■ Faulty power interface board
	■ Faulty power interconnect board
	■ Faulty inverter board
	■ Faulty display adapter board
BIOS error messages	■ Refer to the BIOS error message information

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

Fault Isolation Procedure   Follow the primary troubleshooting tree for fault isolation. (See Figure 4-5.) and (See Figure 4-6.) These trees call for you to run the diagnostics programs, and check for BIOS errors.

Start

Turn on power

Instrument powers on (fans run)?

No → Possible cause:
1 Instrument power cord is not plugged in
2 Faulty power supply
3 Faulty power interconnect
4 Do *Isolating to a Board If Power Will Not Come Up*

Yes

Instrument appears "dead" (dead screen)?

Yes → Beeps

Yes → Possible cause:
1 SO DIMMs incorrectly installed or missing
2 Defective µATX motherboard
3 Check beep codes

No

No

Flat-panel display OK?

No → Install XGA monitor to XGA port

XGA OK.

No

Yes

XGA OK.

Yes → Move monitor to VIDEO port.

No

Bad DA or inverter board. Loose connections

BIOS setting, bad power interface board

Bad µATX motherboard

Yes

External monitor blank, if present?

Yes → Possible cause:
1 Monitor cable defective or not connected to instrument
2 External monitor controls turned down
3 Defective monitor

No

BIOS error message?

Yes → See BIOS error code table

No

Windows Boots?

No → 1 See *If the Instrument Will Not Boot*

2 See *Booting Into Windows*

3 Boot to Safe Mode and restore the registry.

Yes

Run instrument diagnostics

Passes all tests?

No → Acquisition board defective

Yes

If the instrument Application is not already running, start it from the Start menu.

Instrument Application starts?

No → Reinstall instrument software (see user manual)
Do *If the Instrument Application Does Not Work*

Yes

Done

0076-011

Figure 4-5: Primary troubleshooting tree (DSA/DPO70000B)

```
Start
  │
  ▼
Turn on power
  │
  ▼
Instrument powers on (fans run)? ──No──▶  Possible cause:
  │                                        1 Instrument power cord
 Yes                                          is not plugged in
  │                                        2 Faulty power supply
  ▼                                        3 Faulty power
Instrument appears "dead" (dead screen)? ──Yes──▶    interconnect
  │                                        4 See Isolating to a Board
 No                                            If Power Will Not
  │                                            Come Up
  ▼
Flat-panel display OK? ──No──▶ Install XGA monitor to the DVI port    Possible cause:
  │                                        │                           1 SO DIMMs incorrectly
 Yes                                       ▼                              installed or missing
  │                            Is the XGA output OK? ──Yes──┐           2 Defective μATX
  │                                        │                │              motherboard
  │                                       No                │           3 Check post codes
  │                                        ▼                │
  │                            Bad DA or inverter board     │
  │                            loose connections            │
  │◀──────────────────────────────────────────────────────┘
  ▼
BIOS error message? ──Yes──▶ See BIOS error code table
  │
 No
  │
  ▼
Windows Boots? ──No──▶ 1 See If the Instrument
  │                        Will Not Boot
 Yes                     2 See Booting into
  │                        Windows
  │                      3 Boot to Safe Mode and
  ▼                        restore the registry.
Run instrument diagnostics
  │
  ▼
Passes all tests? ──No──▶ Analog board defective
  │
 Yes
  │
  ▼
If the instrument Application is not already running, start it from the Start menu.
  │
  ▼
Instrument Application starts? ──No──▶ Reinstall instrument software (see user manual)
  │                                     See If the Instrument Application Does Not Work
 Yes
  │
  ▼
Done
```

0076-046

Figure 4-6: **Primary troubleshooting tree (MSO70000/C/DX, DSA70000C/D, and DPO70000C/D/DX)**

Isolating to a Board if Power Will Not Come Up, DPO7000/C Series. If the instrument is in standby mode (plugged in, but not turned on), a red light is visible through the right side of the instrument. The location of the red light is shown in the following illustration. (See Figure 4-7.)

If the instrument is On, the red light should be off. A red light when the instrument in On means that there is a problem with one of the power supplies.

Mains power-on and over current LEDs are near the center of the power supply. A glow from them is visible while looking through the side of the instrument.

0076-013
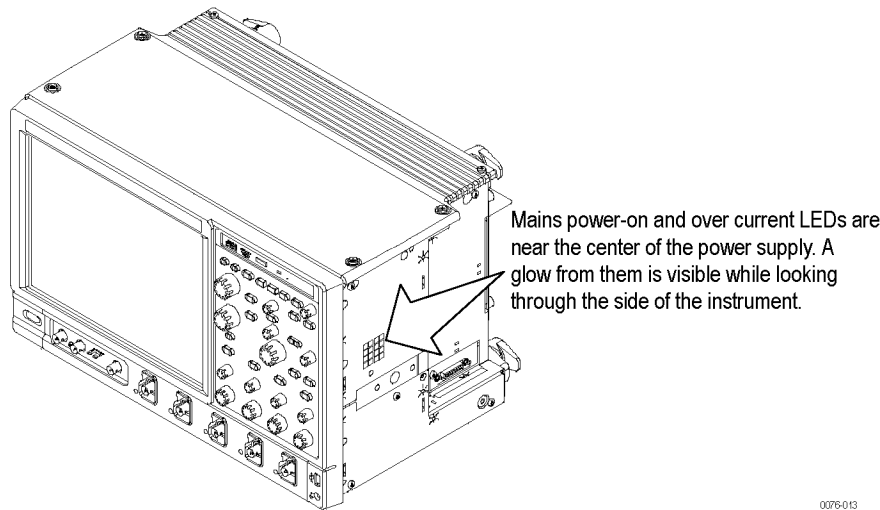
Figure 4-7: Location of power-on and over-current LEDs

Table 4-7: Power-on and over-current LEDs

LED	Supply	Description
DS200	+15 VA	Green when supply is operating within tolerance.
DS201	+5 VA	Green when supply is operating within tolerance.
DS202	N/A	Red if any of the supplies (+15 VA, +5 VA, +1.8 VD, -15 VA, and -5 VA) are out of tolerance.
DS203	-5 VA	Green when supply is operating within tolerance.
DS204	-15 VA	Green when supply is operating within tolerance.
DS330	+1.8 VD	Green when supply is operating within tolerance.

Remove boards one at a time to locate a fault (the Display board, Acquisition board, Power interface board, and the μATX board). If this does not identify the problem, check the IEC power cable.

If this process did not correct the problem, replace the power supply.

Isolating to a Board if Power Will Not Come Up, MSO70000/C/DX, DPO70000B/C/D/DX, and DSA70000B/C/D Series. Remove boards one at a time to locate a fault (the Display board, Acquisition board, Power distribution board, PCI backbone board, and the μATX board). If this does not identify the problem, check the IEC power cable.

If this process did not correct the problem, replace the power supply.

Checking the Power Supply Voltages. To check the power supply voltages, power on the instrument and connect the reference lead of a digital voltmeter to chassis ground, such as the top of the power supply.

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 following table shows the voltage you should find on each pin of J102 or J8 and J103 or J9. (See Figure 4-8 on page 4-25.)

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.

Table 4-8: Power supply voltages

Power interconnect board (J102) Power distribution board (J8)	Voltage	Power interconnect board (J103) Power distribution board (J9)	Voltage
Pins 1, 2, 11	+3.3 V	Pins 1, 2	COM
Pin 12	-12 V	Pins 3, 4	+12 V
Pin 10	+12 V		
Pin 18	-5 V*		
Pins 4, 6, 19, 20	+5 V		
Pin 9	+5 VSB		
Pins 3, 5, 7, 13, 15, 16, 17	COM		
Pin 14	PS-ON		
Pin 8	PW-OK		
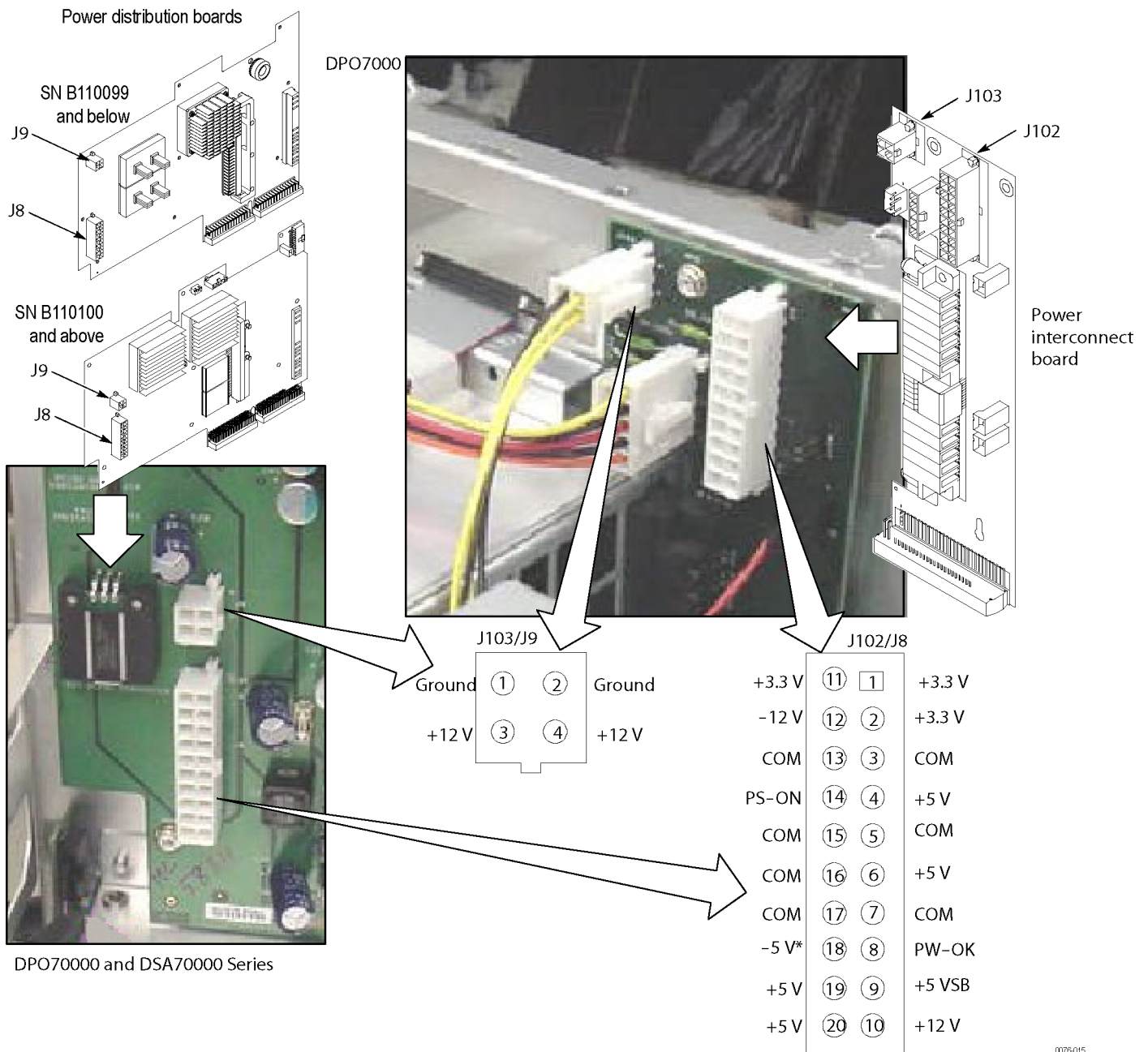
Figure 4-8: Power supply test points

If the Instrument Will Not Boot. If nothing is displayed, check that the display is turned on. At boot time, and while using an external monitor connected to the μATX external video port, press F2 to enter the BIOS setup. The Advanced Video Configuration menu lets you select PCI (LCD) or Integrated (the μATX VIDEO port on the rear panel). The lower XVGA port on the rear panel is the PCI video port (driven by the same video controller as the LCD).

If there is a display on the XVGA port, but not on the LCD, check the power supply voltages. If the voltages are okay but there is still no display on the LCD, replace the display assembly (LCD, lamps, and cable).

Booting Into Windows. If the instrument will not start, run the CMOS restore utility. (See page 4-57, *Update/Restore the CMOS.*)

If the instrument starts, finds the hard disk, but locks up while displaying the Windows splash screen:

1. Select the Integrated video port using the setup menu.

2. Disable the buses and disconnect the PPC board by installing J111.

3. If the system boots (It will only boot to Windows, the instrument application will not run) to the external µATX video port, replace the Power Interface board.

If the Instrument Application Does Not Work. If the instrument starts Windows, but the instrument application does not work (the DPO Main graphic is displayed), check the following:

1. The application software.

2. The Acquisition board.

3. The Power Interface board (try removing and reinstalling the Power Interface board).

4. Did someone exit the application using Task Manager and then try to reenter the application without rebooting?

5. If the relays click, the acquisition is running.

6. On the Settings tab of the desktop properties, select Advanced and then the Performance tab. Hardware Acceleration must be set to Full for video merge to work. If you change the setting, restart.

Instrument Diagnostics   The primary diagnostics for the instrument are accessible through the oscilloscope application software. Procedures for running these diagnostics are described next.

The Instrument diagnostics check the basic functionality of the acquisition system at every power on.

The Instrument Diagnostics run after Windows has booted up and run its own set of system checks. If any failures occur at power on, a pop-up message indicates that a failure has occurred and provides a choice to go directly to the diagnostic results window to view the specific failures, or to ignore them and continue directly into the oscilloscope application.

Several diagnostic tests are available. (See Table 4-9 on page 4-28.) The table indicates which tests run automatically at power-up, and which tests are run manually.

The power on tests ensure that the hardware is installed and can be accessed by the software. The tests provide limited diagnostic information, and provide no performance information.

If there are no failures, you can view the results of the tests in the Instrument Diagnostics page, under the Utilities menu.

To run the instrument Diagnostics, perform these steps:

1. Turn off all other applications.

2. From the menu bar, touch Utilities and then select Instrument Diagnostics; the Diagnostics control panel appears. (See Figure 4-9.)

Figure 4-9: Diagnostics control panel ("C" model shown)

Table 4-9: Diagnostic tests

Component	Group & test	Error codes	Power on	Manual	Instrument
Processor	Memory	111 DRAMWalk1	✔		All
		112 DRAMCell			All
		113 DRAMMarch			All
		114 DRAMCal			MSO70000/C/DX only
Registers	PCI	211 MIA	✔		All
	Acquisition	221 ACL	✔		All
		222 PLL			
		223 Preamp			
		224 TrkHld			
		225 ADC			
		226 DAC			
		227 Demux			
	Trigger	231 SBTL	✔		All
		232 SGTL			All
		233 TrigComp			All
		234 CommTrig			All
		235 FTL			MSO70000/C/DX only
	Misc	241 FanCtrl	✔		All
		242 Tek04			MSO70000/C/DX only
		243 DigCtrl			MSO70000/C/DX only
		IntfBoard			
		FpBoard			
		AfeBoard			
	Digital Trig	Tek05Dfe			MSO70000/C/DX only
		Tek05Dev			
		Tek05HkRam			
		Tek05AcqRam			

Table 4-9: Diagnostic tests (cont.)

Component	Group & test	Error codes	Power on	Manual	Instrument
Acquisition	Demux	311 RunAB 312 AcqDone 313 SysRdy 314 Interrupt 315 IdcLoSpeed 316 IdcHiSpeed 317 IdcAcqDataXfr 318 IdcDispDataXfr	✓		All
	DMA	321 PaDMA 322 IdcAcqDMA IdcDispDma	✓		All
	Memory	331 MemData 332 MemAddr 333 MemSpeed	✓ ✓	 ✓	All
	Vertical	341 Preamp Inputs 342 TH Inputs 343 ADC Inputs 344 ADC Outputs 345 50 OhmOvld 346 LFComp 347 MCM I/O	 ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	All DSA/DPO70000D and MSO/DPO70000DX only
	PLL	351 Clock Freq	✓		All
	HFSource	361 SINE 362 SINE33 363 SQUARE		✓	DPO7000 only All All

Table 4-9: Diagnostic tests (cont.)

Component	Group & test	Error codes	Power on	Manual	Instrument
Acquisition (Cont.)	AcqProcessor	371 SPI	✓		All
		372 INT Line			All
		373 Interrupt			All
		374 RelayDrive			DPO/DSA70000B only
		375 TWI			All
		376 PrbInterrupts			All
		377 TCpowerCtrl			DPO/DSA70000B only
		378 MAX517			All
Trigger	Inputs	411 CH1	✓		All
		412 CH2			All
		413 CH3			All
		414 CH4			All
		415 Line			All
		416 Video			DPO7000 only
		417 Events			All
		418 Serial			All
		419 HSMeta			MSO70000/C/DX only
	Outputs	421 523TrgOut	✓		DPO7000 only
		422 523CpuInt	✓		DPO7000 only
		423 Fedge	✓		All
		424 Ftrig	✓		All
		425 TrigInfo		✓	
	Timers	431 Delay		✓	All
		432 Delta			
		433 Holdoff			
		434 PostTrig			
		435 PreTrig			
		436 Timeout			
	Word	441 Compare	✓		MSO70000/C/DX only
		442 Delay			
		443 Clk Qualify			
		444 Formed LSST			
	Digital	Acq			MSO70000/C/DX only
TekLink	Topology	511 Signals [1]		✓	All
	Trigger	521 Path [1]		✓	All
		TiDone			
	Reference	531 Path [1]		✓	All

[1]   Requires external test fixture.

Software Updates   To update the application software, download the software from the Tektronix Web site.

After Repair   After removal and replacement of a module, you must perform the Performance Verification procedure, found in the instrument *Specifications and Performance Verification* manual, which was provided with the instrument. This manual is also available on the Tektronix Web site (www.tektronix.com/manuals).

If the instrument fails the Performance Verification tests, it must be returned to Tektronix for adjustment.

μATX BIOS Error Messages   When the μATX board powers on, the BIOS runs power-on self-tests (POST) to check the board. The BIOS writes error codes to location 80h and tries to write the codes to the display. If the error is fatal, the POST code indicates the last successful checkpoint reached. The following table lists the error messages that are displayed by the BIOS. Another table lists the POST codes displayed by the BIOS. (See Table 4-12 on page 4-35.)

Once the display is enabled, errors are written to the display as text messages. These messages are always displayed unless the board is configured for silent startup or headless operation (no keyboard, mouse, or display).

Table 4-10: μATX BIOS error messages

Item no.	Error message	Description
1	GA20 Error	Error when switching to protected mode during the memory test.
2	Pri Master HDD Error, Pri Slave HDD Error Sec Master HDD Error, Sec Slave HDD Error	Could not read sector.
3	Pri Master Drive - ATAPI Incompatible PRI Slave Drive - ATAPI Incompatible Sec Master Drive - ATAPI Incompatible Sec Slave Drive - ATAPI Incompatible	Drive not an ATAPI device. Run setup, and make sure the device is set up correctly.
4	A: Drive Error	No response from the drive.
5	Cache Memory Bad	Memory may be bad.
6	CMOS Battery Low	Replace the battery.
7	CMOS Display Type Wrong	Check the setup to make sure the type is correct.
8	CMOS Checksum Bad	Run the setup to reset values.
9	CMOS Settings Wrong	Settings corrupted or the battery has failed.
10	CMOS Date/Time Not Set	Run the setup to correct values.
11	DMA Error	Error during read/write test of controller.
12	FDC Failure	Error while trying to access controller.
13	HDC Failure	Error while trying to access controller.
14	Checking NVRAM. . . .	NVRAM is being checked.
15	Update OK!	Invalid NVRAM has been updated.
16	Update Failed	Unable to update invalid NVRAM.
17	Keyboard Error	Make sure the keyboard is connected properly.
18	Keyboard/Interface Error	Keyboard test failed.

Table 4-10: µATX BIOS error messages (cont.)

Item no.	Error message	Description
19	Memory Size Decreased	If no memory was removed, the memory may be bad.
20	Memory Size Increased	If no memory was added, the system may have a problem.
21	Memory Size Changed	If no memory was added or removed, the memory may be bad.
22	No Boot Device Available	Boot device not found.
23	Off Board Parity Error	Parity error occurred on an off-board card.
24	On Board Parity Error	Parity error occurred in on-board memory.
25	Parity Error	Error occurred in on-board memory at an unknown address.
26	NVRAM/CMOS/PASSWORD cleared by Jumper	Turn off power and remove the jumper.
27	<CTRL_N> Pressed	CMOS is ignored and NVRAM is cleared. Enter Setup.

Table 4-11: 039-0173-xx and 065-0745-xx µATX POST codes

Item no.	Module	Displayed POST code	Description
1	Host Processor	10	Power-on initialization of the host processor (Boot Strap Processor)
		11	Host processor Cache initialization (including APs)
		12	Starting Application processor initialization
		13	SMM initialization
2	Chipset	21	Initializing a chipset component
3	Memory	22	Reading SPD from memory DIMMs
		23	Detecting presence of memory DIMMs
		24	Programming timing parameters in the memory controller and the DIMMs
		25	Configuring memory
		26	Optimizing memory settings
		27	Initializing memory, such as ECC init
		28	Testing memory
4	PCI Bus	50	Enumerating PCI busses
		51	Allocating resources to PCI bus
		52	Hot Plug PCI controller initialization
		53 - 57	Reserved for PCI Bus
5	USB	58	Resetting USB bus
		59	Reserved for USB

Table 4-11: 039-0173-xx and 065-0745-xx μATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
6	ATA/ATAPI/SATA	5A	Resetting PATA/SATA bus and all devices
		5B	Reserved for ATA
7	SMBus	5C	Resetting SMBUS
		5D	Reserved for SMBUS
8	Local Console	70	Resetting the VGA controller
		71	Disabling the VGA controller
		72	Enabling the VGA controller
9	Remote Console	78	Resetting the console controller
		79	Disabling the console controller
		7A	Enabling the console controller
10	Keyboard (PS2 or USB)	90	Resetting keyboard
		91	Disabling keyboard
		92	Detecting presence of keyboard
		93	Enabling keyboard
		94	Clearing keyboard input buffer
		95	Instructing keyboard controller to run Self Test (PS2 only)
11	Mouse (PS2 or USB)	98	Resetting mouse
		99	Disabling mouse
		9A	Detecting presence of mouse
		9B	Enabling mouse
12	Fixed Media	B0	Resetting fixed media
		B1	Disabling fixed media
		B2	Detecting presence of a fixed media (IDE hard drive detection etc.)
		B3	Enabling/configuring a fixed media
13	Removable media	B8	Resetting removable media
		B9	Disabling removable media
		BA	Detecting presence of a removable media (IDE, CD-ROM detection, etc.)
		BC	Enabling/configuring a removable media
14	BDS	Dy	Trying boot selection y (y=0 to 15)
15	PEI Core	E0	Started dispatching PEIMs (emitted on first report of EFI_SW_PC_INIT_BEGIN EFI_SW_PEI_PC_HANDOFF_TO_NEXT
		E2	Permanent memory found
		E1, E3	Reserved for PEI/PEIMs

Table 4-11: 039-0173-xx and 065-0745-xx µATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
16	DXE Core	E4	Entered DXE phase
		E5	Started dispatching drivers
		E6	Started connecting drivers
17	DXE Drivers	E7	Waiting for user input
		E8	Checking password
		E9	Entering BIOS setup
		EA	TBD - Flash Update
		EB	Calling Legacy Option ROMs
		EE	TBD - Calling INT 19. One beep unless silent boot is enabled.
		EF	TBD - Unrecoverable Boot failure/S3 resume failure
18	Runtime Phase/EFI OS Boot	F4	Entering Sleep state
		F5	Exiting Sleep state
		F8	EFI boot service ExitBootServices ( ) has been called
		F9	EFI runtime service SetVirtualAddressMap ( ) has been called
		FA	EFI runtime service ResetSystem ( ) has been called
19	PEIMs/Recovery	30	Crisis Recovery has initiated per User request
		31	Crisis Recovery has initiated by software (corrupt flash)
		34	Loading recovery capsule
		35	Handing off control to the recovery capsule
		3F	Unable to recover

Table 4-12: 039-0185-xx μATX POST codes

Item no.	Module	Displayed POST code	Description
1	Turn Off Chipset and CPU test	C0	OEM Specific-Cache control cache
			Processor Status (1FLAGS) Verification.
			Tests the following processor status flags: Carry, zero, sign, overflow.
			The BIOS sets each flag and verifies that they are set, then turns each flag off and verifies that it is off.
			Read/Write/Verify all the CPU registers except SS, SP, and BP with data pattern FF and 00.
			RAM must be periodically refreshed to keep the memory from decaying. This function ensures that the memory refresh function is working properly.
2	Memory Presence	C1	First block memory detect
			OEM Specific-Test to size on-board memory
			Early chip set initialization
			Memory presence test
			OEM chip set routines
			Clear low 64K of memory
			Test first 64K memory
3	Early Memory Initialization	C2	OEM Specific-Board Initialization
4	Extend Memory DRAM select	C3	OEM Specific-Turn on extended memory
			Initialization
			Cyrix CPU initialization
			Cache initialization
5	Special Display Handling	C4	OEM Specific-Display/Video Switch
			Handling so that the Switch Handling display switch errors never occur
6	Early Shadow	C5	OEM specific-Early shadow enable for fast boot
7	Cache presence test	C6	External cache size detection
8	CMOS Check	CF	CMOS checkup
9	Spurious	B0	If interrupt occurs in protected mode.
10	Unclaimed NMI	B1	If unmasked NMI occurs, display
			Press F1 to disable NMI, F2 reboot.
11	Program Chip Set	BF	To program chipset from defaults values

Table 4-12: 039-0185-xx µATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
12	Setup Pages	E1–EF	E1- Page 1, E2 - Page 2, and so on
	Force load Default to chipset	1	Chipset defaults program
	Reserved	2	
	Early Superio Init	3	Early Initialize of the super IO
	Reserved	4	
	Blank video	5	Reset the Video controller
	Reserved	6	
	Init KBC	7	Keyboard controller init
	KB test	8	Test the keyboard
	Reserved	9	
	Mouse Init	A	Initialize the mouse
	Onboard Audio init	B	Initialize the onboard audio controller if it exits
	Reserved	C	
	Reserved	D	
	CheckSum Check	E	Check the integrity of the ROM, BIOS, and message
	Reserved	F	
	Auto detect EEPROM	10	Check the Flash type and copy flash write/erase routines to 0F000h segments
	Reserved	11	
	CMOS Check	12	Check CMOS Circuitry and reset CMOS
	Reserved	13	
	Chipset Default load	14	Program the chipset registers with CMOS values
	Reserved	15	
	Clock Init	16	Init onboard clock generator
	Reserved	17	
	Identify the CPU	18	Check the CPU ID and init L1/L2 cache
	Reserved	19	
	Reserved	1A	
	Setup Interrupt Vector Table	1B	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL
	Reserved	1C	
	Early PM Init	1D	First step initialize if single CPU onboard
	Reserved	1E	
	Re-initial KB	1F	Re-init KB
	Reserved	20	
	HPM init	21	If support HPM, HPM get initialized here
	Reserved	22	

Table 4-12: 039-0185-xx µATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
12	Test CMOS Interface and Battery Status	23	Verifies CMOS is working correctly and detects bad battery. If failed, load CMOS defaults and load into chipset
	Reserved	24	
	Reserved	25	
	Reserved	26	
	KBC final Init	27	Final Initial KBC and setup BIOS data area
	Reserved	28	
	Initialize Video Interface	29	Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
	Reserved	2A	
	Reserved	2B	
	Reserved	2C	
	Video memory test	2D	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
	Reserved	2E	
	Reserved	2F	
	Reserved	30	
	Reserved	31	
	Reserved	32	
	PS2 Mouse setup	33	Set up PS2 Mouse and reset KB
	Reserved	34	
	Test DMA Controller 0	35	Test DMA channel 0
	Reserved	36	
	Test DMA Controller 1	37	Test DMA channel 1
	Reserved	38	
	Test DMA Page Registers	39	Test DMA Page Registers.
	Reserved	3A	
	Reserved	3B	
	Test Timer Counter 2	3C	Test 8254 Timer 0 Counter 2.
	Reserved	3D	
	Test 8259-1 Mask Bits	3E	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
	Reserved	3F	
	Test 8259-2 Mask Bits	40	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
	Reserved	41	
	Reserved	42	

Table 4-12: 039-0185-xx μATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
12	Test Stuck 8259's Interrupt Bits	43	Turn off interrupts then verify no interrupt mask register is on.
	Test 8259 Interrupt Functionality		Force an interrupt and verify the interrupt occurred.
	Reserved	44	
	Reserved	45	
	Reserved	46	
	Set EISA Mode	47	If EISA non-volatile memory checksum is good, execute EISA initialization.
			If not, execute ISA tests and clear EISA mode flag.
	Reserved	48	
	Size Base and Extended Memory	49	Size base memory from 256K to 640K and extended memory above 1 MB.
	Reserved	4A	
	Reserved	4B	
	Reserved	4C	
	Reserved	4D	
	Test Base and Extended Memory	4E	Test base memory from 256K to 640K and extended memory above 1 MB using various patterns.
			NOTE. This test is skipped in EISA mode and can be skipped with ESC key in ISA mode.
	Reserved	4F	
	USB init	50	Initialize USB controller
	Reserved	51	
	Memory Test	52	Test all memory of memory above 1 MB using Virtual 8086 mode, page mode, and clear the memory
	Reserved	53	
	Reserved	54	
	CPU display	55	Detect CPU speed and display CPU vendor-specific version string and turn on all necessary CPU features
	Reserved	56	
	PnP Init	57	Display PnP logo and PnP early init
	Reserved	58	
	Setup Virus Protect	59	Setup virus protect according to Setup
	Reserved	5A	
	Awdflash Load	5B	If required, will auto load Awdflash.exe in POST
	Reserved	5C	
	Onboard I/O Init	5D	Initializing onboard super IO

Table 4-12: 039-0185-xx µATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
12	Reserved	5E	
	Reserved	5F	
	Setup enable	60	Display setup message and enable setup functions
	Reserved	61	
	Reserved	62	
	Initialize & Install Mouse	63	Detect if mouse is present, initialize mouse, install interrupt vectors
	Reserved	64	
	PS2 Mouse special	65	Special treatment to PS2 Mouse port
	Reserved	66	
	ACPI init	67	ACPI sub-system initializing
	Reserved	68	
	Setup Cache Controller	69	Initialize cache controller
	Reserved	6A	
	Setup Entering	6B	Enter setup check and auto-configuration check up
	Reserved	6C	
	Initialize Floppy Drive & Controller	6D	Initialize floppy disk drive controller and any drives.
	Reserved	6E	
	FDD install	6F	Install FDD and set up BIOS data area parameters
	Reserved	70	
	Reserved	71	
	Reserved	72	
	Initialize Hard Drive & Controller	73	Initialize hard drive controller and any drives.
	Reserved	74	
	Install HDD	75	IDE device detection and install
	Reserved	76	
	Detect & Initialize Serial/Parallel	77	Initialize any serial and parallel ports (also game port)
	Reserved	78	
	Reserved	79	

Table 4-12: 039-0185-xx µATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
12	Detect & Initialize Math Coprocessor	7A	Initialize math coprocessor
	Reserved	7B	
	HDD Check for Write protection	7C	HDD check out
	Reserved	7D	
	Reserved	7E	
	POST error check	7F	Check POST error and display them and ask for user intervention
	Reserved	80	
	Reserved	81	
	Security Check	82	Ask password security (optional)
	Write CMOS	83	Write all CMOS values back to RAM and clear screen
	Pre-boot Enable	84	Enable parity checker
			Enable NMI, enable cache before boot.
	Initialize Option ROMs	85	Initialize any option ROMs present from C8000h to EFFFFh.
			NOTE. When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.
	Reserved	86	
	Reserved	87	
	Reserved	88	
	Reserved	89	
	Reserved	8A	
	Reserved	8B	
	Reserved	8C	
	Reserved	8D	
	Reserved	8E	
	Reserved	8F	
	Reserved	90	
	Reserved	91	
	Reserved	92	
	Boot Medium detection	93	Read and store boot partition head and
	Final Init	94	Final init for last micro details before boot
	Special KBC patch	95	Set system speed for boot Setup NumLock status according to Setup
	Boot Attempt	96	Set low stack Boot via INT 19h.
	Boot	FF	

Table 4-12: 039-0185-xx µATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
Quick POST Codes			
13	Init onboard device	65	Early Initialized the super IO
			Reset Video controller
			Keyboard controller init
			Test the Keyboard
			Initialized the mouse
			Onboard audio controller initialize if exist
			Check the integrity of the ROM, BIOS, and message
			Check Flash type and copy flash write/erase routines to 0F000h segments
			Check CMOS Circuitry and reset CMOS Program the chipset registers with CMOS values Init onboard clock generator
	Early System setup	66	Check the CPU ID and init L1/L2 cache
			Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL First step initialize if single CPU onboard.
			Re-init KB If support HPM, HPM get initialized here
	KBC and CMOS Init	67	Verifies CMOS is working correctly
			detects bad battery
			If failed, load CMOS defaults and load into chipset
			Final Initial KBC and setup BIOS data area.
	Video Init	68	Read CMOS location 14h to find out type of video in use.
			Detect and Initialize Video Adapter.
			Test video memory, write sign-on message to screen.
			Setup shadow RAM - Enable shadow according to Setup.
	8259 Init	69	Init 8259 channel 1 and mask IRQ 9

Table 4-12: 039-0185-xx µATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
13	Memory test	6A	Quick Memory Test
	CPU Detect and IO init	6B	Detect CPU speed and display CPU vendor specific version string and turn on all necessary CPU features
			Display PnP logo and PnP early init
			Setup virus protect according to Setup.
			If required, will auto load Awdflash.exe in POST
			Initializing onboard super IO
	Reserved	6C	
	Reserved	6D	
	Reserved	6E	
	Reserved	6F	
	Setup Init	70	Display setup message and enable setup functions
			Detect if mouse is present, initialize mouse, install interrupt vectors
			Special treatment to PS2 Mouse port
			ACPI sub-system initializing
	Setup Cache Controller	71	Initialize cache controller
	Install FDD	72	Enter setup check and auto-configuration check up
			Initialize floppy disk drive controller and any drives
			Install FDD and setup BIOS data area parameters
	Install HDD	73	Initialize hard drive controller and any drives
			IDE device detection and install Initialize any serial and parallel ports (also game port)
	Detect & Initialize Math Coprocessor	74	Initialize math coprocessor
	HDD Check for Write protection	75	HDD check out
	Reserved	76	
	Display POST error	77	Check POST error and display them and ask for user intervention
			Ask password security (optional)
	CMOS and Option ROM Init	78	Write all CMOS values back to RAM and clear screen
			Enable parity checker
			Enable NMI
			Enable cache before boot.

