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Service Manual

Tektronix

DTG5078 & DTG5274 & DTG5334
Data Timing Generators

071-1615-00

This document applies to firmware version 2.0.0
and above.

www.tektronix.com

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General Safety Summary

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

Only qualified personnel should perform service procedures.

To Avoid Fire or Personal Injury

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

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

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

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

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

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

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

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

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

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

Symbols and Terms

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

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

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

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

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

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

CAUTION indicates a hazard to property including the product.

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



WARNING
High Voltage



Protective Ground
(Earth) Terminal



CAUTION
Refer to Manual



Double
Insulated

Service Safety Summary

DTG5000 Series only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

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

Disconnect Power. To avoid electric shock, disconnect the mains power by means of the power cord or, if provided, the power switch.

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

To avoid electric shock, do not touch exposed connections.

Calendar (date and time) Backup Battery. This product contains a Lithium:poly-carbon mono fluoride battery for calendar backup purposes. This battery is part of the CPU unit and is not replaceable.

Preface

This manual provides information necessary for service technicians to service the DTG5000 Series Data Timing Generator to the module level.

Manual Structure

This manual is divided into sections, such as *Specifications* and *Theory of Operation*. Further, some sections are divided into subsections, such as *Product Description* and *Removal and Installation Procedures*.

Sections containing procedures also contain introductions to those procedures. Be sure to read these introductions because they provide information needed to do the service correctly and efficiently. The following contains a brief description of each manual section.

- *Operating Information* includes general information and operating instructions.
- *Theory of Operation* contains circuit descriptions that support service to the module level.
- *Adjustment Procedures* contains information that you need to manually adjust the data timing generator so that it meets specifications.
- *Maintenance* contains information and procedures for performing preventive and corrective maintenance of the data timing generator. These instructions include cleaning, module removal and installation, and fault isolation to the module.
- *Replaceable Electrical Parts* contains a statement referring you to *Replaceable Mechanical Parts*, where both electrical and mechanical modules are listed.
- *Diagrams* contains block diagrams and an interconnection diagram.
- *Replaceable Mechanical Parts* includes a table of all replaceable modules, their descriptions, and their Tektronix part numbers.

Manual Conventions

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

Some sections of the manual contain procedures for you to perform. To keep those instructions clear and consistent, this manual uses the following conventions:

- Front-panel controls and menu names appear in the same case (initial capitals, all uppercase, and so on) in the manual as is used on the data timing generator front-panel and menus. Front-panel labels are all upper case letters (for example, MENU, SELECT, PULSE GEN, and so on).
- Instruction steps are numbered unless there is only one step.

Modules

Throughout this manual, any replaceable component, assembly, or part of the data timing generator is referred to generically as a module. In general, a module is an assembly (like a circuit board), rather than a component (like a resistor or an integrated circuit). Sometimes a single component is a module; for example, the chassis of the data timing generator is a module.

Safety

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

Finding Other Information

This manual mainly focuses on the troubleshooting and maintenance of the data timing generator. See the following list for other documents supporting the data timing generator operation. All documents are on the DTG5000 Series Product Documents CD-ROM that shipped with instrument.

Document name	Description
DTG5000 Series Technical Reference for Performance Verification & Specifications	Describes how to verify the performance of the data timing generator and lists its specifications. (Product Documents CD)
DTG5000 Series User Manual 1	A quick reference to major features of the instrument and how they operate. It also provides several tutorials to familiarize the user with basic instrument features. (Product Documents CD)
DTG5000 Series User Manual 2	A reference provides an encyclopedia of topics that describe the data timing generator interface and features, and gives background information on how to use them. (Product Documents CD)
DTG5000 Series *Programmer Manual*	Provides complete information on programming commands and remote control of the instrument. (Product Documents CD)
DTG5000 Series Online Help	An online help system, integrated with the User Interface application that ships with this product. The help is preinstalled in the instrument.

Contacting Tektronix

Phone	1-800-833-9200*
Address	Tektronix, Inc. Department or name (if known) 14200 SW Karl Braun Drive P.O. Box 500 Beaverton, OR 97077 USA
Web site	www.tektronix.com
Sales support	1-800-833-9200, select option 1*
Service support	1-800-833-9200, select option 2*
Technical support	Email: techsupport@tektronix.com 1-800-833-9200, select option 3* 6:00 a.m. - 5:00 p.m. Pacific time

* **This phone number is toll free in North America. After office hours, please leave a voice mail message.**
Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.

Introduction

This manual contains information that is needed to properly service the DTG5000 Series Data Timing Generator as well as general information that is critical to safe and effective servicing.

To prevent personal injury or damage to the data timing generator, consider the following before attempting service:

- The procedures in this manual should be performed only by a qualified service person.
- Read the *General Safety Summary* on page vii and the *Service Safety Summary,* beginning on page ix.
- Read *Installation* in *Operating Information*.

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

Performance Verification Procedures

The performance check should be done every 12 months. In addition, a performance check is recommended after module replacement. The performance check procedures for this instrument are on the DTG5000 Series Product Documents CD-ROM (Tektronix part number 063-3883-xx) that shipped with your product. Look for the DTG5000 Series Technical Reference for Performance Verification & Specifications PDF on this disk.

If the data timing generator does not meet performance criteria, repair is necessary.

Strategy for Servicing

Throughout this manual, the term, *module*, refers to any field-replaceable component, assembly, or part of the data timing generator.

This manual contains the information needed for periodic maintenance of the data timing generator. Further, it contains information for corrective maintenance down to the module level. To isolate a failure to a module, use the troubleshooting procedures found in the *Maintenance* section. To remove and replace any failed module, follow the instructions in the *Removal and Installation Procedures* subsection. After isolating a faulty module, replace it with a fully-tested module obtained from the factory. The *Replaceable Mechanical Parts* section contains part number and ordering information for all replaceable modules.

Tektronix Service Offerings

Tektronix provides service to cover repair under warranty as well as other services that may provide a cost-effective answer to your service needs.

Whether providing warranty repair service or any of the other services listed below, Tektronix service technicians are well trained to service the data timing generator. They have access to the latest information on improvements to the DTG5000 Series as well as new options.

Warranty Repair Service

Tektronix warrants this product for one year from date of purchase. The warranty appears at the front of this manual. Tektronix technicians provide warranty service at most Tektronix service locations. The Tektronix product catalog lists all worldwide service locations.

Self Service

Tektronix supports repair to the module level by providing Module Exchange.

Module Exchange. This service reduces down-time for repair by allowing you to exchange most modules for remanufactured ones. Each module comes with a 90-day service warranty.

For More Information. Contact your local Tektronix service center or sales engineer for more information on any of the repair or adjustment services just described.

Specifications

Specifications

The specifications for this instrument are now available on the DTG5078 & DTG5274 & DTG5334 Performance Verification & Specifications Technical Reference (Tektronix part number 071-1611-xx). A PDF of this technical reference is provided on the DTG5000 Series Product Documents CD-ROM (Tektronix part number 063-3833-xx) that shipped with your product.

Operating Information

Product Description

This section describes the key features of the DTG5000 Series Data Timing Generators and their Output modules.

Models

This manual supports the following data timing generators:

- DTG5078 Data Timing Generator
- DTG5274 Data Timing Generator
- DTG5334 Data Timing Generator

The differences between the data timing generators will be called out when necessary; otherwise, the material applies to all data timing generators. The term "data timing generator" refers to all of the products.

Key Features

The DTG5000 Series Data Timing Generator is a high-speed, multichannel signal generator that creates a wide range of digital timing signals. The products are designed to generate a data pattern for standard and nonstandard pulses necessary for functional tests or characterization of legacy devices (TTL, CMOS, ECL) as well as the latest devices (PECL, LVDS, GTL, CML).

Use the DTG5000 series to insert glitches and jitter as needed, and easily create patterns for device stress testing. In addition, to shorten testing time, use the sequence function to create signal sequences from combinations of various patterns.

The DTG5000 Series Data Timing Generator supports six types of output modules (DTGM10, DTGM20, DTGM21, DTGM30, DTGM31 and DTGM32). Table 2-1 lists the key features of the data timing generators, and Table 2-2 lists the key features of the output modules.

Table 2-1: DTG5000 series key features

	DTG5078	DTG5274	DTG5334
Maximum clock frequency/Maximum data rate	750 MHz/750 Mb/s	2.7 GHz /2.7 Gb/s	3.35 GHz /3.35 Gb/s
Number of slots	8 (A, B, C, D, E, F, G, and H)	4 (A, B, C, and D)	4 (A, B, C, and D)
Pattern length	240 to 8,000,000 words/channel	960 to 32,000,000 words/channel	960 to 64,000,000 words/channel
Block size granularity	1	1 to 4 (depends on Vector Rate)	1 to 4 (depends on Vector Rate)
Sequence steps	1 to 8,000 steps	1 to 8,000 steps	1 to 8,000 steps
Sequence repeat counter	1 to 65,536 or Infinite	1 to 65,536 or Infinite	1 to 65,536 or Infinite
Master-Slave	Up to three (one Master, two Slaves)	Up to two (one Master, one Slave)	Up to two (one Master, one Slave)
Data Generator Mode	Slot A, B, C, D, E, F, G, and H	Slot A, B, C, and D	Slot A, B, C, and D
Data format			
Slot A to D	NRZ, RZ, and R1	NRZ, RZ, and R1	NRZ, RZ, and R1
Slot E to H	NRZ		
Data rate			
NRZ	50 kb/s to 750 Mb/s	50 kb/s to 2.7 Gb/s	50 kb/s to 3.35 Gb/s
RZ and R1	50 kb/s to 375 Mb/s	50 kb/s to 1.35 Gb/s	50 kb/s to 1.675 Gb/s
Channel addition	Slot A, B, C, and D	Slot A, B, C, and D	Slot A, B, C, and D
Jitter generation	Channel 1 of slot A	Channel 1 of slot A	Channel 1 of slot A
Lead delay resolution	1 ps	0.2 ps	0.2 ps
Trail delay resolution	5 ps	5 ps	5 ps
Pulse width resolution	5 ps (slot A, B, C, and D)	5 ps (slot A, B, C, and D)	5 ps (slot A, B, C, and D)
Pulse Generator Mode	Slot A, B, C, and D	Slot A, B, C, and D	Slot A, B, C, and D
Clock frequency	50 kHz to 375 MHz	50 kHz to 1.35 GHz	50 kHz to 1.675 GHz

Table 2-2: DTG5000 series Output module key features

	DTGM10	DTGM20	DTGM21	DTGM30	DTGM31	DTGM32
Number of channels	4	4	4	2	1	1
Number of available channels						
DTG5078	4	4	4	2	1	1
DTG5274	2 (CH1, CH2)	2 (CH1, CH2)	2 (CH1, CH2)	2	1	1
DTG5334	2 (CH1, CH2)	2 (CH1, CH2)	2 (CH1, CH2)	2	1	1
Amplitude (50 Ω)	3.5 V_{p-p}	3.5 V_{p-p}	3.90 V_{p-p} (50 Ω) 5.35 V_{p-p} (23 Ω)	1.25 V_{p-p}	1.25 V_{p-p}	1.25 V_{p-p}
Amplitude (1 MΩ)	10 V_{p-p}	7 V_{p-p}	7.81 V_{p-p}	2.5 V_{p-p}	2.5 V_{p-p}	2.5 V_{p-p}
Rise time/ fall time at 1 V_{p-p} into 50 Ω (20% to 80%)	<540 ps (variable)	<340 ps (variable)	<350 ps	<110 ps	<110 ps	<110 ps
Hi Z Control			yes			
External Jitter Input					yes one Input	yes two Inputs

Mainframe and Output Module Configuration

The DTG5000 Series Data Timing Generator offers a modular card system. Six types of the output modules can be combined in any combination. Each module can be inserted into any slot. The functional restrictions are:

- 8 slots installed in the DTG5078 (A, B, C, D, E, F, G, and H)
- 4 slots installed in the DTG5274 and DTG5334 (A, B, C, and D)
- When a DTGM10, DTGM20, or DTGM21 is installed in a DTG5274 or DTG5334, CH3 and CH4 are unavailable. Only CH1 and CH2 can be used.
- Slots E, F, G, and H are unavailable in the Pulse Generator mode.
- Available data formats are different:
  - NRZ, RZ, R1 (Slot A, B, C, and D)
  - NRZ (Slot E, F, G, and H)
- Due to power consumption constraints, the output modules used with the DTG5078 are limited as follows:
  - Using the power consumption figures for each installed output module [P(Mxx) in Table 2-3], the sum of all P(Mxx) values must not exceed 100.

Table 2-3: Current consumption coefficient

Module	Current consumption coefficient
DTGM10	P(M10) = 9
DTGM20	P(M20) = 10
DTGM21	P(M21) = 10
DTGM30	P(M30) = 8
DTGM31	P(M31) = 33
DTGM32	P(M32) = 32

Example 1: DTGM31 1 each, DTGM30 7 each
P(M31) + P(M30) x 7 = 33 + 8 x 7 = 89 < 100; Acceptable

Example 2: DTGM32 3 each, DTGM30 5 each
P(M32) x 3 + P(M30) x 5 = 32 x 3 + 8 x 5 = 136 >100; Not Acceptable

Product Software

The data timing generator includes the following software:

- The system software, which includes a specially configured version of Windows 2000, comes preinstalled on the data timing generator. Windows 2000 is the operating system on which the user-interface application of this product runs, and provides an open desktop for you to install other compatible applications.

NOTE. *Do not attempt to substitute any version of Windows that is not specifically provided by Tektronix for use with this instrument.*

- The DTG5000 Software comes preinstalled on the data timing generator. This software, which runs on Windows 2000, is the data timing generator application. This software starts automatically when the data timing generator is powered on, and provides the user interface (UI) and all other instrument control functions. You can also minimize the data timing generator application.
  - The product software runs not only on a data timing generator mainframe, but also on a PC. When the software runs on the data timing generator mainframe, it is called the *Online mode*. While running on the PC, it is called the *Offline mode*. In the Offline mode, it is possible to create and edit the pattern data and set the output parameters.
- The DTG5000 Configuration Utility comes preinstalled on the data timing generator. This software, running on Windows 2000, is used for setting up the system configurations for the DTG5000 Software. This software controls the Master operation, Master/Slave operation, Online/Offline operation, and so forth.

NOTE. *When you use the DTG5000 software in the offline mode, you must also install the DTG5000 Configuration Utility into your PC.*

- The Readme file contains release notes and updates that could not be included in other product documentation.
- There are no limits on the number of PCs that can operate in the offline mode.

Occasionally new versions of software for your instrument may become available on our Web site. See *Contacting Tektronix* on page xiii in the *Preface* section for Web site information.

Installation

This section covers installation of the data timing generator, addressing the following topics:

- *Checking the Environment Requirements* on page 2-10
- *Output Module* on page 2-11
- *Powering On the Data Timing Generator* on page 2-12
- *Shutting Down the Data Timing Generator* on page 2-13
- *Creating an Emergency Rescue Disk* on page 2-15
- *Backing Up User Files* on page 2-17
- *Installing Software* on page 2-17



CAUTION. *Be sure to create your emergency rescue disk as described on page 2-15. You may need that disk if you ever need to reinstall Windows 2000 from the data timing generator hard drive.*

Supplying Operating Power

WARNING. *To avoid equipment failure and potential fire or personal shock hazards, do not exceed the maximum rated operating voltage of 250 V between the voltage-to-ground (earth) and either pole of the power source. The DTG5000 Series operates from a single-phase power source and has a three-wire power cord with a two-pole, three-terminal grounding plug. Before connecting to the power source, be sure the DTG5000 Series has a suitable two-pole, three-terminal, grounding-type plug.*

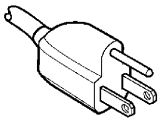
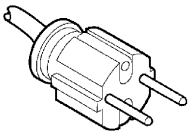
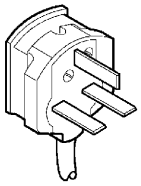
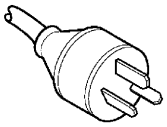
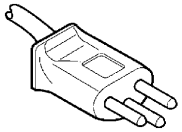
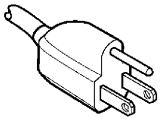
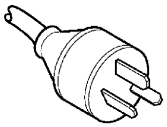
To avoid personal shock hazard, do not touch conductive parts. All accessible conductive parts are directly connected through the grounding conductor of the power cord to the grounded (earth) contact of the power plug. The DTG5000 Series is safety Class 1 equipment (IEC designation).

To prevent electrical shock, remove all power from the instrument, switch the ***PRINCIPAL POWER SWITCH*** *on the back panel to OFF, and disconnect the power cord from the instrument. Some components in the DTG5000 Series are still connected to line voltage after powering off the instrument from the front-panel* ***ON/STBY*** *button.*

Power Cord Information

A power cord with the appropriate plug configuration is supplied with each DTG5000 Series Data Timing Generator. If you require a power cord other than the one supplied, refer to Table 2-4

Table 2-4: Power cord identification

Plug configuration	Normal usage	Option number
	North America 125 V/15 A Plug NEMA 5-15P	Standard
	Europe 230 V	A1
	United Kingdom 230 V	A2
	Australia 230 V	A3
	Switzerland 230 V	A5
	Japan 100 V	A6
	China 230 V	A10
	No power cord supplied.	A99

Checking the Environment Requirements

Read this section before attempting any installation procedures. This section describes site considerations and power requirements for your data timing generator.

Site Considerations

The data timing generator is designed to operate on a bench in the normal position (on the bottom feet). For proper cooling, at least three inches (7.62 cm) of clearance is required on both sides of the data timing generator, and the bottom requires the clearance provided by the bottom feet.

If you operate the data timing generator in the Master-Slave mode, you can stack up to two mainframes.



CAUTION. *To avoid damage to the mainframe, always close the bottom stands when you stack the mainframes.*

Using a cart is not recommended when you stack the mainframes. Doing so could result in serious damage to the cart or mainframes.

Do not operate the mainframe while it rests on its left side feet. Always place the mainframe in the normal position (on the bottom feet) while the mainframe powered on.

Operating Requirements

Table 2-5 shows general operating requirements for the data timing generator. For more information, refer to *Specifications* section in the DTG5078 & DTG5274 & DTG5334 Performance Verification & Specifications Technical Reference. It covers power source, temperature, humidity and altitude information.

Table 2-5: Operating requirements

Item	Description
Operating temperature	+10 °C to +40 °C
Operating relative humidity	20% to 80% (No condensation)
Operating altitude	Up to 3 km (10,000 ft)
Power supply	
Rating voltage	100 V to 240 V
Voltage range	90 V to 250 V
Frequency	47 Hz to 63 Hz
Maximum power	600 VA maximum

Output Module

The DTG5000 Series Data Timing Generator mainframe and output module(s) are shipped separately. At least one output module must be installed in the mainframe slot to operate properly.

Six types of output modules can be combined in any combination. Each module can be inserted in any slot. There are functional differences between slot A to D and slot E to H. (Refer to *Mainframe and Output Module Configuration* on page 2-4.) It is recommended that slot A is used when only one output module is installed in the mainframe slot.

Installing the Output Module

To install the output module, first power off the mainframe using the front panel On/Standby switch.



CAUTION. *To prevent damage to the output module or mainframe, never install or remove the output module when the mainframe is powered on.*

To avoid damage from Electro Static Discharge, please do not touch the board surface or connectors of the output module with your fingers when you handle the module.

Attach the blank panel to the mainframe module slot(s) when the output module(s) are not installed.

If the output module is not in use for a long time, attach the connector caps and SMA terminations (DTGM30) to the output module and then store the output module in the shipping carton. The connector caps and SMA terminations are provided with your output module.

1. Verify that the data timing generator mainframe is not powered on.
2. Remove the blank panel from the mainframe slot.
3. Place the output module in a compartment.
4. Gently push the output module into the slot with firm pressure.
5. Once the module is seated, tighten the two screws with a screwdriver to secure the module to the mainframe.

Removing the Output Module

Verify that the data timing generator mainframe is not powered on.

1. Loosen the two screws.
2. Grasp the right and left screws and slowly pull the module out of the mainframe slot.
3. Attach a blank panel to the slot.

Powering On the Data Timing Generator

Follow these steps to power on the data timing generator.

1. Connect the proper power cord from the rear panel power connector to the power system.

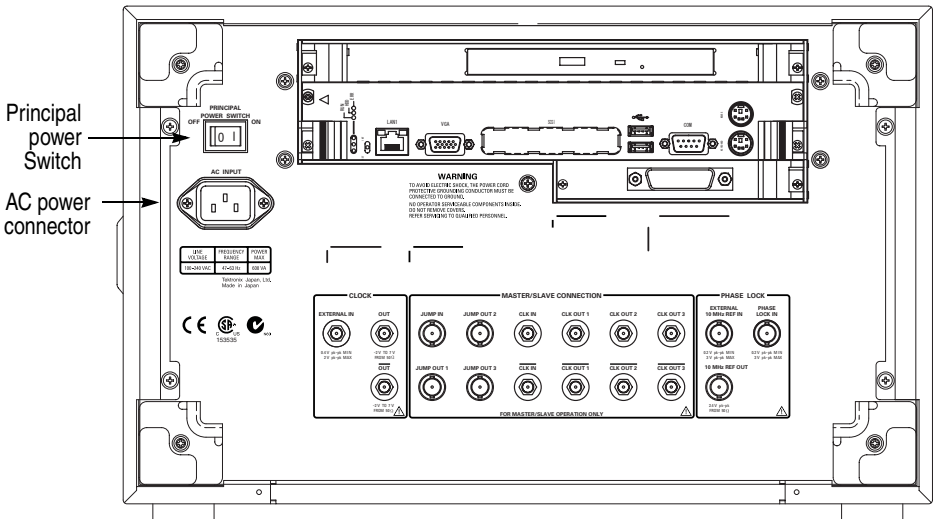


Figure 2-1: Principal power switch and AC power connector

NOTE. *To set up Windows 2000, connect the keyboard and mouse before turning the power on.*
Connect the keyboard, mouse and other accessories before applying power to the product.

2. Turn on the principal power switch at the rear panel. (See Figure 2-1 for switch location.)

3. Push the front panel On/Standby switch to power on the data timing generator. (See Figure 2-2 for the switch location.)

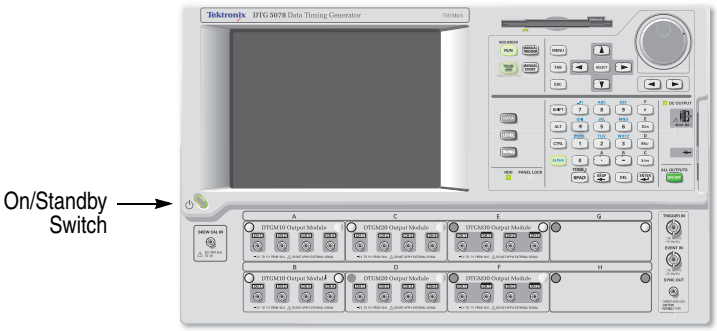


Figure 2-2: On/Standby switch location

Shutting Down the Data Timing Generator

When you push the front-panel On/Standby switch, the data timing generator starts a shutdown process (including a Windows shutdown) to preserve settings. This action removes power from most circuitry in the data timing generator. Avoid using the rear panel power switch or disconnecting the line cord to power off the mainframe.

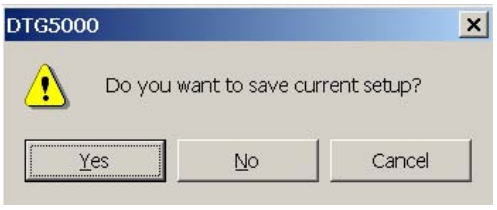
The DTG5000 Series Data Timing Generator runs on Windows 2000; the shut-down process is similar to a PC.

There are three ways to shut down the mainframe:

- Push the On/Standby switch
- Select the Windows **Start** menu, and then select **Shut Down...**
- Select the **File** menu from the DTG5000 software, then select **Shutdown**.

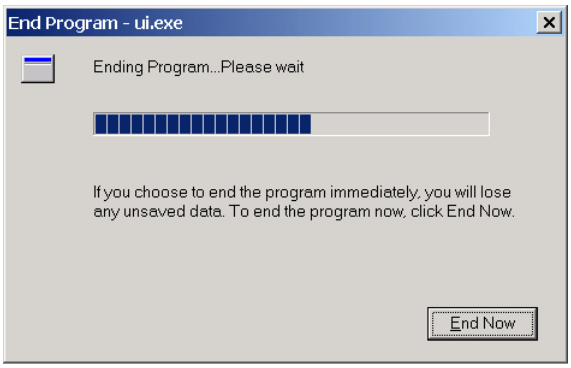
When the data timing generator settings were not changed. When the DTG5000 software is not running, or if the data timing generator settings have not changed since the mainframe start-up, the shut-down process closes all the programs on Windows, and then restores the settings. The power is automatically shut off.

When the data timing generator settings were changed. If the DTG5000 Series Data Timing Generator settings were changed after the mainframe start-up, the dialog box shown below appears on the screen and asks if you want to save the current settings. Push any button within five seconds.



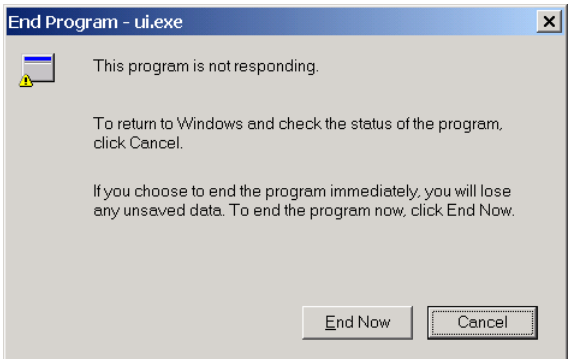
- Select **Yes** to specify the file name and location, and then select **OK** to continue the shut-down process.
- Select **No** without saving the setup file and continue the shut-down process.
- Select **Cancel** to abort the shut-down process and to return to the DTG5000 software.

If you do not select the options within five seconds, Windows forces you to terminate the DTG5000 software. The **End Program** dialog appears.



- Select **End Now** to continue the shut-down process without saving the setup file.

Without any action in ten seconds, the following dialog box appears.



The DTG5000 software is waiting for the information about whether the user wants to save the setup information. In this case, Windows cannot terminate the DTG5000 software.

- Select **End Now** to continue the shut-down process without saving the setup file.
- Select **Cancel** to return to the DTG5000 software.

In all cases, select **End Now** to exit all the Windows programs while preserving the current Windows settings. This shuts off the power to the mainframe.

To completely remove the power from the data timing generator, shut off the principal power switch at the rear panel, and then disconnect the power cord from the mainframe.

NOTE. *If you push the front panel On/Standby switch for more than four seconds, the data timing generator power is forced to be shut off.*

Do not attempt to push the rear panel principal power switch before shutting down the mainframe properly.

Creating an Emergency Rescue Disk

Now that you have completed the basic installation process, you should create an emergency rescue disk that you can use to restart your data timing generator in case of a major hardware or software failure.

NOTE. *Create the emergency rescue disk and store it in a safe place. It may allow you to recover your Windows 2000 installation without rebuilding the entire data timing generator hard disk.*

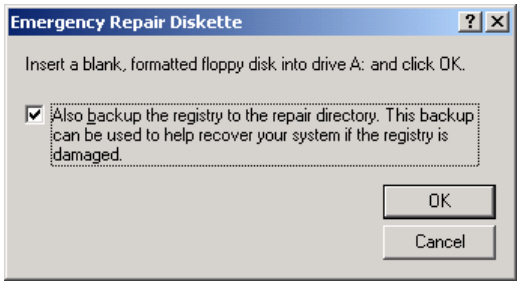
The emergency rescue disk contains basic files to restart your data timing generator. Follow these steps to create the emergency rescue disk:

1. Log on to the mainframe with the administrator name.
2. Click the Windows **Start** button, select **Program → Accessories → System Tools → Backup**. The following dialog box appears.



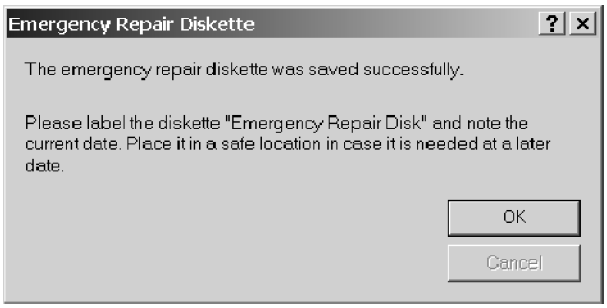
3. Insert a formatted floppy disk into the floppy disk drive, and then click **Emergency Repair Disk**.

4. The **Emergency Repair Diskette** dialog box appears.



5. Click **Also backup the registry...**, and then click **OK**.

6. Wait until the task completes. The following dialog appears.



7. Click **OK**, and then remove the floppy disk and store it in a safe place.

Backing Up User Files

You should always back up your user files on a regular basis. Use the Back Up tool to back up files stored on the hard disk. The Back Up tool is located in the System Tools folder in the Accessories folder.

1. Log on to the mainframe with the administrator name.
2. Click the Windows **Start** button, select **Program → Accessories → System Tools → Backup**.
3. Click **Backup Wizard**.
4. Follow the on-screen instructions.

The backup tool allows you to select your backup media and to select the files and folders that you want to back up. Use the Windows online help for information on using the Backup tool. You can back up to the floppy drive or to a third-party storage device.

Installing Software

The data timing generator mainframe ships with the product software installed, so only perform the reinstallation if it becomes necessary. For more information on the software reinstallation, refer to the User Manual, volume 2.

System Diagnostics

In case of instrument problems, you may want to run the system diagnostics. See the *DTG5078 & DTG5274 & DTG5334 Performance Verification and Specifications Technical Reference manual* for more information on self tests and system diagnostics.

Operating Basics

This section contains information on the various interfaces for controlling the DTG5000 Series Data Timing Generator and basic menu operation of the instrument.

- *Front Panel Controls* on page 2-21 provides a quick overview of front panel controls such as the knob, buttons and keys.
- *Front Panel Connectors* on page 2-24 subsection provides a quick overview of front panel connectors.
- *Rear Panel Connectors* on page 2-27 provides a quick overview of rear panel connectors.
- *Display Area and Application Windows* on page 2-32 provides an overview of screen elements and the application windows.
- *Using the Menu System* on page 2-35 provides an overview of the menu and key operations of the data timing generator.

Front Panel

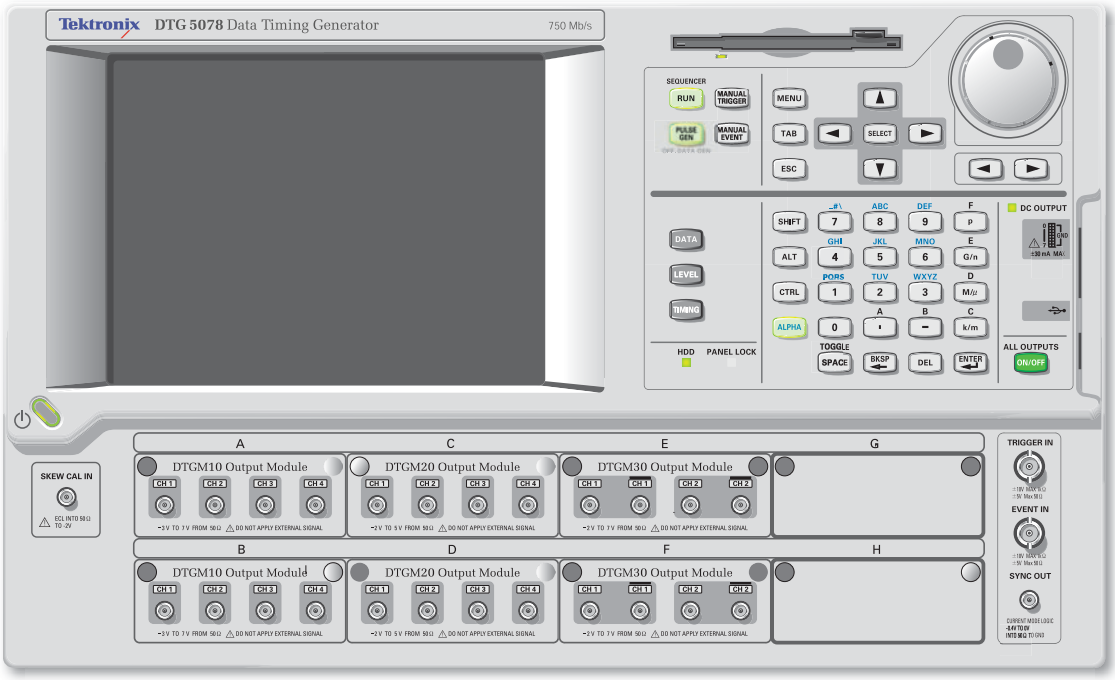


Figure 2-3: Front panel (DTG5078)

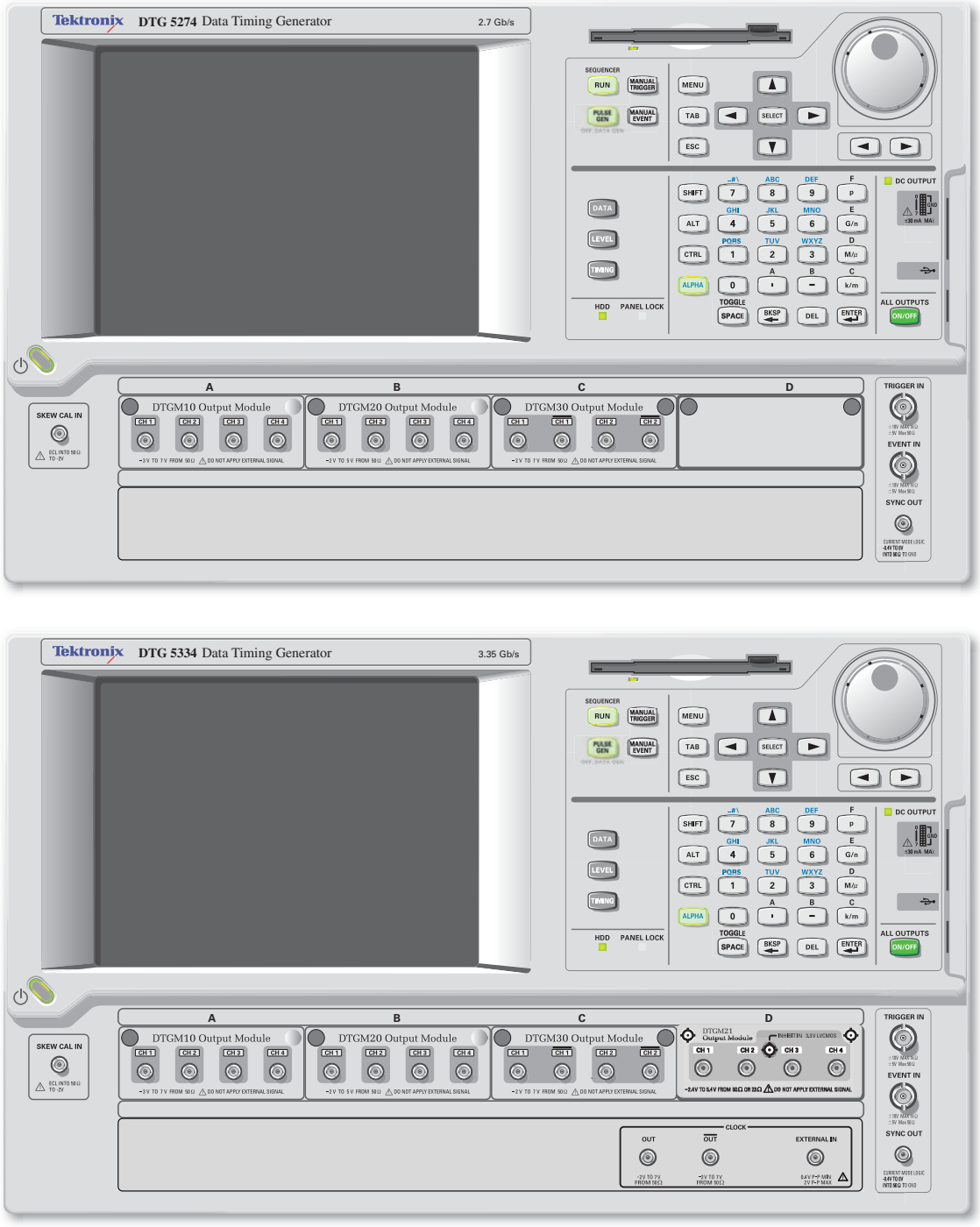


Figure 2-4: Front panel (DTG5274, DTG5334)

Front Panel Controls

This section introduces you to the front panel controls of the data timing generator, which provides a brief overview of how to use the front panel key controls.