Table 4-12: 039-0185-xx µATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
13			Initialize any option ROMs present from C8000h to EFFFFh
			NOTE. When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.
	Reserved	79	
	Reserved	7A	
	Reserved	7B	
	Reserved	7C	
	Boot Medium detection	7D	Read and store boot partition head and cylinders values in RAM
	Final Init	7E	Final init for last micro details before boot
	Special KBC patch	7F	Set system speed for boot Setup NumLock status according to Setup
	Boot Attempt	80	Set low stack Boot via INT 19h
	Boot	FF	
S4 POST Codes			
14	Early Chipset Init	5A	Early Initialized the super IO
			Reset Video controller
			Keyboard controller init
			Test the Keyboard
			Initialized the mouse
	Cmos Check	5B	Check CMOS Circuitry and reset CMOS
	Chipset default Prog	5C	Program the chipset registers with CMOS values. Init onboard clock generator
	Identify the CPU	5D	Check the CPU ID and init L1/L2 cache
	Setup Interrupt Vector Table	5E	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and INT 00h-1Fh according to INT_TBL
			First step initialize if single CPU Onboard
			Re-init KB
			If support HPM, HPM get initialized here.
	Test CMOS Interface and Battery status	5F	Verifies CMOS is working correctly
			detects bad battery. If failed, load CMOS defaults and load into chipset
	KBC final Init	60	Final Initial KBC and setup BIOS data area
	Initialize Video Interface	61	Read CMOS location 14h to find out type of video in use
			Detect and Initialize Video Adapter

Table 4-12: 039-0185-xx μATX POST codes (cont.)

Item no.	Module	Displayed POST code	Description
14	Video memory test	62	Test video memory, write sign-on message to screen
			Setup shadow RAM - Enable shadow according to Setup
	Setup PS2 mouse and test DMA	63	Setup PS2 Mouse and reset KB Test DMA channel 0
	Test 8259	64	Test 8259 channel 1 and mask IRQ 9
	Init Boot Device	65	Detect if mouse is present, initialize mouse, install interrupt vectors
			Special treatment to PS2 Mouse port ACPI sub-system initializing Initialize cache controller
	Install Boot Devices	66	Enter setup check and auto-configuration check up
			Initialize floppy disk drive controller and any drives
			Install FDD and setup BIOS data area
			Parameters Initialize hard drive
	Cache Init	67	Cache init and USB init
	PM init	68	PM initialization
	PM final Init and issue SMI	69	Final init Before resume
	Full on	FF	

BootBlock POST Codes

Item no.	Module	Displayed POST code	Description
15	Base memory test	1	Clear base memory area (0000:0000–9000:ffffh)
	KB init	5	Initialized KBC
	Install interrupt vectors	12	Install int. vector (0-77) and initialized 00-1fh to their proper place
	Init Video	0D	Video initializing
	Init FDD	41	Scan floppy and media capacity for onboard super IO
	Boot	FF	Load boot sector

Table 4-13: 039-0188-xx μATX POST codes

Displayed POST code	Description
	Boot Block Initialization Codes
Before D1	Early chip set initialization is done. Early super I/O initialization is done including RTC and keyboard controller. NMI is disabled.
D0	Go to flat mode with 4GB limit and GA20 enabled. Verify the boot block checksum.
D1	Perform keyboard controller BAT test. Check if waking up from power management suspend state. Save power-on CPUID value in scratch CMOS.
D2	Disable CACHE before memory detection. Execute full memory sizing module. Verify that flat mode is enabled.

Table 4-13: 039-0188-xx µATX POST codes (cont.)

Displayed POST code	Description
D3	If memory sizing module is not executed, start memory refresh and do memory sizing in Boot block code. Do additional chip set initialization. Re-enable CACHE. Verify that flat mode is enabled.
D4	Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	Boot block code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. Main BIOS checksum is tested. If BIOS recovery is necessary, control flows to checkpoint E0. See Boot block Recovery Code section of document for more information.
D7	Restore CPUID value back into register. The Boot block-run time interface module is moved to system memory and control is given to it. Determine whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9	Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM.
DA	Restore CPUID value back into register. Give control to BIOS POST (execute POST kernel). See POST Code section of document for more information.
	Boot Block Recovery Codes
E0	Initialize the floppy controller in the super I/O. Some interrupt vectors are initialized. DMA controller is initialized. 8259 interrupt controller is initialized. L1 cache is enabled.
E9	Set up floppy controller and data. Attempt to read from floppy.
EA	Enable ATAPI hardware. Attempt to read from ARMD and ATAPI CDROM.
EB	Disable ATAPI hardware. Jump back to E9.
EF	Read error occurred on media. Jump back to EB.
E9 or EA	Determine information about root directory of recovery media.
F0	Search for predefined recovery file name in root directory.
F1	Recovery file not found.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by the recovery file.
F3	Start reading the recovery file cluster by cluster.
F4	The recovery file size does not equal the found flash part size.
F5	Disable L1 cache.
FA	Check the validity of the recovery file configuration to the current configuration of the flash part.
FB	Make flash write enabled through chip set and OEM specific method. Detect proper flash part. Verify that the found flash part size equals the recovery file size.
FC	Erase the flash part.
FD	Program the flash part.
FF	The flash has been updated successfully. Make flash write disabled. Disable ATAPI hardware. Restore CPUID value back into register. Give control to F000 ROM at F000:FFF0h.
	POST Codes

Table 4-13: 039-0188-xx µATX POST codes (cont.)

Displayed POST code	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable wCMOSFlags.
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to POSTINT1ChHandlerBlock.
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
C0	Early CPU Init Start – Disable Cache - Init Local APIC
C1	Set up boot strap processor Information
C2	Set up boot strap processor for POST
C5	Enumerate and set up application processors
C6	Reenable cache for boot strap processor
C7	Early CPU Init Exit
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chip set registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM. See DIM Code section for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM. See DIM Code Checkpoints section of document for more information.

Table 4-13: 039-0188-xx μATX POST codes (cont.)

Displayed POST code	Description
39	Initializes DMAC-1 and DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chip set registers.
40	Detect different devices (parallel ports, serial ports, and coprocessor in CPU) successfully installed in the system and update the BDA and EBDA.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed or requested.
8C	Late POST initialization of chip set registers.
8D	Build ACPI tables (if ACPI is supported)
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module.
A7	Displays the system configuration screen if enabled. Initialize the CPUs before boot, which includes the programming of the MTRRs.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for Int 19 boot.
AC	End of POST initialization of chip set registers.
B1	Save system context for ACPI.
00	Passes control to OS Loader (typically INT19h).

Table 4-13: 039-0188-xx μATX POST codes (cont.)

Displayed POST code	Description
	DIM Codes
2A	Initialize different buses and perform the following functions: Reset, Detect, and Disable (function 0); Static Device Initialization (function 1); Boot Output Device Initialization (function 2). Function 0 disables all device nodes, PCI devices, and PnP ISA cards. It also assigns PCI bus numbers. Function 1 initializes all static devices that include manual configured on-board peripherals, memory and I/O decode windows in PCI-PCI bridges, and noncompliant PCI devices. Static resources are also reserved. Function 2 searches for and initializes any PnP, PCI, or AGP video devices.
38	Initialize different buses and perform the following functions: Boot Input Device Initialization (function 3); IPL Device Initialization (function 4); General Device Initialization (function 5). Function 3 searches for and configures PCI input devices and detects if system has standard keyboard controller. Function 4 searches for and configures all PnP and PCI boot devices. Function 5 configures all on-board peripherals that are set to an automatic configuration and configures all remaining PnP and PCI devices.
	ACPI Runtime Codes
AC	First ASL check point. Indicates the system is running in ACPI mode.
AA	System is running in APIC mode.
01, 02, 03, 04, 05	Entering sleep state S1, S2, S3, S4, or S5.
10, 20, 30, 40, 50	Waking from sleep state S1, S2, S3, S4, or S5.

Table 4-14: 039-0206-xx μATX POST codes

Displayed POST code	Description
	SEC phase codes
0x00	Not used
0x01	Power on. Reset type detection (soft/hard)
0x02	AP initialization before microcode loading
0x03	North Bridge initialization before microcode loading
0x04	South Bridge initialization before microcode loading
0x05	OEM initialization before microcode loading
0x06	Microcode loading
0x07	AP initialization after microcode loading
0x08	North Bridge initialization after microcode loading
0x09	South Bridge initialization after microcode loading
0x0A	OEM initialization after microcode loading
0x0B	Cache initialization
0x0C — 0x0D	Reserved for future AMI SEC error codes
0x0E	Microcode not found

Table 4-14: 039-0206-xx µATX POST codes (cont.)

Displayed POST code	Description
0x0F	Microcode not loaded
	PEI phase
0x10	PEI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-Memory North Bridge initialization (North Bridge module specific)
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-memory South Bridge initialization (South Bridge module specific)
0x10B	Pre-memory South Bridge initialization (South Bridge module specific)
0x1C	Pre-memory South Bridge initialization (South Bridge module specific)
0x1D — 0x2A	OEM pre-memory initialization codes
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection
0x2D	Memory initialization. Programming memory timing information
0x2E	Memory initialization. Configuring memory
0x2F	Memory initialization (other)
0x30	Reserved for ASL (see ASL Status Codes section below)
0x31	Memory Installed
0x32	CPU post-memory initialization is started
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode (SMM) initialization
0x37	Post-Memory North Bridge initialization is started
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)
0x3A	Post-Memory North Bridge initialization (North Bridge module specific)

Table 4-14: 039-0206-xx μATX POST codes (cont.)

Displayed POST code	Description
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module specific)
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F — 0x4E	OEM post memory initialization codes
0x4F	DXE IPL is started
	PEI error codes
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error
0x55	Memory not installed
0x56	Invalid CPU type or Speed
0x57	CPU mismatch
0x58	CPU self test failed or possible CPU cache error
0x59	CPU micro-code is not found or micro-code update is failed
0x5A	Internal CPU error
0x5B	Reset PPI is not available
0x5C — 0x5F	Reserved for future AMI error codes
	S3 resume codes
0xE0	S3 Resume is stared (S3 Resume PPI is called by the DXE IPL)
0xE1	S3 Boot Script execution
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE4 — 0xE7	Reserved for future AMI progress codes
	S3 resume error codes
0xE8	S3 Resume Failed
0xE9	S3 Resume PPI not Found
0xEA	S3 Resume Boot Script Error
0xEB	S3 OS Wake Error
0xEC — 0xEF	Reserved for future AMI error codes

Table 4-14: 039-0206-xx μATX POST codes (cont.)

Displayed POST code	Description
	Recovery codes
0xF0	Recovery condition triggered by firmware (Auto recovery)
0xF1	Recovery condition triggered by user (Forced recovery)
0xF2	Recovery process started
0xF3	Recovery firmware image is found
0xF4	Recovery firmware image is loaded
0xF5 — 0xF7	Reserved for future AMI progress codes
	Recovery error codes
0xF8	Recovery PPI is not available
0xF9	Recovery capsule is not found
0xFA	Invalid recovery capsule
0xFB — 0xFF	Reserved for future AMI error codes
	DXE phase codes
0x60	DXE Core is started
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started
0x6A	North Bridge DXE SMM initialization is started
0x6B	North Bridge DXE initialization (North Bridge module specific)
0x6C	North Bridge DXE initialization (North Bridge module specific)
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)
0x6F	North Bridge DXE initialization (North Bridge module specific)
0x70	South Bridge DXE initialization is started
0x71	South Bridge DXE SMM initialization is started
0x72	South Bridge devices initialization

Table 4-14: 039-0206-xx µATX POST codes (cont.)

Displayed POST code	Description
0x73	South Bridge DXE Initialization (South Bridge module specific)
0x74	South Bridge DXE Initialization (South Bridge module specific)
0x75	South Bridge DXE Initialization (South Bridge module specific)
0x76	South Bridge DXE Initialization (South Bridge module specific)
0x77	South Bridge DXE Initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x7A — 0x7F	Reserved for future AMI DXE codes
0x80 — 0x8F	OEM DXE initialization codes
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller Initialization
0x94	PCI Bus Enumeration
0x95	PCI Bus Request Resources
0x96	PCI Bus Assign Resources
0x97	Console Output devices connect
0x98	Console input devices connect
0x99	Super IO Initialization
0x9A	USB initialization is started
0x9B	USB Reset
0x9C	USB Detect
0x9D	USB Enable
0x9E — 0x9F	Reserved for future codes
0xA0	IDE initialization is started
0xA1	IDE Reset
0xA2	IDE Detect
0xA3	IDE Enable
0xA4	SCSI initialization is started
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable

Table 4-14: 039-0206-xx μATX POST codes (cont.)

Displayed POST code	Description
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL (see ASL Status Codes section below)
0xAB	Setup Input Wait
0xAC	Reserved for ASL (see ASL Status Codes section below)
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin
0xB1	Runtime Set Virtual Address MAP End
0xB2	Legacy Option ROM Initialization
0xB3	System Reset
0xB4	USB hot plug
0xB5	PCI bus hot plug
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xB8 — 0xBF	Reserved for future AMI codes
0xC0 — 0xCF	OEM BDS initialization codes
	DXE error codes
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found
0xD7	No Console Input Devices are found
0xD8	Invalid password
0xD9	Error loading Boot Option (Load Image returned error)
0xDA	Boot Option is failed (StartImage returned error)
0xDB	Flash update is failed
0xDC	Reset protocol is not available

Table 4-14: 039-0206-xx µATX POST codes (cont.)

Displayed POST code	Description
	ACPO/ASL codes
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state
0x03	System is entering S3 sleep state
0x04	System is entering S4 sleep state
0x05	System is entering S5 sleep state
0x10	System is waking up from the S1 sleep state
0x20	System is waking up from the S2 sleep state
0x30	System is waking up from the S3 sleep state
0x40	System is waking up from the S4 sleep state
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode

BIOS Beep Codes   When the μATX board powers on, a number of the BIOS checkpoints generate an audible 'beep' code on failure using the standard PC speaker (also routed through the board audio system). The beep codes are listed in the following table. Codes are also written to I/O port 80h and the video adapters. External ROM modules may issue a series of tones on error detection.

The BIOS generates one short beep if the power on self tests complete without error.

If your instrument does not contain a speaker, attach a speaker to the display-adapter board square pins to hear the codes.

Table 4-15: 039-0173-xx and 065-0745-xx μATX beep codes

Item no.	Beep code	Error message
1	3 (long)	Memory error (beep freq = 1280 Hz)
2	4 (alternating hi-low)	Thermal warning
		(beep freq - high = 2 kHz, low = 1.5 kHz)
3	1	Refresh failure
4	2	Cannot reset parity
5	3	Memory failure, first 64 KB
6	4	Timer failure
7	5	Not used
8	6	Cannot toggle 8042 Gate A20
9	7	Exception interrupt error
10	8	Display memory R/W error
11	9	Not used
12	10	CMOS Shutdown register test error
13	11	Cache memory error

Table 4-16: 039-0185-xx, 039-0186-xx, and 039-0201-xx μATX beep codes

Item no.	Beep code	Error message	Description
1	1 long, 2 short	Video adapter error	Bad video adapter or a bad connection to the video adapter. Ensure that the monitor cable is connected properly.
2	Repeating endless loop	Memory error	Check for improperly seated or missing memory.
3	1 long, 3 short	No video card or bad video RAM	Reseat or replace the video card.
4	High frequency beeps while running	Overheated CPU	Check the CPU fan for proper operation and check the case for proper air flow.
5	Repeating High/Low	CPU	Either the CPU is not seated properly or it is damaged. The problem can also be due to excess heat. Check the CPU fan or BIOS settings for proper fan speed.

Table 4-17: 039-0188-xx μATX beep codes

Item no.	Number of Beeps	Error message	Description
1	1	Memory refresh timing error	Check for improperly seated or missing memory.
2	2	Parity error	
3	3	Main memory read/write test error	
4	8	Display memory error	Reseat the video adapter. If the condition persists, replace the module.
5	4	Motherboard timer not operational	Fatal error. Remove all expansion cards except any video adapter.
6	5	Processor error	
7	6	Keyboard controller BAT test error	■ If the beep code is generated with no connected adapter cards, replace the μATX.
8	7	General exception error	
9	9	ROM checksum error	■ If the beep code is not generated with no connected adapter cards, replace the cards one at a time until the problem recurs. This should reveal the malfunctioning card or module. Replace that card or module.
10	10	CMOS shutdown register read/write error	
11	11	Cache memory bad	

Table 4-18: 039-0206-xx µATX beep codes

Beep code	Description
SEC beep codes	None.
PEI beep codes	
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXEIPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available
DXE beep codes	
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

Update/Restore the CMOS   If the CMOS parameters become corrupted, restore the CMOS memory using the following procedure:

⚠ *CAUTION. Install only CMOS parameters from Tektronix. CMOS parameters from other manufactures may make your instrument inoperable.*

If you cannot restore the CMOS memory, replace the battery.

NOTE. This procedure requires moving the CLRTC or CMOS1 jumper on the motherboard. You may have to remove the motherboard from the instrument to flash BIOS.

Restore the CMOS as follows:

1. Turn off instrument. Remove AC power.

2. Move CLRTC or CMOS1 jumper to short pins 2 and 3.

3. After 5 to 10 seconds move the jumper back to pins 1 and 2.

4. Power-on the motherboard.

5. Press the **Delete** key to enter CMOS Setup Utility.

6. Use arrow keys to move to Load Optimized Defaults.

7. Enter Y to the prompt, Load Optimized Defaults (Y/N)?

8. Use arrow keys to move to Save & Exit Setup.

9. Enter Y to the prompt, Save to CMOS and Exit (Y/N)?

10. Boot to BIOS update media.

11. At the Main Menu select, Install BIOS and Logo.

12. Enter Y to the prompt, Do you want to proceed with BIOS update [YN]?

13. Enter N to the prompt Do You Want To Save BIOS (Y/N).

14. Enter Y to the prompt Press 'Y' to Program or 'N' to Exit.

15. Turn off instrument. Remove AC power.

16. Move CLRTC or DMOS1 jumper to short pins 2 and 3.

17. After 5 to 10 seconds move the jumper back to pins 1 and 2.

18. Power-on the motherboard.

19. Press the Delete key to enter CMOS Setup Utility.

20. Use arrow keys to move to Load Optimized Defaults.

21. Enter Y to the prompt, Load Optimized Defaults (Y/N)?

22. Use arrow keys to move to Save & Exit Setup.

23. Enter Y to the prompt, Save to CMOS and Exit (Y/N)?

Installing an Authorization Key

If you add new options, you must install a new authorization key. Install the authorization key using the following procedure:

1. From the instrument menu bar, touch the **Utilities** menu, select **Option Installation**, and then touch **Continue**.

2. Enter the new key using an attached keyboard.

3. Touch **Continue**.

Hard Disk Drive Repair   Use the same procedures to maintain the instrument disk drive that you use to maintain a disk drive in a personal computer.

Using ScanDisk, you may be able to repair the disk without destroying data on the disk. To use ScanDisk, perform the following steps:

1. Remove the disk drive from the instrument.

2. Install the disk drive into a personal computer.

3. Power on the computer and run ScanDisk. Set ScanDisk to perform a thorough surface scan and to automatically fix errors.

   - Using Microsoft Windows XP: select My Computer\Local Disk\Properties\Tools\Error-checking

   - Using Microsoft MSDOS: enter SCANDISK *drive*: /SURFACE /AUTOFIX

4. If ScanDisk cannot repair the disk, format the disk drive using the File Utilities Format command. Format will destroy all data currently on the disk.

5. If reformatting the disk and reloading the software does not repair the disk, install a new disk drive.

Verify that TekProtect is functional

TekProtect provides protection from electrical overstress (EOS) and electrostatic discharge (ESD) on the four analog input channels. TekProtect circuitry is installed only in MSO/DPO70000C instruments. The TekProtect circuitry is expected to fail after one or more severe electric overload stress (EOS) or electrostatic discharge (ESD) events. If TekProtect has failed, your instrument input circuitry is no longer protected, hence the need to verify that TekProtect is protecting your instrument. Use one of the following methods to test that your TekProtect is working correctly (has not been damaged by EOS or ESD).

TF-TekProtect Health Checker

The TF-TekProtect Health Checker is a fast, simple USB-powered pass/fail tester for TekProtect circuitry installed in MSO/DPO70000C instruments. See the TF-TekProtect Health Checker Instructions (Tektronix part number 071-3376-XX) for information on using this checker. Contact your nearest Tektronix Sales representative for information on ordering this product.

Precautions while performing the test

This test checks the TekProtect leakage and clamping thresholds. Use caution when operating the Source Measure Unit (SMU) or voltage/current sources in this test setup. Even though TekProtect protects the oscilloscope from reasonable over voltages, use care to avoid damaging the TekProtect or Oscilloscope inputs. Follow these precautions:

■ Always set the SMU or current/voltage sources limits as specified.

■ Always disable the SMU or current/voltage sources output before connecting or disconnecting the oscilloscope from the test setup.

■ Set the SMU or voltage/current source to zero volts before enabling the output.

Manual checking of TekProtect

This manual procedure for checking TekProtect is only for MSO/DPO70000C instruments that have TekProtect installed.

Equipment Required

Source Measure Unit (SMU) or equivalent separate voltage/current sources capable of sourcing or sinking 3.5 V and 65 mA, and digital voltage/current meters.

Adapter, TCA-BNC.

Two BNC cables (example: Tektronix part number 012-0076-xx, 20 inch BNC cable).

Two BNC to Banana plug adapters.

Two Banana plug cables.

1. *Install the test hookup and preset the instrument controls:*

    a. *Initialize the instrument:* Press the **Default Setup** button.

    ⚠ *CAUTION. Do not perform this test without sending the following command to the oscilloscope. Doing so can damage the oscilloscope inputs.*

    b. Using the All Programs > TekVISA > OpenChoice Talker Listener, send the `IMPOSE:CHECKESD` command to the oscilloscope. Do not make additional settings changes to the instrument until asked to in Step 11.

    c. Configure the SMU or voltage/current sources before connecting to the oscilloscope:

      ‒ Set the SMU or voltage/current sources to zero volts.

      ‒ Disable the output from the SMU or voltage/current sources.

    a. *Hook up the test-signal source*: Connect the adapters and cables for SMU or no SUM test setup as shown in the following diagrams.
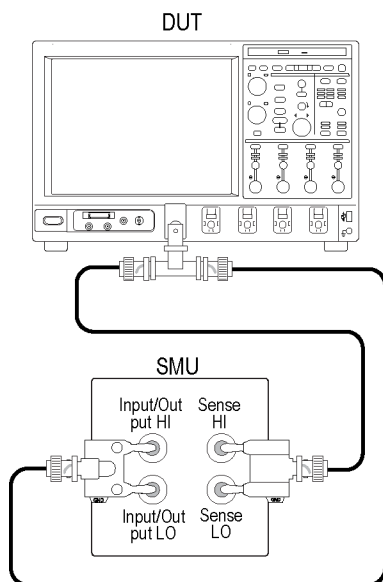
Figure 4-10: TekProtect initial test hookup (SMU)
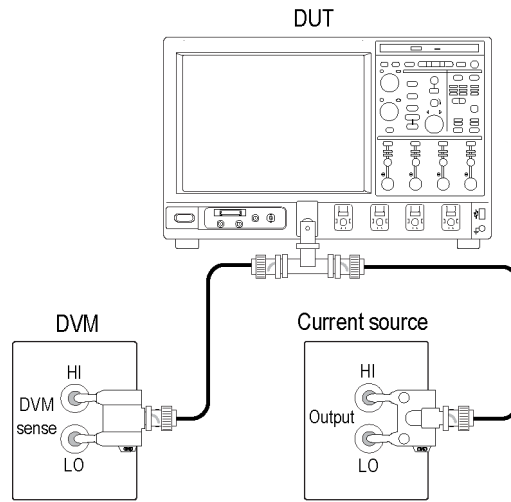
Figure 4-11: TekProtect initial test hookup (no SMU voltage measurement)
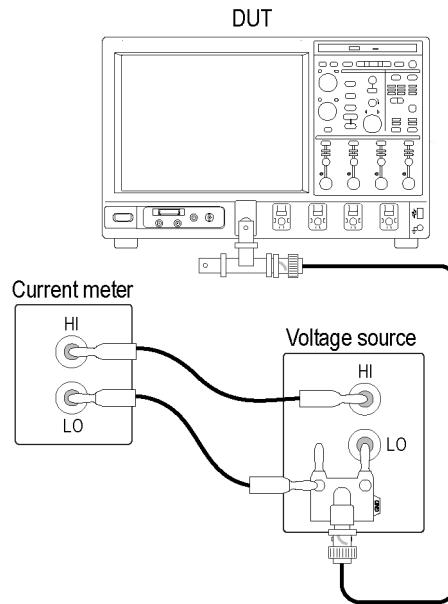
Figure 4-12: TekProtect initial test hookup (no SMU current measurement)

NOTE. The diagrams show positive voltage or current testing connections; reverse the source connections for negative voltage/current tests. Make sure to set the outputs to zero before reversing the connections.

2. Use the following guidelines while using the SMU or voltage/current sources with the oscilloscope:

   - Do not exceed the test voltage value.

   - Once tested, reduce the voltage to zero volts before changing SMU or voltage/current source settings.

   - Do not disconnect or reconnect any test cables until you reduce the output to zero.

3. Set the Source Measure Unit or voltage source to output +2.0 V. Verify that the measured current is less than +100 µA.

4. Set the Source Measure Unit or voltage source to output –2.0 V (or set the output to 0 V, reverse the leads on the voltage source, then set the voltage back to +2 VDC). Verify that the measured current is less than –100 µA.

5. Set the Source Measure Unit or current source to output +65 mA, with the overvoltage limit set to +3.5 V. Verify that the measured voltage is ≤3.42 V.

6. Set the Source Measure Unit or current source to output –65 mA, with the overvoltage limit set to –3.5 V (or set the output to 0 A, reverse the leads on the current source, then set the current back to +65 mA). Verify that the measured voltage is ≥–3.42 V.

7. Set the Source Measure Unit or current and voltage sources to output 0 volts and current.

8. Move the TCA-BNC adapter to an unchecked input channel.

9. Repeat steps 3 through 8 until all 4 input channels have been checked.

10. *Disconnect the hookup:* Set the SMU or voltage/current source output to **zero**, disable the outputs, and disconnect the TCA-BNC adapter from the oscilloscope.

11. Return the instrument to normal operation by pressing the Default Setup button.

12. *Check the completion status:* If any of the 4 checks on any of the 4 channels is outside the limits, return the instrument to Tektronix Service for repair.

Troubleshooting (MSO/DPO5000/B Series)

⚠ *WARNING. Before performing this or any other procedure in this manual, read the safety summaries at the beginning of this manual. Also, to prevent possible injury to service personnel or damage to the instrument components, read Installation, and Preventing ESD in this section. (See page 4-1, Preventing ESD.)*

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

This section contains information and procedures designed to help you isolate faults to a module.

This section requires that service personnel have the appropriate skills to work on this instrument, including PC troubleshooting and Microsoft Windows operating system skills. Details of PC and Windows operation and service are not in this manual.

For assistance, contact your local Tektronix Service Center.

Software Updates You can install the latest firmware in one of the following ways:

Connect to the Internet. You can connect your oscilloscope to the Internet and download the new firmware from www.tektronix.com/software.

USB CD-ROM. You can download the new firmware from www.tektronix.com/software to a USB CD-ROM and load it from there to your oscilloscope.

USB Flash Drive. You can download the new firmware from www.tektronix.com/software to a USB flash drive and load it from there to your oscilloscope.

If you want to contact your Tektronix service center, see *Contacting Tektronix* on the back of the title page.

After Repair After removal and replacement of a module, you must perform the Performance Verification procedure, found in the instrument *Specifications and Performance Verification* manual, which was provided with the instrument. This manual is also available on the Tektronix Web site (www.tektronix.com/manuals).

If the instrument fails the Performance Verification tests, it must be returned to Tektronix for adjustment.

Service Level   This section contains information and procedures designed to help you isolate faulty modules in the MSO5000/B Series and DPO5000/B Series instruments. If a module needs to be replaced, refer to the Module Removal section. (See page 4-14, *Module Removal (MSO/DPO5000/B Series)*.)

Check for Common Problems   Use the following table to quickly identify common problems, such as a blown fuse or loose cable.

Table 4-19: Failure symptoms and possible causes

Symptom	Possible cause(s)
Instrument will not power on	■ Power cord not plugged in
	■ Faulty power supply
	■ Faulty COM-E Interface board
Front panel light comes on (instrument powers on), but one or more fans will not operate	■ Faulty fan cable
	■ Defective fan assembly
	■ Faulty power supply
	■ Faulty Main board
	■ Faulty COM-E module
Hard disk/solid state drive related symptoms	■ Defective disk drive
	■ Incorrect disk type selected in the BIOS setup
	■ Replaceable disk drive not installed
	■ Power supply failure
	■ Corrupted BIOS module firmware, reinstall firmware
	■ Corrupted OS image
Flat- panel display blank	■ Defective cable from Main board to display
	■ Defective cable from Main board to backlighting display lamp
	■ Defective backlighting display lamp
	■ Faulty display
	■ Faulty COM-E module
	■ Faulty COM-E Interface board
BIOS error messages	■ Refer to the BIOS error message information.

Fault Isolation Procedure   Use the troubleshooting tree for fault isolation. (See Figure 4-13 on page 4-66.)

Start

Turn on power

Instrument powers on (fans run)?

No → Possible cause:
1 Instrument power cord is not plugged in
2 Faulty power supply
3 See *Isolating to a Board If Power Will Not Come Up*

Yes

Instrument appears "dead" (dead screen)?

Yes → Beeps

Yes → Possible cause:
1 SO DIMMs incorrectly installed or missing
2 Defective COM-E board
3 Check beep codes

No

No

Flat-panel display OK?

No → Connect XGA monitor to the rear-panel XGA output.

Yes

Is the XGA output OK?

No

Yes

Is the backlight on? (See *Checking the Backlight.*)

Yes → Problem with COM-E Interface board, Main board or LCD

No

Does the LCD show activity? (See *Checking the Backlight.*)

No → Problem with COM-E Interface board, Main board or LCD

Yes

Troubleshoot backlight cable, backlight controller, and backlight.

External monitor blank, if present?

Yes → Possible cause:
1 Monitor cable defective or not connected to instrument
2 External monitor controls turned down
3 Defective monitor

No

BIOS error message?

Yes → See BIOS error code table

No

Windows Boots?

No → 1 See *If the Instrument Will Not Boot*
2 Boot to Safe Mode and restore the registry.

Yes

Run instrument diagnostics

Passes all tests?

No → Main board or Analog board defective

Yes

If the instrument Application is not already running, start it from the Start menu.

Instrument Application starts?

No → Reinstall instrument software (see user manual)
See *If the Instrument Application Does Not Work*

Yes

Done

0076-036

Figure 4-13: Troubleshooting tree (MSO/DPO5000/B Series)

Isolating to a Board if Power Will Not Come Up. If the instrument is in standby mode (plugged in, but not turned on), a green light is visible through the right side of the instrument, and the front-panel Power button is amber.

When you press the power switch, the switch turns green and the instrument should boot. If this does not happen, isolate the problem to a module as follows:

■ Remove boards one at a time to locate a fault (the COM-E Interface board with module, Main board, Analog board, and Front-panel board).

■ If the previous step did not identify the problem, check the IEC power cable.

■ If the previous step did not correct the problem, replace the power supply.

If the Instrument Will Not Boot. If nothing is displayed, check that the display is turned on. At boot time, and while using an external monitor connected to the external video port, press the **Del** key on a connected keyboard to enter the BIOS setup.

If the instrument will not start, press the **Del** key on the connected keyboard. Go into CMOS setup and select "Load optimized defaults.".

If the Instrument Application Does Not Work. If the instrument starts Windows, but the instrument application does not work (the DPO Main graphic is displayed), check the following:

1. The diagnostic LEDs. (See the following section). Check to see if the PCIe locked LED is lit.

2. The application software.

3. The Analog board.

4. The COM-E Interface board.

5. Did someone exit the application using Task Manager and then try to reenter the application without rebooting?

6. If the relays click, the acquisition is running.

Checking the Backlight. If the instrument display is not working, shine a flashlight directly at the display while the instrument is on and the fans are running. Move the flashlight around and look at the screen from different angles to determine whether you can see any activity on the LCD. If you see the expected display but it is not visible without the flashlight, check for a problem with the backlight or associated circuitry or cables.

If there is a display on the external video port, but not on the LCD, check the power supply voltages. If the voltages are okay but there is still no display on the LCD, replace the display assembly (LCD, lamps, and cable). (See Figure 4-13 on page 4-66.)

Diagnostic LEDs   There are several LEDs in the MSO/DPO5000/B Series oscilloscopes. Most of them can be viewed without removing the instrument covers. After getting familiar with them, you can peer through the cooling holes on the side of the instrument and determine much of the instrument status and operational health based on these LEDs.

Power Switch LED. The front-panel power switch LED has three conditions: off, amber, and green.

- LED off indicates one of the following conditions:

    - AC power is not connected.

    - The main power supply has failed.

    - Front-panel circuits that drive the LED have failed.

- LED amber indicates that the instrument is in standby state and ready to be turned on by pushing the power switch.

- LED green indicates that the instrument is on.

There are two beep codes:

- A single long beep followed by two short beeps = video error.

- A single long beep that repeats = DRAM error.

Main Board LEDs.

- DS7301: PLX PCIe Link OK LED (Orange)

    This is the first LED on the Main board to turn on during a power up. The PLX bridge is what connects to the COM-E Computers PCIe connection. When the bridge establishes that the link is working, this light comes on. This does not indicate that the PLX is fully functional but it is a good indication of functional digital power supplies on the Main board as well as a functional COM-E Module.