In addition to the front panel controls, you can also control the data timing generator from a keyboard and a mouse (provided with the instrument).

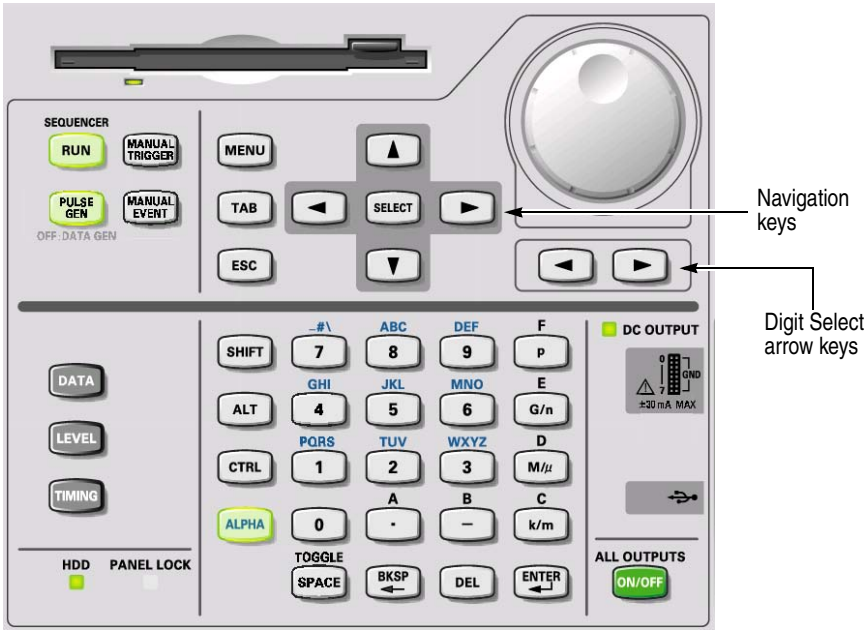


Figure 2-5: Front panel controls

Navigation Keys

The MENU and SELECT buttons, TAB, ESC, and the Up, Down, Left and Right arrow keys are called navigation keys. These buttons and keys allow you to perform the data timing generator basic windows operation without using a mouse or a keyboard. Figure 2-5 shows the locations of the front-panel controls.

Table 2-6: Front panel controls

Key, Button	Description
MENU button MENU	Opens the pull-down menu items of the last menu bar that you opened, regardless of current selection. To cancel the pull-down menu, push the **MENU** button again. Pressing the **ESC** key also forces the pull-down menu to disappear, however the menu bar is still active. If you press any arrow key in this state, the key operates on the menu bar area. Pressing the **ESC** key twice moves the focus to the lower window area.

Table 2-6: Front panel controls

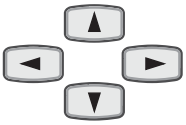
Key, Button	Description
SELECT button 	The SELECT button has the same capability as the Windows standard ENTER key. This button is mainly used for the following actions: ■ Use to make a selection on the pull-down menu items ■ Use to open a pop-up menu in a tabular view ■ Use to select an item in a pop-up menu Use to select **OK** or **Cancel** in the dialog box
TAB key 	The TAB key is used to move the focus within the window. By pressing the **SHIFT** and **TAB** keys simultaneously, you can move the focus in the reverse direction.
ESC key 	The ESC key is used to cancel text input or dialog box appearance. To cancel the menu items opened with the **MENU** button, press the **ESC** key twice.
Arrow keys 	The arrow keys are used for the following actions: ■ Use to open the pull-down menus on the menu bar and move to the desired items, after pushing the **MENU** button (you can also use the knob). ■ Use to move the current cell (cursor position) in a tabular view ■ Use to select a radio button The arrow keys have the capability of auto repeat.
DATA button 	Provide direct access to frequently used menus. The DATA button is used to display previously selected pattern data editing window (Data-Listing window or Data-Waveform window). While one window is displayed, pushing this button switches to the alternate window on the screen.
LEVEL button 	Provide direct access to frequently used menus. The LEVEL button is used to display the Level window and moves the focus to the previously selected items.
TIMING button 	Provide direct access to frequently used menus. The TIMING button is used to display the Timing window and moves the focus to the **Clock Frequency** or previously selected item.
Knob. 	The knob is used to increment or decrement a set value or select an item from a pop-up or pull-down menu. Use right or left arrow keys just under the knob to move the digit when you increment or decrement the setup value.
Digit Select arrow keys 	The Digit Select arrow key is used to move the underbar to a field that contains an editable number. This will allow you to change the digit.
RUN button 	The RUN button is used to control the start and stop of signal outputs. If the signal is being output, the LED indicator lights up  . To actually output the signal through the output connectors, you must turn the **Output** on in the Level window or push the front panel **ALL OUTPUTS ON/OFF** button.

Table 2-6: Front panel controls

Key, Button	Description
PULSE GEN button 	The PULSE GEN button is used to toggle between Pulse Generator and Data Generator modes. The LED lights up when the instrument is in PG mode.
MANUAL TRIGGER button 	The MANUAL TRIGGER button is used to generate an internal trigger.
MANUAL EVENT button 	The MANUAL EVENT button is used to generate an event signal internally.
Suffix buttons (p, G/n, M/µ, k/m)    	After you complete the input with numeric keys, you can determine the unit by pushing one of the suffix buttons, without pressing the Enter key. If you push a suffix button for a frequency, the unit is interpreted as G (giga-), M (mega-) or k (kilo-). If you push it for a time or voltage, the unit is interpreted as p (pico-), n (nano-), µ (micro-) or m (milli-).
SHIFT key 	The SHIFT key has the same capability as the Shift key on a Windows PC keyboard.
ALPHA key 	The ALPHA key is used to enter a character with a numeric key. Pressing the **ALPHA** key causes the LED to light up.  While the LED is on, the data timing generator is in the text input mode and you can use numeric keys to enter alphanumeric characters.
SPACE key 	The SPACE key switches the On/Off state of a check box. Pressing the **ALT** and **SPACE** keys simultaneously displays the Control menu. See *DTG icons* on page 2-32 for details on the Control menu.
ENTER key 	The ENTER key has the same capability as the Enter key on a Windows PC keyboard. This also switches the On/Off state of a check box.
BKSP key 	The BKSP key has the same capability as the Back Space key on a Windows PC keyboard.
DEL key 	The DEL key has the same capability as the Delete key on a Windows PC keyboard.
ALL OUTPUTS ON/OFF button 	This button is used to switch the on/off of channel output, DC output or clock output. To turn on or off these outputs, use the Level window, DC Output window, or Time Base window, respectively. You can turn on or off the channel (or DC or clock) outputs all together by using this button, instead of switching them the on/off separately. If you push this button while at least one active channel or DC output or clock output is on, all the outputs turn off. If you push this button while all the outputs are off, all the outputs turn on. In the Data Generator mode, the physical channels that are not assigned to a logic channel do not turn on.

Front Panel Connectors

Figure 2-6 shows the locations of the data timing generator front panel connectors.

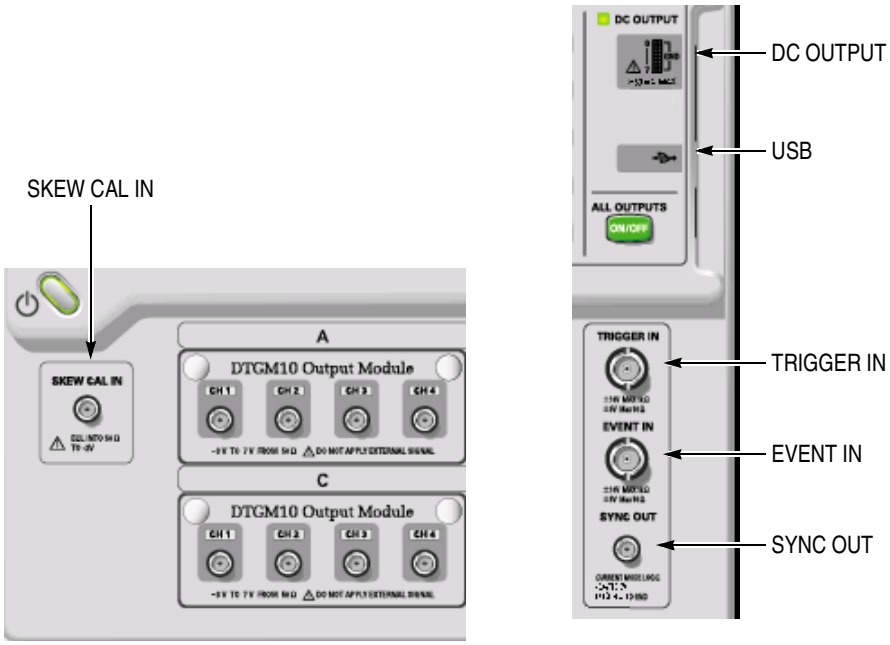


Figure 2-6: Front panel connectors

CAUTION. *To prevent damage to your data timing generator, do not apply a voltage outside the specified input voltage range.*

Do not apply a voltage to the output connector.

Table 2-7: Front panel connectors

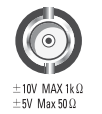
Connector	Description
TRIGGER IN 	External trigger signal input connector. Use for Wait Trigger on Sequence operation and for starting trigger of Burst mode on Pulse Generator operation. **Input Voltage Range.** ■ –5 V to +5 V, 50 Ω ■ –10 V to 10 V, 1 kΩ ■ Connector: BNC

Table 2-7: Front panel connectors (cont.)

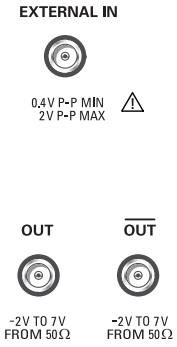
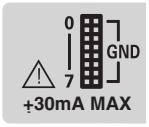
Connector	Description
EVENT IN 	Event signal input connector. Use for Event Jump on Sequence operation. **Input Voltage Range.** ■ –5 V to +5 V, 50 Ω ■ –10 V to 10 V, 1 kΩ ■ Connector: BNC
SYNC OUT 	Synchronized signal output connector for CML level. **Data Generator Mode.** A pulse is output at the head of each block of the output pattern. If the block repeats, the pulse is output at each repeated block head. **Pulse Generator Mode.** A single pulse is output at the timing of Burst. No signal is output in Continuous operation. ■ V_{OH} = 0 V, V_{OL} = –0.4 V into 50 Ω to GND ■ Connector: SMA
SKEW CAL IN 	Signal input connector for adjusting channel-to-channel skews. **Input Voltage Level.** ■ ECL into 50 Ω to –2 V ■ Connector: SMA
CLOCK 	The following external clock input/output signal connectors are provided in the DTG5334. **EXTERNAL IN.** Connect the external clock input signal. ■ Input Voltage Range: 0.4 V_{p-p} to 2 V_{p-p} into 50 Ω ■ Input Frequency Range: DTG5334: 1 MHz to 3.35 GHz **OUT, $\overline{\text{OUT}}$.** Outputs the clock signal. Amplitude and Offset can be set in the Time Base window. ■ Output Voltage Range VOH: –1.00 V to 2.47 V into 50 Ω to GND ■ Output Voltage Range VOL: –2.00 V to 2.44 V into 50 Ω to GND ■ Output Voltage Amplitude: 0.03 Vp-p to 1.25 Vp-p ■ Resolution: 10 mV ■ Signal type: Complementary ■ Connector: SMA ***NOTE.*** *A 50Ω SMA termination is provided with your data timing generator mainframe. When you use the instrument with single end, attach the termination to the unused connector.*

Table 2-7: Front panel connectors (cont.)

Connector	Description
DC OUTPUT 	Outputs eight channel DC voltages. This signal is independent of the output module signal. **Output Voltage Range.** ■ – 3.0 V to 5.0 V ■ Connector: 2.54 mm 2 x 8 pin header (female)
USB 	Connect a USB device.

Rear Panel Connectors

Figure 2-7, Figure 2-8, and Figure 2-9 show the locations of the data timing generator rear panel connectors.

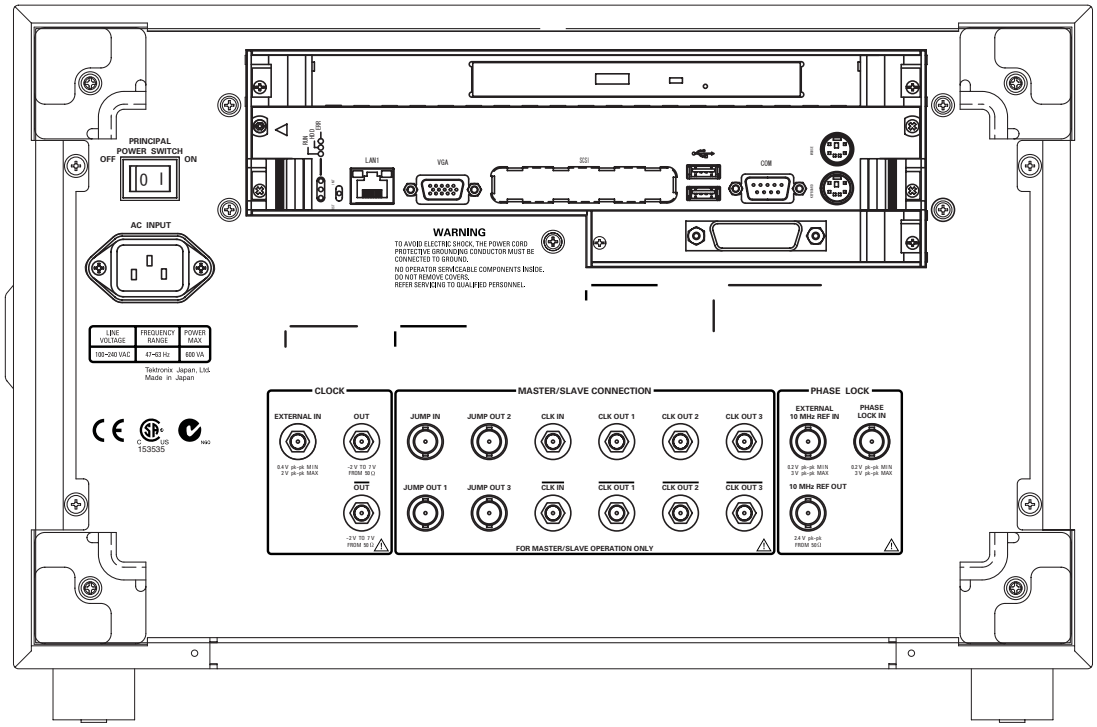


Figure 2-7: Rear panel (DTG5078)

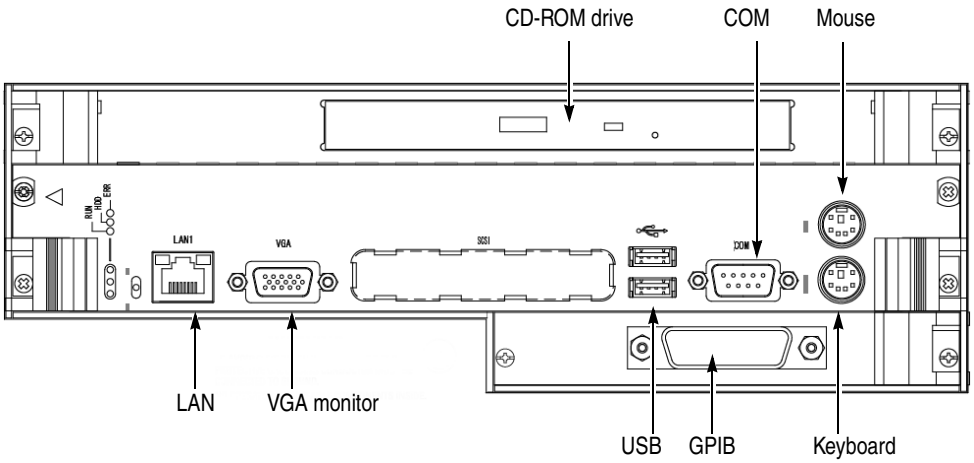


Figure 2-8: Rear panel connectors (1)

Table 2-8: Rear panel connector (1)

	Description
CD-ROM drive	The CD-ROM drive is used to reinstall the DTG5000 product software or to rebuild the operating system.
COM	COM port.
Mouse	Connect a PS/2 mouse. A USB mouse must be connected to the USB port.
Keyboard	Connect a PS/2 keyboard. By connecting a keyboard and mouse to the connectors, you can perform the Windows PC operations more easily. A USB keyboard must be connected to the USB port.
GPIB	The GPIB port. Used to control the data timing generator through the GPIB.
USB (2 each)	Connect a USB device. The keyboard and mouse of the data timing generator standard accessories must be connected to the USB port.
VGA	If an external display is connected to this connector, the same image as the data timing generator LCD screen is displayed on it. **Resolution Settings.** ■ The 800 by 600 setting is recommended. ■ It is possible to set the data timing generator display off (from the Control Panel settings) and to display the screen image with external display. In this condition, images can be displayed at a higher resolution. If the external display is disconnected from the connector, images are displayed on the data timing generator screen at a resolution of 800 by 600 pixels, regardless of the resolution settings of the external display.
LAN	LAN is a port used to connect the data timing generator to a network. Connect a 10Base-T or 100BASE-T connector here. In the Master-Slave operation, the Master mainframe controls the Slave machine by way of network.

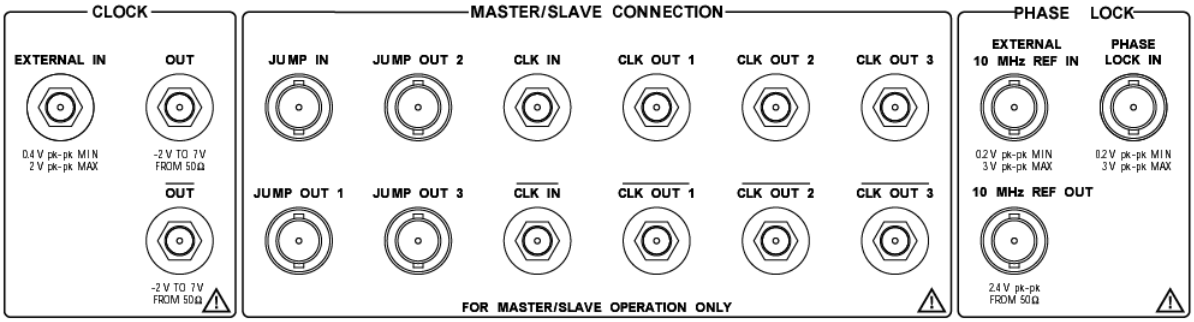


Figure 2-9: Rear panel connectors (DTG5078) (2)

CAUTION. *To prevent damage to your data timing generator, do not apply a voltage outside the specified input voltage range.*

Do not apply a voltage to the output connector.