- DS7302: FPGA Loaded (Green)

    When this light comes on, it means that the Tektronix Acquisition Driver has loaded and the FPGA is configured and ready for use. This is typically the second LED to come on during a bootup sequence. This generally indicates that the path from the COM-E module through the PLX and to the FPGA is working properly.

- DS9004: ACQ Activity (Green)

    This light flashes when any activity occurs between the acquisition system and the COM-E computing system. Register reads and writes as well as Data DMA transfers cause this light to illuminate. This is generally a good indicator that the oscilloscope application software is running and talking to the acquisition system correctly.

COM-E Interface Board LEDs. If DS19, DS18, or DS10 on the COM-E Interface board lights, use the following information to determine the meaning. If none of these LEDs come on, it is likely a power supply issue or a faulty COM-E Interface board (corrupted firmware in the MCU). The table and the following text provide details about these LED conditions.

Table 4-20: LED Definitions

LED	Color	Definition
DS19	Green	On if all of the DC/DC converters are operating properly.
DS18	Green	On if the PS_ON signal to the COM-E board is high. (Power is off.)
DS10	Red	On if a fault was detected (see the following information about DS10 conditions).

- DS19: DC-DC OK (Green)

  This light comes on after the oscilloscope power button is pressed and the oscilloscope is in the normal operating mode. If this light is on, it means that all of the COM-E Interface board power supplies are up and within spec. It also indicates that all of the DC power supplies on the Main board are working. It does not check the power supplies on the Main board to see if they are within tolerance or working correctly.

- DS18: PS_ON (Green)

  This light comes on when the Standby power supply is plugged in and the oscilloscope is in the Off state. (It is plugged into an AC outlet but not turned on.) This light goes out when DC-DC OK turns on. This light is also typically on when the front-panel power button is amber.

- DS10: Fault (Red)

  This LED indicates a problem with the system. When it flashes, it generally means something is wrong on the COM-E Interface board (typically the power supply). It can also indicate a communication problem between the COM-E Interface board and other systems. This LED will flash after a fault is discovered on the board, unless the error is a CRC failure (bad FLASH memory). Each error uses a different flash period and delay between flash bursts.

  The speed of the flashes determines the error number, which defines the error type (for example, very slow flashing indicates Error 1.) Error 1 is fatal during startup or shutdown. During normal operation, Error 1 is a warning indicating that a converter is operating near the tolerance limits. (See Table 4-21 on page 4-70.)

  The number of flashes points to the problematic DC/DC converter or circuit. A DC/DC converter has a startup or shutdown failure if it fails to cross

a predefined threshold in a specific amount of time. (See Table 4-22 on page 4-70.)

- Example 1: A series of four flashes with a period of 500 ms and a four-second pause before the four flashes repeat indicates that the +3.3 V DC/DC converter had an output voltage that went out of tolerance. To protect the system, all supplies would have been shut down as a result of this fault.

- Example 2: A series of seven flashes with a period of 500 ms and a four-second pause before the seven flashes repeat indicates that the internal VPI probe 12 V current limit was exceeded.

Table 4-21: DS10 Errors by speed and duration

Period	LED "On" time	Delay before flash pattern is repeated	Error number	Error type
0	0	LED always on. No flashes.	0	Microcontroller code is corrupt. Internal CRC verification failed.
2 s	1 s	16 s	1	Startup or shutdown failed or output voltage is out of tolerance.
1 s	500 ms	8 s	2	Output voltage is high.
500 ms	250 ms	4 s	3	Output voltage is low.

Table 4-22: DS10 Errors by number of flashes, with related voltages

Number of flashes	Channel	Under (Error 3)	Low (Error 1)	High (Error 1)	Over (Error 2)
1	+12 V	9.8 V	10.8 V	13.2 V	14.4 V
2	+12 VM (switched +12 V to COM-E module and SATA HDD)	9.8 V	10.8 V	13.2 V	14.4 V
3	+5 V	4.1 V	4.5 V	5.5 V	6 V
4	+3.3 V	2.6 V	3 V	3.6 V	4 V
6	VPI probe power external 12 V	8.2 V	10.2 V	14 V	16.2 V
7	VPI probe power internal 12 V load current	200 mA	500 mA	1.2 A	1.5 A
11	ADT7476 requested a shut down because temperature is too high				
12	ADT7476 fan controller did not respond to programming				

BIOS Error Messages   When the COM-E Interface board powers on, the BIOS runs power-on self-tests (POST) to check the board and writes error codes to location 80h. To read these error codes, an external LPC-based port 80 decoder is required. Connect the decoder to J20 on the COM-E board. An example of an LPC-based port 80 decoder is the Tektronix test board, G2834XA. A PCI port 80 decoder is not compatible with this product.

If the error is fatal, the POST code indicates the last successful checkpoint reached. The following table lists the POST codes displayed by the BIOS. (See Table 4-23.)

Once the display is enabled, errors are written to the display as text messages. These messages are always displayed unless the board is configured for silent startup or headless operation (no keyboard, mouse, or display).

Table 4-23: BIOS POST codes: ECM-945GM Series

Module	Displayed POST code	Description
Turn Off Chipset and CPU test	C0	OEM Specific-Cache control cache
		Processor Status (1FLAGS) Verification
		Tests the following processor status flags: Carry, zero, sign, overflow.
		The BIOS sets each flag and verifies that they are set, then turns each flag off and verifies that it is off
		Read/Write/Verify all the CPU registers except SS, SP, and BP with data pattern FF and 00.
		RAM must be periodically refreshed to keep the memory from decaying. This function ensures that the memory refresh function is working properly.
Memory Presence	C1	First block memory detect
		OEM Specific-Test to size on-board memory
		Early chip set initialization
		Memory presence test
		OEM chip set routines
		Clear low 64K of memory
		Test first 64K memory
Early Memory Initialization	C2	OEM Specific-Board Initialization
Extend Memory DRAM select	C3	OEM Specific-Turn on extended memory
		Initialization
		Cyrix CPU initialization
		Cache initialization
Special Display Handling	C4	OEM Specific-Display/Video Switch
		Handling so that the Switch Handling display switch errors never occur
Early Shadow	C5	OEM specific-Early shadow enable for fast boot
Cache presence test	C6	External cache size detection
CMOS Check	CF	CMOS checkup

Table 4-23: BIOS POST codes: ECM-945GM Series (cont.)

Module	Displayed POST code	Description
Spurious	B0	If interrupt occurs in protected mode.
Unclaimed NMI	B1	If unmasked NMI occurs, display
		Press F1 to disable NMI, F2 reboot.
Program Chip Set	BF	To program chipset from defaults values
Setup Pages	E1–EF	E1- Page 1, E2 - Page 2, and so on
Force load Default to chipset	1	Chipset defaults program
Reserved	2	
Early Superio Init	3	Early Initialize of the super IO
Reserved	4	
Blank video	5	Reset the Video controller
Reserved	6	
Init KBC	7	Keyboard controller init
KB test	8	Test the keyboard
Reserved	9	
Mouse Init	A	Initialize the mouse
Onboard Audio init	B	Initialize the onboard audio controller if it exits
Reserved	C	
Reserved	D	
CheckSum Check	E	Check the integrity of the ROM, BIOS, and message
Reserved	F	
Auto detect EEPROM	10	Check the Flash type and copy flash
		write/erase routines to 0F000h segments
Reserved	11	
CMOS Check	12	Check CMOS Circuitry and reset CMOS
Reserved	13	
Chipset Default load	14	Program the chipset registers with CMOS values
Reserved	15	
Clock Init	16	Init onboard clock generator
Reserved	17	
Identify the CPU	18	Check the CPU ID and init L1/L2 cache
Reserved	19	
Reserved	1A	
Setup Interrupt Vector Table	1B	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL
Reserved	1C	

Table 4-23: BIOS POST codes: ECM-945GM Series (cont.)

Module	Displayed POST code	Description
Early PM Init	1D	First step initialize if single CPU onboard
Reserved	1E	
Re-initial KB	1F	Re-init KB
Reserved	20	
HPM init	21	If support HPM, HPM get initialized here
Reserved	22	
Test CMOS Interface and Battery Status	23	Verifies CMOS is working correctly and detects bad battery. If failed, load CMOS defaults and load into chipset
Reserved	24	
Reserved	25	
Reserved	26	
KBC final Init	27	Final Initial KBC and setup BIOS data area
Reserved	28	
Initialize Video Interface	29	Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
Reserved	2A	
Reserved	2B	
Reserved	2C	
Video memory test	2D	Test video memory, write sign-on message to screen. Set up shadow RAM - Enable shadow according to Setup.
Reserved	2E	
Reserved	2F	
Reserved	30	
Reserved	31	
Reserved	32	
PS2 Mouse setup	33	Set up PS2 Mouse and reset KB
Reserved	34	
Test DMA Controller 0	35	Test DMA channel 0
Reserved	36	
Test DMA Controller 1	37	Test DMA channel 1
Reserved	38	
Test DMA Page Registers	39	Test DMA Page Registers.
Reserved	3A	
Reserved	3B	
Test Timer Counter 2	3C	Test 8254 Timer 0 Counter 2.

Table 4-23: BIOS POST codes: ECM-945GM Series (cont.)

Module	Displayed POST code	Description
Reserved	3D	
Test 8259-1 Mask Bits	3E	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
Reserved	3F	
Test 8259-2 Mask Bits	40	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
Reserved	41	
Reserved	42	
Test Stuck 8259's Interrupt Bits	43	Turn off interrupts then verify no interrupt mask register is on.
Test 8259 Interrupt Functionality		Force an interrupt and verify the interrupt occurred.
Reserved	44	
Reserved	45	
Reserved	46	
Set EISA Mode	47	If EISA non-volatile memory checksum is good, execute EISA initialization.
		If not, execute ISA tests and clear EISA mode flag.
Reserved	48	
Size Base and Extended Memory	49	Size base memory from 256K to 640K and extended memory above 1 MB.
Reserved	4A	
Reserved	4B	
Reserved	4C	
Reserved	4D	
Test Base and Extended Memory	4E	Test base memory from 256K to 640K and extended memory above 1 MB using various patterns.
		NOTE. This test is skipped in EISA mode and can be skipped with ESC key in ISA mode.
Reserved	4F	
USB init	50	Initialize USB controller
Reserved	51	
Memory Test	52	Test all memory of memory above 1 MB using Virtual 8086 mode, page mode, and clear the memory
Reserved	53	
Reserved	54	
CPU display	55	Detect CPU speed and display CPU vendor- specific version string and turn on all necessary CPU features
Reserved	56	

Table 4-23: BIOS POST codes: ECM-945GM Series (cont.)

Module	Displayed POST code	Description
PnP Init	57	Display PnP logo and PnP early init
Reserved	58	
Setup Virus Protect	59	Set up virus protect according to Setup
Reserved	5A	
Awdflash Load	5B	If required, will auto load Awdflash.exe in POST
Reserved	5C	
Onboard I/O Init	5D	Initializing onboard super IO
Reserved	5E	
Reserved	5F	
Setup enable	60	Display setup message and enable setup functions
Reserved	61	
Reserved	62	
Initialize & Install Mouse	63	Detect if mouse is present, initialize mouse, install interrupt vectors
Reserved	64	
PS2 Mouse special	65	Special treatment to PS2 Mouse port
Reserved	66	
ACPI Init	67	ACPI Sub-system initializing
Reserved	68	
Setup Cache Controller	69	Initialize cache controller
Reserved	6A	
Setup Entering	6B	Enter setup check and auto-configuration check up
Reserved	6C	
Initialize Floppy Drive & Controller	6D	Initialize floppy disk drive controller and any drives.
Reserved	6E	
FDD install	6F	Install FDD and set up BIOS data area parameters
Reserved	70	
Reserved	71	
Reserved	72	
Initialize Hard Drive & Controller	73	Initialize hard drive controller and any drives.
Reserved	74	
Install HDD	75	IDE device detection and install
Reserved	76	
Detect & Initialize Serial/Parallel	77	Initialize any serial and parallel ports (also game port)

Table 4-23: BIOS POST codes: ECM-945GM Series (cont.)

Module	Displayed POST code	Description
Reserved	78	
Reserved	79	
Detect & Initialize Math Coprocessor	7A	Initialize math coprocessor
Reserved	7B	
HDD Check for Write protection	7C	HDD check out
Reserved	7D	
Reserved	7E	
POST error check	7F	Check POST error and display them and ask for user intervention
Reserved	80	
Reserved	81	
Security Check	82	Ask password security (optional)
Write CMOS	83	Write all CMOS values back to RAM and clear screen
Pre-boot Enable	84	Enable parity checker Enable NMI, enable cache before boot.
Initialize Option ROMs	85	Initialize any option ROMs present from C8000h to EFFFFh. *NOTE. When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.*
Reserved	86	
Reserved	87	
Reserved	88	
Reserved	89	
Reserved	8A	
Reserved	8B	
Reserved	8C	
Reserved	8D	
Reserved	8E	
Reserved	8F	
Reserved	90	
Reserved	91	
Reserved	92	
Boot Medium detection	93	Read and store boot partition head and cylinders values in RAM
Final Init	94	Final init for last micro details before boot
Special KBC patch	95	Set system speed for boot. Set up NumLock status according to Setup.
Boot Attempt	96	Set low stack Boot via INT 19h.
Boot	FF	

BIOS Beep Codes When the COM-E board powers on, a number of the BIOS checkpoints generate an audible 'beep' code on failure using the standard PC speaker (also routed through the board audio system). The beep codes are listed in the following table. Codes are also written to I/O port 80h and the video adapters. External ROM modules may issue a series of tones on error detection.

Table 4-24: BIOS beep codes

Beep code	Error message
1 short beep	Self test has completed without error.
3 beeps	Memory

Hard Disk Drive Repair Use the same procedures to maintain the instrument disk drive that you use to maintain a hard disk drive in a personal computer.

Using ScanDisk, you may be able to repair the disk without destroying data on the disk. To use ScanDisk, perform the following steps:

1. Remove the disk drive from the instrument.

2. Install the disk drive into a personal computer.

3. Power on the computer and run ScanDisk. Set ScanDisk to perform a thorough surface scan and to automatically fix errors.

    ‒ Using Microsoft Windows: select
      My Computer\File\Properties\Tools\Error-checking

    ‒ Using Microsoft MSDOS: enter SCANDISK *drive*: /SURFACE /AUTOFIX

4. If ScanDisk cannot repair the disk, format the disk drive using the File Utilities Format command. Format will destroy all data currently on the disk.

5. If reformatting the disk and reloading the software does not repair the disk, install a new disk drive.

Replaceable Parts

Replaceable Parts Overview

This section contains separate subsections for different product groups, such as 7000 series, 70000B series, 70000C/D/DX series, and 5000/B series. Use the lists in the appropriate section to identify and order replacement parts for your product.

Standard Accessories. Standard accessories for these products are listed in your user manual. The user manual is available at www.tektronix.com/manuals.

Parts Ordering Information

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

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

- Part number

- 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, call 1-800-833-9200. Outside North America, contact a Tektronix sales office or distributor; see the Tektronix Web site (www.tektronix.com) for a list of offices.

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

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

Using the Replaceable Parts List

This section contains a list of the replaceable mechanical and/or electrical components. 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	Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow.
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 entry 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.

Replaceable Parts (DPO7000/C Series)

Table 5-1: Replaceable parts – External (DPO7000/C Series)

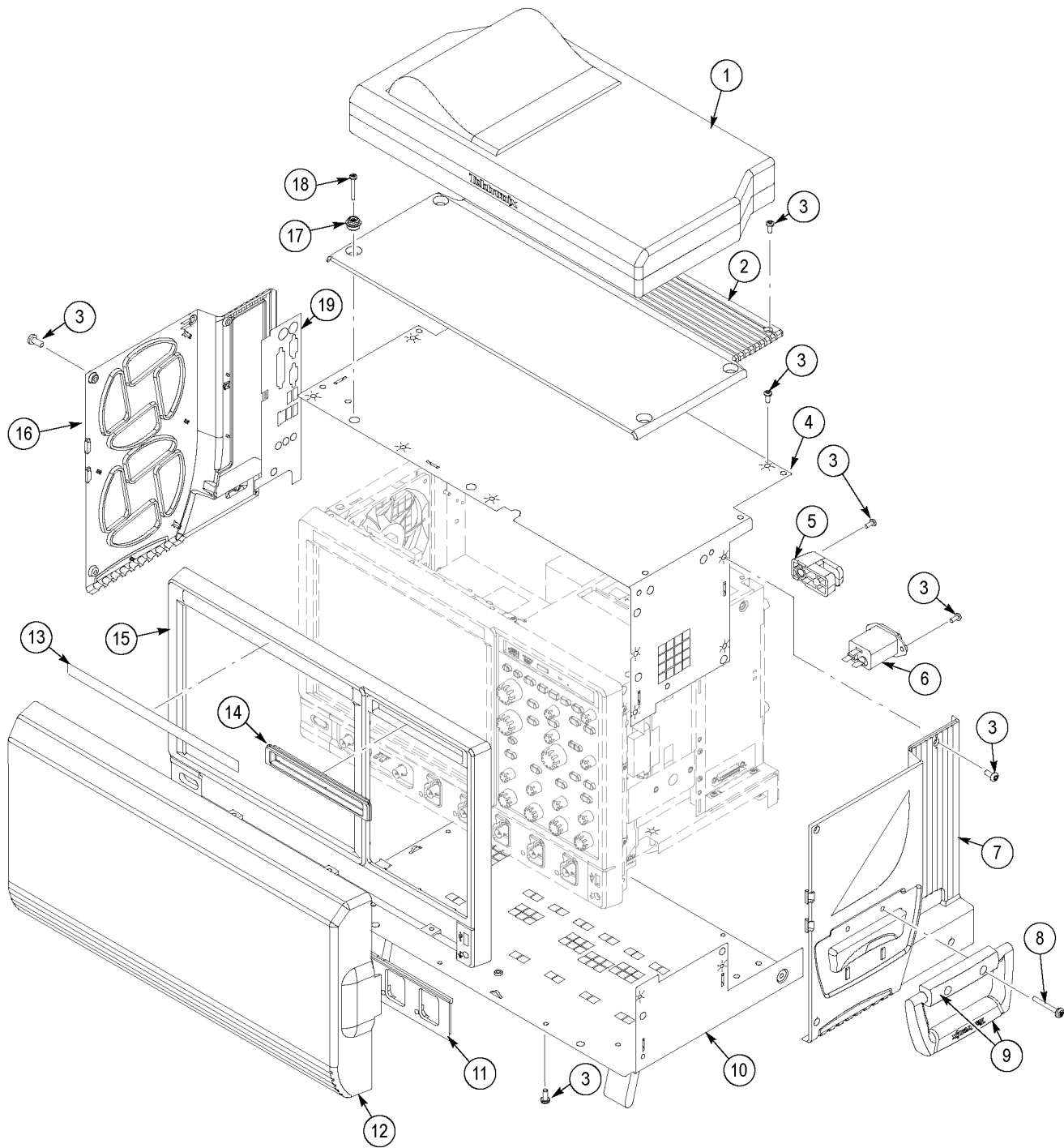| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-1-					**EXTERNAL PARTS**
-1	016-1966-00			1	POUCH; ACCESSORIES, BLACK, SNAP-ON
-2	200-4956-00			1	COVER, TOP; COSMETIC
-3	211-1224-00			8	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-4	200-4954-00			1	COVER; EMI TOP, SAFETY CONTROLLED
-5	348-1861-00			4	FOOT; REAR, ASSY. W/ CORD WRAP, THERMOPLASTIC, SRY
-6	174-5227-00			1	CABLE ASSY; LINE FILTER; SAFETY CONTROLLED
-7	200-4958-00			1	COVER, LEFT; COSMETIC STINGRAY
-8	212-0232-00				SCREW, MACHINE: 8-32 X 1.125L, PNH, STL, BLACK OXIDE, T-20
-9	367-0528-00			1	HANDLE, CARRYING; DUAL DUROMETER MOLDED, POLYPROPYLENE, VINYL GRIP SECTION, SAFETY CONTROLLED
	407-4887-00			1	BRACKET: HANDLE BASE, PC/ABS ALLOY, BAYER BAYBLEND FR-110,TEK BLUE
-10	200-4955-00			1	COVER; EMI BOTTOM, SAFETY CONTROLLED
-11	101-0183-00			1	DPO7000C Series: PLASTIC, FRONT PANEL INSERT, VPI (ACQUISITION AREA)
-12	200-4963-00			1	COVER, FRONT; PC/ABS ALLOY BAYBLEND
-13	335–2466–00			1	DPO7000C Series: LABEL, NOMENCLATURE, DPO7354C
	335–2465–00			1	DPO7000C Series: LABEL, NOMENCLATURE, DPO7254C
	335–2464–00			1	DPO7000C Series: LABEL, NOMENCLATURE, DPO7104C
	335–2463–00			1	DPO7000C Series: LABEL, NOMENCLATURE, DPO7054C
	335-1757-00			1	DPO7000 Series: MARKER, IDENT; LABEL, IDENTIFICATION; (7354 ONLY)
	335-1520-00			1	DPO7000 Series: MARKER, IDENT; LABEL, IDENTIFICATION; (7254 ONLY)
	335-1551-00			1	DPO7000 Series: MARKER, IDENT; LABEL, IDENTIFICATION; (7104 ONLY)
	335-1552-00			1	DPO7000 Series: MARKER, IDENT; LABEL, IDENTIFICATION; (7054 ONLY)
-14	101-0174-00			1	TRIM, DVD
-15	101-0171-00			1	TRIM RING; FR110, PC/ABS
-16	200-4957-00			1	COVER, RIGHT; COSMETIC STINGRAY
-17	355-0303-00			4	STUD.SNAP: 0.570 DIA, 0.165 THK, STAINLESS STEEL
-18	211-0721-00			4	SCREW, MACHINE; 6-32 X 0.375,PNH,STL,CDPL,T-15 TORX DR
-19	335–2481–00			1	DPO7000C Series: LABEL, M-BOARD IO, AIMB-566
	335-1517-00			1	DPO7000 Series: LABEL, REAR, LEXAN, MOTHERBOARD TAPPEN, SAFETY CONTROLLED, 039-0173-xx
	335-2011-00			1	DPO7000 Series: LABEL, REAR, LEXAN, MOTHERBOARD ADVANTECH AIMB-562, SAFETY CONTROLLED, 039-0185-xx

Figure 5-1: External parts (DPO7000/C Series)

Table 5-2: Replaceable parts – Front panel and display (DPO7000/C Series)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-2-					**FRONT PANEL AND DISPLAY**
-1	174-5165-00			1	CABLE ASSY; POWER SWITCH
-2	211-1221-00			2	SCREW; M2.0 6-MM LONG PHILLIPS FLATHEAD ZINC-PLATED
-3	671-6107-00			1	CIRCUIT BOARD ASSY; USB
-4	211-1050-00			4	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-5	174-5164-00			1	CA ASSY; USB 2.0
-6	065-0756-01			1	MODULAR ASSY, FRONT PANEL,TERMINATOR
-7	407-5140-00			1	BRACKET; TRIM, FRONT PANEL, SHEET METAL, SAFETY CONTROLLED
-8	065-0760-01			1	CIRCUIT BD ASSY; FRONT PANEL; TERMINATOR
-9	671-6062-00			1	CIRCUIT BD ASSY; FRONT PANEL ENCODER; TERMINATOR
-10	366-0859-01			1	ASSEMBLY, KNOB; 470 DIAMETER, SOFT TOUCH
-11	366-0860-01			1	ASSEMBLY, KNOB; .685 DIAMETER, SOFT TOUCH
-12	366-0861-01			1	ASSEMBLY, KNOB; .925 DIAMETER, SOFT TOUCH
-13	174-5162-00			1	CABLE ASSY; DISPLAY ADAPTER TO FRONT PANEL BOARD
-14	211-0747-00			8	SCREW, MACHINE; 6-32 X 0.188, PNH, STL, CDPL, T-15 TORX DR
-15	211-0721-00			4	SCREW, MACHINE; 6-32 X 0.375, PNH, STL, CDPL, T-15 TORX DR
-16	065-0742-00			1	MODULE ASSY; SERVICE REPLACEMENT, TOUCH PANEL W/ PACKAGING
-17	065-0766-01			1	MODULE ASSY; SERVICE REPLACEMENT, LCD, INTERCONNECT DISPLAY ADAPTER BOARD W/PACKAGING
-18	174-5160-00			1	CABLE ASSY; DISPLAY ADAPTER TO DISPLAY
-19	065-0746-01			1	POWER BUTTON ASSEMBLY
-20	333–4638–00			1	FRONT PANEL LABEL, SPACER, BRACKET

Figure 5-2: Front panel and display (DPO7000/C Series)

Table 5-3: Replaceable parts – Power supply and fans (DPO7000/C Series)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-3-					**POWER SUPPLY AND FANS**
-1	119-6986-xx			1	POWER SUPPLY; AC-DC; 460W; +3.3V 40A, +5V 34A, +12V 25A, -12V 1A, +5VSB, 2A; 90-264VAC, 47-63HZ; BERG 51624-XX001; 9.5X4.9X3.8IN, SAFETY CONTROLLED
-2	407-5089-00			1	BRACKET; LVPS, SAFETY CONTROLLED
-3	211-1050-00			9	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-4	436-0421-00			1	TRAY, FAN; CHASSIS ASSY, W/FANS MOUNTED; STINGRAY, SAFETY CONTROLLED
-5	441-2435-00			1	CHASSIS; MAIN; AL, SAFETY CONTROLLED
-6	671-5930-00			1	CIRCUIT BD SUBASSY; POWER INTERCONNECT; 389-3659-00; WIRED; SAFETY CONTROLLED
-7	343-1584-00			4	CLAMP; WIRE ROUTING, 0.51 H X 0.625W, NYLON
-8	335-1515-00			1	LABEL, CHASSIS, REAR, SAFETY CONTROLLED

Make sure that the power supply is properly connected to the power interconnect board.

Power interconnect board

Power supply

J104 from hard drive

From line filter

From power supply

J105 from power supply

J107 J108 from fans

To J107 and J108 on power interconnect board

Slide power supply module under chassis brackets.

Cable dress for line filter cable

Figure 5-3: Power supply and fans (DPO7000/C Series)

Table 5-4: Replaceable parts – µATX Motherboard (DPO7000 Series)

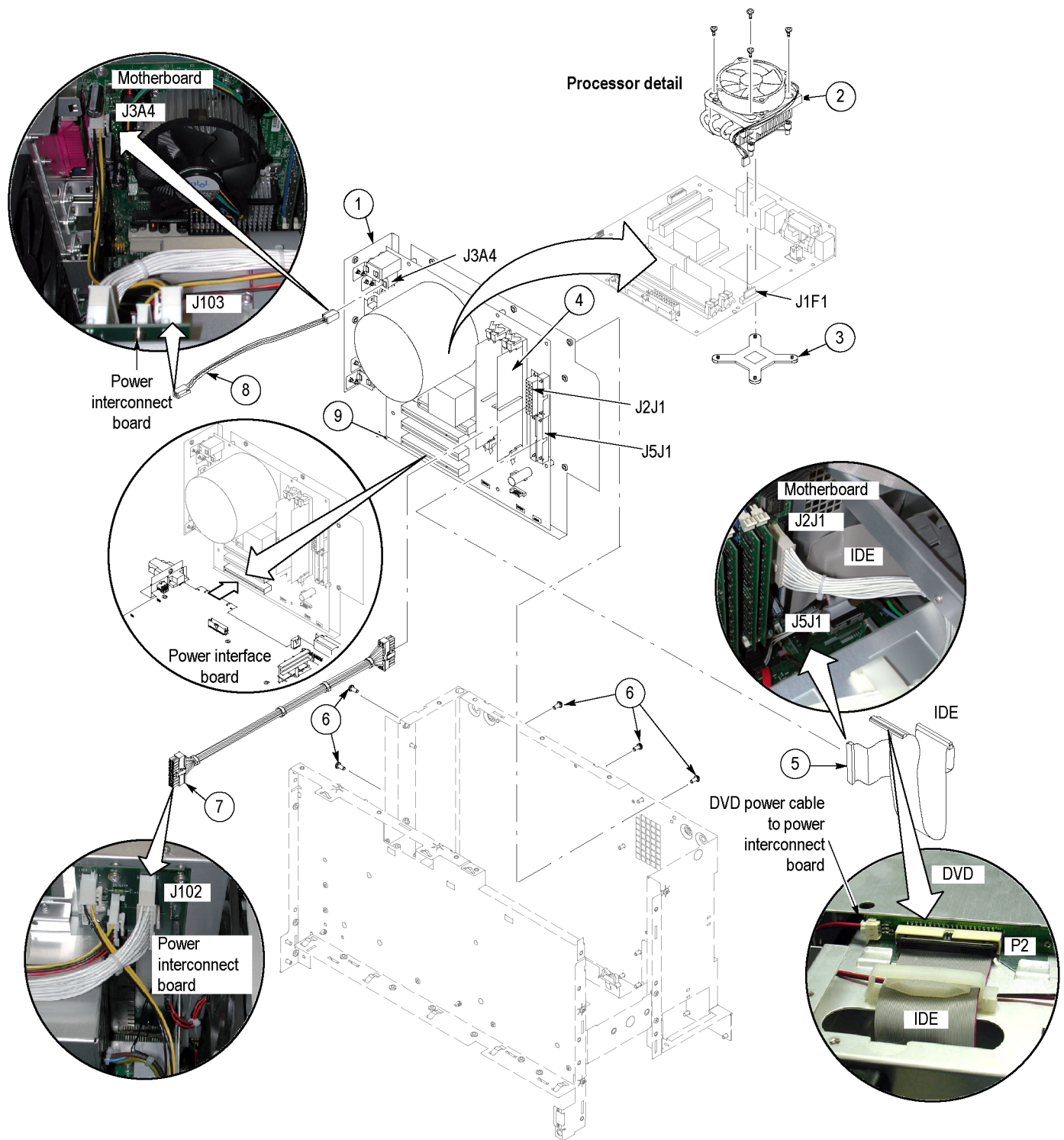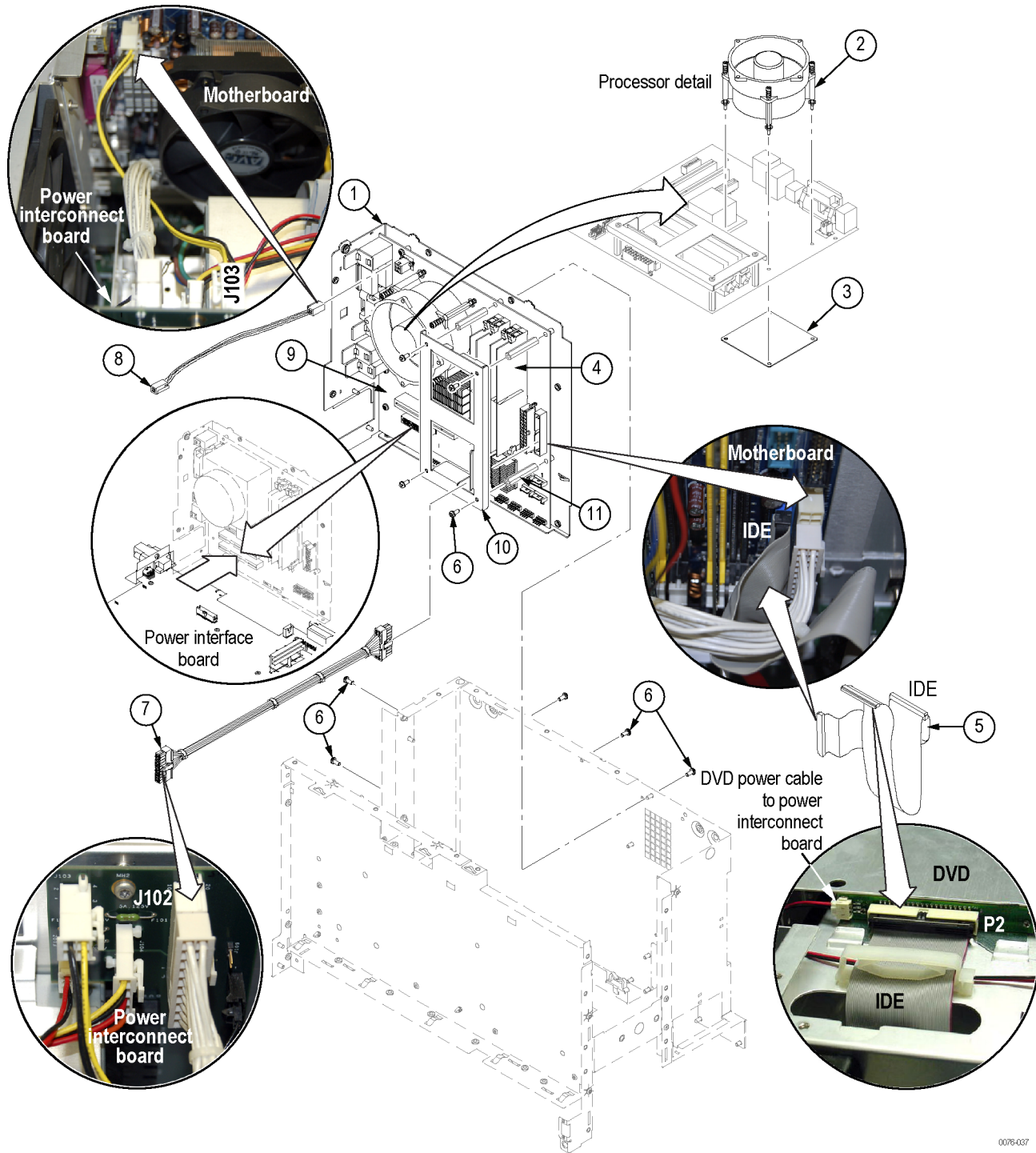| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-4-					**MOTHERBOARD**
-1	441-2466-01			1	CHASSIS; REAR PROCESSOR, 039-0173-xx and 065-0745-xx
-2	119-7333-00			1	FAN AND HEAT SINK WITH BRACKET
-3				1	BRACKET FOR FAN AND HEATSINK (PART OF ITEM 2 IN THIS LIST)
-4	167-1048-00	B010857		2	IC, MEMORY; 128M X 64, 1 GB DDR2, 1.8V, 3-3-3; MT16HTF12864AY-40E, DIMM240, DS1, 039-0173-xx
-5	174-5271-00			1	IDE CABLE WITH STRAIN RELIEF & PULL-TAB
-6	211-1050-00			5	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-7	174-4797-00			1	CA ASSY; 20 PIN ATX POWER, SAFETY CONTROLLED
-8	174-4865-00			1	CA ASSY; 4 PIN P4 POWER, 9.5 L, MOTHER BOARD TO INTERFACE BOARD, SAFETY CONTROLLED
-9	050-3723-00			1	PARTS REPLACEMENT KIT; AIMB562VG-00A1E, BIOS 562X12AN.BIN, ALC888 AUDIO CODEC, 039018601 WITH 063425400 AIMB-562 AUDIO DRIVER, ADVANTECH VERSION 5.10.0.5324
	167-0657-00			1	PROCESSOR; PENTIUM 4, 3.4 GHZ INTERNAL CLOCK, 400MHZ BUS, SOCKET 478 COMPATIBLE, W/O FAN HEATSINK, JM80547PG0961M

Figure 5-4: 039-0173-xx and 065-0745-xx µATX Motherboard (DPO7000 Series)

Table 5-5: Replaceable parts – µATX Motherboard (DPO7000C Series)

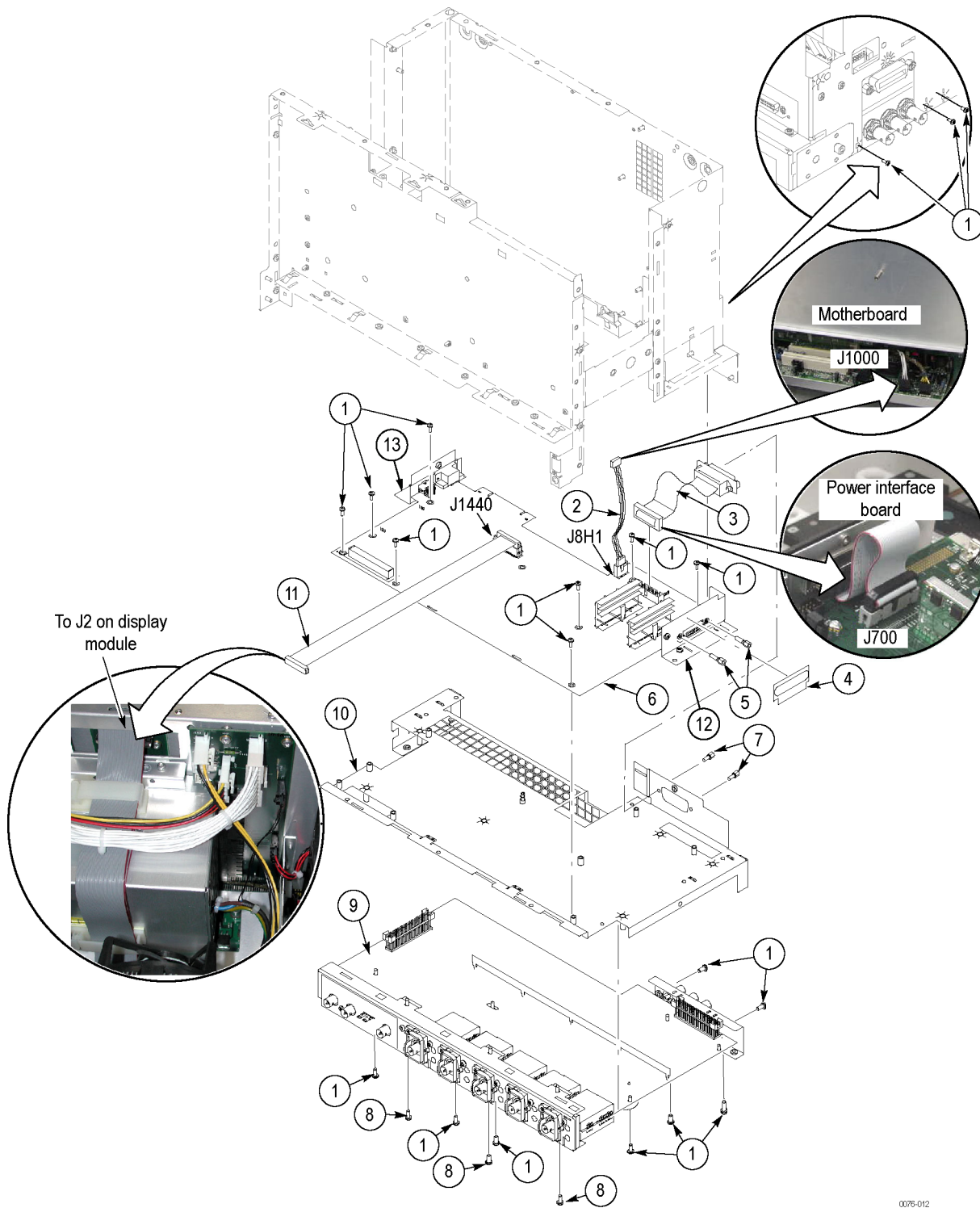| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-5-					**MOTHERBOARD**
-1	441-2639-00			1	CHASSIS, REAR AIMB-566
-2	119–7632–00			1	COOLER MASTER HEATSINK CHD00008-02-GP
-3	324–1153–00			1	INSULATOR; PLATE, MOTHERBOARD, 0.04 POLYCARBONATE, TAPPEN (039-0188 µATX MOTHERBOARD
-4	167-1048-00	B010857		2	IC, MEMORY; 128M X 64, 1 GB DDR2, 1.8V, 3-3-3; MT16HTF12864AY-40E, DIMM240, DS1
-5	174-5271-00			1	IDE CABLE WITH STRAIN RELIEF & PULL-TAB
-6	211-1050-00			9	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-7	174-4797-00			1	CA ASSY; 20 PIN ATX POWER, SAFETY CONTROLLED
-8	174-4865-00			1	CA ASSY; 4 PIN P4 POWER, 9.5 L, MOTHER BOARD TO INTERFACE BOARD, SAFETY CONTROLLED
-9	050-3763-00			1	COMPUTER BOARD; ADVANTECH, MICROATX, LGA 775 CORE 2 DUO, DDR2, PCI-E X4, DUAL CH LVDS, DVI-I, SINGLE GBE LAN; ADVANTECH AIMB-566
	167-1348-00			1	PROCESSOR; INTEL CORE 2 DUO, 3.0 GHZ, WOLFDALE, E8400; 65W; BUS SPD 1333MHZ; FC-LGA775 PKG, W/O FAN and HEATSINK EU80570PJ0806M SLB9J
-10	407-5579-00			1	BRACKET, DIMM RETENTION, WITH TABS
	348-1988-00			1	PORON PADS, 1.00 X 3.30, 4 X 8 ARRAY ON ADHESIVE TAPE (PART OF ITEM 10 IN THIS LIST)
-11	129-1716-00			4	STANDOFF, M-BRD TO DIMM RETEN BRKT

Figure 5-5: 039-0188-00 Motherboard (DPO7000C Series)

Table 5-6: Replaceable parts – Power interface and Acquisition assemblies (DPO7000/C Series)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-6-					**POWER INTERFACE AND ACQUISITION ASSEMBLIES**
-1	211-1050-00			19	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-2	174-5048-00			1	CA ASSY; USB 1.0
-3	174-5159-01			1	CABLE ASSY; GPIB
-4	335-1518-01			1	LABEL, TEKLINK, SAFETY CONTROLLED
-5	211-1206-00			2	SCREW, JACK; 2-56 ID X 4-40 OD,.188 HEX, SS
					Part of number 12 in this list
-6	065–0880–00			1	DPO7000C Series: KIT, SERVICE REPLACEMENT, PCIE POWER INTERFACE BOARD, 8780499XX FUNCTIONAL TESTED W/ PACKAGING
	671-5912-02			1	DPO7000 Series: CIRCUIT BD ASSY; POWER INTERFACE, 6795912XX, TESTED; WIRED, 389352600
-7	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, BULK PACK
-8	211-0747-00			3	SCREW, MACHINE; 6-32 X 0.188, PNH, STL, CDPL, T-15 TORX DR
-9	671–6483–00			1	DPO7000C Series: CIRCUIT BRD ASSY; SERVICE REPLACEMENT, ACQUISITION FOR DPO7054C and DPO7104C, 6646483XX TESTED W/ PACKAGING
	671–6484–00			1	DPO7000C Series: CIRCUIT BRD ASSY; SERVICE REPLACEMENT, ACQUISITION FOR DPO7104C 2SR, 6646484XX TESTED W/ PACKAGING
	671–6485–00			1	DPO7000C Series: CIRCUIT BRD ASSY; SERVICE REPLACEMENT, ACQUISITION FOR DPO7254C, 6646485XX TESTED W/ PACKAGING
	671–6486–00			1	DPO7000C Series: CIRCUIT BRD ASSY; SERVICE REPLACEMENT, ACQUISITION FOR DPO7354C, 6646486XX TESTED W/ PACKAGING
	672-5819-54			1	DPO7000 Series: CIRCUIT BD ASSY; ACQ,6725819XX, TESTED; WIRED, (DPO7254 ONLY)
	672-6166-54			1	DPO7000 Series: CIRCUIT BD ASSY; ACQ, 6726166XX, TESTED; WIRED, (DPO7104, DPO7054 ONLY)
	672-6172-50			1	DPO7000 Series: CIRCUIT BD ASSY; ACQ, 6726172XX, TESTED; WIRED, (DPO7354 ONLY)
-10	441-2436-01			1	CHASSIS; ACQ; AL, SAFETY CONTROLLED
-11	174-5161-00			1	CABLE ASSY; DISPLAY ADAPTER TO PCI BOARD
-12	386–7450–01			1	BRACKET, TEKLINK, AL, SAFETY CONTROLLED
					(Part of item 10 in this list)
	335–1518–01			1	LABEL, TEKLINK, SAFETY CONTROLLED
-13	407–5546–00			1	DPO7000C Series: BRACKET, NO CONNECTORS (ON PWR INTERFACE PCB)
	407–5088–00			1	DPO7000 Series: Stamped Component, Aluminum
	335–2482–00			1	LABEL, BRACKET COVER, FAN SIDE
					(Part of item 10 in this list)

Figure 5-6: Power interface and Acquisition assemblies (DPO7000/C Series)

Table 5-7: Replaceable parts – Drives (DPO7000/C Series)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-7-					**DRIVES**
-1	065–0881–xx			1	DPO7000C Series:
					KIT; DRIVE ASSEMBLY W/ PACKAGING; 6505457XX, PRGM HDD ASSY WITH OS/APPS SW ON HIDDEN PARTITION, FOR ADVANTECH AIMB-566 MOTHERBOARD and WIN7; DPO/DSA/MSO70KC and DPO7KC
	065–0882–xx			1	DPO7000C Series:
					KIT; DRIVE ASSEMBLY W/ PACKAGING; 6505458XX, SOLID STATE PRGM HDD ASSY WITH OS/APPS SW ON HIDDEN PARTITION, FOR ADVANTECH AIMB-566 MOTHERBOARD and WIN7; DPO/DSA/MSO70KC and DPO7KC (OPTION SSD)
	065-0744-00				DPO7000 Series:
					DISK DRIVE ASSY; SERVICE REPLACEMENT W/O SOFTWARE, W/ PACKAGING
-2	211-1050-00			11	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-3	407-5069-00			1	BRACKET, RHDD; SATA COMBO CABLE, 3.5 INCH REMOVABLE HARD DISK DRIVE RECEPTACLE
-4	174-5169-00			1	CABLE ASSY; SATA COMBO, HARD DRIVE CABLE
-5	679-5915-00			1	CKT BD SUBASSY; DVD-CD/RW ADAPTER, UNTESTED, 389-3689-00 WIRED
-6	129-1618-00			1	SPACER; DVD-CD/RW SLIMLINE DRIVE ADAPTER, PLASTIC
-7	065–0666–02			1	DISK DRIVE; OPTICAL, 644MB, CD-RW/DVD ROM, COMBO, 16.7 MB/SEC, IDE/ATAPI; DW-224E-C93, SAFETY CONTROLLED
-8	211-0950-00			3	SCREW, MACHINE; M2X.4X3L, PHL, PNH, STL NI PL
-9	407-5156-00			1	BRACKET, DVD-CD/RW, COMBO; ADAPTER FOR DVD-CD/RW, COMBO, SLIMLINE
-10	174-5017-00			1	CABLE ASSEMBLY; DVD POWER

Figure 5-7: Drives (DPO7000/C Series)

Replaceable Parts (DSA/DPO70000B Series)

Table 5-8: Replaceable parts – External 1 (DSA/DPO70000B Series)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-8-					**EXTERNAL PARTS**
-1	016-1441-01			1	ACCESSORY POUCH; BLACK CORDURA
-2	200-5065-00			1	COVER, TOP; COSMETIC
-3	211-1224-00			8	SCREW, MACHINE; 6-32 X 0.375, PNH, STL, CDPL, T-15
-4	355-0298-00			1	STUD.SNAP; 0.570 DIA, 0.165 THK, STAINLESS STEEL
-5	200-5066-00			1	COVER; EMI TOP
-6	211-1050-00			14	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-7	348-1859-00			4	FOOT; REAR, W/ CORD WRAP, THERMOPLASTIC
-8	101-0173-00		Discontinued	1	TRIM, ACQUISITION INSERT
-9	101-0171-00			1	TRIM RING; FR110, PC/ABS
-10	200-4963-00			1	COVER, FRONT; PC/ABS ALLOY BAYBLEND
-11	101-0174-00			1	TRIM, DVD
-12	335-1940-00			1	MARKER, IDENT; DPO70404B
	335-1939-00				MARKER, IDENT; DPO70604B
	335-1938-00				MARKER, IDENT; DPO70804B
	335-1943-00				MARKER, IDENT; DPO71254B
	335-1942-00				MARKER, IDENT; DPO71604B
	335-1941-00				MARKER, IDENT; DPO72004B
	335-1946-00				MARKER, IDENT; DSA70404B
	335-1945-00				MARKER, IDENT; DSA70604B
	335-1944-00				MARKER, IDENT; DSA70804B
	335-1949-00				MARKER, IDENT; DSA71254B
	335-1948-00				MARKER, IDENT; DSA71604B
	335-1947-00				MARKER, IDENT; DSA72004B
-13	348-1817-00			2	FOOT, SKID

Figure 5-8: External parts 1 (DSA/DPO70000B Series)

Table 5-9: Replaceable parts – External 2 (DSA/DPO70000B Series)

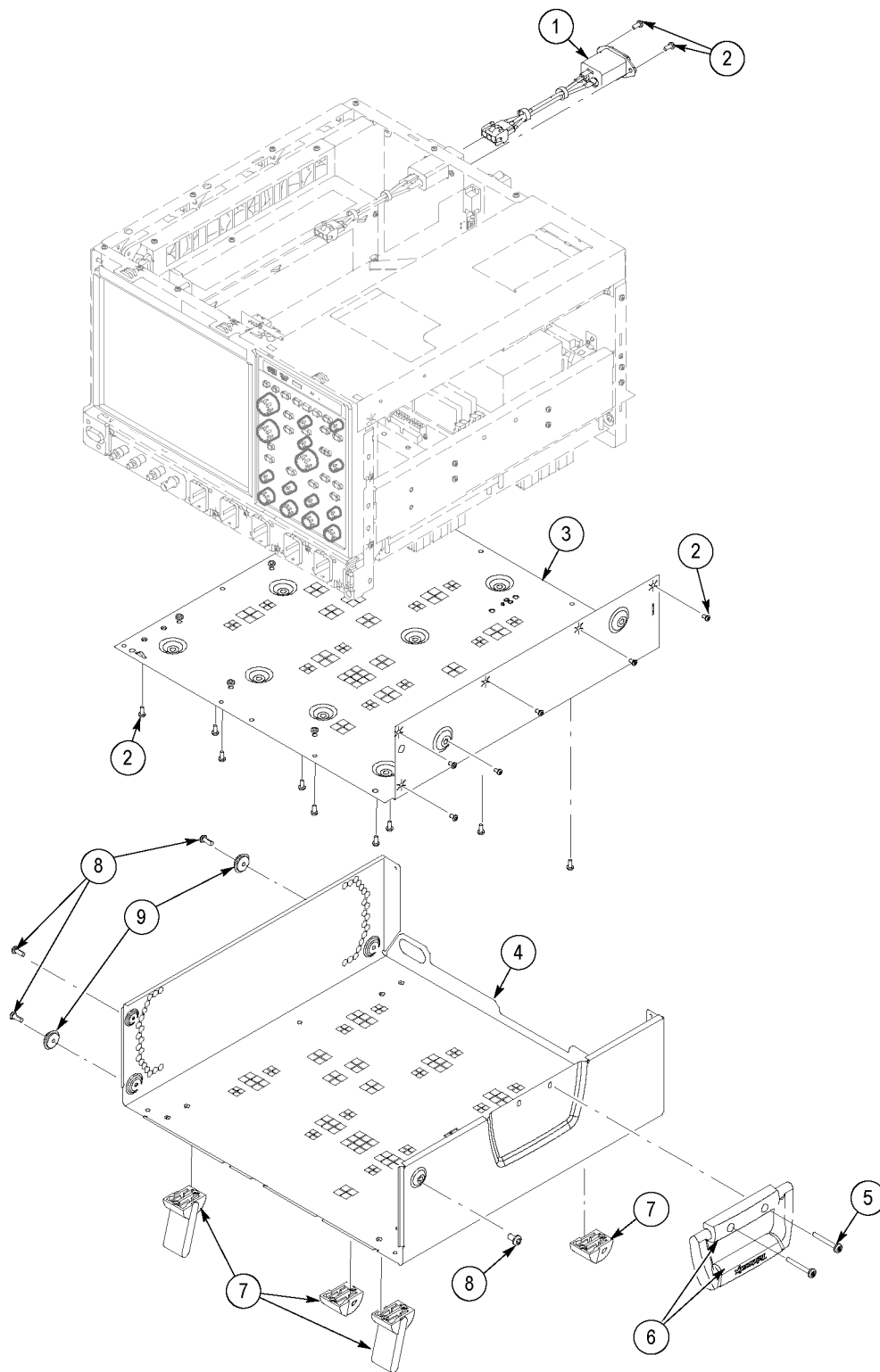| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-9-					**EXTERNAL PARTS**
-1	174-5226-00			1	CABLE ASSY; LINE FILTER
-2	211-1050-00			16	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-3	200-4936-00			1	COVER; EMI BOTTOM, DPO/DSA70804/70604/70404
	200-5007-00			1	COVER; EMI BOTTOM, DPO/DSA720004/71604/71254
-4	200-5067-00			1	COVER, BOTTOM; COSMETIC; W/FEET
-5	212-0232-00			2	SCREW,MACHINE; 8-32 X 1.125L, PNH, STL, BLACK ZINC SPEC #ASTM B633 TYPE II, T-20
-6	367-0528-00			1	HANDLE, CARRYING; DUAL DUROMETER MOLDED, POLYPROPYLENE, VINYL GRIP SECTION
	407-4887-00			1	BRACKET; HANDLE BASE, PC/ABS ALLOY, BAYER BAYBLEND FR-110, TEK BLUE
-7	348-1515-00			1	FEET, CABINET; BLACK, GLASS-FIBRE REINFORCED PLASTIC, SET OF 4 FEET, 4 RUBBER INSERTS
-8	211-1224-00			4	SCREW, MACHINE, BLACK
-9	348-1817-00			2	FOOT, SKID

Figure 5-9: External parts 2 (DSA/DPO70000B Series)

Table 5-10: Replaceable parts – Front panel and display (DSA/DPO70000B Series)

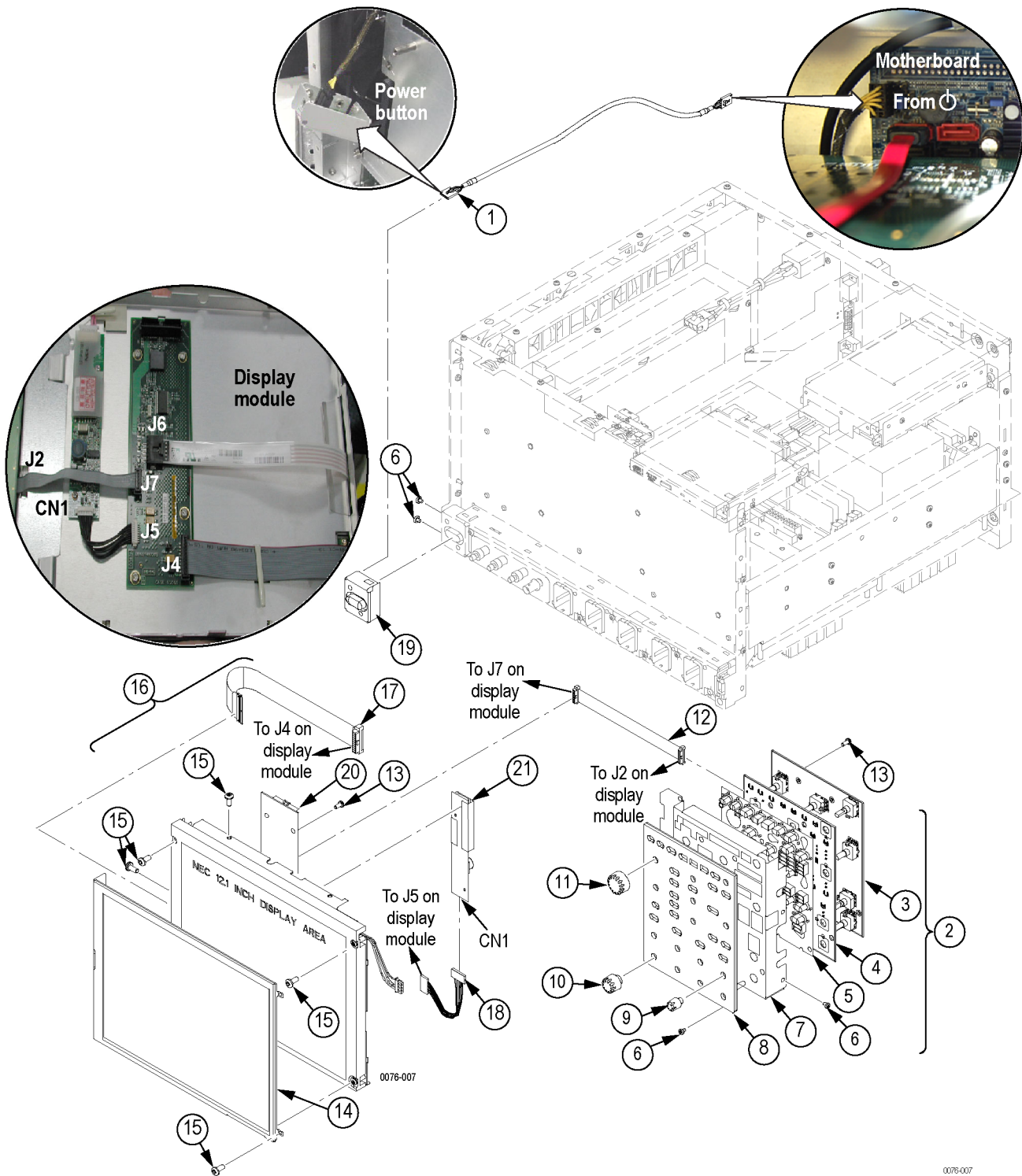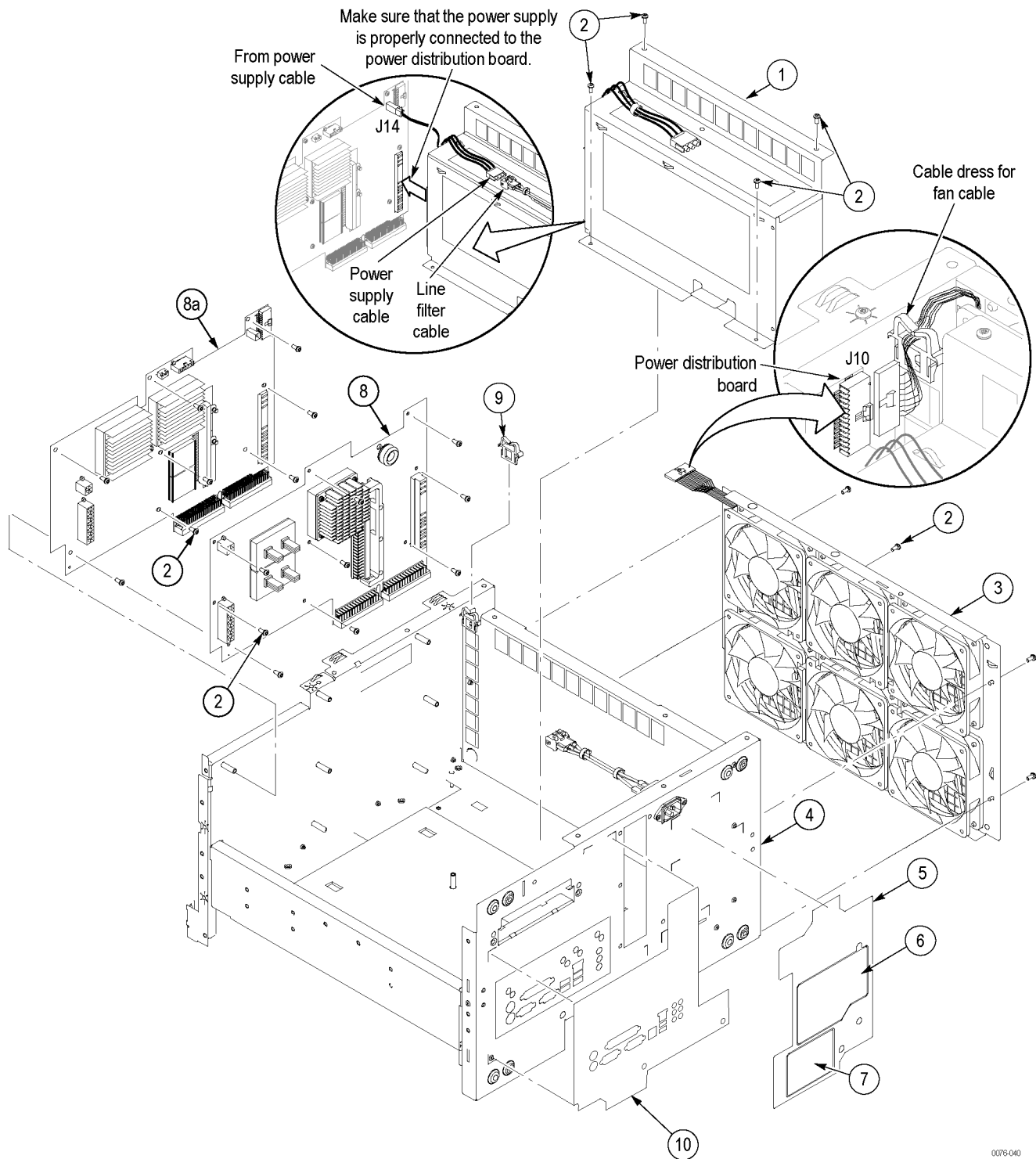| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-10-					**FRONT PANEL AND DISPLAY**
-1	174-5165-00			1	CABLE ASSY; POWER SWITCH
-2	065-0756-02			1	MODULE ASSY;SERVICE REPLACEMENT KIT,614104101 FRONT PANEL ASSEMBLY W/ PACKAGING;DPO7000,DPO/DSA70000 SERIES
-3	671-6062-00			1	CIRCUIT BOARD ASSY; FRONT PANEL ENCODER
-4	065-0760-00			1	CIRCUIT BD ASSY; FRONT PANEL MAIN
-5	260-2818-00			1	SWITCH, KEYPAD; ELASTOMER EMAT
-6	211-1150-00			1	SCREW, MACHINE; 6-32 X 0.172, PNH, STL, T-15 TORX DR, BLACK OXIDE
-7	407-5140-00			1	BRACKET; TRIM,FRONT PANEL, SHEET METAL
-8	333-4522-00		Discontinued	1	PANEL ASSEMBLY; FRONT SUBPANEL, W/BRACKET ASSEMBLY, BEZEL & LABEL
	333-4564-00		Discontinued	1	PANEL ASSEMBLY; FRONT SUBPANEL, W/BRACKET ASSEMBLY, BEZEL & LABEL
-9	366-0859-01			1	ASSEMBLY, KNOB; .470 DIAMETER, SOFT TOUCH
-10	366-0860-01			1	ASSEMBLY, KNOB; .685 DIAMETER, SOFT TOUCH
-11	366-0861-01			1	ASSEMBLY, KNOB; .925 DIAMETER, SOFT TOUCH
-12	174-5162-00			1	CABLE ASSY; DISPLAY ADAPTER TO FRONT PANEL BOARD
-13	211-0747-00			4	SCREW, MACHINE; 6-32 X 0.188, PNH, STL, CDPL, T-15
-14	065-0742-00			1	TOUCH SCREEN ASSEMBLY, 12.1 IN, RESISTIVE, 5-WIRE, W/GASKETS, W/BRACKETS
-15	211-0721-00			5	SCREW, MACHINE; 6-32 X 0.375, PNH, STL, CDPL, T-15
-16	065-0743-01			1	COMPONENT KIT; LCD DISPLAY ADAPTER MODULE SUBASSEMBLY, STANDARD
-17	174-5160-00			1	CABLE ASSY; DISPLAY ADAPTER TO DISPLAY
-18	174-5163-00			1	CABLE ASSY; DISPLAY ADAPTER TO INVERTER BOARD
-19	065-0746-01			1	MODULE ASSY; SERVICE REPLACEMENT KIT, POWER BUTTON ASSY
-20	679-6283-01			1	CIRCUIT BOARD ASSY; DISPLAY ADAPTER
-21	119-7016-00			1	CIRCUIT BOARD ASSY; INVERTER

Figure 5-10: Front panel and display (DSA/DPO70000B Series)

Table 5-11: Replaceable parts – Power supply and fans (DSA/DPO70000B Series)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-11-					**POWER SUPPLY AND FANS**
-1	119-6982-xx			1	POWER SUPPLY: AC-DC; 1200W, +48V 25A, +12V 1A, 85-264VAC, 47-63HZ, ELCON 377-0002-00100A, IEC320-C22; 11.5X6.75X2.75IN; CLOSED CHASSIS
	407-5381-00	B110100			BRACKET; POWER SUPPLY
-2	211-1050-00			12	SCREW, MACHINE; 6-32X0.312 L, PNH, STL CAD PLT, T15
-3	436-0422-00			1	TRAY, FAN; CHASSIS ASSY, W/6 FANS MOUNTED; HAMMERHEAD
-4	441-2563-00			1	CHASSIS ASSEMBLY, MAIN, ADVANTECH AIMB-562 UATX, SAFETY CONTROLLED;DPO70000B SERIES
	407-5366-00			1	BRACKET, IO BACK PANEL PLATE, DPO/DSA7000B SERIES
-5	335-1634-00			1	LABEL, CHASSIS, REAR COSMETIC
-6	335-0263-01			1	MARKER, IDENT; SUPER LABEL, BLANK ROLL STOCK
-7	335-0347-00			1	MARKER,IDENT; REAR PANEL, BLANK, 2.100 X 2.700
-8	065-0759-01	B010100	B110099	1	CIRCUIT BOARD; POWER DISTRIBUTION, DSA70000, DPO70000
-8a	671-6385-00	B110100		1	CIRCUIT BOARD; POWER DISTRIBUTION, DSA70000B, DPO70000B
-9	343-1585-00			1	CLAMP; WIRE ROUTING CLAMP, FLAT CABLE BLIND HOLE MOUNTED, NYLON
-10	335–2119–01			1	LABEL, REAR I/O PLATE, LEXAN

Make sure that the power supply is properly connected to the power distribution board.