Table 2-9: Rear panel connectors (2)

Connector	Description
CLOCK EXTERNAL IN 0.4 V pk-pk MIN 2 V pk-pk MAX OUT -2 V TO 7 V FROM 50 Ω $\overline{\text{OUT}}$ -2 V TO 7 V FROM 50 Ω	The following external clock input/output signal connectors are provided. (These are provided on the front panel in the DTG5334) **EXTERNAL IN.** Connect the external clock input signal. ■ Input Voltage Range: 0.4 V_{p-p} to 2 V_{p-p} into 50 Ω ■ Input Frequency Range: DTG5078: 1 MHz to 750 MHz DTG5274: 1 MHz to 2.7 GHz **OUT, $\overline{\text{OUT}}$.** Outputs the clock signal. Amplitude and Offset can be set in the Time Base window. ■ Output Voltage Range VOH: –1.00 V to 2.47 V into 50 Ω to GND ■ Output Voltage Range VOL: –2.00 V to 2.44 V into 50 Ω to GND ■ Output Voltage Amplitude: 0.03 Vp-p to 1.25 Vp-p ■ Resolution: 10 mV ■ Signal type: Complementary ■ Connector: SMA ***NOTE.*** *A 50Ω SMA termination is provided with your data timing generator mainframe. When you use the instrument single-ended, attach the termination to the unused connector.*

Table 2-9: Rear panel connectors (2) (cont.)

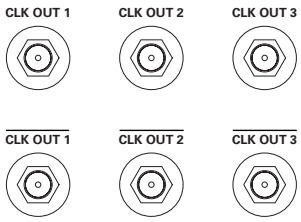
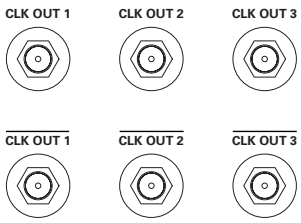
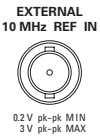
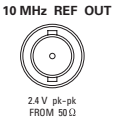
Connector	Description
Master-Slave Connection: **CLK IN, $\overline{\text{CLK IN}}$** 	Clock, Jump and Timing signals used for Master-Slave operation. Clock signal input connector to receive the clock signal from the master-mainframe. ■ Voltage level: ECL ■ Connector: SMA
CLK OUT1, CLK OUT2, CLK OUT3, **$\overline{\text{CLK OUT}}$1, $\overline{\text{CLK OUT2}}$, $\overline{\text{CLK OUT3}}$** 	Outputs the clock signals from the master-mainframe to control the clock of slave-mainframe. Connect the CLK OUT1 to CLK IN of master-mainframe. Only the DTG5078 is equipped with CLK OUT3 and $\overline{\text{CLK OUT3}}$. ■ Connector: SMA
JUMP IN 	Signal input connector to control the sequence waveform outputs in Master-Slave operation. Connect the master-mainframe JUMP OUTx signal to the slave-mainframe JUMP IN. ■ Connector: BNC
JUMP OUT1, JUMP OUT2, JUMP OUT3 	Signal output connectors to control the sequence waveform outputs in Master-Slave operation. This signal is used to control sequence waveform jumps of slave-mainframe. Connect the JUMP OUT1 to JUMP IN of master-mainframe. Only the DTG5078 is equipped with JUMP OUT3. ■ Connector: BNC

Table 2-9: Rear panel connectors (2) (cont.)

Connector	Description
PHASE LOCK: **PHASE LOCK IN,** 	External PLL input/output signal connectors. External PLL input signal connector. ■ Input Voltage Range: 0.2 V_{p-p} to 3.0 V_{p-p} ■ Input Frequency Range: 1 MHz to 200 MHz ■ Impedance: 50 Ω, AC coupled ■ Connector: BNC
EXTERNAL 10 MHz REF IN 	External 10 MHz reference clock input signal connector. ■ Input Voltage Range: 0.2 V_{p-p} to 3.0 V_{p-p} ■ Input Frequency Range: 10 MHz ± 0.1 MHz ■ Impedance: 50 Ω, AC coupled ■ Connector: BNC
10 MHz REF OUT 	Outputs 10 MHz reference clock signal. ■ Output Voltage Amplitude: 1.2 V_{p-p} into 50 Ω to GND 2.4 V_{p-p} into 1 MΩ to GND ■ Impedance: 50 Ω, AC coupled ■ Connector: BNC

Display Area and Application Windows

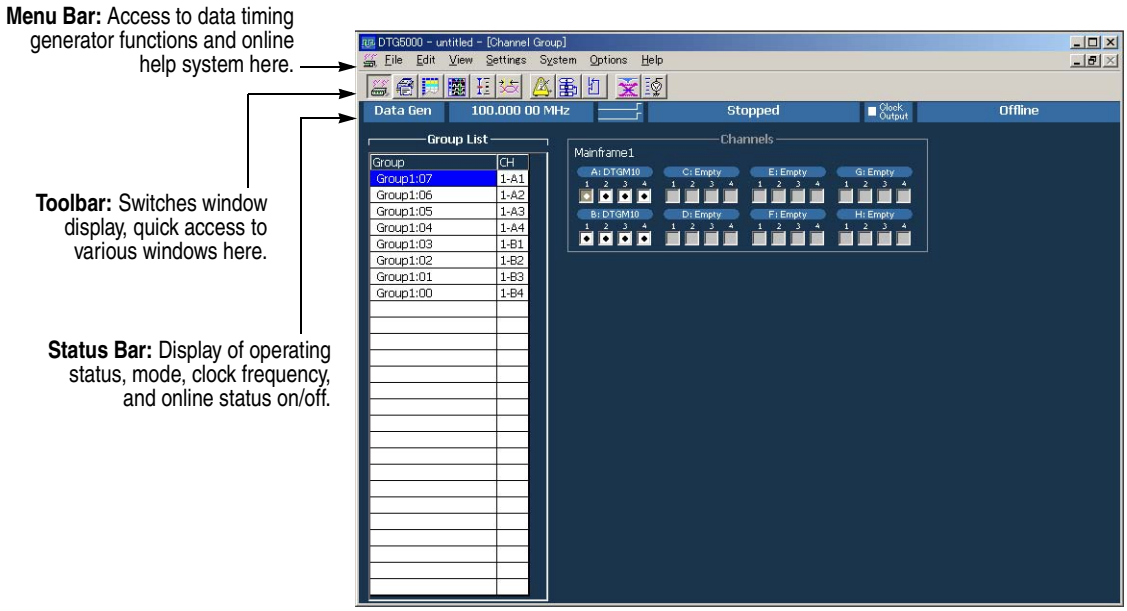
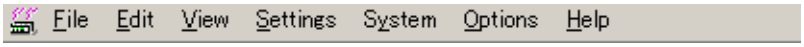


Figure 2-10: Screen elements just after the power on

Menu Bar

You can access each of the menu bar items by using the **MENU** button and the Up, Down, Left and/or Right arrow keys.



DTG icons (control box menus). These menus control the data timing generator window operations.

File Menu. The File menu controls the data timing generator file operations.

Edit Menu. The Edit menu shows various pull-down menus depending on the active window or the items specified by cursor. Refer to each window description.

View Menu. The View menu controls the data timing generator display.

Settings Menu. The Settings menu allows the selection of setup windows.

System Menu. The System menu contains the items related to the data timing generator system.

Options Menu. The Options menu contains the Preference item that is used for the instrument setup.

Help Menu. The Help menu contains help topics and password input box.

Toolbar. The toolbar contains the shortcut buttons for the data timing generator. Accessing the toolbar requires a mouse. Two types of toolbars are provided; the common toolbar (common to all windows) and specific toolbars (for individual windows). See Figure 2-11 on page 2-34.

To hide or display the toolbar on the screen, select **Toolbar** from the **View** menu.

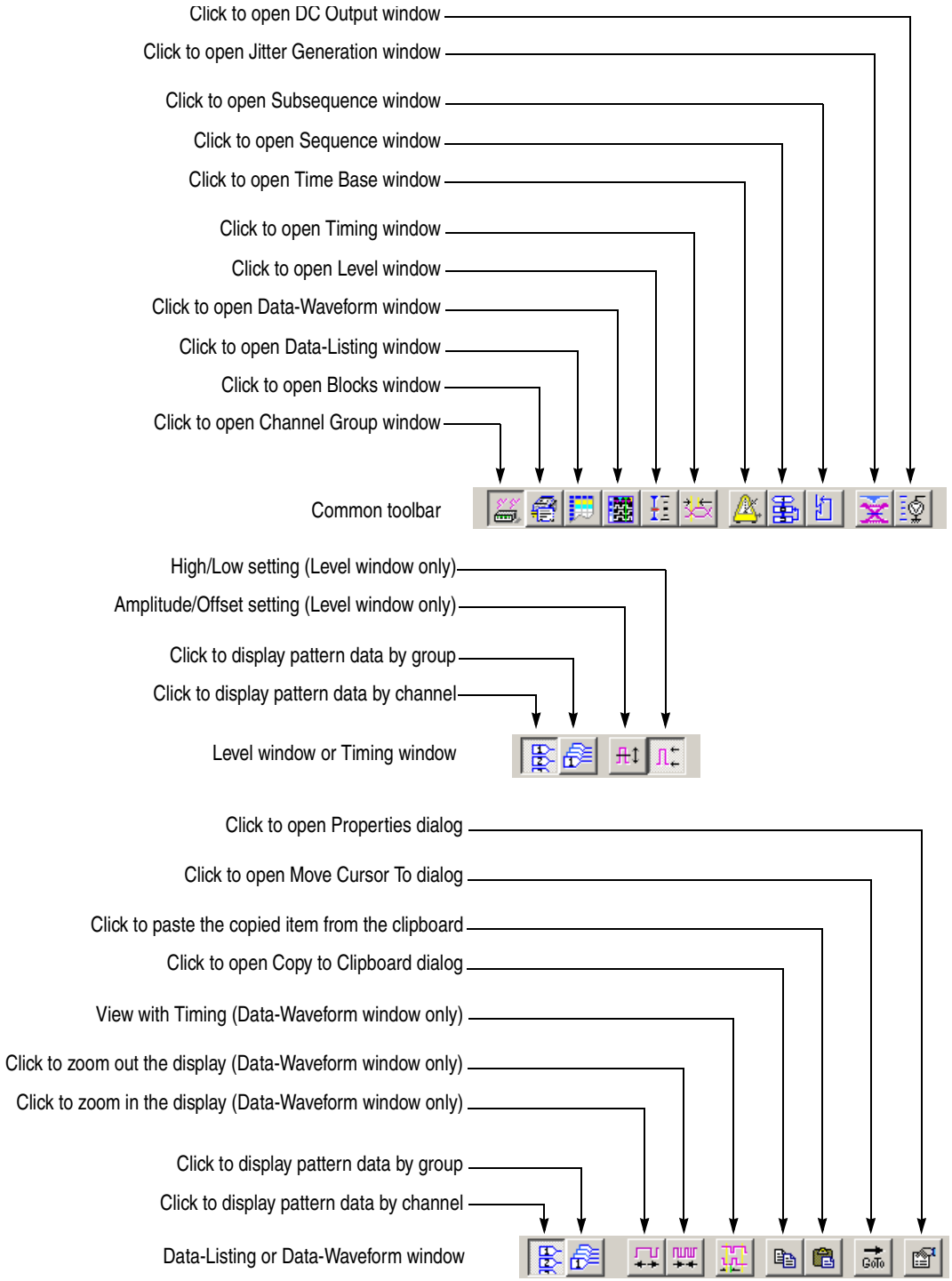


Figure 2-11: Toolbar

Status Bar. The status bar provides useful information about the state of the data timing generator operation or setup.

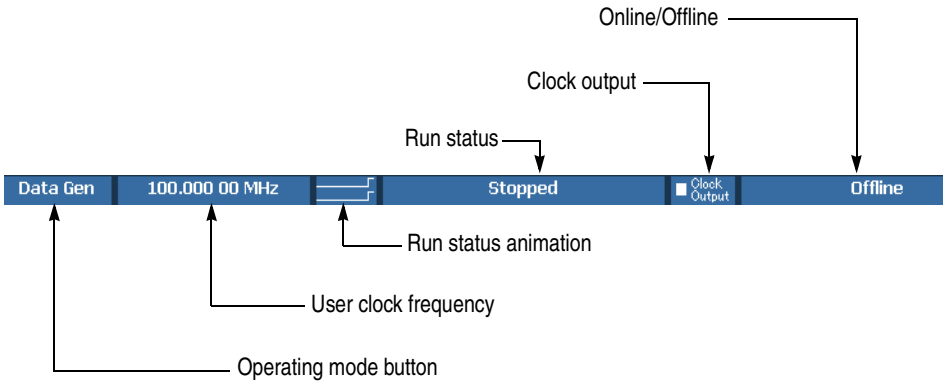


Figure 2-12: Status bar

Using the Menu System

This section describes the basic operation of the data timing generator using the front panel keys, buttons and knob.

Menu System

Pushing the front panel **MENU** button displays the last menu you selected on the menu bar.

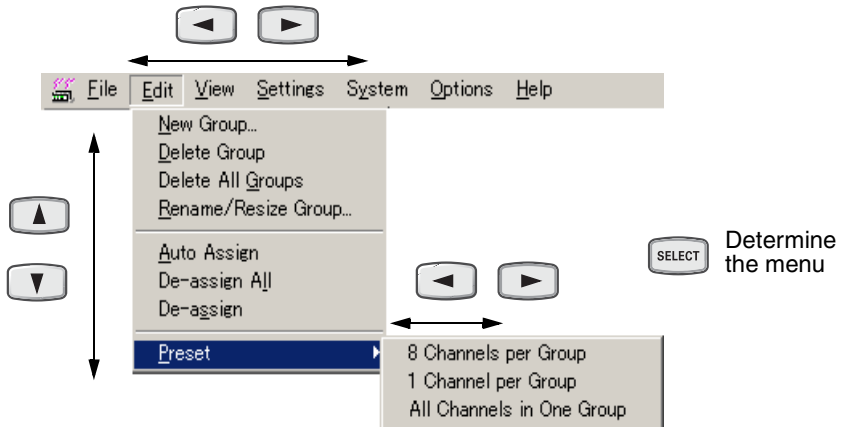


Figure 2-13: Menu selection

Table 2-10: Menu selection

Key	Description
MENU	Displays the last menu you selected on the menu bar. Cancel the menu display when a menu is displayed.
▼ ▲	Navigates through a pull-down menu list. You can also use the knob instead of the arrow keys to navigate through a menu list.
◄ ►	Shows a submenu (▶). Navigate s through the menu bar pressing on a menu item not having any submenu.
SELECT	The menu is determined.
ESC	To cancel the menu display, press the **ESC** key twice. When you press it only once, the menu bar is still active although the display disappears. In this state, you can navigate through the menu bar by pressing the ◄ ► 、 ▼ ▲ keys.
ALT	Activates the menu bar. Then, you can make a menu selection using the ◄ ► 、 ▼ ▲ keys.

Pop-up Menu Items. In the individual data timing generator windows, selecting the setup item and pushing the front panel **SELECT** button displays the pop-up menu item(s) corresponding to the selected item.

Using a Window

The data timing generator windows contain various items of information. Input of numeric values such as the output level and clock rate, selection of the trigger source and other settings, creation of the pattern data, and other operations can be performed.

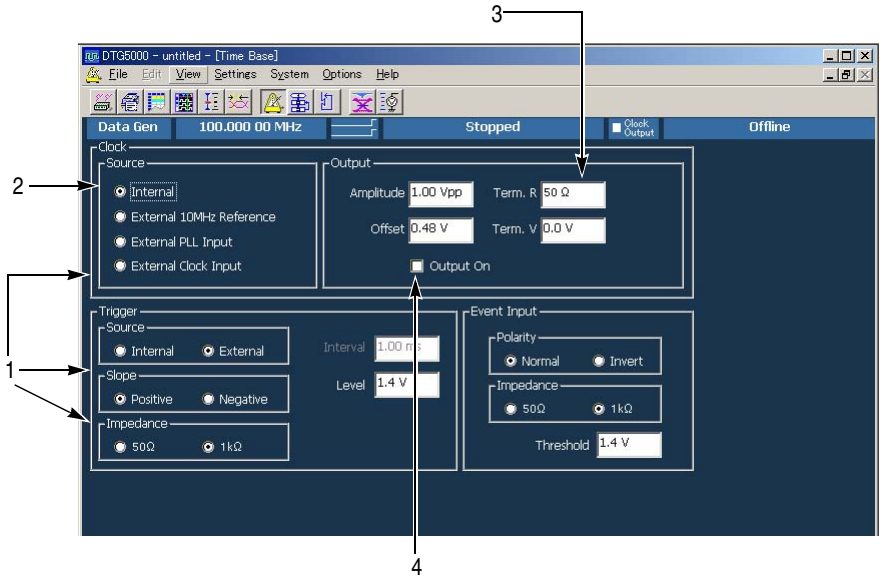


Figure 2-14: Window operation: Time Base window

Table 2-11: Time Base Window operation

Key operation	Description
TAB	**1.** To navigate through the Clock Source, Output Amplitude, and other similar items, use the **TAB** key. You can navigate through these in the reverse direction by pressing the **SHIFT** and **TAB** keys simultaneously. Displays the last menu you selected on the menu bar.
▼ ▲ ◄ ►	**2.** To select the parameter with radio buttons such as Clock Source or Trigger Source, use the Up, Down, Left and/or Right arrow key.
 	**3.** Any numeric input box has a unit attribute according to the setting. The unit attribute s is for the time, V for the voltage, Ω for the resistance, or nothing for the count or size. To enter a numeric value, use either numeric keys or the knob. For details, see *Numeric Input* on page 2-38.
SPACE	**4.** To place the check sign into a check box such as **Output On**, use the **SPACE** key.