From power supply cable

J14

Power supply cable

Line filter cable

Cable dress for fan cable

Power distribution board

J10

8a

8

9

2

2

1

2

2

2

3

4

5

6

7

10

0076-040

Figure 5-11: Power supply and fans (DSA/DPO70000B Series)

Table 5-12: Replaceable parts – µATX assembly (DSA/DPO70000B Series)

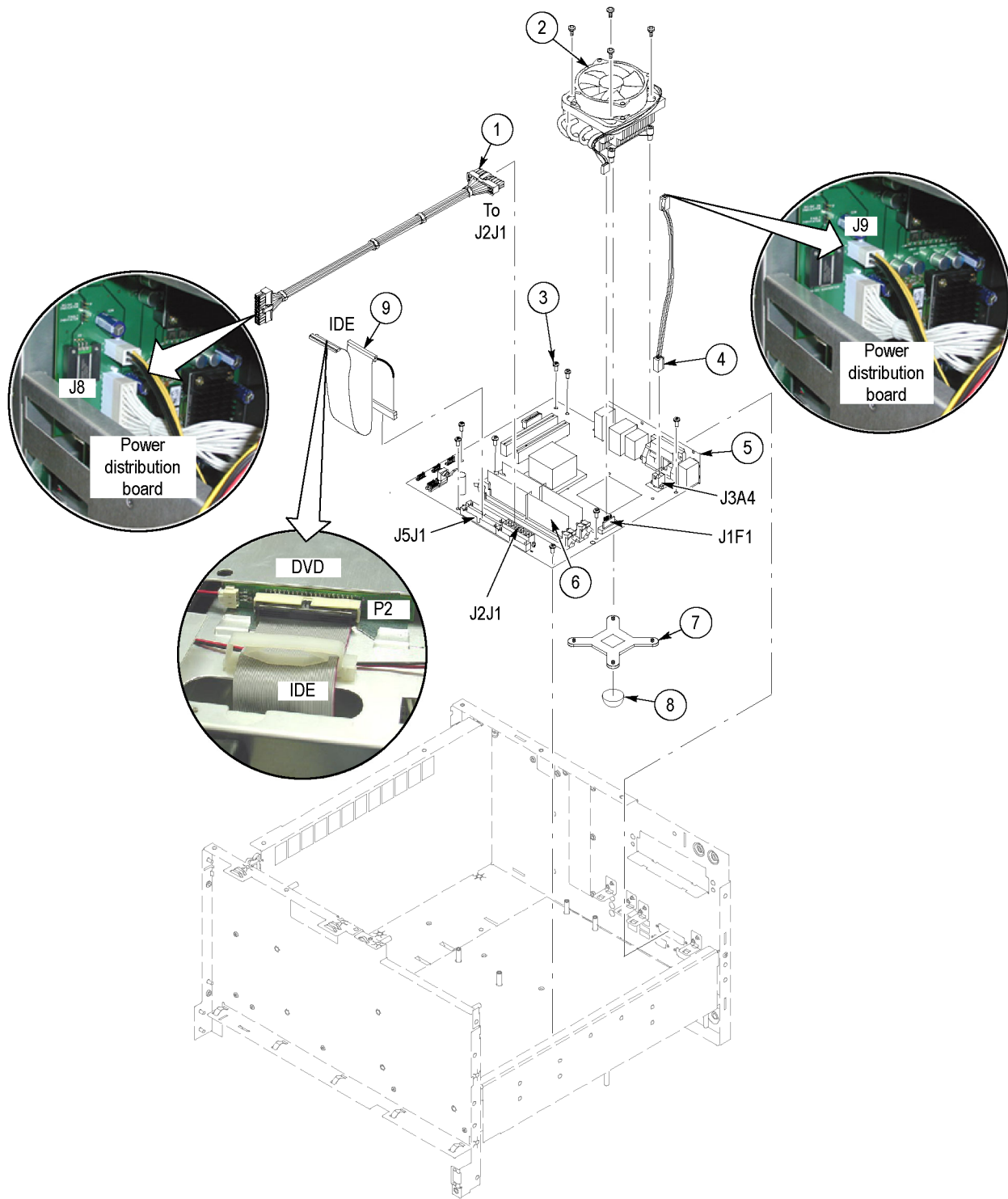| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-12-					**MOTHERBOARD**
-1	174-4797-00			1	CA ASSY; 20 PIN ATX POWER, SAFETY CONTROLLED
-2	065-0745-02			1	SERVICE KIT FOR CPU BRD, CPU, FAN AND HEAT SINK ASSEMBLY
	167-0657-00			1	PROCESSOR; PENTIUM 4, 3.4 GHZ INTERNAL CLOCK, 400MHZ BUS, W/O FAN HEATSINK, HH80552PG0962M
	119-7333-00			1	FAN, HEATSINK AND BRACKET
-3	211-0935-00			8	SCREW, MACHINE; 6-32 X 0.50, PNH, T-15, SST, PASSIVATED
-4	174-4798-00			1	CA ASSY; 4 PIN P4 POWER
-5	050-3723-00			1	PARTS REPLACEMENT KIT; AIMB562VG-00A1E, BIOS 562X12AN.BIN, ALC888 AUDIO CODEC, 039018601 WITH 063425400 AIMB-562 AUDIO DRIVER, ADVANTECH VERSION 5.10.0.5324; DPO7000, DPO/DSA70000, DPO/DSA7000B, VM6000, DSA8200, TLA5000B SERIES
-6	167-1048-00			2	IC, MEMORY; 128M X 64, 1GB DDR2 1.8V, 3-3-3; MT16HTF12864AY-40E, DIMM240,DS1
-7	119-7333-00			1	HEATSINK AND BRACKET
-8	342-1198-00			1	DAMPENER, PORON FOAM FOR P4 HEATSINK
-9	174-5271-00			1	IDE CABLE WITH STRAIN RELIEF & PULL-TAB

Figure 5-12: 039-0173-xx and 065-0745-xx µATX (DSA/DPO70000B Series)

Table 5-13: Replaceable parts – Acquisition assembly (DSA/DPO70000B Series)

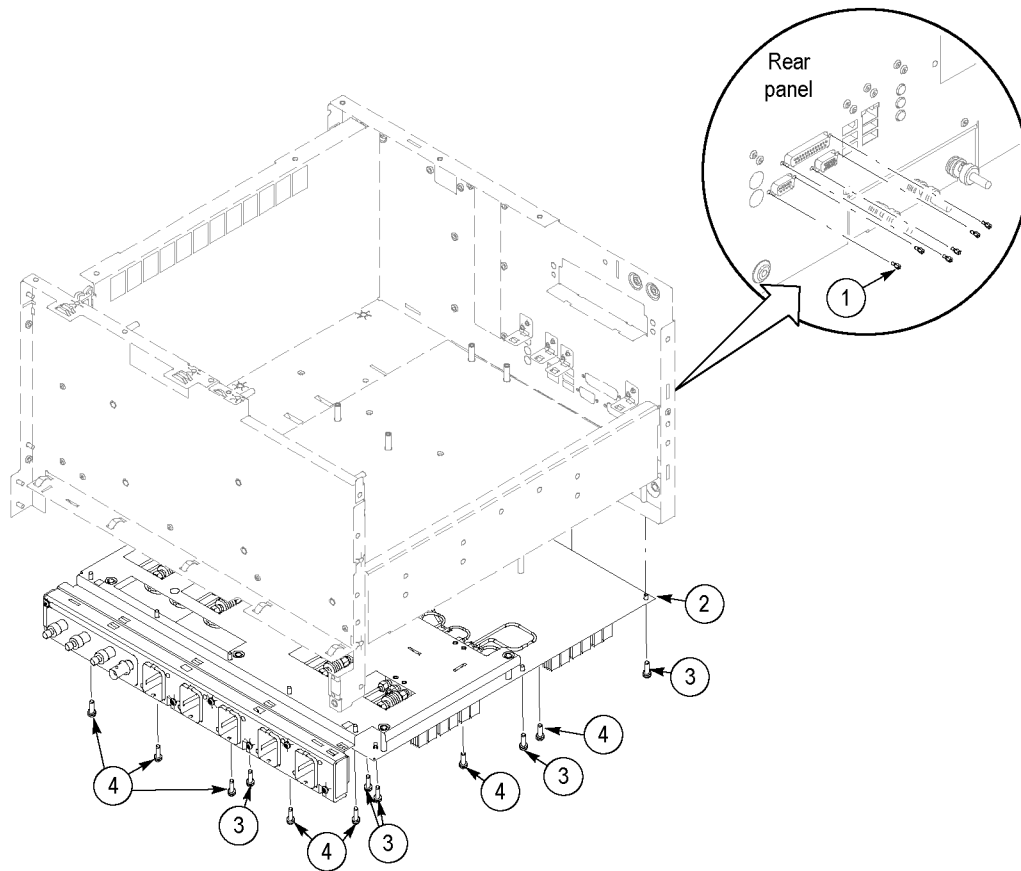| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-13-					**ACQUISITION**
-1	214-3903-00			8	SCREW, JACK; 4-40 X 0.312 LONG, 0.188 H HEX HEAD STAND OFF, 4-40 INT THD, X 0.312 THD EXT 4-40
-2	- - - - - - -			1	ACQUISITION MODULE, RETURN TO TEKTRONIX FOR SERVICE
-3, -4	211-1050-00			17	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15

Figure 5-13: Acquisition assembly (DSA/DPO70000B Series)

Table 5-14: Replaceable parts – Interface board (DSA/DPO70000B Series)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-14-					**INTERFACE BOARD**
-1	065-0825-00			1	KIT, SERVICE REPLACEMENT, BACKBONE BOARD ASSY, 6646431XX TESTED W/ PACKAGING
					ATTACHED PARTS
	386-7536-00			1	BRACKET, STIFFENER FOR PCI PCB
	211-0747-00			5	SCREW, MACHINE; 6-32 X 0.188, PNH, STEEL, ZINC FINISH, T-15 TORX DR
					END ATTACHED PARTS
-2	211-1050-00			6	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-3	335-1604-00			1	LABEL REAR I/O PLATE, SAFETY CONTROLLED
-4	214-3903-00			2	SCREW, JACK; 4-40 X 0.312 LONG, 0.188 H HEX HEAD STAND OFF, 4-40 INT THD, X 0.312 THD EXT 4-40
-5	211-1206-00			2	SCREW, JACK; 2-56 ID X 4-40 OD, 0.188 HEX, SS
-6	214-1061-00			2	CONTACT, ELEC; GROUNDING, CU BE SAFETY CONTROLLED
-7	386-7447-00			1	PLATE; REAR, PCI I/O
-8	174-5164-00			1	CA ASSY; USB 2.0
-9	679-6107-00			1	CIRCUIT BD ASSY; USB
-10	211-1221-00			2	SCREW; M2.0 6-MM LONG PHILLIPS FLATHEAD ZINC-PLATED
-11	174-5048-00			1	CA ASSY; USB 1.0
-12	174-4241-00			1	CABLE ASSY; RIBBON, BUS, IDC, 32 AWG,16.50 L,60POS, BOX, IDC, FEMALE, RTANG, 0.050CTR X 2
-13	386-7481-00			1	BRACKET, BRACE BETWEEN PCI PCB AND DRIVE BRACKET

Font panel cable from the interface board to J2 on the display module

J1000

J1440

Rear panel

USB78
Motherboard

Front panel

Distribution board

PCI backbone board

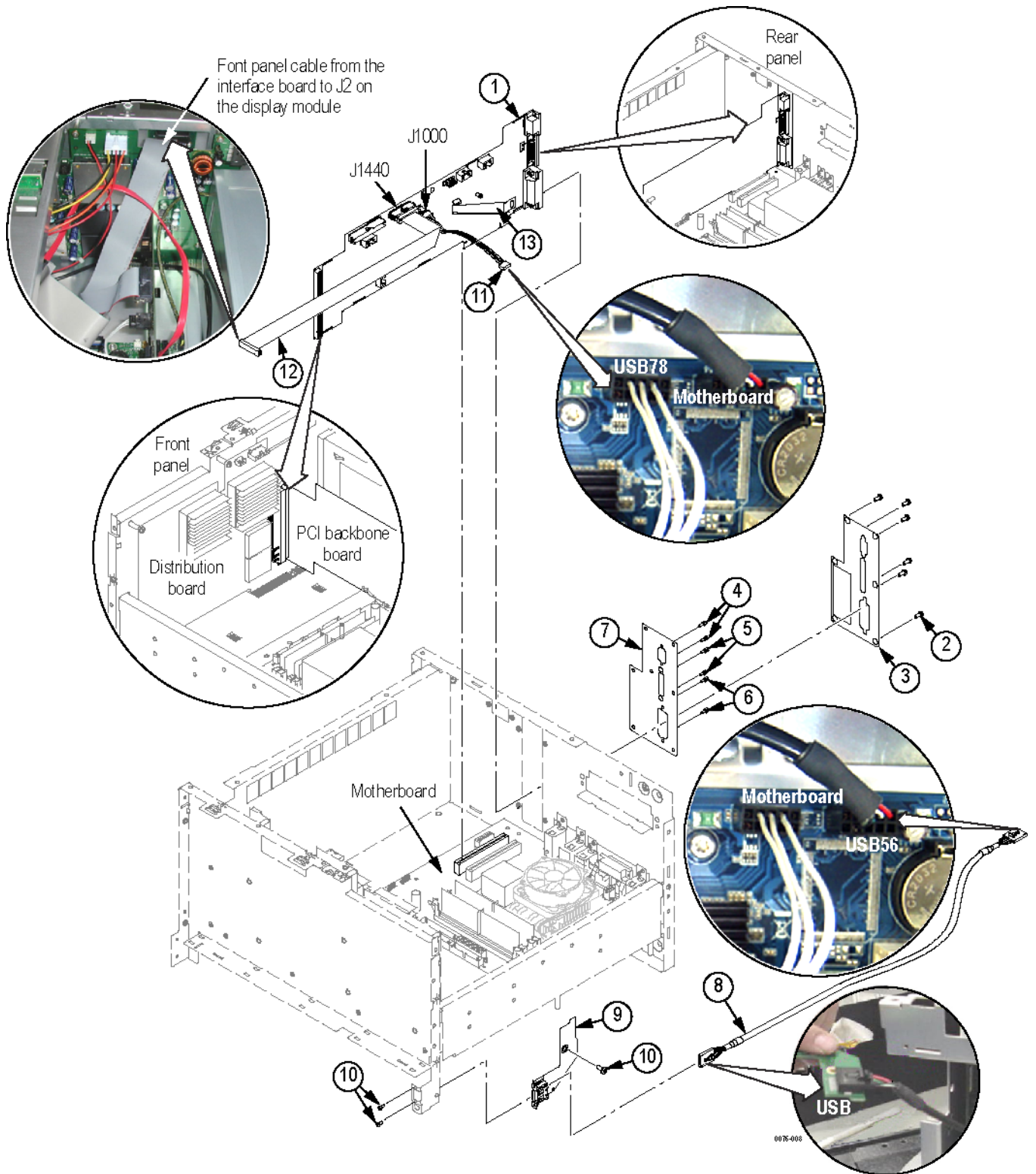Motherboard

Motherboard

USB56

USB

Figure 5-14: Interface board (DSA/DPO70000B Series)

Table 5-15: Replaceable parts – Drives (DSA/DPO70000B Series)

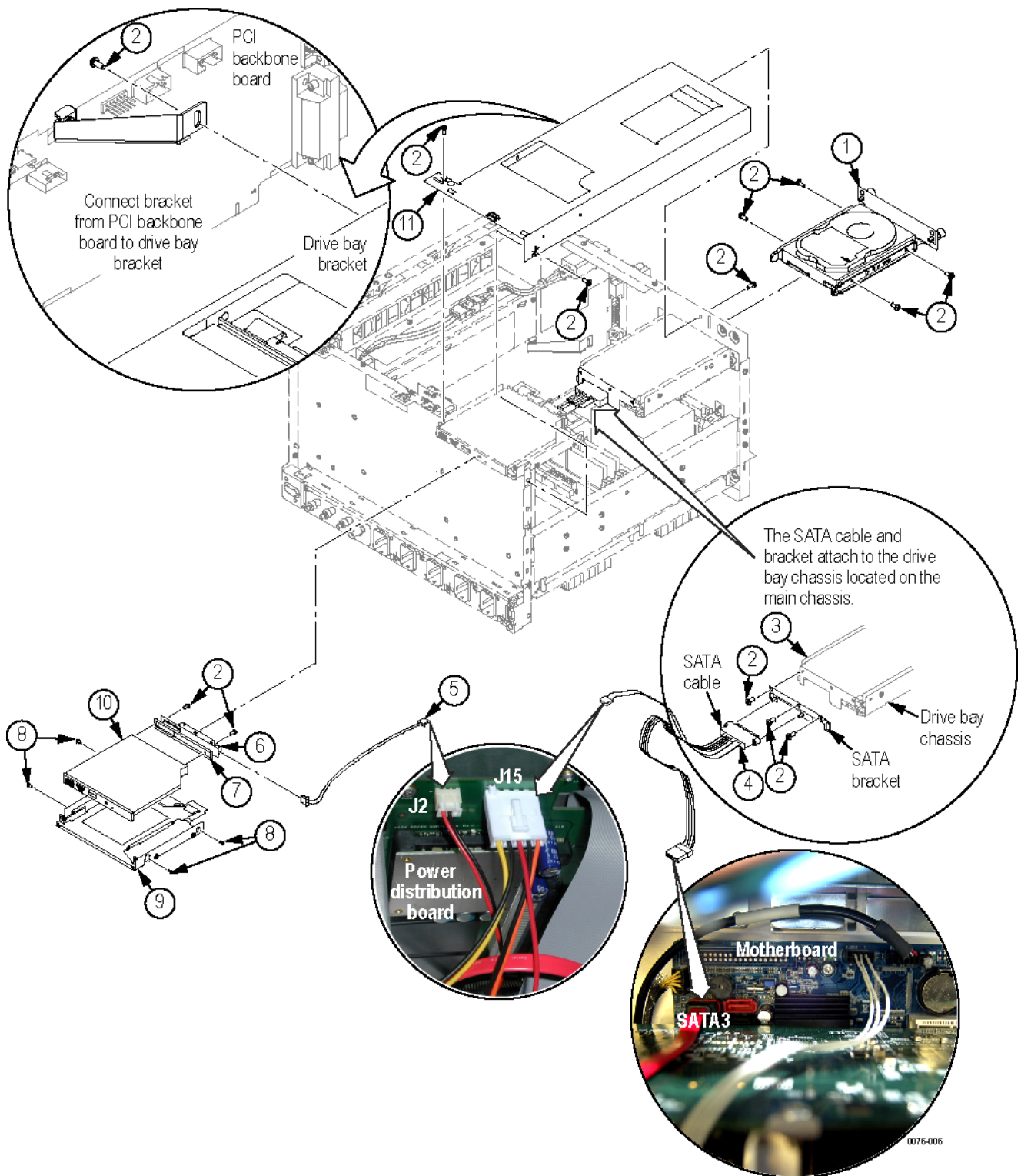| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-15-					**DRIVES**
-1	065-0834-10			1	DISK DRIVE ASSY; SERVICE REPLACEMENT, PROGRAMMED HARD DRIVE
-2	211-1050-00			8	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-3	407-5069-00			1	BRACKET, RHDD; SATA COMBO CABLE, 3.5 INCH REMOVABLE HARD DISK DRIVE RECEPTACLE
-4	174-5169-00			1	CABLE ASSY; SATA COMBO, HARD DRIVE CABLE
-5	174-5017-00			1	CABLE ASSEMBLY; DVD POWER
-6	679-5915-00			1	CKT BD SUBASSY; DVD-CD/RW ADAPTER, UNTESTED, 389-3689-00 WIRED
-7	129-1618-00			1	SPACER; DVD-CD/RW SLIMLINE DRIVE ADAPTER, PLASTIC
-8	211-0950-00			4	SCREW, MACHINE; M2X.4X3L, PHL, PNH, STL NI PL
-9	407-5156-00			1	BRACKET, DVD-CD/RW; ADAPTER FOR DVD-CD/RW SLIMLINE
-10	119-7196-00			1	DISK DRIVE; OPTICAL, 644MB, CD-RW/DVD ROM, COMBO, 16.7 MB/SEC, IDE/ATAPI; DW-224E-C93
-11	441-2496-01			1	CHASSIS; DRIVE BAY; METAL

Figure 5-15: Drives (DSA/DPO70000B Series)

Replaceable Parts (MSO70000/C/DX, DSA70000C/D, and DPO70000C/D/DX Series)

Table 5-16: Replaceable parts – External 1 (MSO70000/C/DX, DSA70000C/D, and DPO70000C/D/DX Series)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-16-					EXTERNAL PARTS
-1	016-1441-01			1	ACCESSORY POUCH; BLACK CORDURA
-2	200-5119-00			1	COVER, TOP; COSMETIC
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	200-5176-00			1	COVER, TOP; COSMETIC
					(DSA70000D SERIES, DPO70000D SERIES)
	200-5275-00			1	COVER, TOP; COSMETIC
					(MSO70000DX SERIES, DPO70000DX SERIES)
-3	211-0967-00			2	SCREW; 6-32X 0.25,PNH,T-15, W/FLAT WASHER, STEEL, ZINC FINISH
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1328-00			2	SCREW; 6-32 X 0.25, PNH, T-15, W/FLAT WASHER, W/ NYLON PATCH, STEEL, ZINC FINISH
					(DSA70000D SERIES, MSO70000DX SERIES, DPO70000D/DX SERIES)
-4	355-0298-00			1	STUD.SNAP; 0.570 DIA, 0.165 THK, STAINLESS STEEL
-5	200-5060-00			1	COVER; TOP EMI
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	200-5174-00			1	COVER, TOP; EMI
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)
-6	211-1050-00			19	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			19	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)
-7	348-1859-00			4	FOOT; REAR, W/ CORD WRAP, THERMOPLASTIC
-8	101-0184-00			1	PLASTIC, FRONT PANEL INSERT, HPP (ACQUISITION AREA)
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	101-0173-00			1	PLASTIC, FRONT PANEL INSERT, HPI (ACQUISITION AREA)
					(DSA70000D, DPO70000D SERIES)
	101-0193-00			1	PLASTIC, FRONT PANEL INSERT, HPI (ACQUISITION AREA)
					(MSO70000DX, DPO70000DX SERIES)
-9	101-0171-00			1	TRIM RING; FR110, PC/ABS
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	101-0185-00			1	TRIM RING; FR110, PC/ABS
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)
-10	200-4963-01			1	COVER, FRONT; PC/ABS ALLOY BAYBLEND
-11	101-0174-00			1	TRIM, DVD

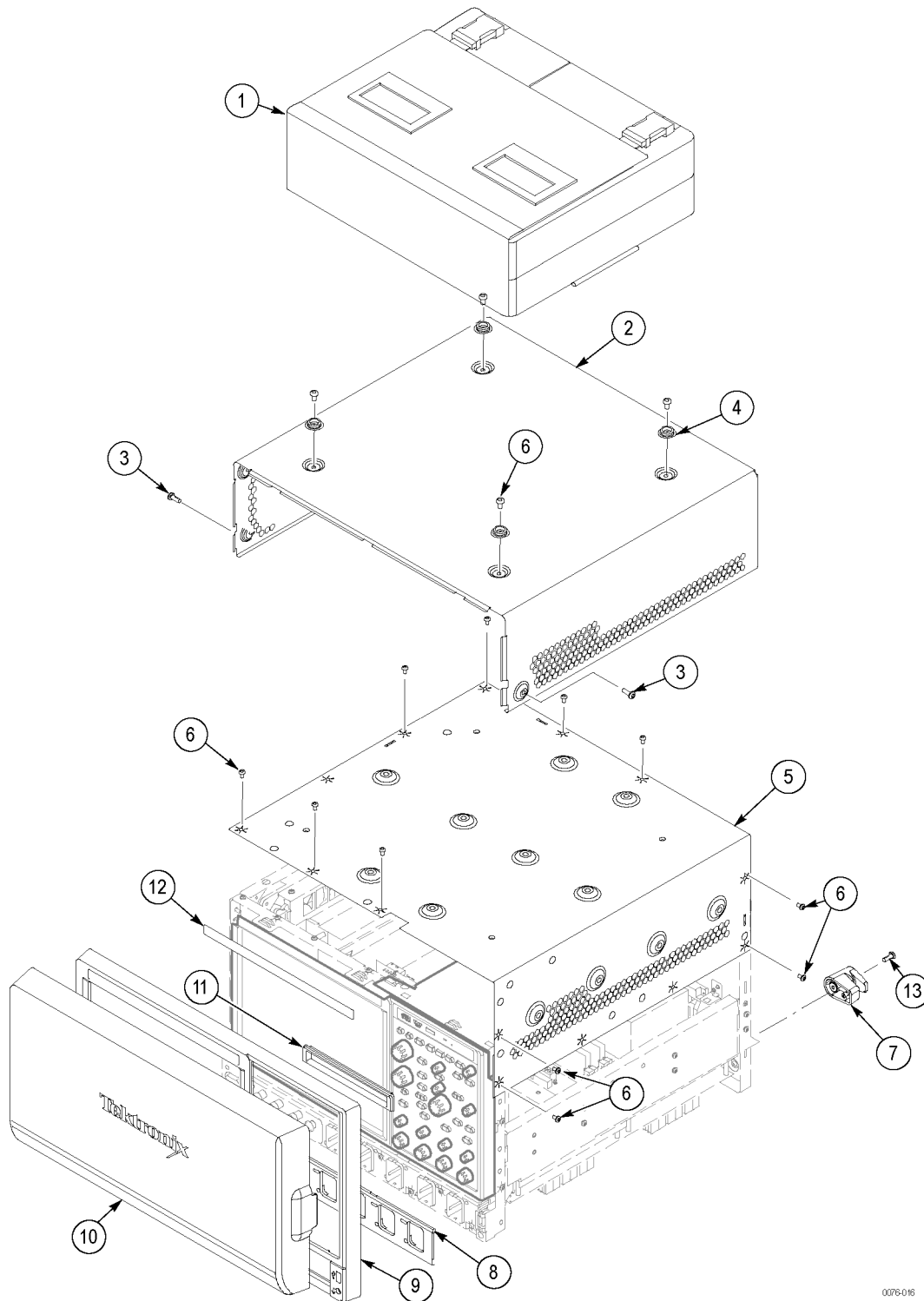| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
-12	335-2169-00			1	LABEL, NOMENCLATURE, MSO70404
	335-2389-00			1	LABEL, NOMENCLATURE, MSO70404C
	335-2170-00			1	LABEL, NOMENCLATURE, MSO70604
	335-2424-00			1	LABEL, NOMENCLATURE, MSO70604C
	335-2171-00			1	LABEL, NOMENCLATURE, MSO70804
	335-2425-00			1	LABEL, NOMENCLATURE, MSO70804C
	335-2172-00			1	LABEL, NOMENCLATURE, MSO71254
	335-2426-00			1	LABEL, NOMENCLATURE, MSO71254C
	335-2173-00			1	LABEL, NOMENCLATURE, MSO71604
	335-2427-00			1	LABEL, NOMENCLATURE, MSO71604C
	335-2174-00			1	LABEL, NOMENCLATURE, MSO72004
	335-2428-00			1	LABEL, NOMENCLATURE, MSO72004C
	335-2435-00			1	LABEL, NOMENCLATURE, DSA70404C
	335-2436-00			1	LABEL, NOMENCLATURE, DSA70604C
	335-2437-00			1	LABEL, NOMENCLATURE, DSA70804C
	335-2438-00			1	LABEL, NOMENCLATURE, DSA71254C
	335-2439-00			1	LABEL, NOMENCLATURE, DSA71604C
	335-2440-00			1	LABEL, NOMENCLATURE, DSA72004C
	335-2785-00			1	LABEL, NOMENCLATURE, DSA72504D
	335-2732-00			1	LABEL, NOMENCLATURE, DSA73304D
	335-2429-00			1	LABEL, NOMENCLATURE, DPO70404C
	335-2430-00			1	LABEL, NOMENCLATURE, DPO70604C
	335-2431-00			1	LABEL, NOMENCLATURE, DPO70804C
	335-2432-00			1	LABEL, NOMENCLATURE, DPO71254C
	335-2433-00			1	LABEL, NOMENCLATURE, DPO71604C
	335-2434-00			1	LABEL, NOMENCLATURE, DPO72004C
	335-2784-00			1	LABEL, NOMENCLATURE, DPO72504D
	335-2731-00			1	LABEL, NOMENCLATURE, DPO73304D
	335-2980-00			1	LABEL, NOMENCLATURE, MSO72304DX
	335-2981-00			1	LABEL, NOMENCLATURE, MSO72504DX
	335-2982-00			1	LABEL, NOMENCLATURE, MSO73304DX
	335-2914-00			1	LABEL, NOMENCLATURE, DPO72304DX
	335-2915-00			1	LABEL, NOMENCLATURE, DPO72504DX
	335-3121-00			1	LABEL, NOMENCLATURE, DPO73304DX
-13	211-0721-00			4	SCREW, MACHINE; 6-32 X 0.375, PNH, STEEL, ZINC FINISH WITH NYLOC PATCH, T-15 TORX DR (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211–1423–00			4	SCREW, MACHINE, 6-32X.500 PANHEAD, TORX T15 W/NYLON PATCH (MSO70000DX,DSA70000D , DPO70000D/DX SERIES)

Figure 5-16: External 1 — MSO70000/C/DX, DSA70000C/D, and DPO70000C/D/DX Series ("C" series models shown)

Table 5-17: External 2 — MSO70000/C/DX, DSA70000C/D, and DPO70000C/D/DX Series

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-17- and 5-18-					**EXTERNAL PARTS**
-1	174-5226-00			1	CABLE ASSY; LINE FILTER
					(MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
	174-6153-00			1	CABLE ASSY; LINE FILTER
					(MSO70000DX, DPO70000DX SERIES)
-2	211-1050-00			16	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			16	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)
-3	200-5123-00			1	70000 Series:
					COVER; EMI BOTTOM, MSO70804, MSO70604, MSO70404
	200-5124-00			1	70000 Series:
					COVER; EMI BOTTOM, MSO72004, MSO71604, MSO71254
	200-5170-00			1	70000C Series:
					COVER, EMI, BOTTOM, LOW BW (WITH KEYING FEATURE), MSO70804C, MSO70604C, MSO70404C, DSA70804C, DSA70604C, DSA70404C, DPO70804C, DPO70604C, DPO70404C
	200-5171-00			1	70000C Series:
					COVER; EMI BOTTOM, HIGH BW, MSO72004C, MSO71604C, MSO71254C, DSA72004C, DSA71604C, DSA71254C, DPO72004C, DPO71604C, DPO71254C,
	200-5175-00			1	70000D Series:
					COVER; EMI BOTTOM,
	200-5274-00			1	70000DX Series:
					COVER; EMI BOTTOM,
-4	200-5125-00			1	COVER, BOTTOM; COSMETIC; W/FEET
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	200-5177-00			1	COVER, BOTTOM; COSMETIC; W/FEET
					(DSA70000D SERIES, DPO70000D SERIES)
	200-5276-00			1	COVER, BOTTOM; COSMETIC; W/FEET
					(MSO70000DX SERIES, DPO70000DX SERIES)
-5	212-0232-00			2	SCREW,MACHINE; 8-32 X 1.125L, PNH, STL, BLACK ZINC SPEC #ASTM B633 TYPE II, T-20
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1265-00			2	SCREW,MACHINE;
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)
-6	367-0528-00			1	HANDLE, CARRYING; DUAL DUROMETER MOLDED, POLYPROPYLENE, VINYL GRIP SECTION
	407-4887-00			1	BRACKET; HANDLE BASE, PC/ABS ALLOY, BAYER BAYBLEND FR-110, TEK BLUE

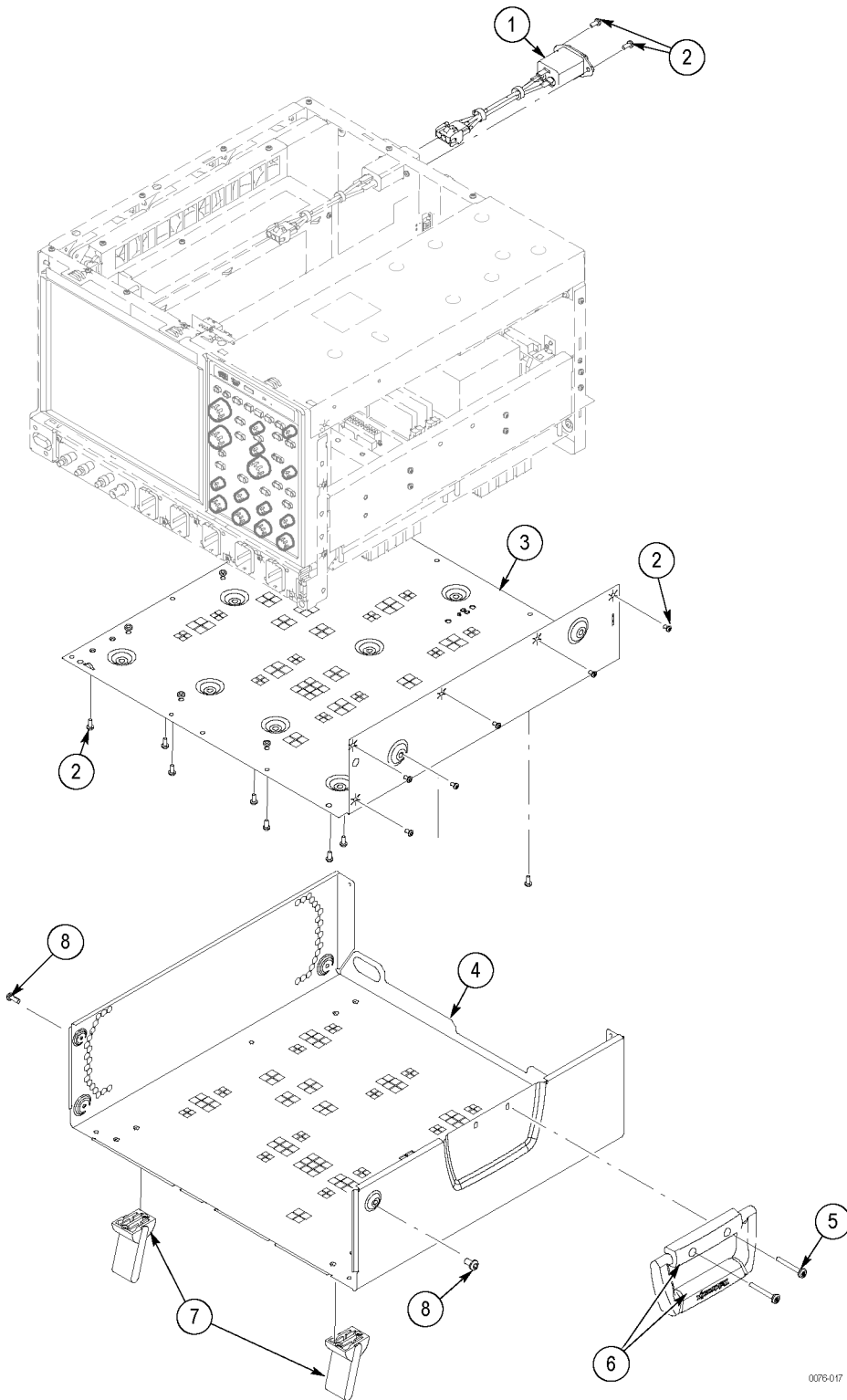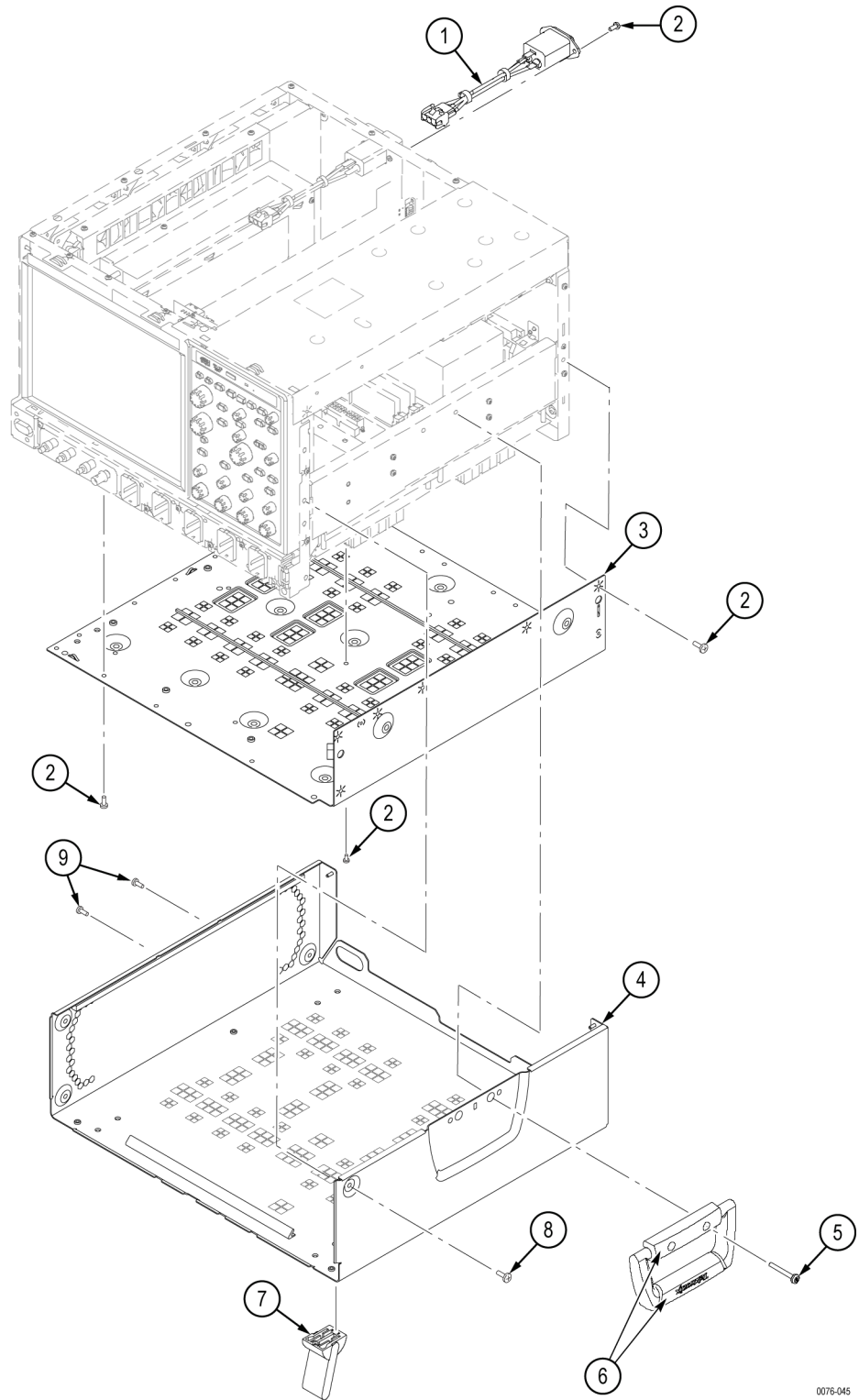| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
-7	348-1951-00			2	FRONT FOOT ASSEMBLY, FLIP (2), SAFETY CONTROLLED
					(MSO70000/C/DX SERIES, DSA70000C/D SERIES, DPO70000C/D/DX SERIES)
	211-1290-00			2	SCREW, THREAD FORMING, 3MM X 8MM FLAT HEAD
					(MSO70000/C/DX SERIES, DSA70000C/D SERIES, DPO70000C/D/DX SERIES)
	348-1947-00			1	CUSHION, FOOT; SANTOPRENE, (4) BLACK 101-80
					(MSO70000/C/DX SERIES, DSA70000C/D SERIES, DPO70000C/D/DX SERIES)
-8	211-1224-00			2	SCREW, MACHINE, BLACK
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1328-00			2	SCREW, MACHINE, BLACK
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)
-9	211-1328-00			2	SCREW, MACHINE, BLACK
					(MSO70000DX SERIES, DPO70000DX SERIES)

**Figure 5-17: External parts 2 — MSO70000/C, DSA/DPO70000C Series**

0076-045

Figure 5-18: External parts 2 — DSA/DPO70000D and MSO/DPO70000DX Series

Table 5-18: Front panel — MSO70000/C/DX, DSA70000C/D, and DPO70000C/D/DX Series

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-19-					**FRONT PANEL AND DISPLAY**
-1	174-5165-00			1	CABLE ASSY; POWER SWITCH
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	174-6205-00			1	CABLE ASSY; POWER SWITCH
					(MSO70000DX SERIES, DPO70000DX SERIES)
-2	065-0862-01			1	MODULE ASSY; SERVICE REPLACEMENT KIT, FRONT PANEL ASSEMBLY W/ PACKAGING
-3	366-0859-01			1	ASSEMBLY, KNOB; .470 DIAMETER, SOFT TOUCH
-4	366-0860-01			1	ASSEMBLY, KNOB; .685 DIAMETER, SOFT TOUCH
-5	366-0861-01			1	ASSEMBLY, KNOB; .925 DIAMETER, SOFT TOUCH
-6	174-5162-00			1	CABLE ASSY; DISPLAY ADAPTER TO FRONT PANEL BOARD
-7	065-0827-01			1	COMPONENT KIT; LCD DISPLAY ADAPTER MODULE SUBASSEMBLY, STANDARD
					(MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
	065-0942-00			1	COMPONENT KIT; LCD DISPLAY ADAPTER MODULE SUBASSEMBLY, STANDARD
					(MSO70000DX SERIES, DPO70000DX SERIES)
-8	065-0819-00			1	MODULE ASSY; SERVICE REPLACEMENT KIT, POWER BUTTON ASSY W/ PACKAGING, FOR ADVANTECH AIMB-562 MOTHERBOARD
					(MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
-9	211-1050-00			2	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STEEL, ZINC FINISH, T15
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			2	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)
-10	333-4638-00			1	FRONT PANEL LABEL, SPACER, BRACKET
-11	211–1050–00			1	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STEEL, ZINC FINISH, T15
					(MSO70000DX SERIES, DPO70000DX SERIES)
-12	878–0785–00			1	CIRCUIT BOARD ASSY;POWER SWITCH, 3894677XX
					(MSO70000DX SERIES, DPO70000DX SERIES)
-13	260–2809–00			1	SWITCH,KEYPAD; ELASTOMERIC,POWER BUTTON
					(MSO70000DX SERIES, DPO70000DX SERIES)
-14	407–5237–00			1	BRACKET, POWER SWITCH WITH EMC CLIP
					(MSO70000DX SERIES, DPO70000DX SERIES)
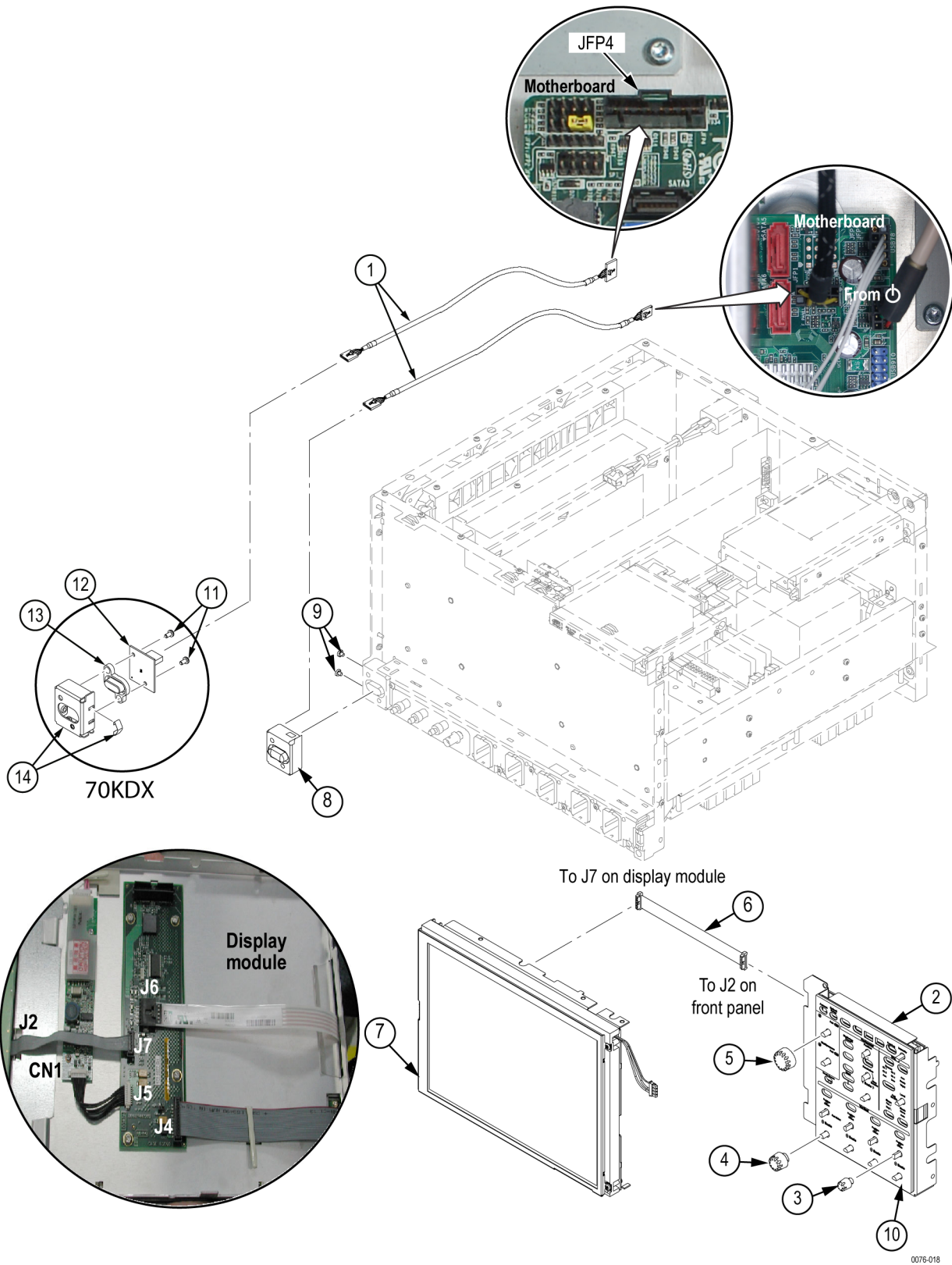
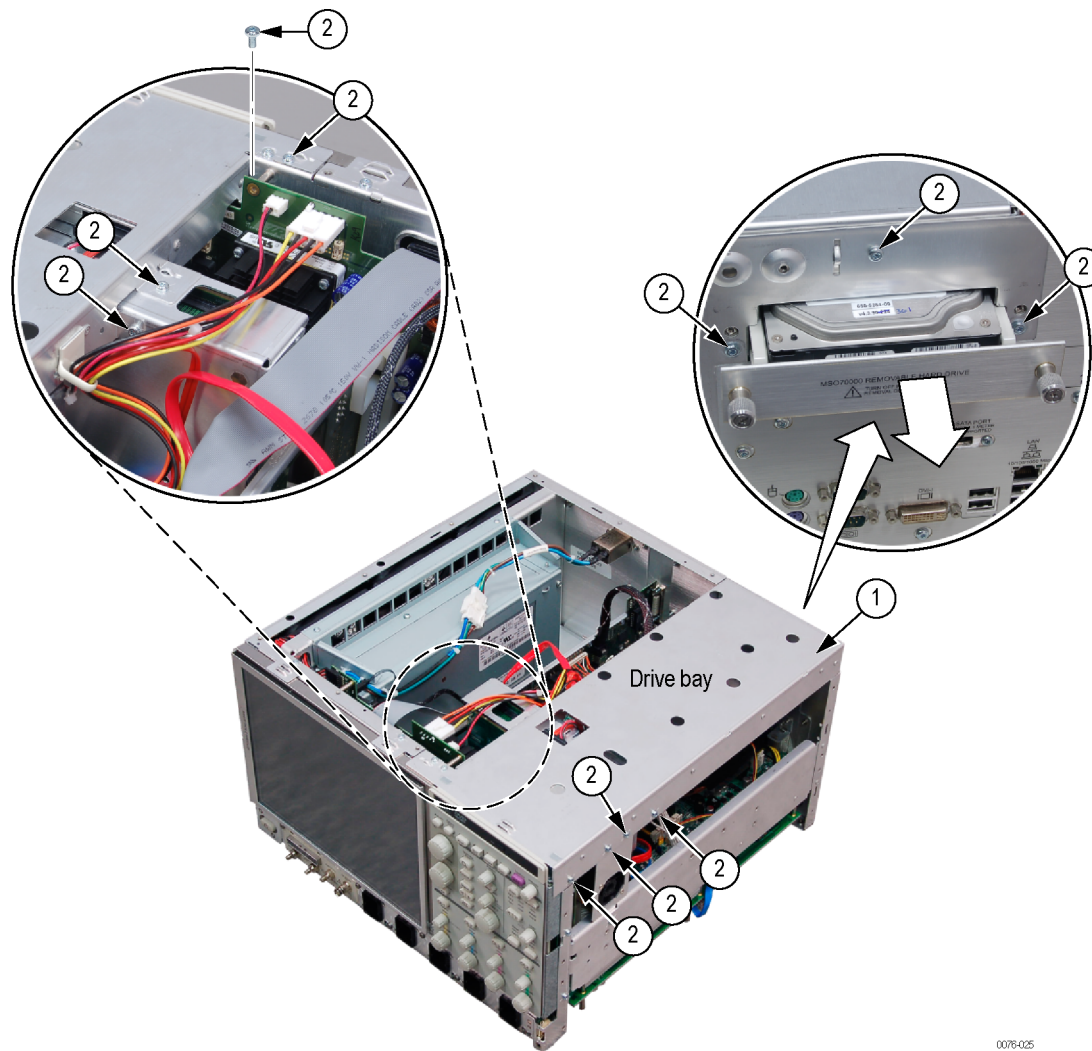**Figure 5-19: Front panel and display — MSO70000/C/DX, DSA70000C/D, DPO70000C/D/DX Series ("C" series models shown)**

Table 5-19: Drive bay 1 — MSO70000/C/DX, DSA70000C/D, DPO70000C/DX Series

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-20-					**DRIVE BAY 1**
-1	441-2602-00			1	CHASSIS, DRIVE BAYS (DVD AND HD)
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	441-2676-00			1	CHASSIS, DRIVE BAYS (DVD AND HD)
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)
-2	211-1050-00			11	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			11	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)

Figure 5-20: Drive bay 1 — MSO70000/C/DX, DSA70000C/D, DPO70000C/D/DX Series ("C" series model shown)

Table 5-20: Drive bay 2 — MSO70000/C/DX, DSA70000C/D, DPO70000C/D/DX Series

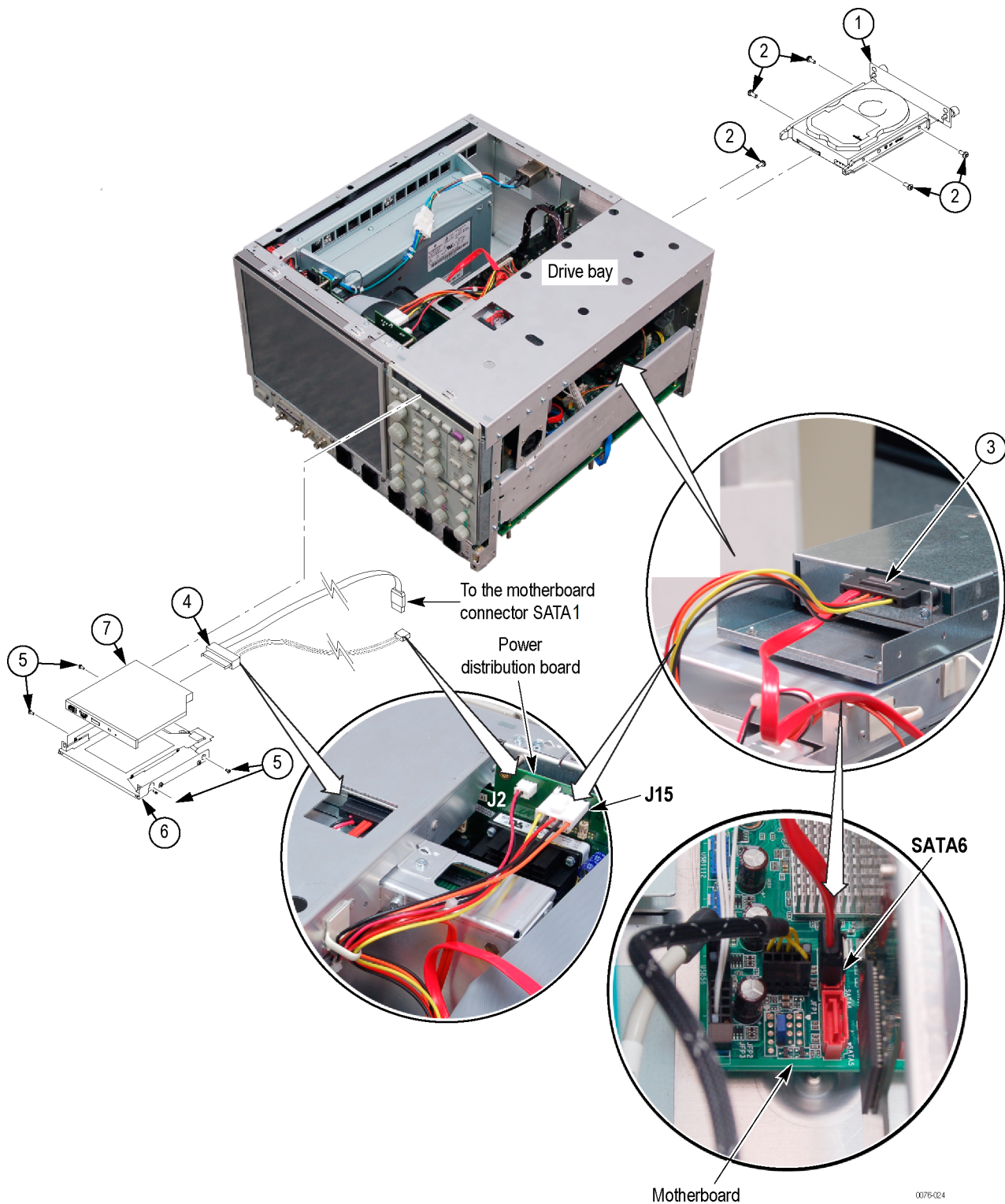| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-21-					**DRIVE BAY 2**
-1	065-0882-xx			1	KIT; DRIVE ASSEMBLY W/ PACKAGING; 6505458XX, SOLID STATE PRGM HDD ASSY WITH OS/APPS SW ON HIDDEN PARTITION, FOR ADVANTECH AIMB-566 MOTHERBOARD and WIN7
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES, DP070000C SERIES OPTION SSD)
	065-0881-xx			1	KIT; DRIVE ASSEMBLY W/ PACKAGING; 6505457XX, PRGM HDD ASSY WITH OS/APPS SW ON HIDDEN PARTITION, FOR ADVANTECH AIMB-566 MOTHERBOARD and WIN7
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	065-0896-00			1	KIT;DRIVE ASSEMBLY W/ PACKAGING; 6505536XX, SOLID STATE PRGM HDD ASSY WITH OS/APPS SW ON HIDDEN PARTITION, FOR ADVANTECH AIMB-566 MOTHERBOARD & WIN7
					(DSA70000D SERIES, DPO70000D SERIES)
	065-0944-00			1	KIT;DRIVE ASSEMBLY W/ PACKAGING; 6505687XX,SOLID STATE PRGM HDD ASSY WITH OS/APPS SW ON HIDDEN PARTITION, FOR ADVANTECH AIMB-581 MOTHERBOARD & WIN7
					(MSO70000DX SERIES, DPO70000DX SERIES)
-2	211-0722-00			8	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-3	174-5349-00			1	CABLE ASSY; SATA COMBO, HARD DRIVE CABLE
-4	174-5650-00			1	CABLE ASSY; SATA-DVD, DATA, AND POWER
-5	211-0950-00			4	SCREW, MACHINE; M2X.4X3L, PHL, PNH, STL NI PL
-6	407-5156-00			1	BRACKET, DVD-CD/RW; ADAPTER FOR DVD-CD/RW SLIMLINE
-7	065-0807-01			1	DISK DRIVE; OPTICAL,CD-RW/DVD R/RW, 16.7 MB/SEC, 650MEG/8.5GIG, SATA/ATAPI; TEAC MODEL DV-W28S-V93; 119767800 W / PACKAGING; DSA8200

Figure 5-21: Drive bay 2 — MSO70000/C/DX, DSA70000C/D, DPO70000C/D/DX Series ("C" series model shown)

Table 5-21: Interface board — MSO70000/C, DSA70000C/D, and DPO70000C/D/DX Series

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-22- 5-23- 5-24-					**INTERFACE BOARD, MSO70000/C, DSA/DPO70000C** **INTERFACE BOARD, DSA/DPO70000D** **INTERFACE BOARD, MSO/DPO70000DX**
-1	065-0863-01			1	KIT, SERVICE REPLACEMENT, PCIE BACKBONE BOARD, 8780573XX FUNCTIONAL TESTED W/ PACKAGING (MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
	065-0943-00			1	KIT, SERVICE REPLACEMENT, PCIE BACKBONE BOARD, 8780806XX FUNCTIONAL TESTED W/ PACKAGING (DSA70000DX SERIES, DPO70000DX SERIES)
	ATTACHED PARTS				
	386-7536-00			1	BRACKET, STIFFENER FOR PCIe PCB
	211-0747-00			5	SCREW, MACHINE; 6-32 X 0.188, PNH, STEEL, ZINC FINISH, T-15 TORX DR
	END ATTACHED PARTS				
-2	211-1050-00			7	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15 (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			7	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE (DSA70000D SERIES, MSO70000DX, DPO70000DX SERIES)
-3	335-2638-00			1	LABEL, I/O FOR PCIE PCB REAR BRKT (WITH OPENING FOR MS WIN 7 LICENSE) (MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
	335-2984-00			1	LABEL, I/O FOR PCIE PCB (ATTACHES TO PCIE PCB REAR BRACKET) (MSO70000DX, DPO70000DX SERIES)
-4	211-1206-01			2	SCREW, JACK; 2-56 ID X 4-40 OD, 0.188 HEX, SS
-5	213-1061-00			2	JACKSCREW; 6-32 EXT THD, M3.5 X 0.6-6 INT THD, 410 SS, PASSIVATE
-6	386-7537-00			1	BRACKET, PCIE PCB MOUNT AND MS WINDOWS LABEL HOLDER, SAFETY CONTROLLED (MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
	386-7736-00			1	BRACKET, PCIE PCB MOUNT AND MS WINDOWS LABEL BACKER (MSO70000DX, DPO70000DX SERIES)
-7	174-5048-00			1	CA ASSY; USB 2.0 (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	174-6009-00			1	CA ASSY; USB 2.0 (DSA70000D SERIES, DPO70000D SERIES)
	174-6204-00			1	CA ASSY; USB 2.0 (MSO70000DX, DPO70000DX SERIES)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
-8	679-6107-00			1	CIRCUIT BD ASSY; USB
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	878-0638-00			1	CIRCUIT BD ASSY; USB
					(DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)
-9	211-1221-00			2	SCREW; M2.0 6-MM LONG PHILLIPS FLATHEAD ZINC-PLATED
-10	174-5048-00			1	CA ASSY; USB 1.0
					(MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
	174-6206-00			1	CABLE ASSEMBLY (USB 2.0 INTERFACE)
					(MSO70000DX, DPO70000DX SERIES)
-11	174-5162-00			1	CABLE ASSY; DISPLAY ADAPTER TO FRONT `PANEL BOARD

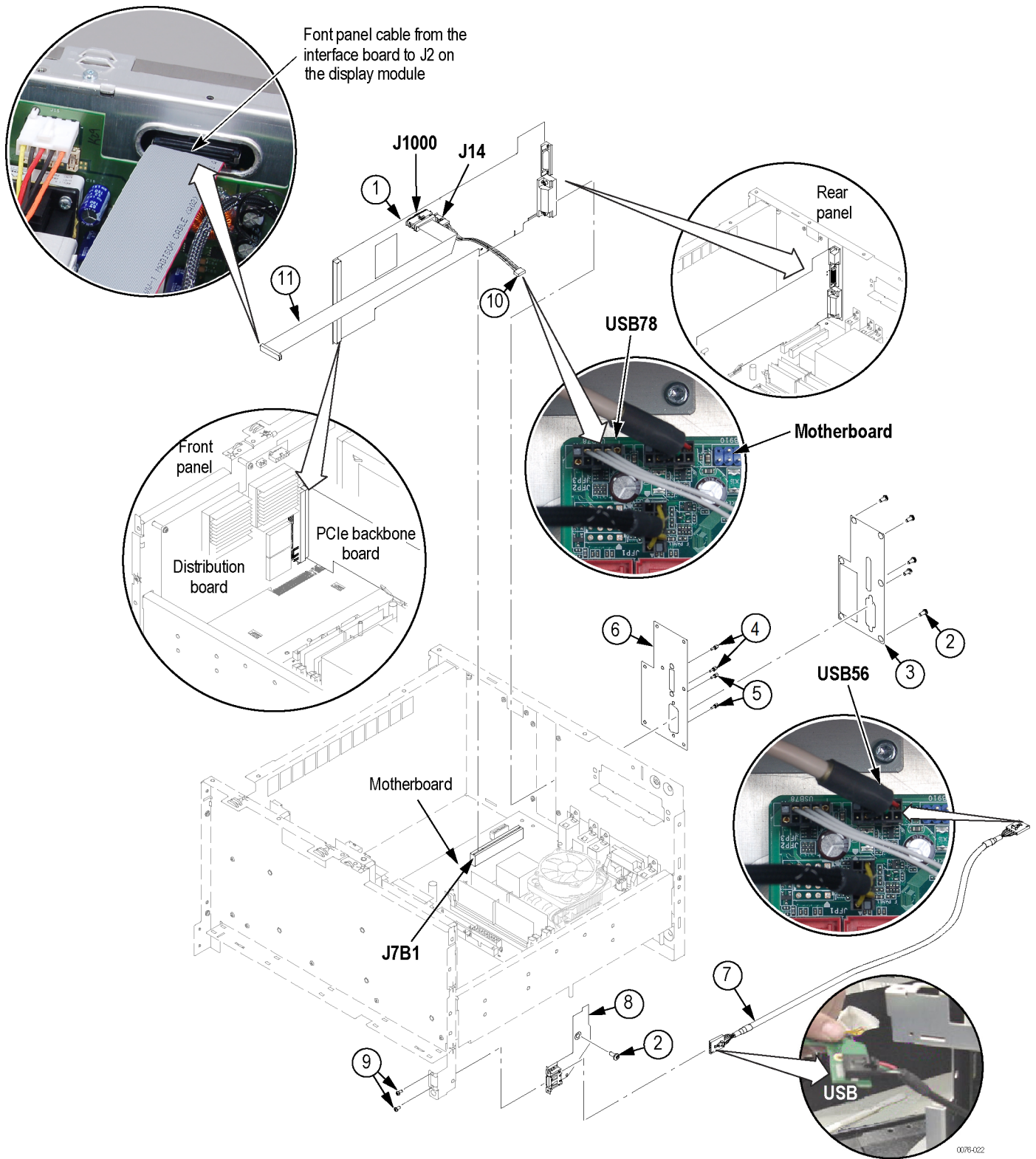**Figure 5-22: Interface board — MSO70000/C, DSA/DPO70000C Series**

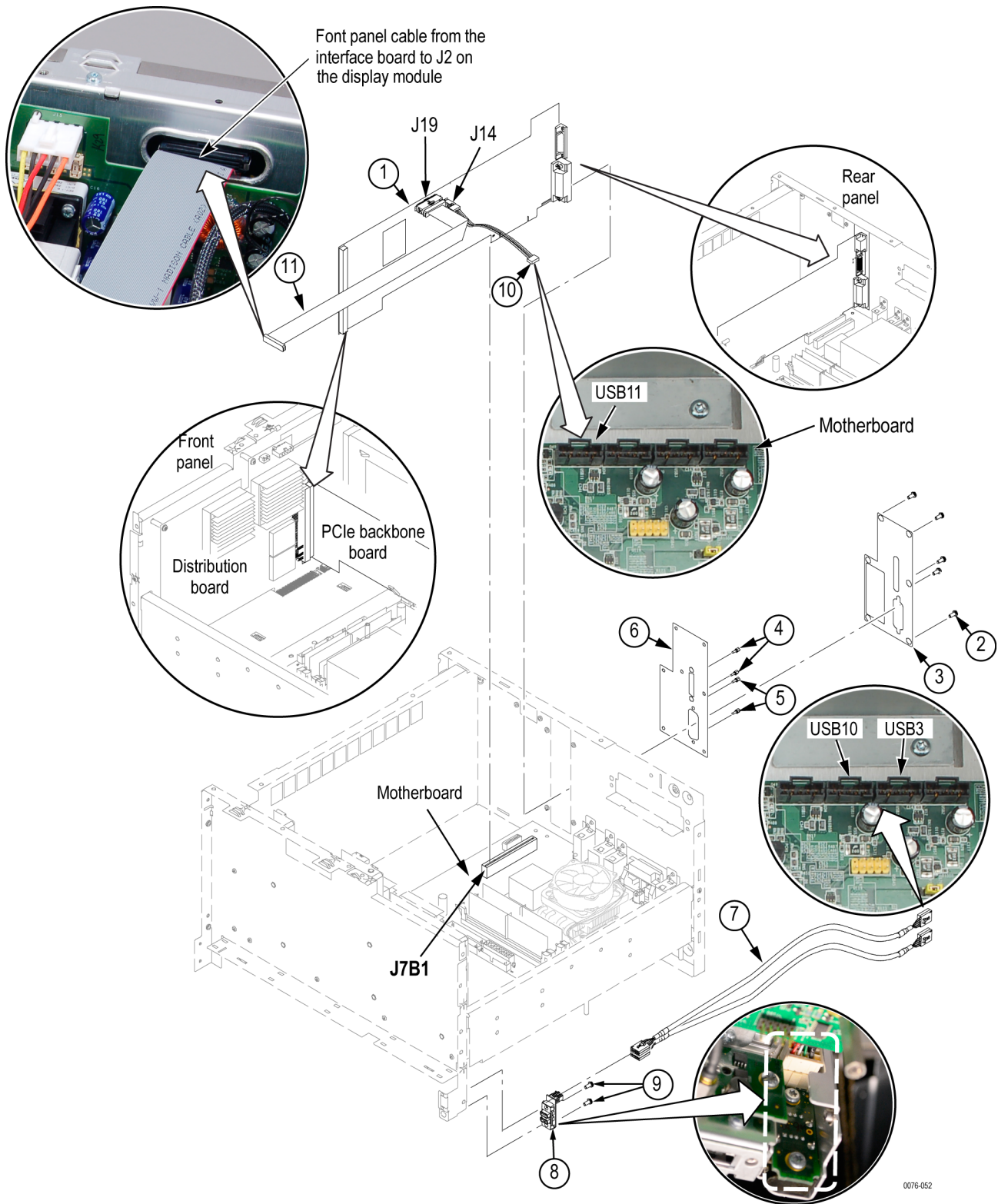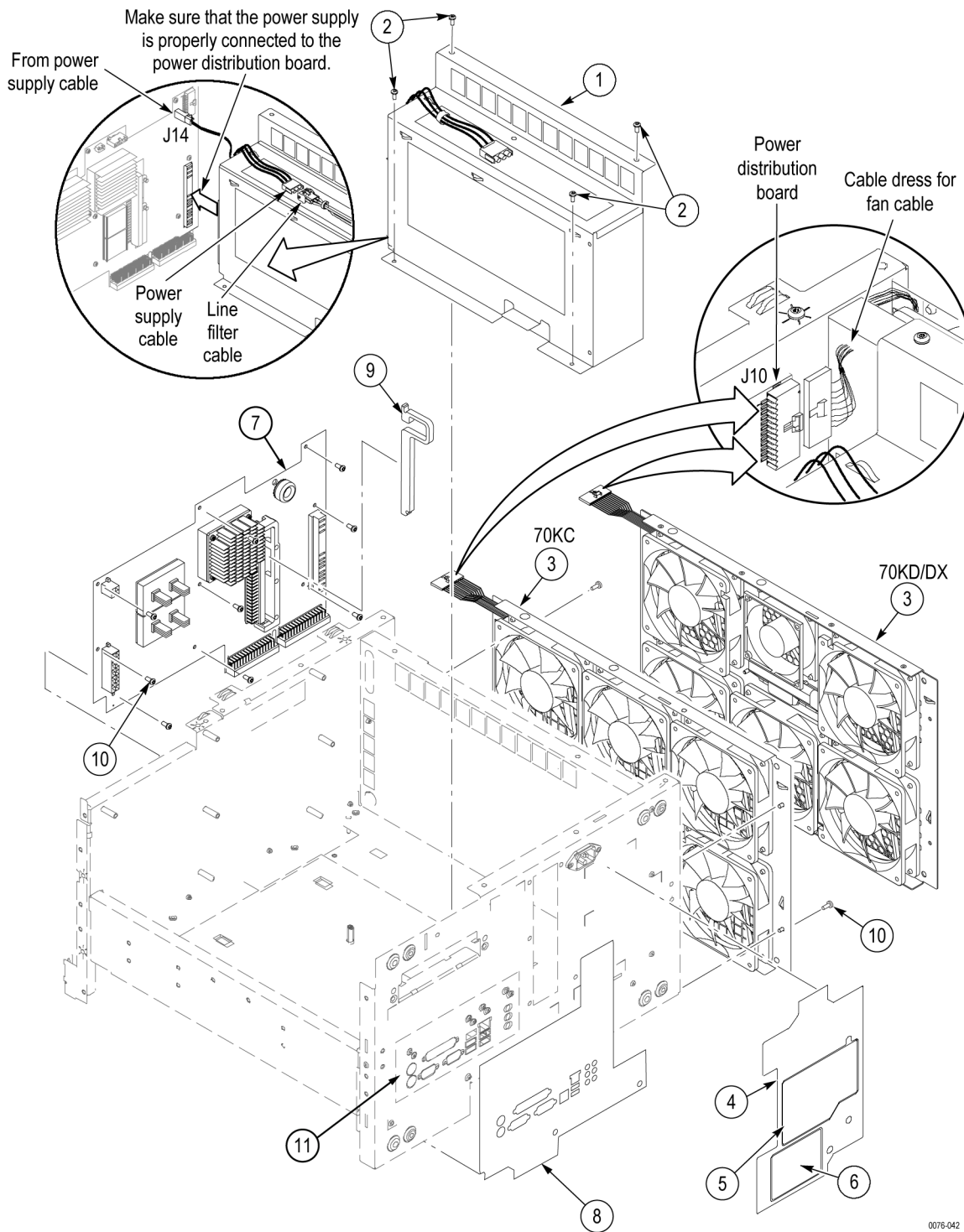**Figure 5-23: Interface board — DSA/DPO70000D Series**

Figure 5-24: Interface board — MSO/DPO70000DX Series

Table 5-22: Power supply and fans — MSO70000/C/DX, DSA70000C/D, DPO70000C/D/DX Series

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-25-					**POWER SUPPLY AND FANS**
-1	119-6982-xx			1	POWER SUPPLY: AC-DC; 1200W, +48V 25A, +12V 1A, 85-264VAC, 47-63HZ, ELCON 377-0002-00100A, IEC320-C22; 11.5X6.75X2.75IN; CLOSED CHASSIS
					ATTACHED PARTS
	407-5381-00				BRACKET; POWER SUPPLY
					END ATTACHED PARTS
-2	211-0721-00			12	SCREW, MACHINE; 6-32 X 0.375, PNH, STEEL, ZINC FINISH WITH NYLOC PATCH, T-15 TORX DR
-3	436-0422-00			1	TRAY, FAN; CHASSIS ASSY, W/6 FANS MOUNTED (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	436-0440-00			1	ASSEMBLY, FAN TRAY (DSA70000D SERIES, DPO70000D SERIES)
	436-0441-00			1	ASSEMBLY, FAN TRAY (MSO70000DX SERIES, DPO70000DX SERIES)
-4	335-2167-00			1	LABEL, CHASSIS, REAR COSMETIC
-5	335-0263-01			1	MARKER, IDENT; SUPER LABEL, BLANK ROLL STOCK
-6	335-0347-00			1	MARKER, IDENT; REAR PANEL, BLANK, 2.100 X 2.700
-7	870-0210-00			1	CIRCUIT BOARD ASSY; POWER DISTRIBUTION, 8780210XX TESTED W/ PACKAGING (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	863-0210-01			1	CIRCUIT BOARD ASSY; POWER DISTRIBUTION, 8780210XX, FUNCTIONAL TESTED
	870-0947-00			1	CIRCUIT BOARD ASSY; POWER DISTRIBUTION, 8780947XX, FUNCTIONAL TESTED (MSO70000DX SERIES, DPO70000DX SERIES)
-8	335-2153-00			1	LABEL, M-BOARD IO, AIMB566 (MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
	335-2983-00			1	LABEL, M-BOARD IO, AIMB581 (MSO70000DX SERIES, DPO70000DX SERIES)
-9	343-1719-00			1	CLIP, PCB RETENTION BRACKET (PWR-DIST TO PCI)
-10	211-1050-00			15	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STEEL, ZINC FINISH, T15 (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			15	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE (DSA70000D SERIES, MSO70000DX, DPO70000DX SERIES)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-25-					**POWER SUPPLY AND FANS**
-11	441-2585-00			1	70000C Series:
					BRACKET, IO M-BOARD, AIMB566
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	441-2710-00			1	70000D Series:
					BRACKET, IO M-BOARD, AIMB566
					(DSA70000D SERIES, DPO70000D SERIES)
	441-2724-00			1	70000DX Series:
					BRACKET, IO M-BOARD, AIMB581TK
					(MSO70000DX SERIES, DPO70000DX SERIES)

Make sure that the power supply is properly connected to the power distribution board.