Numeric Input

Any numeric input box has a unit attribute according to the setting. The unit attribute s is for the time, **V** for the voltage, Ω for the resistance, or nothing for the count or size. The data timing generator recognizes the range of the acceptable parameter values. If you enter a value outside the valid range, the maximum or minimum value will be set automatically. To enter a numeric value, use either numeric keys or the knob.

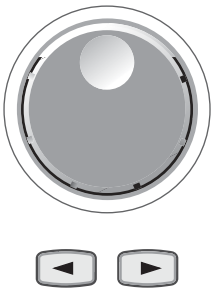
Using the Numeric Keys. Auxiliary unit keys such as k/m and M/μ are available. For k (kilo-), m (milli-), M (mega-), and their related units, the one suitable for the parameter is selected automatically.

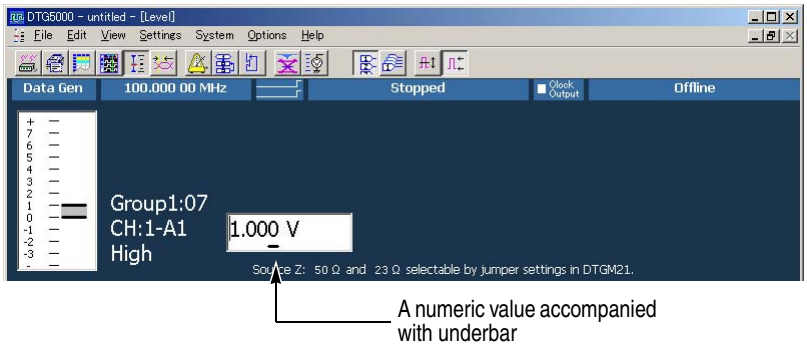
Table 2-12: Example of Numeric Keys input

Key operation	Description
Example 1: Amplitude 0 , · , 5 , and ENTER	If you press in this order, 0.5 V is entered.
5 , 0 , 0 , and k/m	If you press in this order, 0.5 V (500 mV) is entered.
Example 2: Term Z 5 , 0 and ENTER	f you press in this order, 50 Ω is entered.
1 and M/μ	If you press in this order, 1 MΩ is entered.

Using the Knob. If a numeric value is accompanied with an underbar, you can use the knob for editing it. The digit accompanied with an underbar can be edited.

To move the underbar to the target digit to be edited, use the Left and/or Right arrow key under the knob. See Figure 2-5 on page 2-21 for the location of the key.





Using the External Keyboard. Numeric keys above the alphabetical letter keys, not those on the numeric keypad, are available on the external keyboard. The k (kilo-), M (mega-), G (giga-), m (milli-), µ (micro-), n (nano-) and p (pico-) keys are available for auxiliary units.

Text Input

To enter text from the front panel, use the **ALPHA** ALPHA key and numeric keys. Push the ALPHA key to activate the text input mode. In this mode, you can enter characters that are printed above each numeric key. The ALPHA key's LED stays lit ALPHA if the text input mode is selected.

Table 2-13: Example of Numeric Keys input

Key operation	Description
ALPHA ALPHA	Indicates DtG5000 is in the numeric input mode. Pressing this key changes in the text input mode. Indicates DtG5000 is in the text input mode. Pressing this key changes in the numeric input mode.
	By pressing a numeric key repeatedly, the characters indicated above the key are displayed Example: Pressing the 8 key displays a at the caret. If you press the 8 key repeatedly, the character changes to b, c, A, B, C and 8 in order.
another numeric key or ◄ ►	When you press another numeric key or the Left or Right arrow key, the character currently displayed is determined and the caret moves.
another numeric key or ENTER	By pressing the ENTER key or another numeric key, the character is also determined.
Any key unrelated to text input or ESC ENTER	If you press a key unrelated to text input or the ESC key, or use the ENTER key to determine the character, the mode automatically changes from text input to numeric input.

File Operations

To save or load the setup file or import data that has been created on another device, use the Windows standard file I/O dialog box. The data timing generator file operations are the same as the general PC file operations. If the mouse is not used, several restrictions are applied to the file operations.

Selecting a file. Do the followings steps to select a file without using a mouse.

Table 2-14: Selecting a file

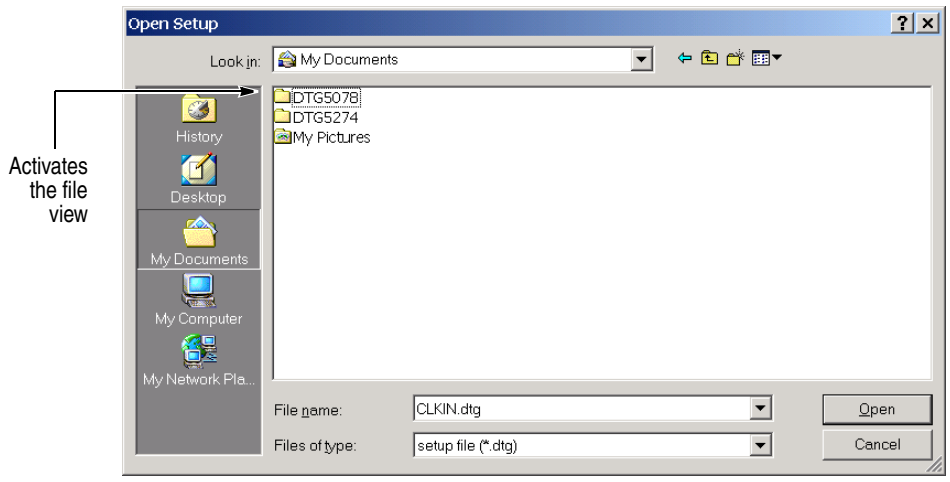
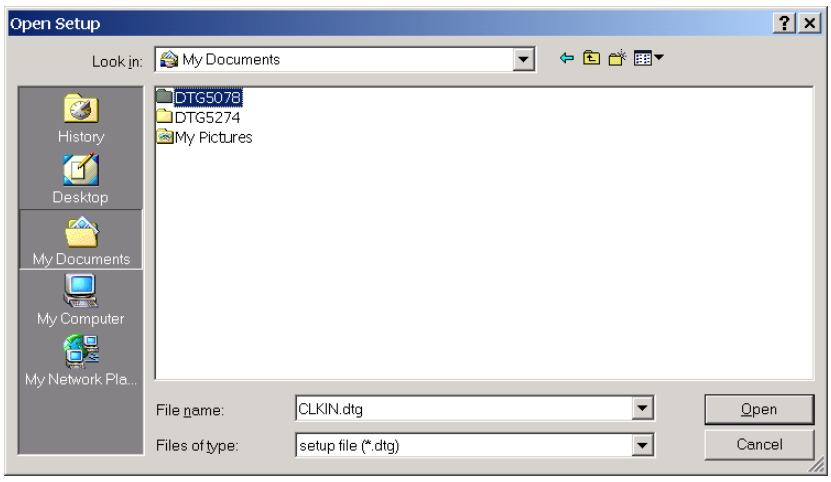
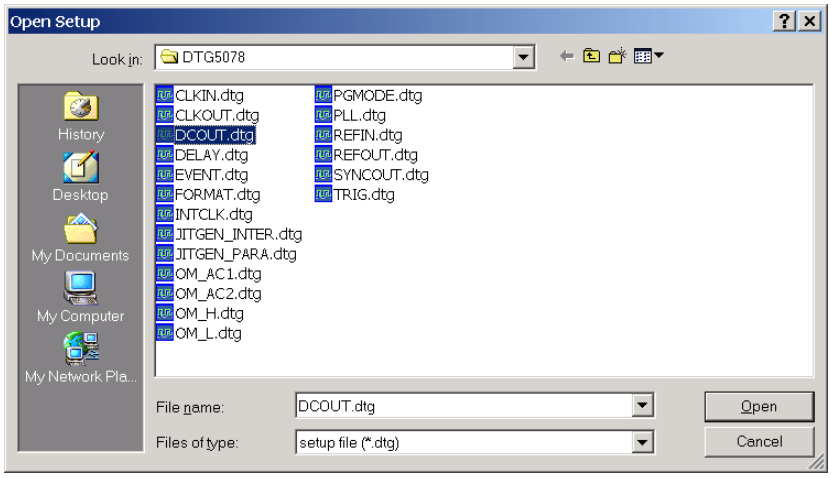
Screen	Key operations
	1. Press the TAB key repeatedly to activate the file view.
	2. Browsing a folder: ▼ ▲ :select the folder. ENTER : open the folder BKSP : move the folder hierarchy up

Table 2-14: Selecting a file (cont.)

Screen	Key operations
	**3.** Specify the file:  :Select the file  : Open the file

Key Operations

Table 2-15 summarizes the data timing generator key operations.

Table 2-15: Key operations

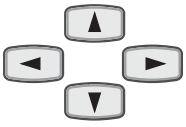
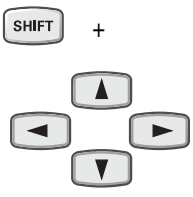
Items	Description
	Displays the last menu you opened on the menu bar.
	Moves the focus through items in the window. Pressing SHIFT and TAB keys simultaneously reverses the moving direction.
	Moves the cursor through items on the menu, moves the caret during text input, or selects a radio button.
	Selects multiple items (Data-Listing/Data-Waveform window), or shifts the current line (SHIFT + Up/Down arrow key only; Timing/Level window).

Table 2-15: Key operations

Items	Description
	Changes a numeric value, moves the cursor through menu items, moves the focus in a table or list, moves the cursor through the Data-Listing or Data-Waveform window, toggles between multiple items for a parameter in the Timing/Level window (NRZ/RZ/R1, On/Off, Normal/Invert, Normal/AND/XOR, etc.), or selects an item from a combo box.
◄ ► Digit Select arrow keys	Located just below the knob. Moves the cursor through digits while using the knob to enter a numeric value. Refer to page 2-21.
SPACE	Turns on or off the check sign in a check box, or toggles between two options for a parameter in the Timing or Level window (On/Off, Normal/Invert, etc.).
ALT	Activates the menu bar.
ALT + ESC	Switches the active application.
ALT + ESC	Switches the application (selected with icon display).
ALT + SPACE	Displays window control menu. You can move/resize/close the window.
ALT + F4	Exits the application. (Available only from the external key board)
ESC	Cancels text input or a dialog box. Cancels display of a menu opened with the SELECT key. To cancel a menu opened with the MENU key, press ESC key twice.
CTRL + TAB	Switches the active window in the application.
CTRL + ◄ ►	Moves the cursor between digits during numeric input.
CTRL + ▼ ▲	Increments or decrements the value during numeric input.
CTRL + ESC	Displays the Windows Start menu.
CTRL + ALT + DEL	Forcibly exits the application. (Available only from the external key board)

Keyboard and Mouse

As the standard accessories, a USB keyboard and USB mouse are shipped with the data timing generator. Though it is possible to operate the instrument only with front panel controls, attaching the mouse and external keyboard to the data timing generator mainframe makes the operation more easily. Read the following topics related to the mouse and external keyboard.

When you set up the Windows operating system or perform the system recovery, the external keyboard and mouse are required.

You can connect or remove the USB devices while the data timing generator powered on.

Mouse.

- Using a mouse allows you to access the toolbar icons, each window buttons and scroll bar which cannot be accessed from the data timing generator front panel controls.
- In the data editing windows such as Data-Listing or Data-Waveform, or in the setup windows such as Timing or Level, you can access the area you cannot access from the keyboard. By dragging, right clicking or left clicking the mouse allows you to access those functions.

Keyboard.

The Delete and Back space (BS) functions are assigned to a single key. To use it as BS, press **Fn+Delete**. If you want to use a key as labeled on the key front (such as BS, F1, F2...), press it while holding down the **Fn** key.

- The ◇ key operates as the Windows key.
- You can assign the **Delete** key to the **BS** key using a SW3 DIP switch located on the back. In this case, you can input **Delete** by pressing **Fn+'**. For details of the DIP switches, refer to the underside of the keyboard.
- After you power on the instrument for the first time, you have to set up Windows. Connect the keyboard supplied with the instrument before turning on the power.

NOTE. *If you need to perform the system recovery, you must use a PS/2 keyboard and PS/2 mouse.*

Theory of Operation

Theory of Operation

This section presents an overview of DTG5000 Series Data Timing Generator hardware, the data structure, and operating modes to allow you to take full advantage the capabilities of the data timing generator.

Interconnect Diagrams

Figure 3-1, 3-2, and 3-3 show the data timing generator circuitry. This section describes the hardware blocks that provide the background knowledge necessary to use the instrument effectively.

The DTG5000 Series consists of four major electrical sections: Mainframe section, Main board (A50/A51/A54), Output board (A60/A61/A62/A63), and Output Module (DTGM10/M20/M21/M30/M31/M32).

Mainframe Section

The mainframe section consists of the following modules and components:

Compact PCI CPU Module

The Compact PCI CPU Module contains a Celeron CPU, DRAM, and HDD. This module has various connectors on rear panel, such as VGA, LAN (100 Base-T), Key Board (PS2), Mouse (PS2), USB1.1 (2 each), and COM.

The Compact PCI CPU Module receives commands from the Front Key Board, GPIB interface and Ethernet interface, controls all hardware in DTG5000 Series by DTG5000 series product software. All control signals are transmitted through the PCI I/F Board.

A30 Compact PCI Backplane board

The A30 Compact PCI Backplane board consists of a few decoupling capacitors and LVDS panel control for EMI. The back plane has two Compact PCI slots and three local bus slot. This board receives power from the Power Supply module through the A10 Connector & PCI I/F board and sends power to the CPU board. This board also has the local bus for operating various hardware in the DTG5000 Series.

A10 Connector & PCI Interface board

The A10 Connector & PCI Interface board supplies power to all modules and converts a PCI bus to a local bus. This board also handles Power On control, Fan control, and LVDS Panel Control.

Compact PCI GPIB Module

The Compact PCI GPIB Module is a Compact PCI GPIB card (PXI-GPIB) made by National Instruments. Refer to the National Instruments user manual for details. This module is controlled by the Microsoft Windows 2000 Operating System.

CD-ROM Module

The CD-ROM Module is placed on the A32 CD-ROM Extender board with the dedicated flexible circuit board. This CD-ROM Module is controlled by the Microsoft Windows 2000 Operating System.

LCD Display & Back light

The LCD Monitor is a TFT-type LCD module. This module receives the video signal from the CPU Board through the A10 Connector & PCI Interface board.

A20 Front Key & DC Output Board

The A20 Front Key & DC Output board contains a scan rubber button matrix, LEDs, a rotary encoder and DC Output circuitry. This keyboard interface is compatible with the AWG400/500/600/700 series arbitrary waveform generator.

Power Supply Module

Power Supply Module provides +5 V, +3.3 V, -4.5 V, -2 V, +12 V, and -8 V. This module features the voltage switching regulation and the remote switching mechanism for the ON/STBY switch on the front panel. The Power Supply module sends various regulated voltages to all boards in the mainframe through the A10 Connector and PCI Interface board. The remote switching signal that is generated on the front panel is sent to the CPU Module through the A10 Connector & PCI Interface board. The CPU Module controls the power supply by using the remote control with the Power Supply Module. Software shutdown is also available.

Main Board Section (A50/A51/A54)

The Main board consists of CPU Interface, Pattern Memory, Sequencer, PLL, Trigger Control, Clock Out (DTG5078: A54, DTG5274: A50, DTG5334: A51).

Output Board Section (A60/A61/A62/A63)

The Output board consists of Delay Line and CPU interface (DTG5078: A62& A63), DTG5274: A60, DTG5334: A61).

Output Module Section (DTGM10/M20/M21/ M30/M31/M32)

The Output Module consists of Pin-Driver IC, relay, FPGA for signal decoding. Six kinds of Output Module are prepared at this time. The main difference between these Output Modules is that a different pin driver IC is adopted. These six Outputs Modules are called DTGM10, DTGM20, DTGM21, DTGM30, DTGM31 and DTGM32.