From power supply cable

J14

Power supply cable

Line filter cable

Power distribution board

Cable dress for fan cable

J10

70KC

70KD/DX

0076-042

Figure 5-25: Power supply — MSO70000/C/DX, DSA70000C/D, DPO70000C/D/DX Series

Table 5-23: Acquisition — MSO70000/C, DSA/DPO70000C/D Series

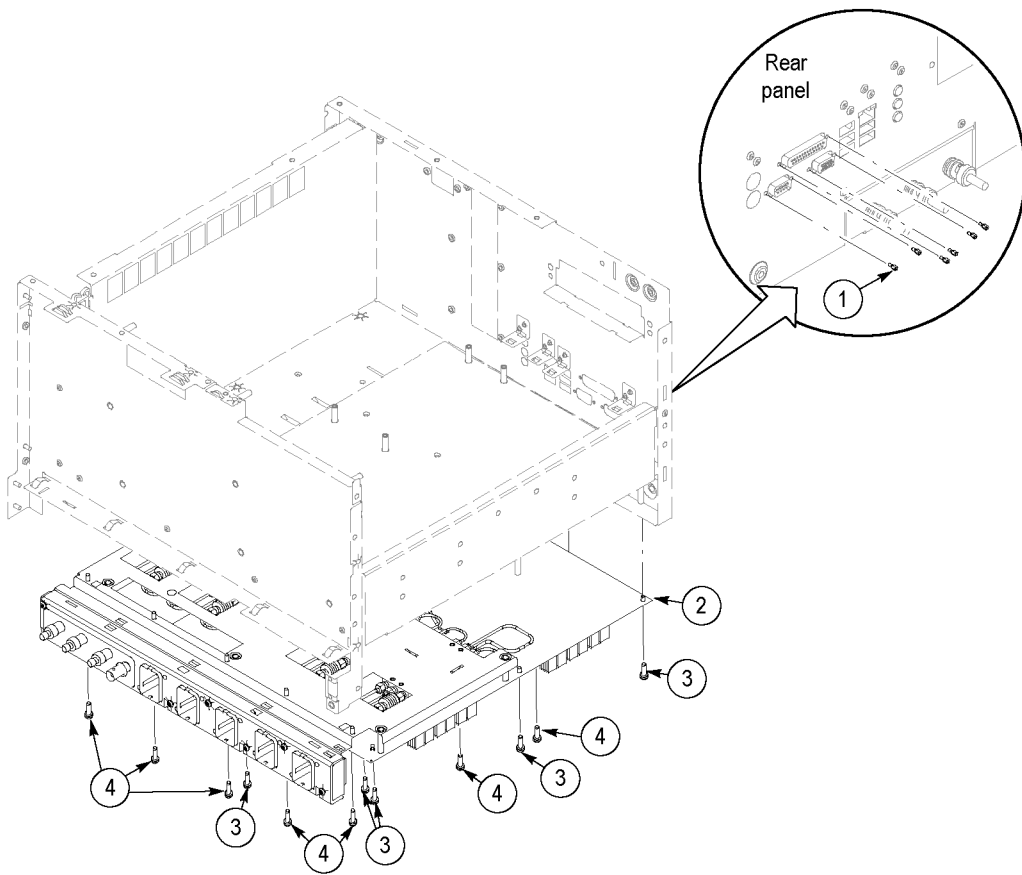| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-26-5-27-					**ACQUISITION, MSO70000/C, DSA/DPO70000C ACQUISITION, DSA/DPO70000D, MSO/DPO70000DX**
-1	214-3903-00			8	SCREW, JACK; 4-40 X 0.312 LONG, 0.188 H HEX HEAD STAND OFF, 4-40 INT THD, X 0.312 THD EXT 4-40
-2	- - - - - - -			1	ACQUISITION MODULE, RETURN TO TEKTRONIX FOR SERVICE
-3	211-0752-00			10	SCREW,MACHINE; 6-32 X 0.75, PNH, TORX (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
-4	211-1050-00			7	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15 (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			7	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE (DSA70000D SERIES, MSO70000DX, DPO70000DX SERIES)
-5	211-1325-00			8	SCREW, LOCKING (DSA70000D SERIES, MSO70000DX, DPO70000DX SERIES)
-6	213-1151-00			2	SCREW, LOAD (SCROLT) (DSA70000D SERIES, MSO70000DX, DPO70000D/DX SERIES)

Figure 5-26: Acquisition assembly — MSO70000/C, DSA/DPO70000C Series
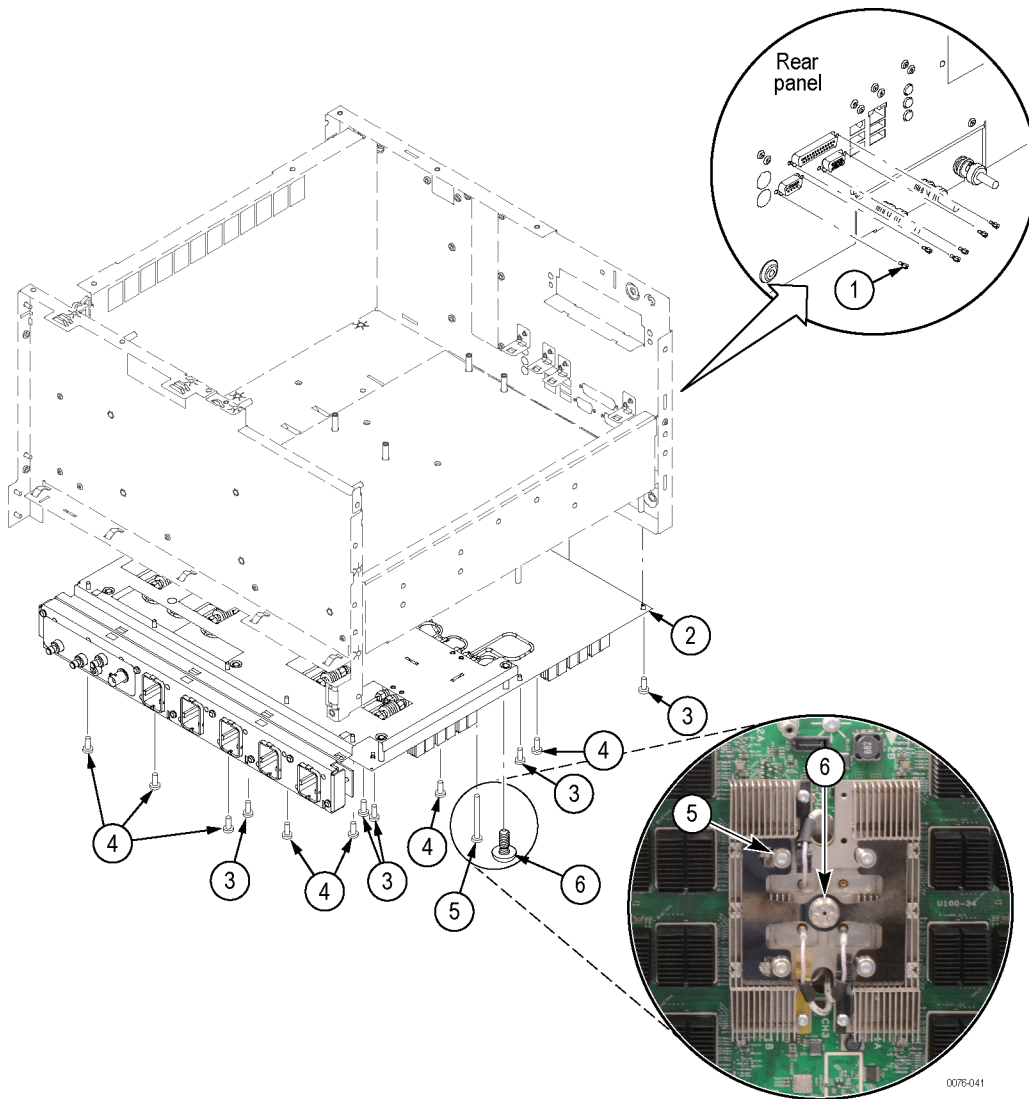
Figure 5-27: Acquisition assembly — DSA/DPO70000D, MSO/DPO70000DX Series

Table 5-24: Replaceable parts – MSO module (MSO70000/C/DX Series and DPO70000 with MSO option)

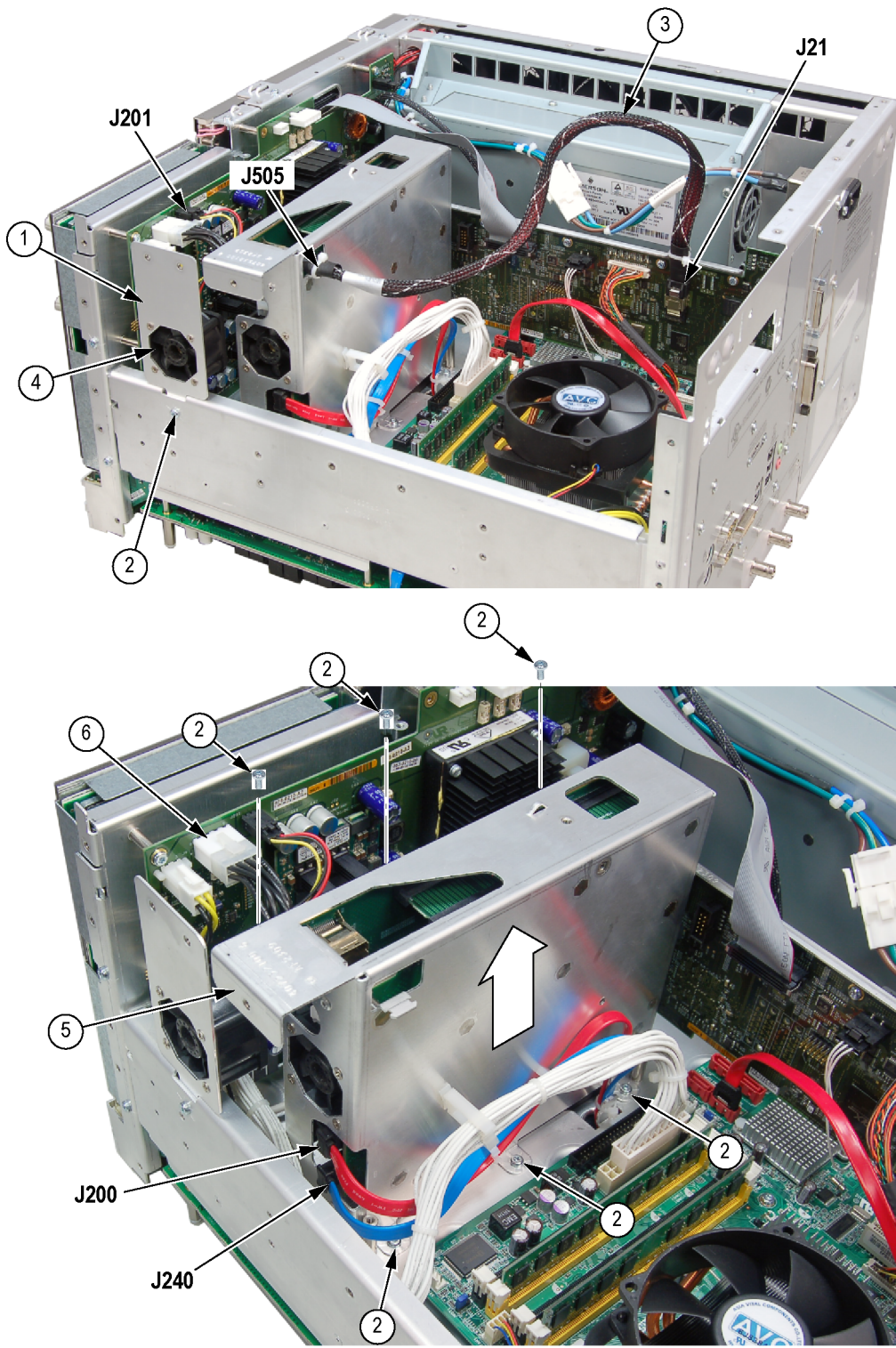| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-28-					**MSO Module**
-1	407-5448-00			1	BRACKET, FAN, PWR DIST PCB
					(MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
	407-5505-00			1	BRACKET, FAN AND FUSEBOARD
					(MSO70000DX SERIES, DPO70000DX SERIES)
-2	211-1050-00			7	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
-3	174-5517-00			1	CABLE ASSY;PCIe, STRAIGHT CONNECTOR ON BOTH ENDS, SAFETY CONTROLLED
-4	119-7036-00			1	FAN ASSEMBLY; DC,12V;0.105A,8.6 CFM,30DBA,3 LEAD, TACH OUTPUT, WITH CONN & HOUSING,SAFETY CONTROLLED
-5	- - - - - - -			1	MSO MODULE, RETURN TO TEKTRONIX FOR SERVICE
-6	174-5516-00			1	CABLE, POWER, 2X4 WITH MINIFIT JR CONNS, SAFETY CONTROLLED
					(MSO70000/C SERIES, DSA70000C/D SERIES, DPO70000C/D SERIES)
	174-6335-00			2	CABLE, POWER, 2X4 WITH MINIFIT JR CONNS, SAFETY CONTROLLED
					(MSO70000DX SERIES, DPO70000DX SERIES)

Figure 5-28: MSO module

Table 5-25: µATX 1 — MSO70000/C, DSA/DPO70000C/D Series

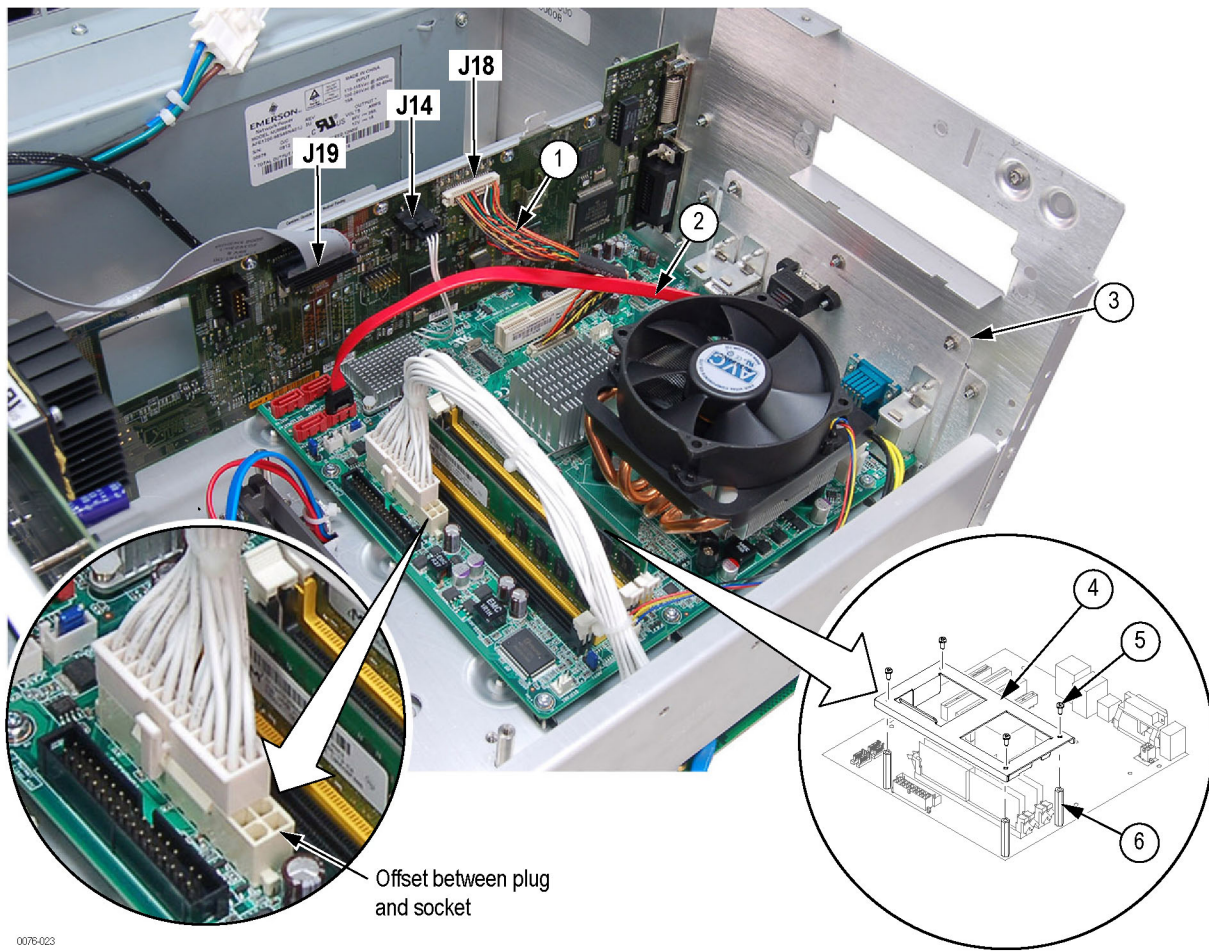| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-29-					**µATX 1**
-1	174-5629-00			1	CABLE, LVDS VIDEO WITH 2X20 HIROSE CONNECTORS;PCIe J18 to µATX LVDS1
-2	174-5763-00			1	CABLE, SATA TO E-SATA, DATA ONLY; RP e-SATA to µATX SATA 2
-3	441-2585-00			1	BRACKET, IO M-BOARD, AMB566
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	441-2710-00			1	BRACKET, IO M-BOARD, AMB566
					(DSA70000D SERIES, DPO70000D SERIES)
-4	407-5579-00			1	BRACKET, DIMM RETENTION, WITH TABS
	348-1988-00			1	PORON PADS, 1.00 X 3.30, 4 X 8 ARRAY ON ADHESIVE TAPE (PART OF ITEM 4 IN THIS LIST)
-5	211-1050-00			4	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			4	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE
					(DSA70000D SERIES, DPO70000D SERIES)
-6	129-1716-00			4	STANDOFF, M-BRD TO DIMM RETEN BRKT
	ATTACHING PARTS				
	211-1050-00			10	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STEEL, ZINC FINISH, T15
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			10	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE
					(DSA70000D SERIES, DPO70000D SERIES)
	214-3903-00			6	SCREW, JACK; 4-40 X 0.312 EXT THD, 4-40 INT THD, 0.188 HEX, ZINC PLATED STEEL
					(DSA70000D SERIES, DPO70000D SERIES)
	214-3903-01			6	SCREW, JACK; 4-40 X 0.312 EXT THD, 4-40 INT THD, 0.188 HEX, ZINC PLATED STEEL
					(MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	END ATTACHING PARTS				

Figure 5-29: μATX 1 — MSO70000/C, DSA/DPO70000C/D Series ("C" series model shown)

Table 5-26: µATX 2 — MSO70000/C, DSA/DPO70000C/D Series

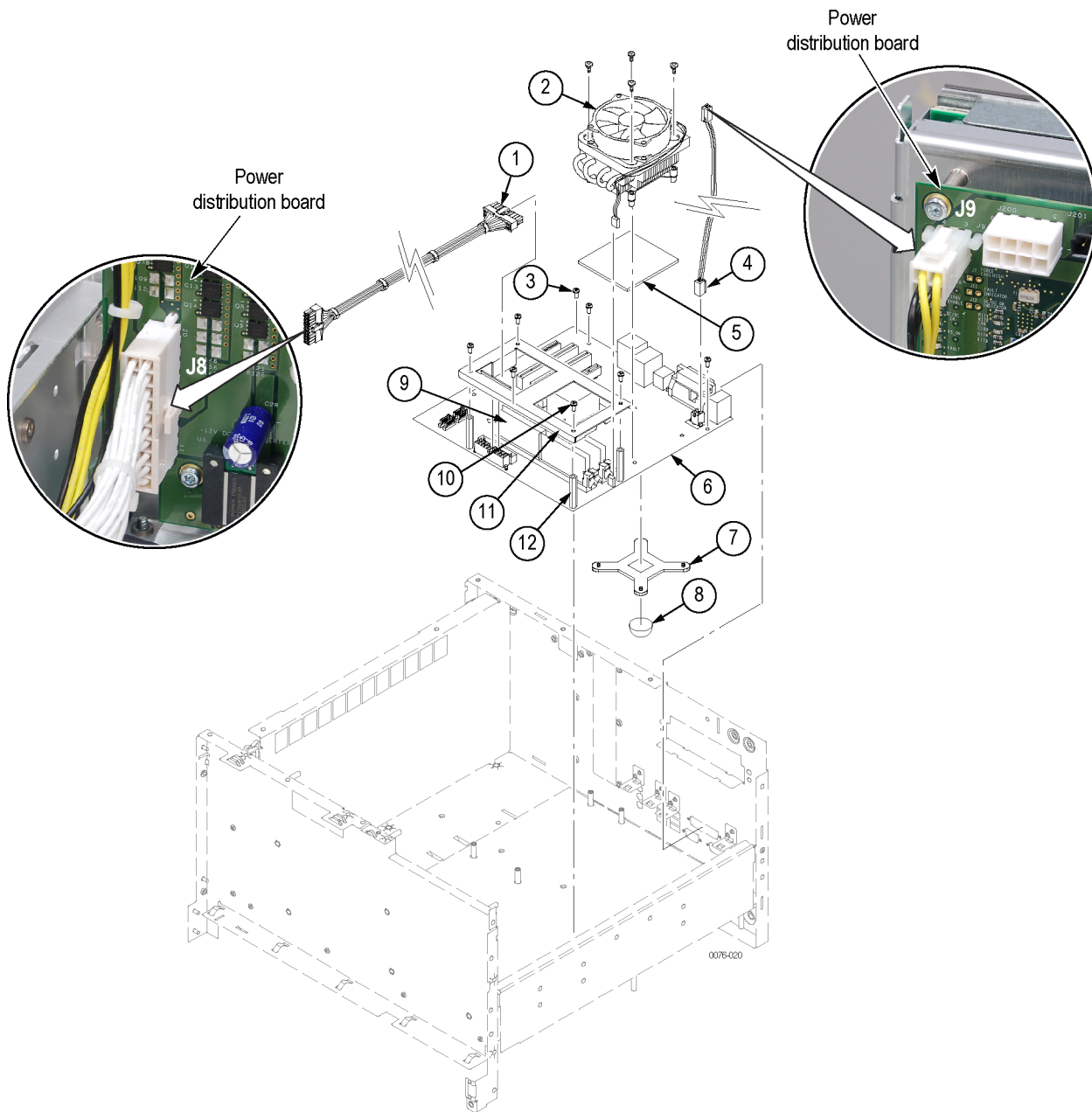| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-30-					**µATX 2**
-1	174-4797-00			1	CA ASSY; 20 PIN ATX POWER,SAFETY CONTROLLED; PWR DIST J8 to µATX EATXPWR1
-2	119-7333-00			1	P4 LGA775 FAN-SINK-BRACKET FROM AVC. SAFETY CONTROLLED
-3	211-1050-00			8	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STEEL, ZINC FINISH, T15 (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			8	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE (DSA70000D SERIES, DPO70000D SERIES)
-4	174-4798-00			1	CA ASSY; 4 PIN P4 POWER,SAFETY CONTROLLED;PWR DIST J9 to µATX 12V
-5	167-1348-00			1	PROCESSOR; INTEL CORE 2 DUO, 3.0 GHZ, WOLFDALE, E8400; 65W; BUS SPD 1333MHZ; FC-LGA775 PKG, W/O FAN and HEATSINK EU80570PJ0806M SLB9J
-6	039-0188-00			1	COMPUTER BOARD;ADVANTECH, MICROATX,LGA 775 CORE 2 DUO, DDR2, PCI-E X4,DUAL CH LVDS, DVI-I, SINGLE GBE LAN; ADVANTECH AIMB-566
-7	- - - - - - -			1	HEAT SINK BRACKET PART OF ITEM 2 IN THIS LIST
-8	342-1198-00			1	DAMPENER FOR SHOCK AND VIBRATION, HEMISPHERE GEOMETRY, 1.00 IN DIA SPHERE (.500 IN HEIGHT), SORBOTHANE PN 0510115, BLACK, 30 DUROMETER
-9	167-1493-00			2	IC, MEMORY;256MBIT X 64, 2GB DDR2 1.8V, 6-6-6, 800 MT/S; MT16HTF25664AY-800, DIMM240, PC6400
-10	211-1050-00			4	SCREW, MACHINE; 6-32 X 0.312 L, PNH, STL CAD PLT, T15 (MSO70000/C SERIES, DSA70000C SERIES, DPO70000C SERIES)
	211-1397-00			4	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE (DSA70000D SERIES, DPO70000D SERIES)
-11	407-5579-00			1	BRACKET, DIMM RETENTION, WITH TABS
	348-1988-00			1	PORON PADS, 1.00 X 3.30, 4 X 8 ARRAY ON ADHESIVE TAPE (PART OF ITEM 11 IN THIS LIST)
-12	129-1716-00			4	STANDOFF, M-BRD TO DIMM RETEN BRKT

Figure 5-30: μATX 2 — MSO70000/C, DSA/DPO70000C/D Series ("C" series model shown)

Table 5-27: μATX 1 — MSO/DPO70000DX Series

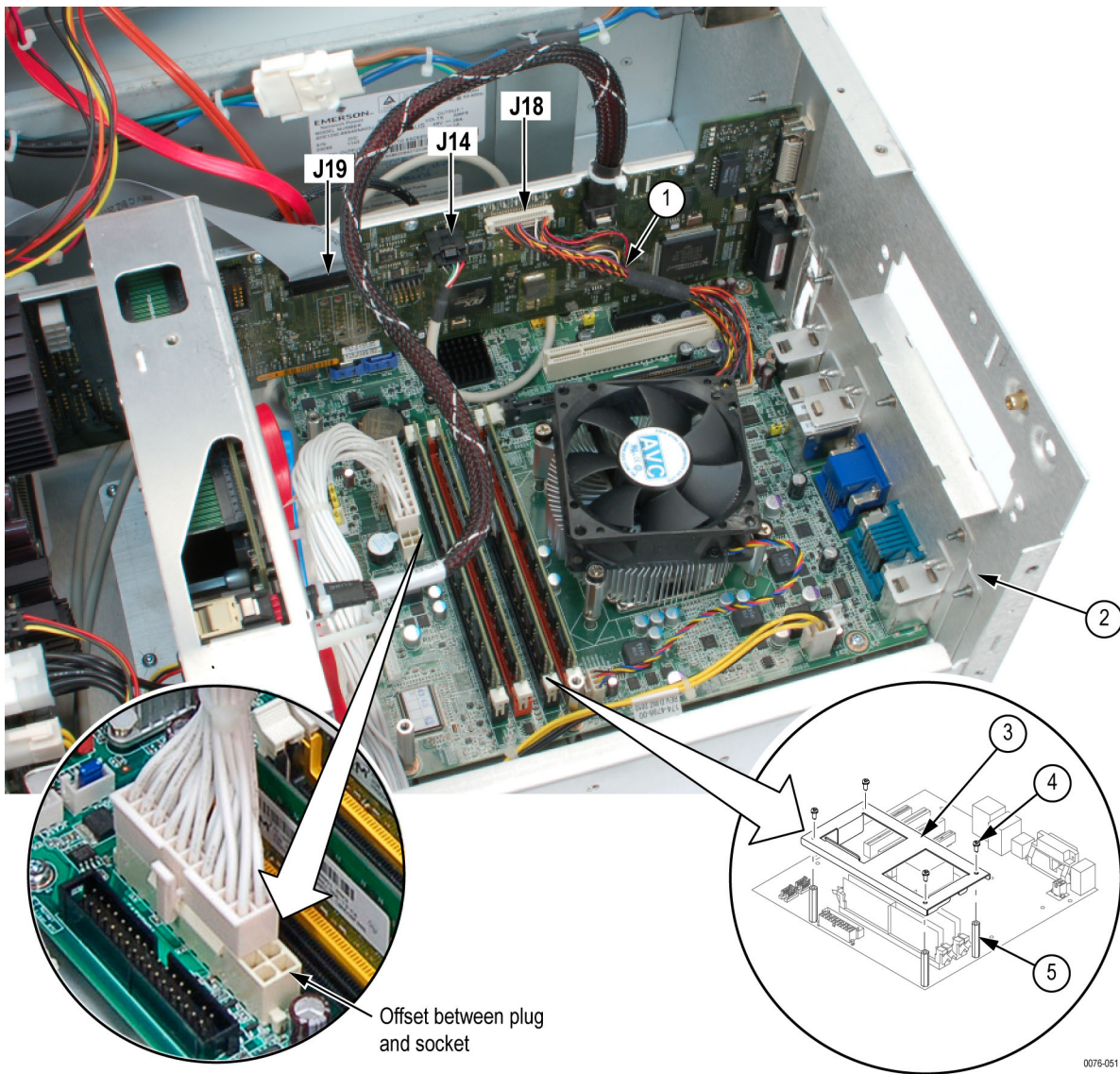| Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-31-					μATX 1
-1	174-5629-00			1	CABLE, LVDS VIDEO WITH 2X20 HIROSE CONNECTORS;PCIe J18 to μATX LVDS1
-2	441-2724-00			1	BRACKET, IO M-BOARD, AMB581
-3	407-5725-00			1	BRACKET, DIMM RETENTION, WITH TABS
	348-1988-00			1	PORON PADS, 1.00 X 3.30, 4 X 8 ARRAY ON ADHESIVE TAPE (USED WITH ITEM 3 IN THIS LIST)
-4	211-0722-00			4	SCREW, MACHINE; 6-32 X 0.250 L, PNH, STL ZINC FINISH, T15
-5	129-1716-00			4	STANDOFF, M-BRD TO DIMM RETEN BRKT

Figure 5-31: µATX 1 — MSO70000DX, DPO70000DX Series

Table 5-28: μATX 2 — MSO70000DX, DPO70000DX Series

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description
5-32-					μATX 2
-1	174-6155-00			1	CA ASSY; 20 PIN ATX POWER,SAFETY CONTROLLED
-2	214-5317-00			1	FANSINK ASSEMBLY, INTEL LGA1156, I7 SERIES
-3	211-1397-00			8	SCREW, 6-32 PANHEAD, T-15, MATHREAD W/ LOCTITE
-4	174-6154-00			1	CABLE ASSEMBLY (4 PIN 12V P4 POWER), SAFETY CONTROL
-5	167-2201-00			1	PROCESSOR; INTEL CORE I7-2600, 3.4 GHZ, SANDY BRIDGE; 95W; 8M CACHE; LGA1155 PKG; QUAD CORE; HD GRAPHICS 2000; W/O FAN&HEATSINK; CM8062300834302 SR00B
-6	039-0206-00			1	COMPUTER BOARD;ADVANTECH, MICROATX, LGA 1156 SANDY BRIDGE, Q67, DDR3, PCI-E X4, DUAL CH LVDS, DVI-D, VGA, ESATA, SINGLE GBE LAN, LATCHING INTERNAL USB; ADVANTECH AIMB-581-TEK
-7	- - - - - - -			1	HEAT SINK BRACKET PART OF ITEM 6 IN THIS LIST
-8	348-2022-00			4	DAMPENER, VIBRATION: .750 HEMISPHERE, 30 DUROMETER
-9	167-2202-00			4	IC, MEMORY;512MBIT X 64, 4GB DDR3 1.5V, 9-9-9, 1333 MT/S; MT16JTF51264AZ-1G4D1, DIMM240, PC3–10600