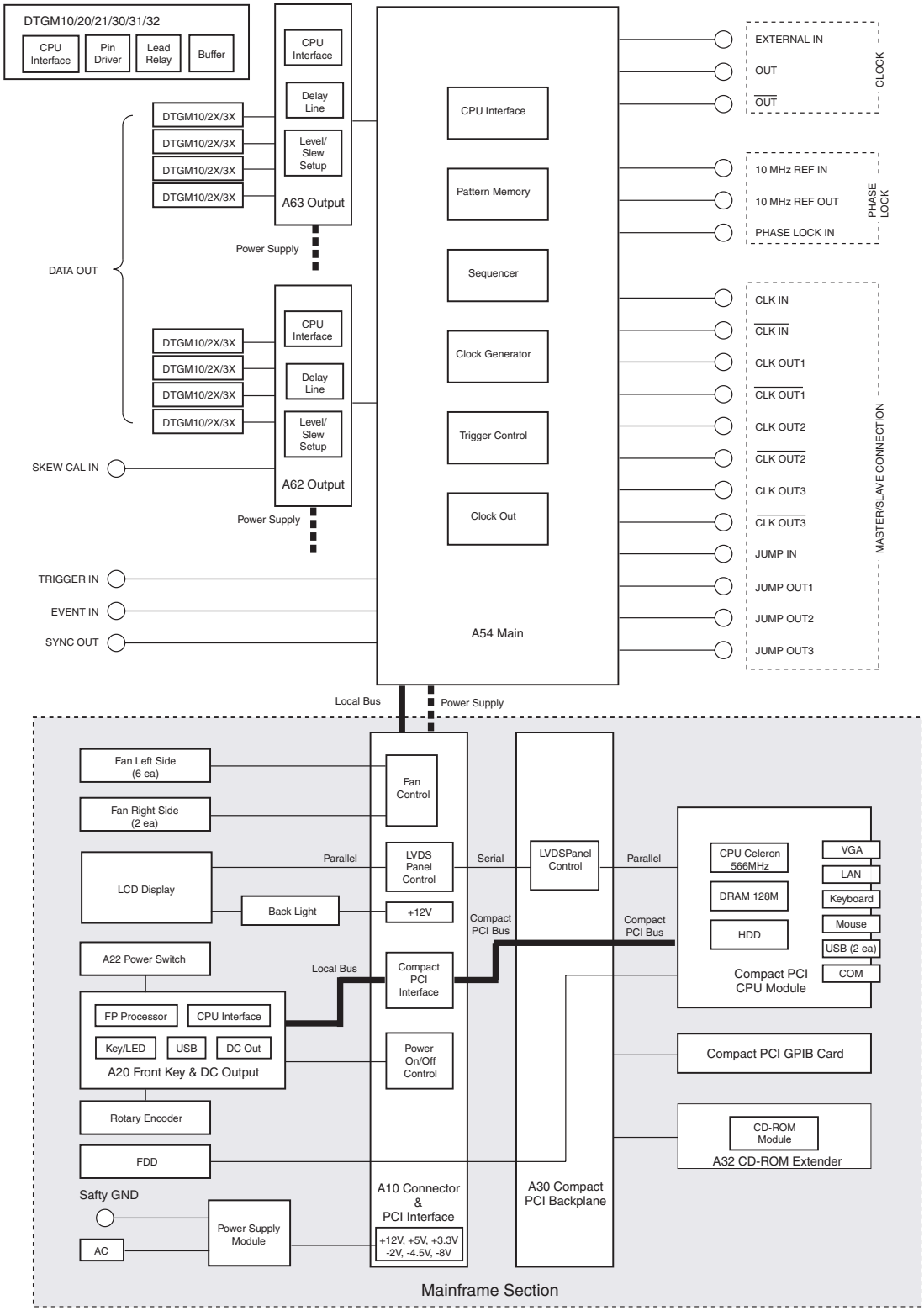


Figure 3-1: DTG5078 interconnection diagram

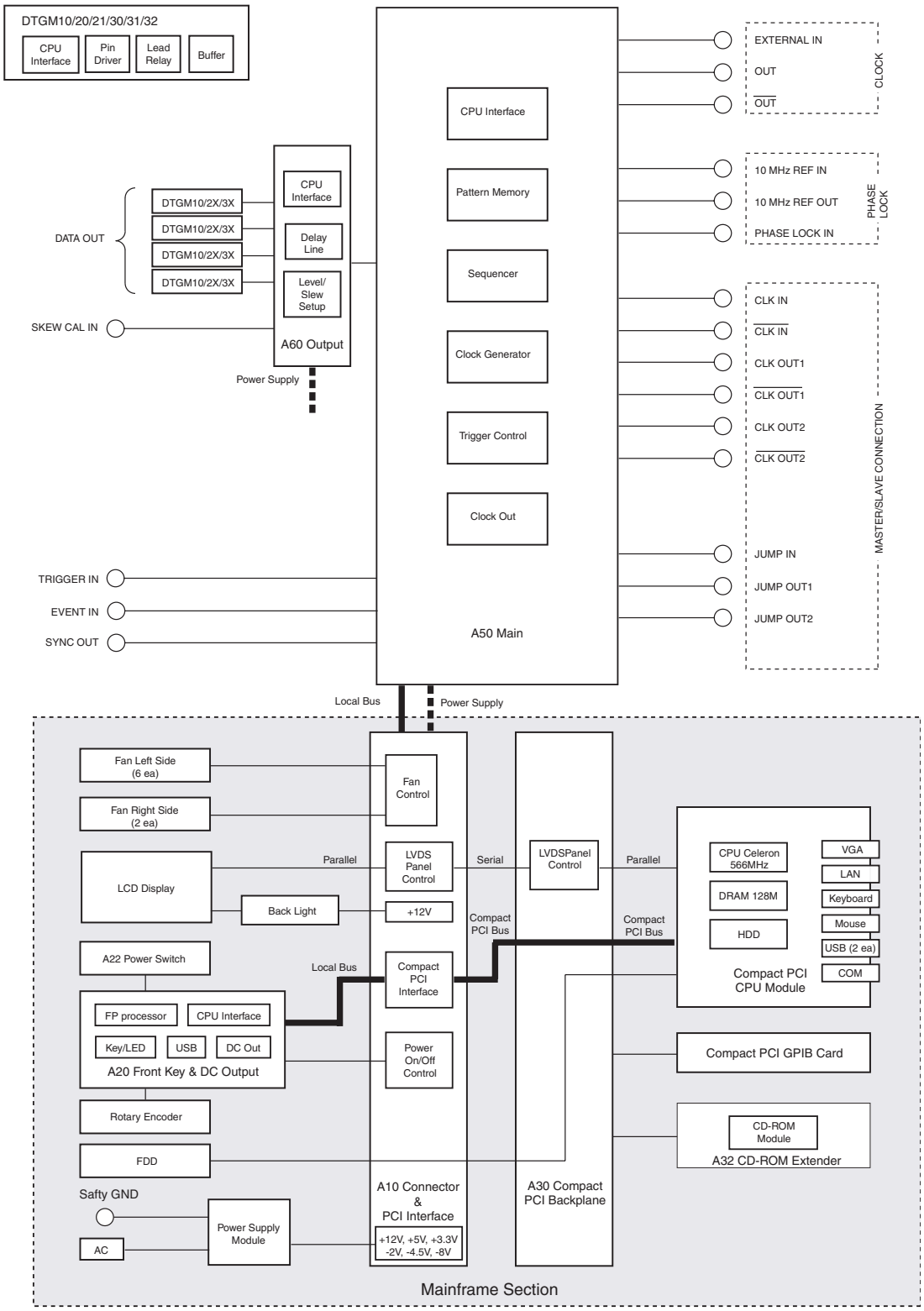


Figure 3-2: DTG5274 interconnection diagram

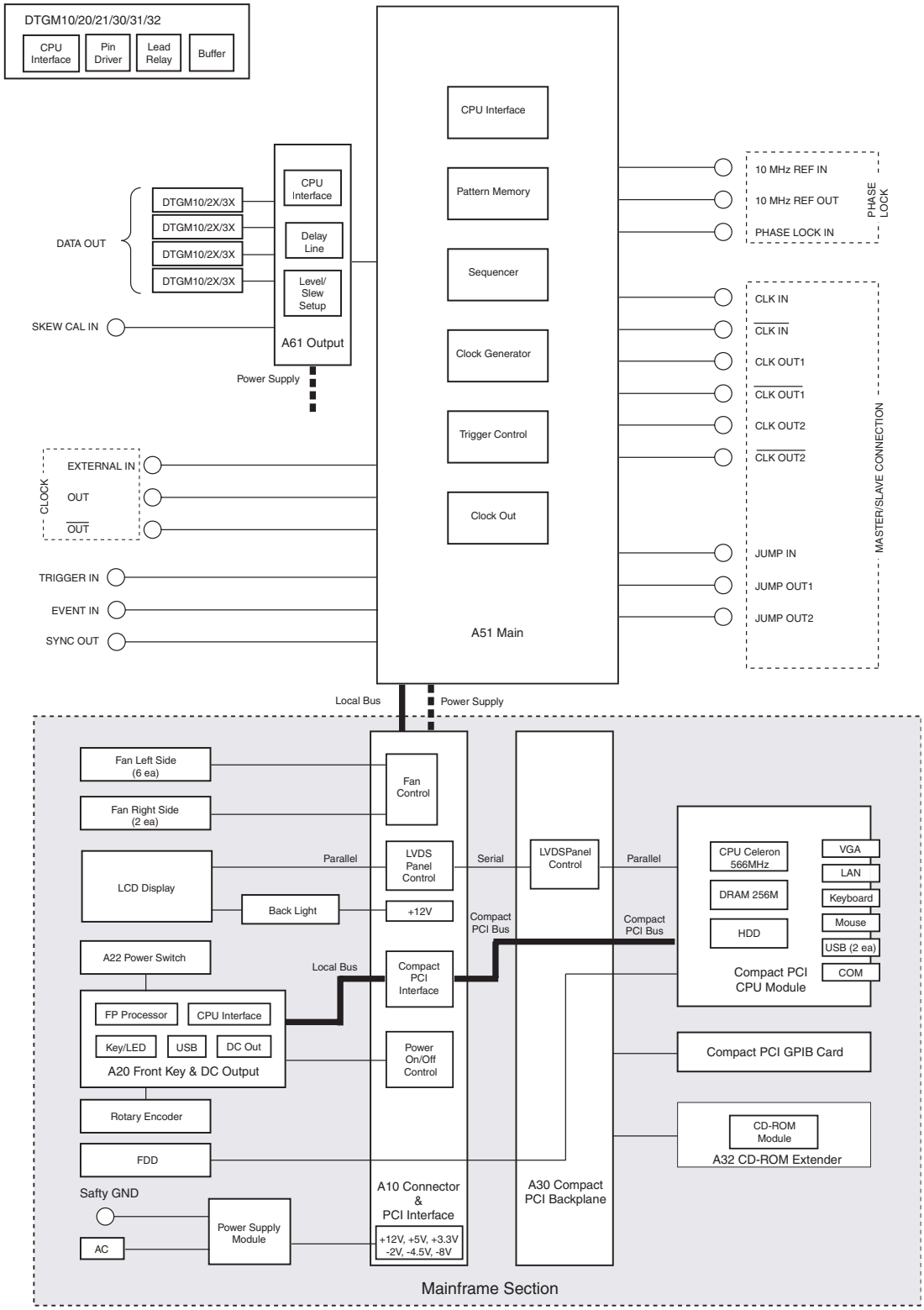


Figure 3-3: DTG5334 interconnection diagram

Block Diagrams

Figure 3-4, 3-5 and 3-6 show the main hardware blocks that make up the DTG5000 series. The DTG5000 series consists of three parts: Clock Generator, Pattern Generator, and Timing Control & Output.

Clock Generator

The Clock Generator consists of 10 MHz TCXO, External 10 MHz Reference, DDS (Direct Digital Synthesis), PLL (Phase Locked Loop), Divider, ASIC including Divider and Trigger Control, and Clock Out. DDS generates a clock from 1 MHz to 2 MHz as a reference signal of an internal 10 MHz TCXO or an external 10 MHz Reference signal selected by SW1. The PLL generates a clock from 500 MHz to 1 GHz in the DTG5078 and from 2 GHz to 4 GHz in the DTG5274/ DTG5334. Either the DDS output or an external divided Phase Lock In is the reference signal for PLL. SW2 selects one of these signals as a reference source. SW3 selects either the PLL output or external CLOCK IN as an internal clock. SW4 should be connected to the CLK IN for Master-Slave in the case of Master-Slave Operation. The internal clock generated at this block is sent to several circuits in the Pattern generator block. The External Clock out can be controlled by the amplitude and offset because this has a high speed pin driver.

Pattern Generator

The Pattern Generator consists of Sequence RAM, Sequencer, Pattern RAM, Shift Register, and Latch. Sequence RAM is the memory for the Sequence Program that a user defines. Sequencer outputs arbitrary pattern data according to the Sequence Program written to the Sequence RAM. Sequencer also controls an event jump sequence when the event occurs. Shift Register accelerates Pattern Data supplied from Pattern RAM 15 times or 16 times. This Pattern Data is sent to Timing Control & Output after the data is latched. In the case of the DTG5274/DTG5334, this latched data is accelerated again four times at 4:1 MUX. This Latch and 4:1 MUX are included in the ASIC. Jump In and Jump Out are used for Master-Slave operation. Sync Out is useful as an external trigger signal for the oscilloscope.

Timing Control & Output

Timing Control & Output consists of Delay Line & Pulse Width Control, Jitter Generation Control, Jitter Pattern RAM, Fine Delay Line, Skew Time Detector, Pin Driver and Relay. Delay Line & Pulse Width Control change the delay time or pulse width of the data pattern. This block also generates the intentional jitter according to the pattern written in Jitter Pattern RAM by changing the delay time. Jitter Generation Control drives this intentional jitter. Fine Delay Line produces the delay time resolution of 1 ps in DTG5078 and 0.2 ps in DTG5274/DTG5334. DTGM10/M20/M21/M30/M31/M32 has the Pin Driver IC and the Relay for opening the outputs.