Power distribution board

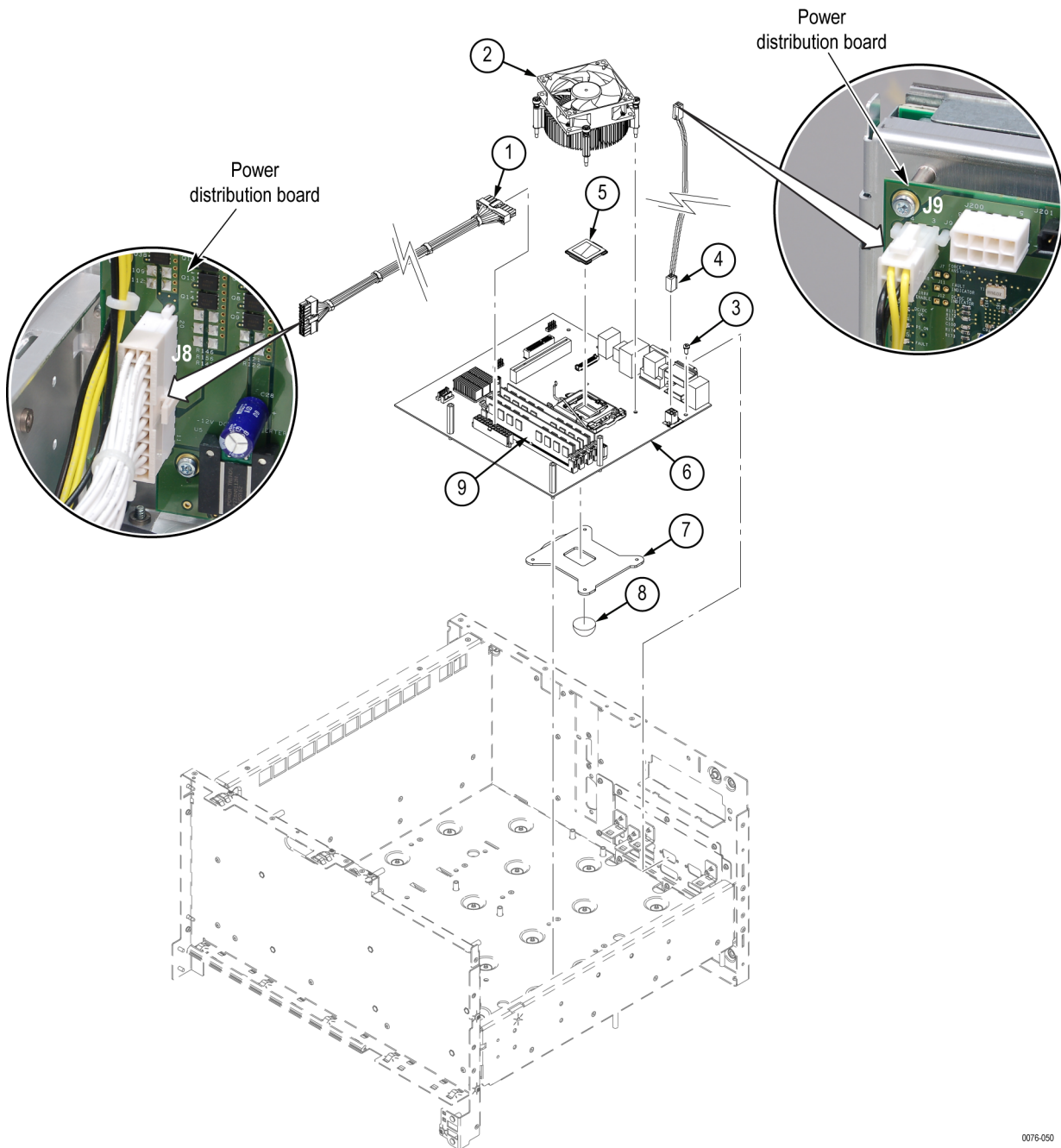Power distribution board

J8

J9

Figure 5-32: µATX 2 — MSO70000DX, DPO70000DX Series

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Replaceable Parts (MSO/DPO5000/B Series)

The following tables and illustrations show the replaceable parts for the MSO5000/B Series and DPO5000/B Series products.
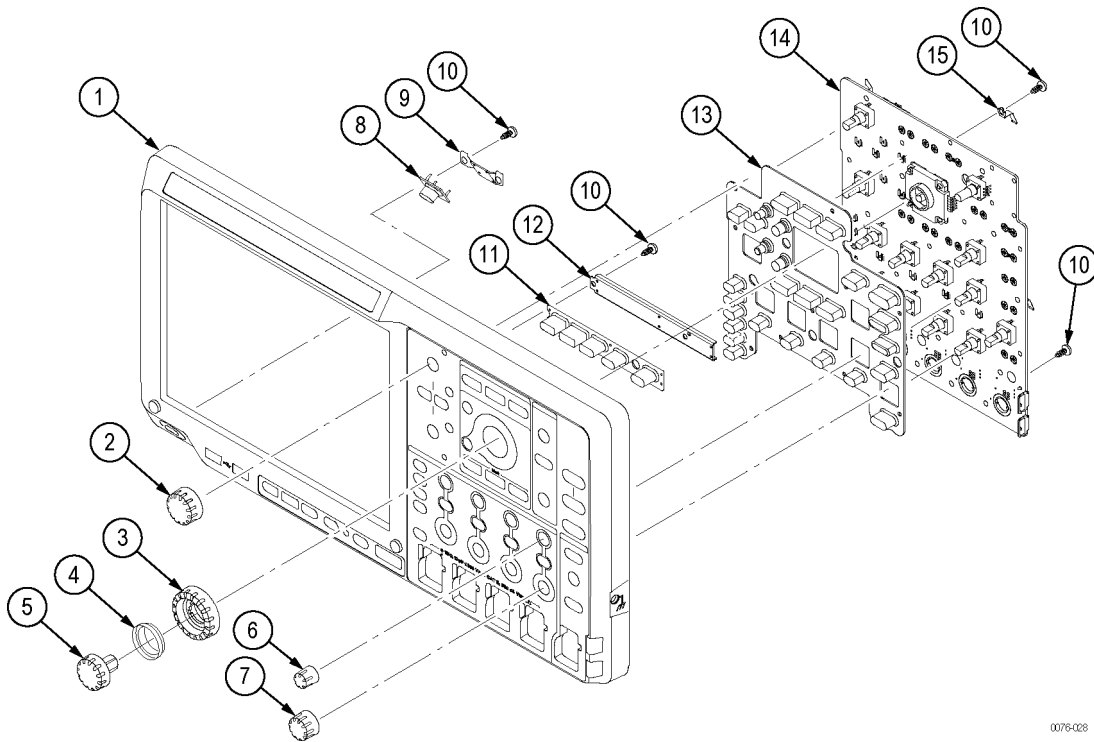
Two tables provide the replaceable cable part numbers:

Two figures show how to attach the connectors in the instrument:

Table 5-29: Replaceable parts – Front panel assembly (MSO/DPO5000/B Series)

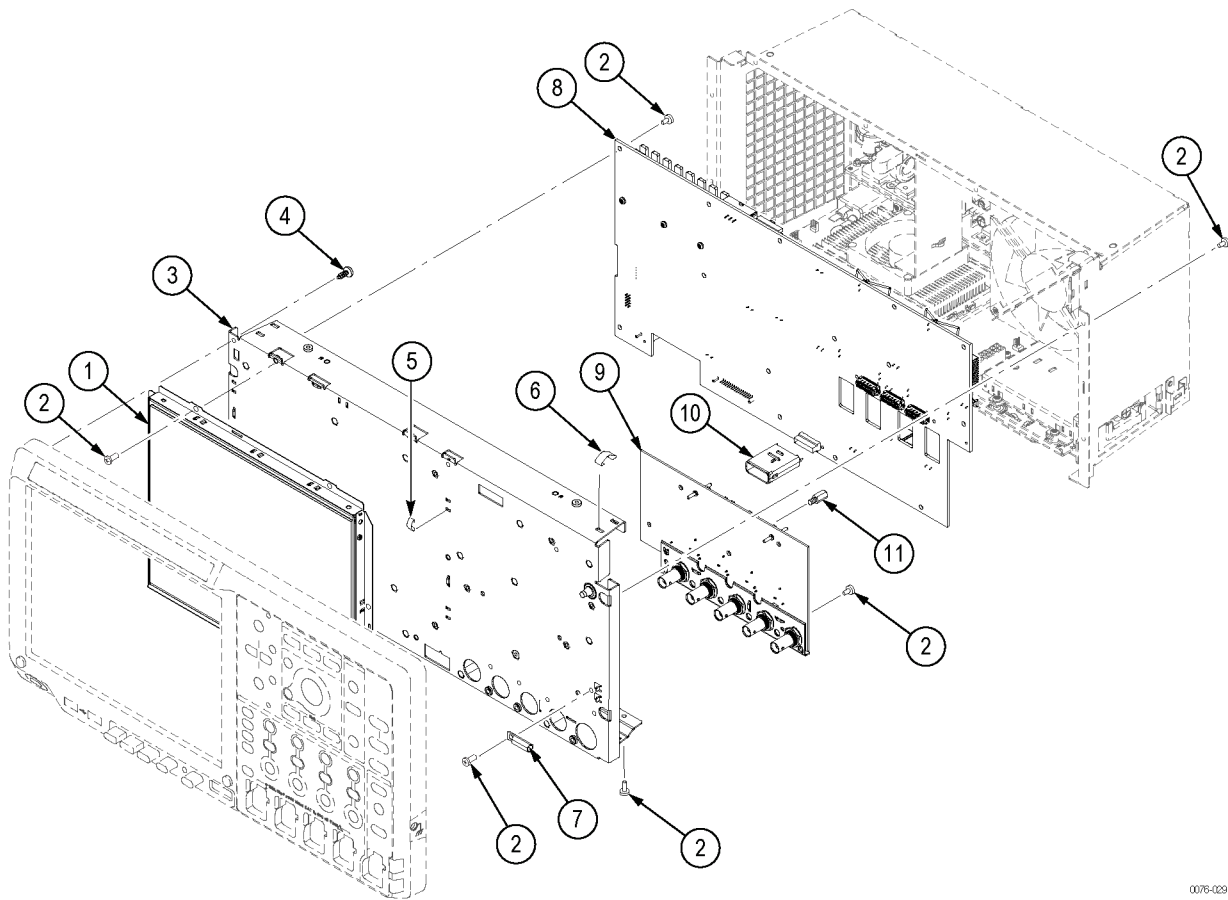| Figure and index no.	Tektronix part no.	Serial no. effective	Serial no. discont'd	Qty.	Name and description
5-33-					**FRONT PANEL ASSEMBLY**
-1	065-0853-00			1	FRONT CASE ASSEMBLY (MSO/DPO5000 SERIES)
	065–0954–00			1	FRONT CASE ASSEMBLY (MSO/DPO5000B SERIES)
-2	366-0861-01			2	ASSEMBLY, KNOB: .925 DIAMETER, SOFT TOUCH
-3	366-0867-01			1	KNOB ASSEMBLY, SHUTTLE AND BUSHING
-4	358-0883-00			1	BUSHING (JOG SHUTTLE KNOB)
-5	366-0865-01			1	KNOB ASSEMBLY, JOG
-6	366-0859-01			6	ASSEMBLY, KNOB: .470 DIAMETER, SOFT TOUCH
-7	366-0860-01			6	ASSEMBLY, KNOB: .685 DIAMETER, SOFT TOUCH
-8	260-2898-00			1	SWITCH, KEYPAD, ELASTOMERIC, POWER
-9	407-5259-00			1	BRACKET, SUPPORT: POWER SWITCH
-10	211-1273-00			19	SCREW, MACHINE: 6–32 x 0.250, PNH, STL, ZNPL, T-15 TORX DRIVE
					- - - - - - - - DISTRIBUTION OF THE 211-1273-00 SCREWS - - - - - - - - -
					2 screws attach the Power switch and bracket to the front case assembly.
					2 screws attach the Utility switch and bracket to the front case assembly.
					10 screws attach the Front panel assembly to the front case assembly – with contact springs (#14).
					5 screws across the bottom of the Front panel assembly attach it to the front case assembly – without contact springs.
-11	260-2899-00			1	SWITCH, KEYPAD, ELASTOMERIC, UTILITY
-12	407-2567-00			1	BRACKET, SUPPORT, UTILITY SWITCH
-13	260-2901-00			1	SWITCH, KEYPAD, ELASTOMERIC, FRONT PANEL
-14	877-0277-01			1	CIRCUIT BOARD ASSEMBLY, FRONT PANEL
-15	131-8139–00			10	CONTACT, SPRING: FRONT PANEL ELEC

Figure 5-33: Front panel assembly (MSO/DPO5000/B Series)

Table 5-30: Replaceable parts – Display, Analog bd , and Main bd (MSO/DPO5000/B Series)

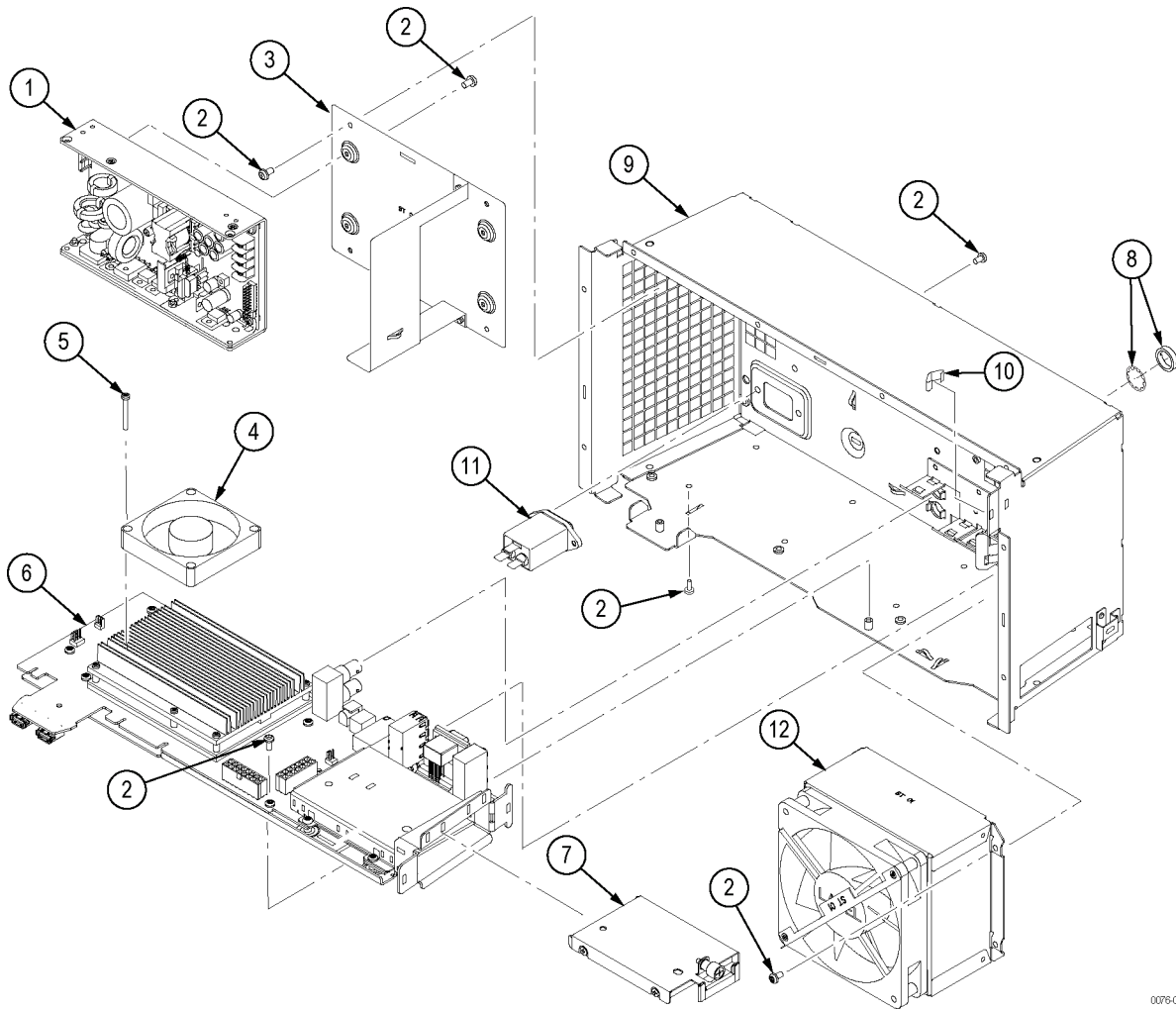| Figure and index no.	Tektronix part no.	Serial no. effective	Serial no. discont'd	Qty.	Name and description
5-34-					**DISPLAY, ANALOG BOARD & MAIN BOARD**
-1	850-0130-00			1	FRAME ASSEMBLY, DISPLAY: LCD
-2	211-1272-00			40	SCREW, MACHINE: 6–32 x 0.250, PNH, STL, ZNPL, T-15 TORX DRIVE
					- - - - - - DISTRIBUTION OF THE 211-1272-00 SCREWS - - - - - - -
					6 screws attach the LCD assembly to the front chassis.
					15 screws attach the Main board assembly to the front chassis.
					6 screws attach the Analog board assembly to the front chassis.
					12 screws attach the rear chassis to the front chassis: 4 across the top flange of the rear chassis, 2 on each side flange, and 4 across the bottom flange of the front chassis.
					1 screw attaches the ground jack to the front chassis.
-3	441-2608-00			1	CHASSIS ASSEMBLY, FRONT
-4	211-1273-00			8	SCREW, PT, K35–1.57, PAN HEAD, STL, ZNPL, T-15 TORX DRIVE
-5	131-6643-00			6	CONTACT, ELEC: GROUNDING, 0.169 L X 0.250 W X 0.320 D, ELECTROLESS NICKEL PLATE
-6	131-6417-00			4	CONTACT, ELEC: GROUNDING, 0.600 L X 0.250 W X 0.220 D, ELECTROLESS NICKEL PLATE
-7	131-7622-00			1	CONN,RECEPT; GROUND JACK
-8	- - - - - - -			1	MAIN BOARD ASSEMBLY. Return the instrument to Tektronix for service.
-9	- - - - - - -			1	ANALOG BOARD ASSEMBLY. Return the instrument to Tektronix for service.
-10	351-1134-00			1	DIGITAL PROBE GUIDE
-11	129-1693-00			1	SPACER, POST

Figure 5-34: Display, Analog bd, and Main bd assembly (MSO/DPO5000/B Series)

Table 5-31: Replaceable parts – Rear chassis and connecting modules (MSO/DPO5000/B Series)

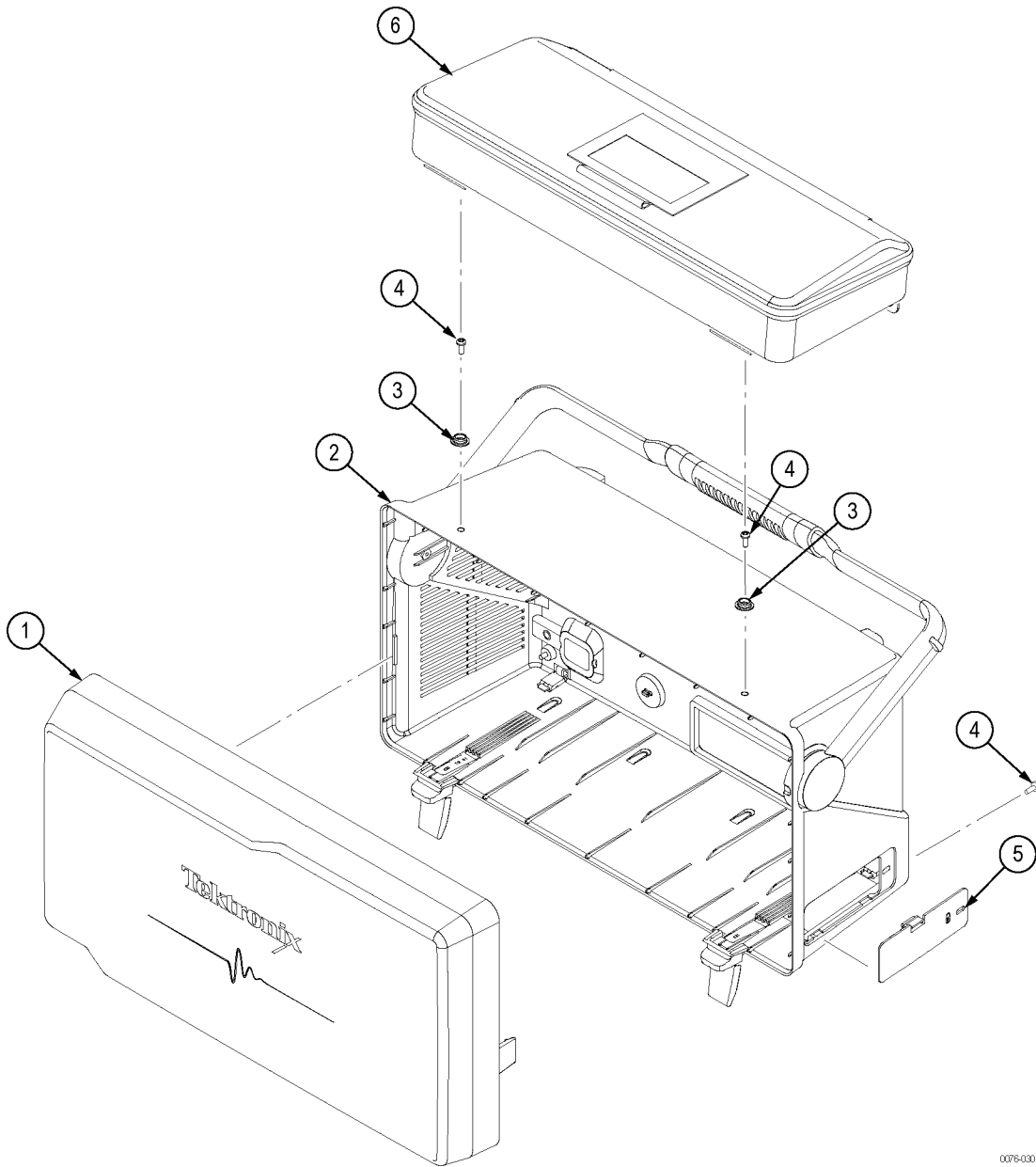| Figure and index no.	Tektronix part no.	Serial no. effective	Serial no. discont'd	Qty.	Name and description
5-35-					**REAR CHASSIS, POWER SUPPLY, COM-E BOARD**
-1	065-0859-00			1	CIRCUIT BOARD ASSEMBLY, POWER SUPPLY
-2	211-1272-00			24	SCREW, MACHINE: 6–32 x 0.250, PNH, STL, ZNPL, T-15 TORX DRIVE
					- - - - - - DISTRIBUTION OF THE 211-1272-00 SCREWS - - - - - - -
					4 screws attach the Power supply circuit board to the Power supply bracket.
					4 screws attach the Power supply assembly to the rear chassis.
					2 screws attach the line filter to the rear chassis.
					2 screws attach the COM-E Interface assembly to the rear chassis (from the top of the assembly).
					4 screws attach the system fan (#12) to the rear chassis.
					8 screws attach the COM-E Interface assembly to the rear chassis (from the outside of the instrument).
-3	407-5464-00			1	BRACKET, POWER SUPPLY BOARD MOUNT
-4	119-7683-00			1	FAN, 12 V, TACH OUT, SAFETY CONTROLLED
-5	211-1345-00			5	SCREW, MACHINE, PANHEAD M3 X 0.5 X 26MM, PHILLIPS
-6	065-0850-00			1	COM-E INTERFACE BOARD ASSEMBLY
-7	065-0851-00			1	HARD DISK DRIVE, REPLACEABLE, PROGRAMMED, WITH BRACKET (MSO/DPO5000 SERIES)
	065–0952–00			1	DRIVE ASSEMBLY, HARD DRIVE, REPLACEABLE, PROGRAMMED (MSO/DPO5000B SERIES)
-8	220-1271-01			2	SPANNER NUT ASSEMBLY WITH WASHER
-9	- - - - - - -			1	CHASSIS ASSEMBLY, REAR. Return the instrument to Tektronix for replacement.
-10	131-6417-00			1	CONTACT, ELEC: GROUNDING, 0.600 L X 0.250 W X 0.220 D, ELECTROLESS NICKEL PLATE
-11	119-7086-00			1	FILTER, EMI, AC LINE CONNECTOR
-12	065-0857-00			1	SYSTEM FAN ASSEMBLY, 120 MM, TUBEAXIAL, 12 VDC; SAFETY CONTROLLED, WITH BRACKET

Figure 5-35: Rear chassis and connecting modules (MSO/DPO5000/B Series)

Table 5-32: Replaceable parts – External parts (MSO/DPO5000/B Series)

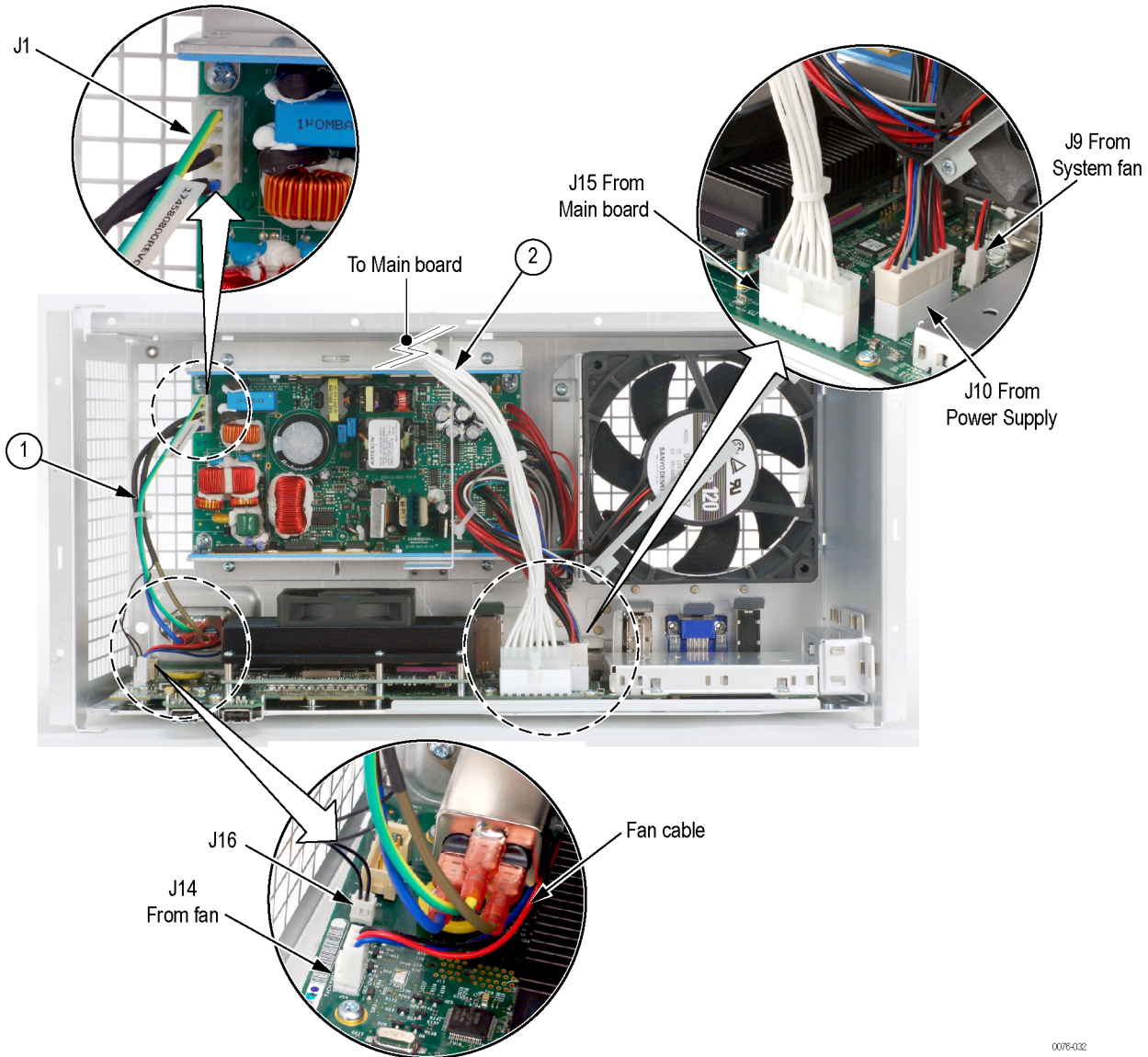| Figure and index no.	Tektronix part no.	Serial no. effective	Serial no. discont'd	Qty.	Name and description
5-36-					**EXTERNAL PARTS**
-1	200-5130-00			1	FRONT PROTECTIVE COVER
-2	065-0858-00			1	REAR CASE
-3	355-0298-00			2	STUD, SNAP: 0.570 DIAMETER, 0.165 THICK, STAINLESS STEEL
-4	211-1272-00			6	SCREW, MACHINE: 6–32 x 0.250, PNH, STL, ZNPL, T-15 TORX DRIVE
					- - - - - - DISTRIBUTION OF THE 211-1272-00 SCREWS - - - - - - -
					2 screws attach the snaps to the top of the rear case
					4 screws attach the rear case to the rear chassis.
-5	200-5155-00			1	COVER, DOOR, HARD DRIVE
-6	016-2029-00			1	POUCH, ACCESSORY, BLACK, SNAP ON

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Figure 5-36: External parts (MSO/DPO5000/B Series)

Table 5-33: Replaceable parts – Cable and connectors, rear chassis (MSO/DPO5000/B Series)

Figure and index no.	Tektronix part no.	Serial no. effective	Serial no. discont'd	Qty.	Name and description
5-37-					**CABLES, REAR CHASSIS**
-1	174-5808-00			1	CABLE, IEC TO POWER SUPPLY
-2	174-5704-00			1	CABLE ASSEMBLY, MAIN BOARD TO INTERFACE POWER (COM-E BOARD)

Figure 5-37: Rear chassis, showing cables and connectors (MSO/DPO5000/B Series)

Table 5-34: Replaceable parts – Cable and connectors, Main board (MSO/DPO5000/B Series)

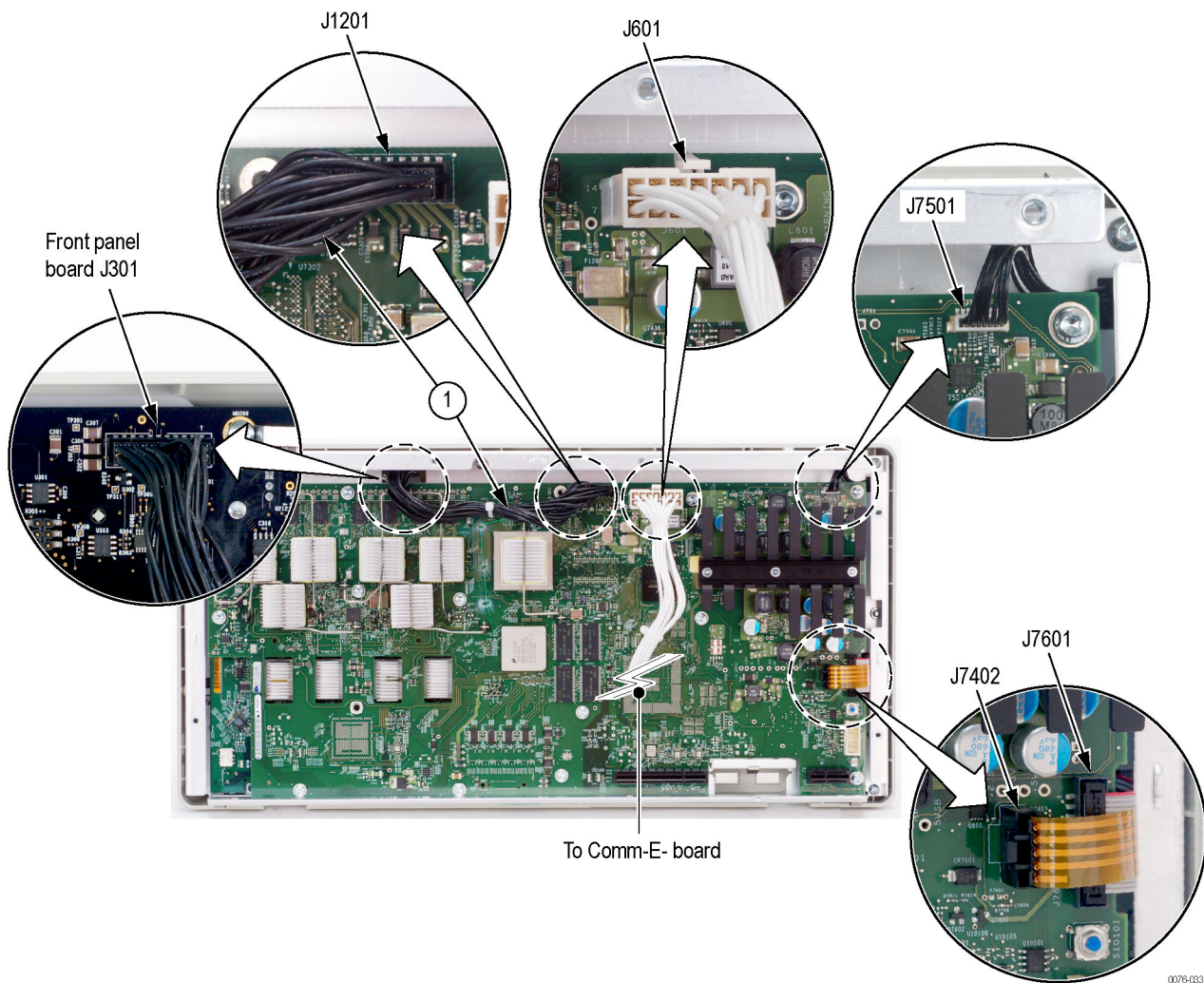| Figure and index no.	Tektronix part no.	Serial no. effective	Serial no. discont'd	Qty.	Name and description
5-38-					**Cable, Main Board**
-1	174-5809-00			1	CABLE, MAIN BOARD TO FRONT PANEL BOARD

Figure 5-38: Main board, showing cable and connectors (MSO/DPO5000/B Series)