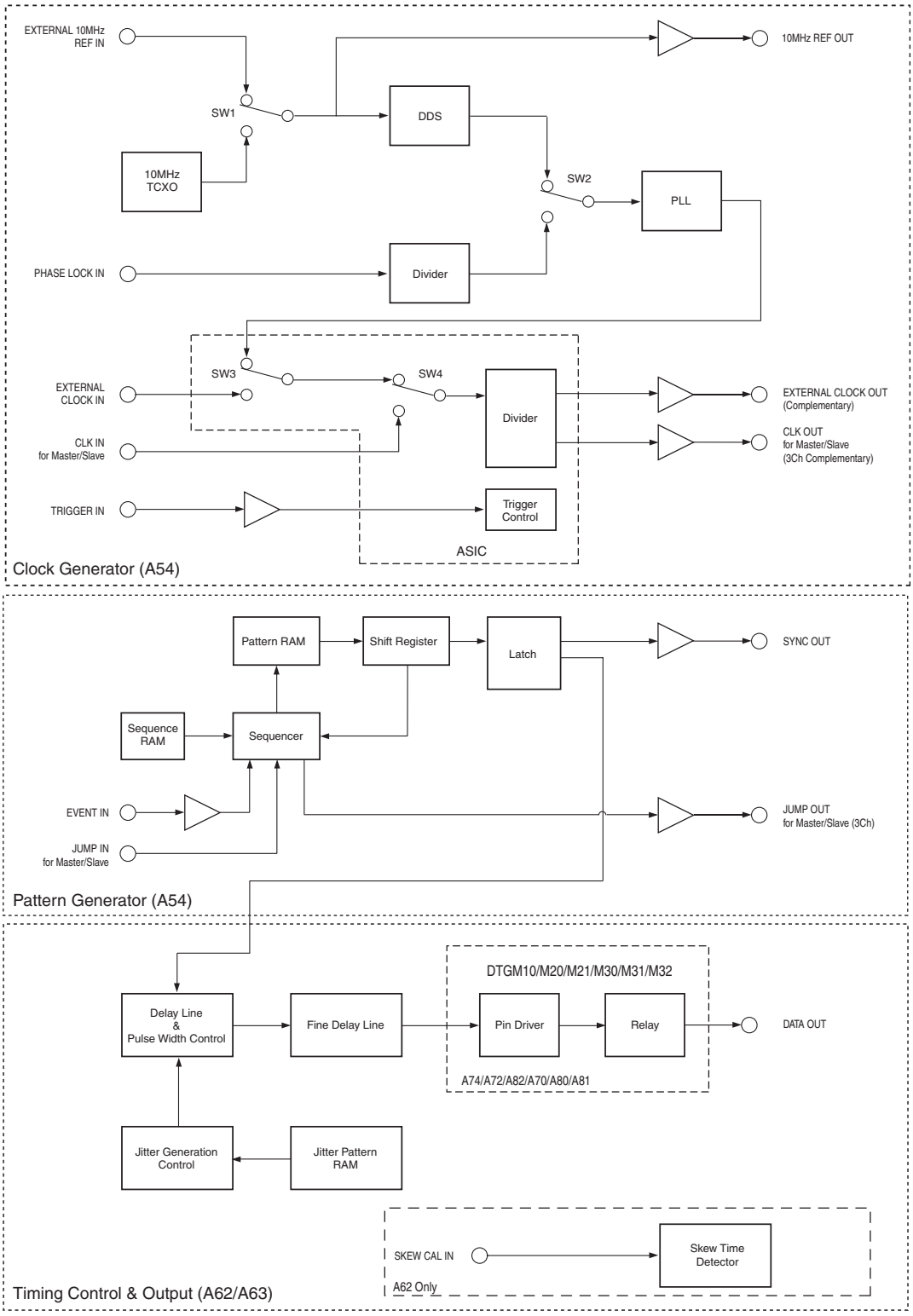


Figure 3-4: DTG5078 block diagram

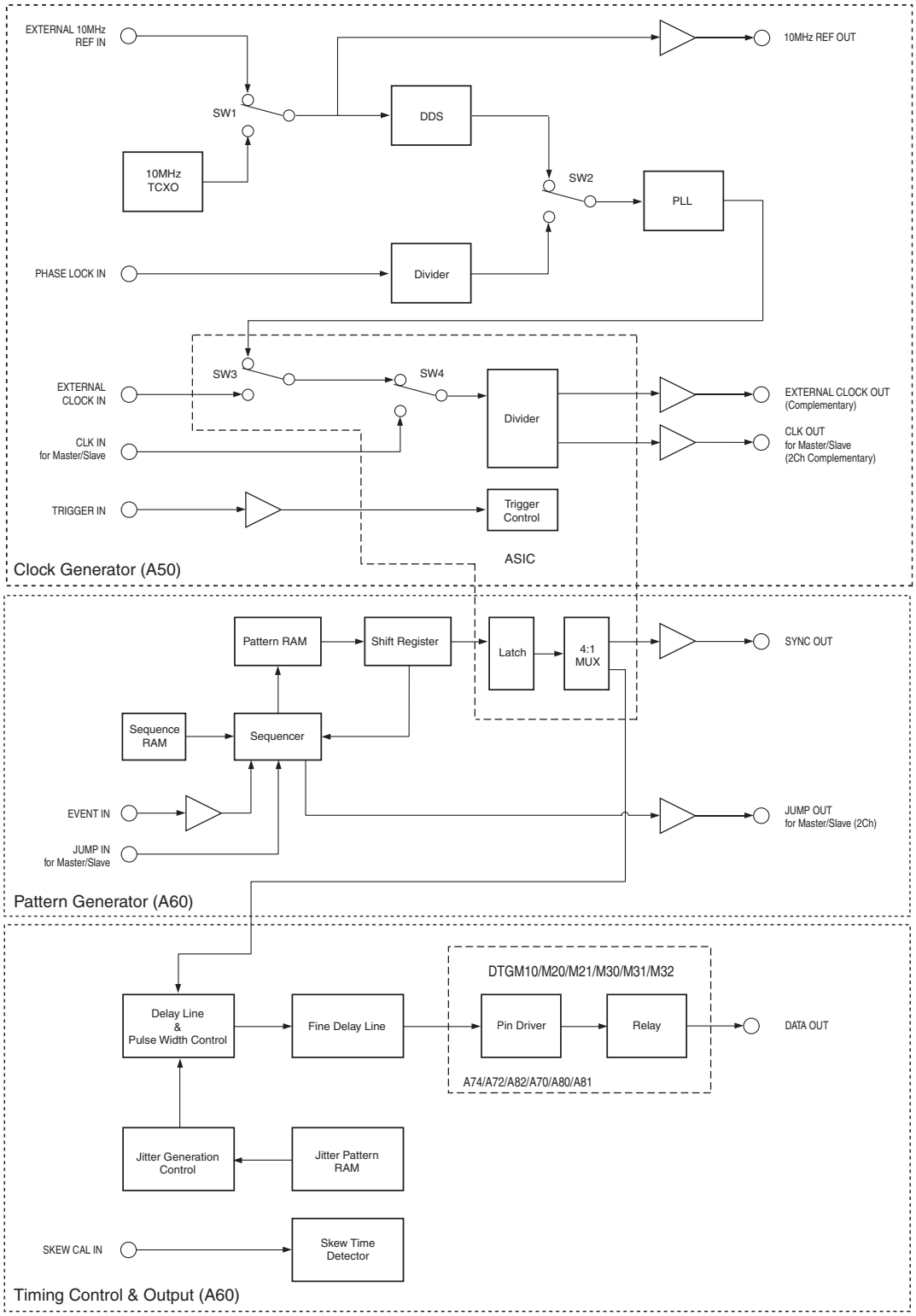


Figure 3-5: DTG5274 block diagram

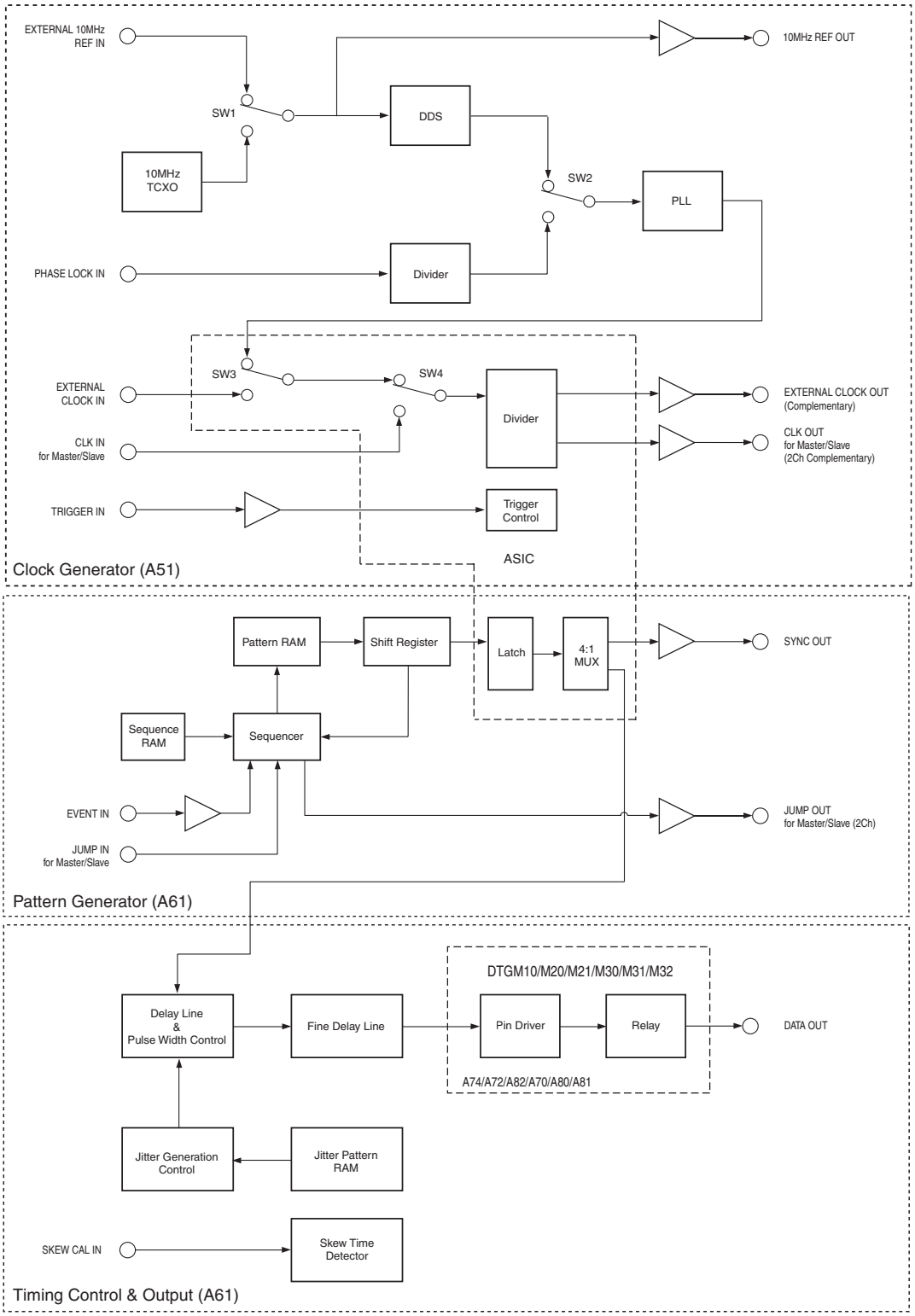


Figure 3-6: DTG5334 block diagram

Performance Verification

Performance Verification

The performance verification procedures for this instrument are now available on the *DTG5078 & DTG5274 & DTG5334 Performance Verification & Specifications Technical Reference* (Tektronix part number 071-1611-xx). A pdf of this technical reference is provided on the DTG5000 Series Product Documents CD-ROM (Tektronix part number 063-3833-xx) that shipped with your product.

Adjustment Procedures

Adjustment Procedures

There are no adjustments. All boards are adjusted when they are shipped from the factory.

Maintenance

Maintenance

This section contains the information needed to do periodic and corrective maintenance on the DTG5000 Series data timing generator.
The following subsections are included:

- Related Maintenance Procedures — Provides information about various sections that have related maintenance information.
- *Preparation* — Introduction plus general information on preventing damage to internal modules when doing maintenance.
- *Inspection and Cleaning* — Information and procedures for inspecting the data timing generator and cleaning its external and internal modules.
- *Removal and Installation Procedures* — Procedures for the removal of defective modules and replacement of new or repaired modules.
- *Troubleshooting* — Information for isolating failed modules. Included are instructions for operating the internal diagnostic routines of the data timing generator and troubleshooting trees. Most of the trees make use of these internal diagnostic routines to speed fault isolation to a module.
- *System recovery* — Information for software installation. When operating system does not start up, you may have to reinstall the operating system for recovery. This section includes information for reinstalling the operating system, setting up the operating system and reinstalling the DTG5000 software.
- *Service Password* — Information for registration of serial number.

Related Maintenance Procedures

The following sections contain information and procedures related to maintenance.

- The *Operating Information* section is useful when you troubleshoot. It also details the service strategy and lists options for obtaining maintenance service and for replacing failed modules.
- The *Theory of Operation* section contains a circuit description at the module, or block, level.
- The *Performance Verification* section in the DTG5000 Series Technical Reference for Performance Verification & Specifications contains procedures that may be useful in isolating problems to modules by testing product performance.

- The *Diagrams* section contains a block diagram using individual modules as blocks and an interconnection diagram showing connections between the modules.
- The *Replaceable Mechanical Parts* section, lists all field replaceable modules by part number.

Preparation

Before servicing this product, read the *Safety Summary* and *Introduction* at the front of the manual and the ESD information below.



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

NOTE. *If you are removing a module for service, begin by doing the* Access Procedure *procedure on page 6-13. By following the instructions in that procedure, you remove the module to be serviced while removing the minimum number of additional modules.*

Preventing ESD

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

1. Minimize handling of static-sensitive modules.
2. Transport and store static-sensitive modules in their static protected containers or on a metal rail. Label any package that contains static-sensitive modules.
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. Do not allow anything capable of generating or holding a static charge on the work station surface.
5. Handle circuit boards by the edges when possible.
6. Do not slide the modules over any surface.
7. Avoid handling modules in areas that have a floor or work-surface covering that is 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 DTG5000 Series data timing generators. Inspection and cleaning are done as preventive maintenance. Preventive maintenance, when done regularly, may prevent data timing generator malfunctions and enhance reliability.

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

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

General Care

The cabinet helps keep dust out of the data timing generator and should normally be in place when operating the generator. The front cover protects the front-panel and display from dust and damage. Install the front cover when storing or transporting the data timing generator.

Inspection and Cleaning procedures

Inspect and clean the data timing generator as often as operating conditions require. The collection of dirt on components inside can cause them to overheat and breakdown. (Dirt acts as an insulating blanket, preventing efficient heat dissipation.) Dirt also provides an electrical conduction path that could cause an generator failure, especially under high-humidity conditions.



CAUTION. *Avoid the use of chemical cleaning agents which might damage the plastics used in this DTG5000 Series data timing generator. Use only deionized water when cleaning the front-panel buttons. Use an ethyl 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 generator for damage, wear, and missing parts, using Table 6-1 as a guide. Data timing generators that appear to have been dropped or otherwise abused should be checked thoroughly to verify correct operation and performance. Immediately repair defects that could cause personal injury or cause further data timing generator damage.

Table 6-1: External inspection check list

Item	Inspect for	Repair action
Cabinet, front-panel, and cover	Cracks, scratches, deformations, damaged hardware or gaskets.	Repair or replace defective module.
Front-panel knobs	Missing, damaged, or loose knobs.	Repair or replace missing or defective knobs.
Connectors	Broken shells, cracked insulation, and deformed contacts. Dirt in connectors.	Repair or replace defective modules. Clear or wash out dirt.
Carrying handle, bail, 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.

Cleaning Procedure — Exterior. Do the following steps to clean the data timing generator exterior:

1. Remove loose dust on the outside of the data timing generator with a lint free cloth.
2. Remove remaining dirt with a lint free cloth dampened in a general purpose detergent-and-water solution. Do not use abrasive cleaners.
3. Clean the light filter protecting the monitor screen with a lint-free cloth dampened with either ethyl alcohol or, preferably, a gentle, general purpose detergent-and-water solution.



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

Flat Panel Display Cleaning. The display is a soft plastic display and must be treated with care during cleaning.

CAUTION. *Imported cleaning agents or methods can damage the flat panel display. Avoid using abrasive cleaners or commercial cleaners to clean the display surface. Avoid spraying liquids 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 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 data timing generator during external cleaning, use only enough liquid to dampen the cloth or applicator.*

Inspection — Interior. To access the inside of the data timing generator for inspection and cleaning, refer to the *Removal and Installation Procedures* in this section.

Inspect the internal portions of the data timing generator for damage and wear, using Table 6-2 as a guide. Defects found should be repaired immediately.

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

Table 6-2: Internal inspection check list

Item	Inspect for	Repair action
Circuit boards	Loose, broken, or corroded solder connections. Burned circuit boards. Burned, broken, or cracked circuit-run plating.	Remove failed module and replace with a new module.
Resistors	Burned, cracked, broken, blistered condition.	Exchange of a new circuit board unit.
Solder connections	Cold solder or rosin joints.	Resolder joint and clean with ethyl alcohol.
Capacitors	Damaged or leaking cases. Corroded solder on leads or terminals.	Exchange of a new circuit board unit.

Table 6-2: Internal inspection check list (cont.)

Item	Inspect for	Repair action
Semiconductors	Loosely inserted in sockets. Distorted pins.	Firmly seat loose semiconductors. Remove devices that have distorted pins. Carefully straighten pins (as required to fit the socket), using long-nose pliers, and reinsert firmly. Ensure that the straightening action does not crack pins, causing them to break off.
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. Do the following steps to clean the generator interior:

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 steps 1 and 2 do not remove all the dust or dirt, please contact your local Tektronix service or Beaverton service center.*

Lubrication. There is no periodic lubrication required for the data timing generator.

Removal and Installation Procedures

This subsection contains procedures for removal and installation of mechanical and electrical modules. Any electrical or mechanical module, assembly, or part listed in the *Replaceable Mechanical Parts* section of this manual is a module.

Preparation for Use



WARNING. *Before doing 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 components, read* Operating Information:Installation *(on page 2-7) and* Preventing ESD *(on page 6-2).*

This subsection contains the following items:

- This preparatory information that you need to properly do the procedures that follow.
- A list of tools that are required to remove and disassemble all modules.
- Three module-locator diagrams for finding the External Modules (see Figure 6-2), Front-Panel and Display Modules (see Figure 6-3), and Inner-Chassis Modules (see Figure 6-4 and Figure 6-5).
- Procedures for removal and installation of the electrical and mechanical modules.
- A disassembly procedure for removal of all the major modules from the data timing generator at one time and for reassembly of those modules. A complete disassembly is normally only done when completely cleaning the data timing generator. (Instructions for doing the actual cleaning are found under *Inspection and Cleaning* at the beginning of this section.)



WARNING. *To prevent serious injury or death, disconnect the power cord from the line voltage source before doing any procedure in this subsection.*

Summary of Procedures

The following procedures are described in the order in which they appear in this section.

- The *Access Procedure* on page 6-13 directs you to the procedure(s) (if any) that are required to access the module to be serviced, and then it directs you to the procedure to remove that module.
- *Procedures for External Modules* on page 6-14 are procedures for removing modules that do not require internal access to the data timing generator.
- *Procedures for Internal Modules (Lower)* on page 6-30 are procedures for removing modules which require access to the internal lower part of the data timing generator chassis.
- *Procedures for Internal Modules (Upper)* on page 6-40 are procedures for removing modules which require access to the internal upper part of the data timing generator chassis.

Equipment Required. Most modules in the data timing generator can be removed using a screwdriver with a #2 Phillips tip (see Table 6-3). 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. All equipment required to remove and install a module are listed in the first step of each procedure.

Table 6-3: Tools required for module removal

Item no.	Name	Description
1	Screwdriver handle	Accepts Phillips-driver bits
2	#1 Phillips tip	Phillips-driver bit for #1 screw size
3	#2 Phillips tip	Phillips-driver bit for #2 screw size
4	Flat-blade screwdriver	Screwdriver for removing slotted screws
5	Needle-Nose Pliers	Standard tool
6	Nutdriver, $\frac{1}{2}$ inch	Standard tool
7	Nutdriver, 5 mm	Standard tool
8	Nutdriver, 7 mm	Standard tool
9	Nutdriver, 10 mm	Standard tool
10	Retaining Ring Pliers	Standard tool
11	Angle-Tip Tweezers	Standard tool
12	Pliers	Standard tool
13	Cable remover	U.FL cable remover by HIROSE
14	Soldering Iron	Standard tool
15	Solder Wick	Standard tool
16	Adhesive	TRA-CON: Tra-Bond #BA-2114

Instrument Orientation

The procedures refer to the front, right, top, bottom, and rear of the data timing generator. Figure 6-1 shows how the sides are referenced.

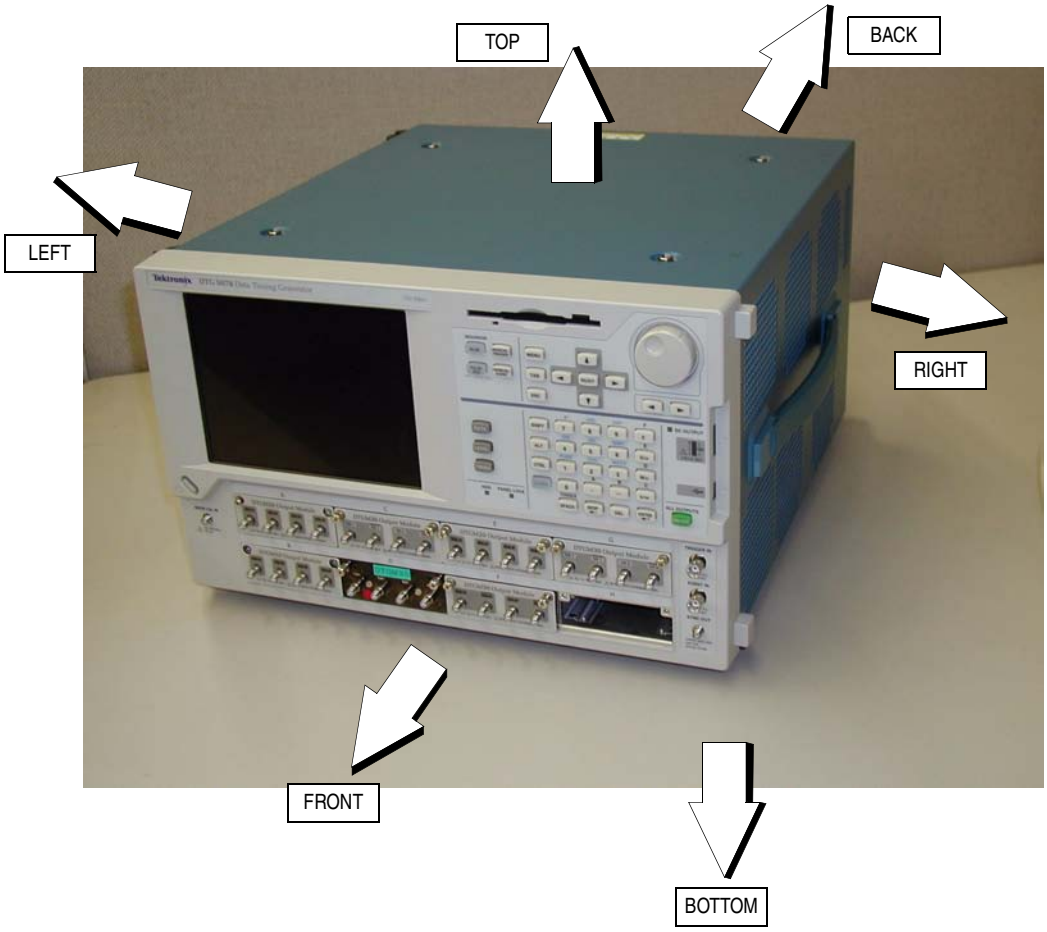
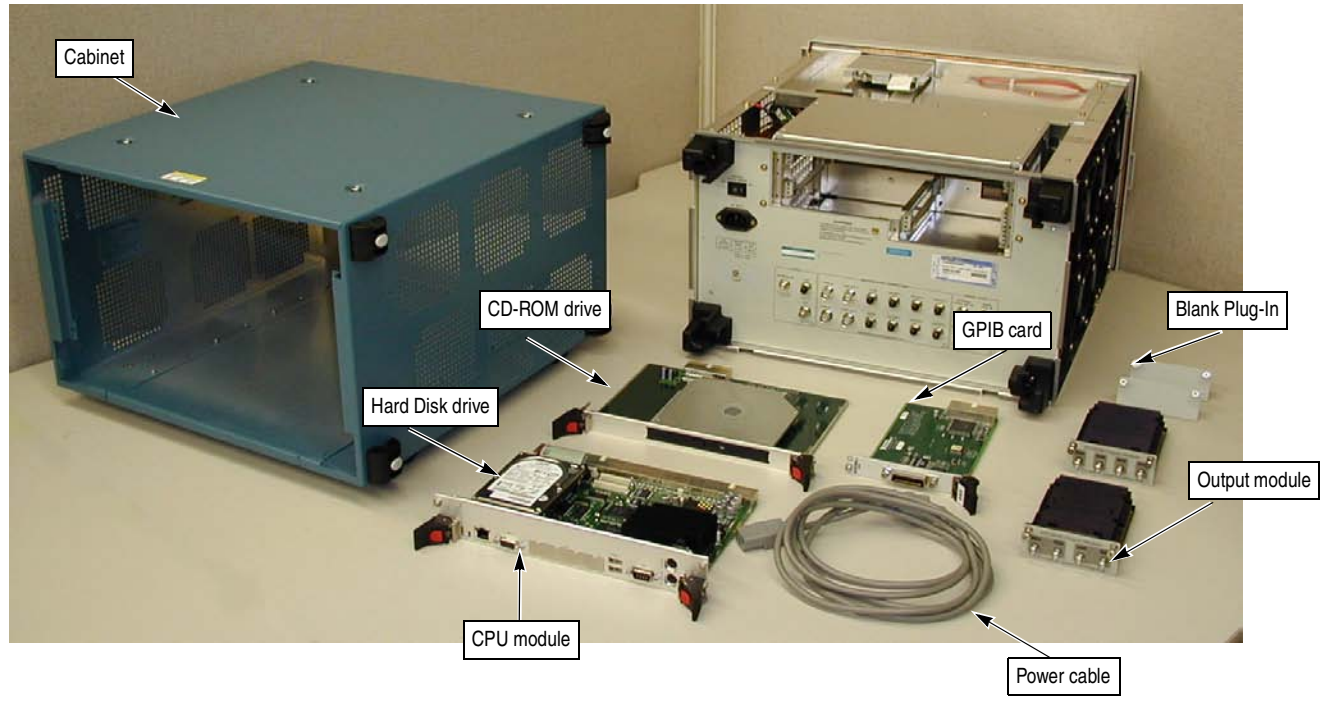


Figure 6-1: Instrument orientation (DTG5078)



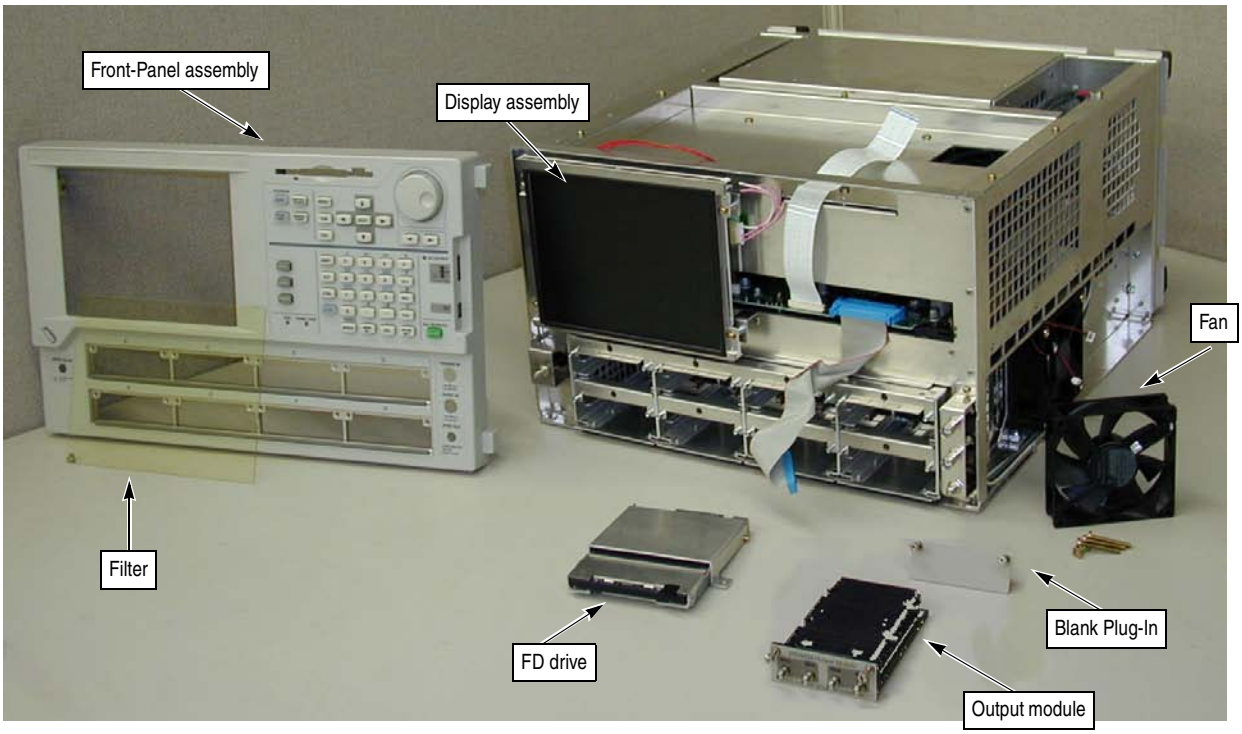


Figure 6-2: External modules

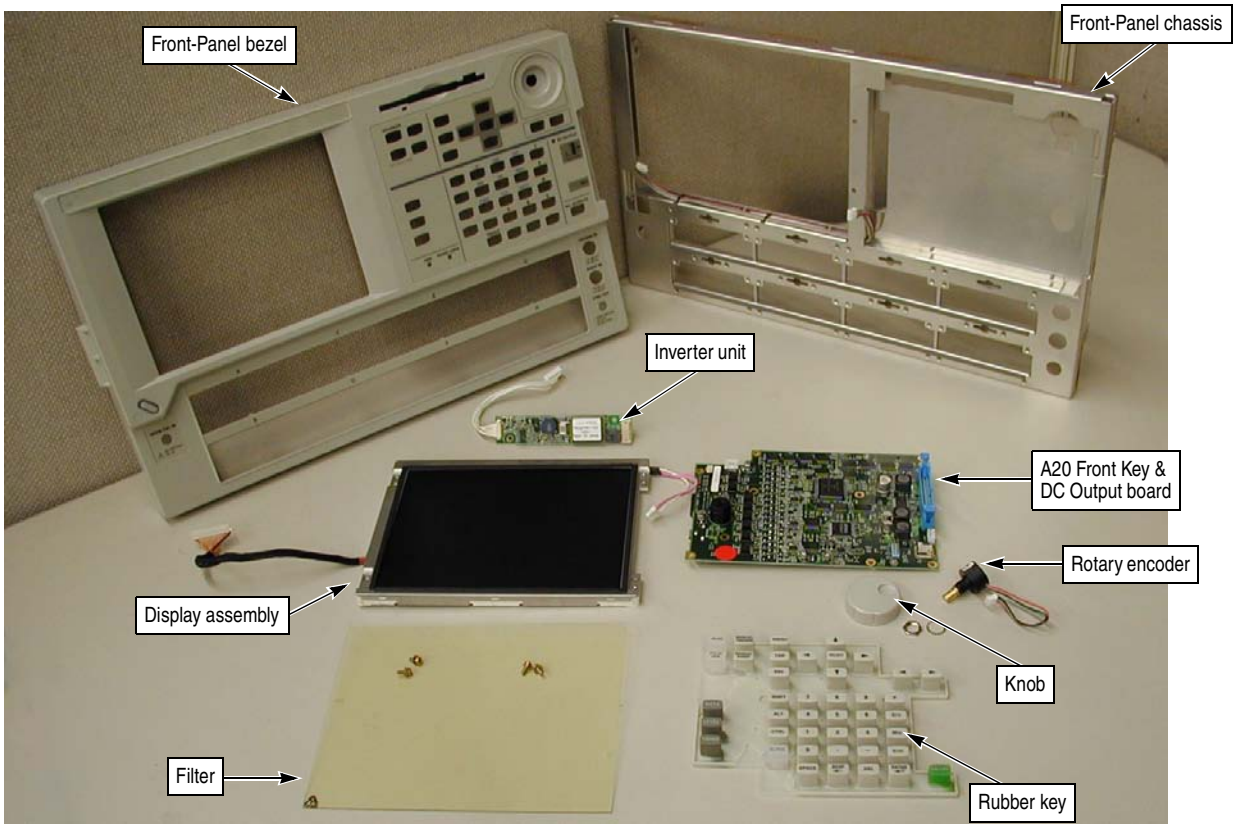


Figure 6-3: Front-Panel assembly & Display assembly

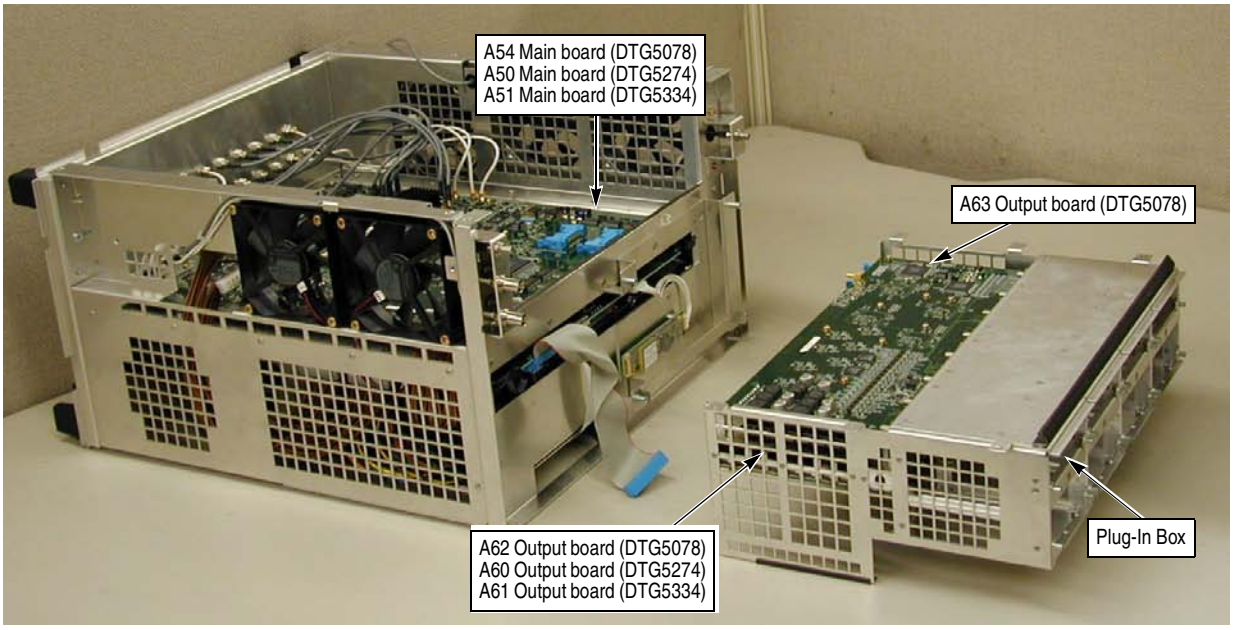


Figure 6-4: Internal modules (Lower)

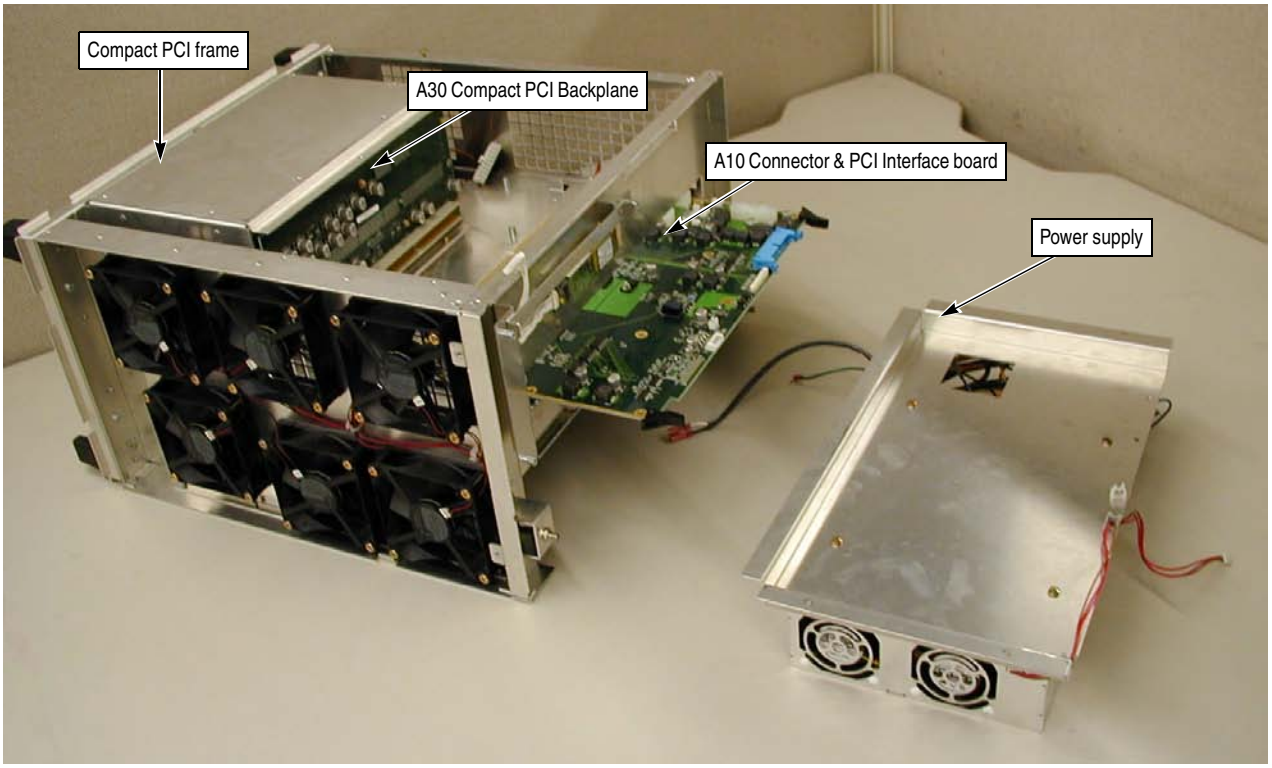


Figure 6-5: Internal modules (Upper)

Access Procedure

Begin with this procedure when you have identified a module to be removed for service.

1. If the data timing generator is running, push the front-panel On/Standby switch to shut it down. Then unplug the power cord from the rear panel AC power connector.
2. Find the module to be removed in Figure 6-2 through Figure 6-5.

   The title of the figure indicates whether the module is an external, internal module (lower), or internal module (upper) part.
3. If the module is externally mounted and no internal access is required, remove the module. Locate the necessary procedure in the *Procedures for External Modules* on page 6-14.
4. If the module is an internal-chassis module and access is required inside of the instrument, do the *Line Cord* procedure, and then do the *Cabinet* procedure. Both procedures are in the *Procedures for External Modules* subsection.
5. After completing those procedures, return to this procedure and continue with step 6.
6. If the module is an internal modules (Lower), access the reverse side of the chassis.
   a. Perform the *Front-Panel assembly* procedure as described in *Procedures for External Modules* (page 6-14).
   b. Perform the removal procedure as described in *Procedures for Internal Modules (Lower)* on page 6-30.
7. If the module is an internal modules (Upper), access the inner chassis.
   a. Perform the *Front-Panel assembly* procedure and *Display assembly* as described in *Procedures for External Modules* (page 6-14).
   b. Perform the procedure as described in *Procedures for Internal Modules (Upper)*, page 6-40.
8. Reinstall all modules that were previously removed. Read the instructions found at the end of the procedure that removes the module to be serviced. These instructions will guide you in reinstalling all modules previously removed.

Procedures for External Modules

Complete the *Access Procedure* on page 6-13 before doing any procedure in this collection.

The following procedures are listed in order presented:

- Power cable
- Output Module and Blank Panel
- CPU module
- Hard Disk drive
- CD-ROM drive
- GPIB card
- Cabinet
- Feet & Rear-Panel
- FD drive
- Front-Panel assembly
- A20 Front Key & USB & DC Output board
- A22 Power Switch board
- Display Assembly
- Inverter
- Fan

Power cable

The data timing generator runs on a Windows 2000 operating system. Before you unplug the power cable form the rear panel AC power connector, you need to confirm that the data timing generator is not running.

1. If the data timing generator is running, push the front-panel On/Standby switch to shutdown.
2. Power off the PRINCIPAL POWER SWITCH on the rear panel and remove the power cord from the AC power connector on the rear panel.

Output Module and Blank Plug-In

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Orient the data timing generator so its bottom is down on the work surface and its front is facing you.
2. Loosen the two screws with screwdriver.
3. Grasp the right and left screws and slowly pull the Output module to remove it from the mainframe.

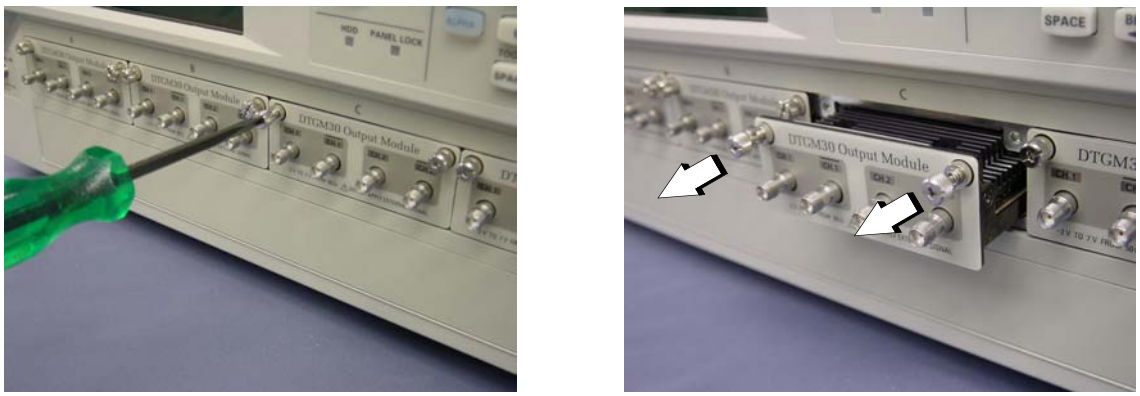


Figure 6-6: Output Module removal

Modules on the rear panel

A CPU module, a CD-ROM drive, and a GPIB card are on the rear panel.

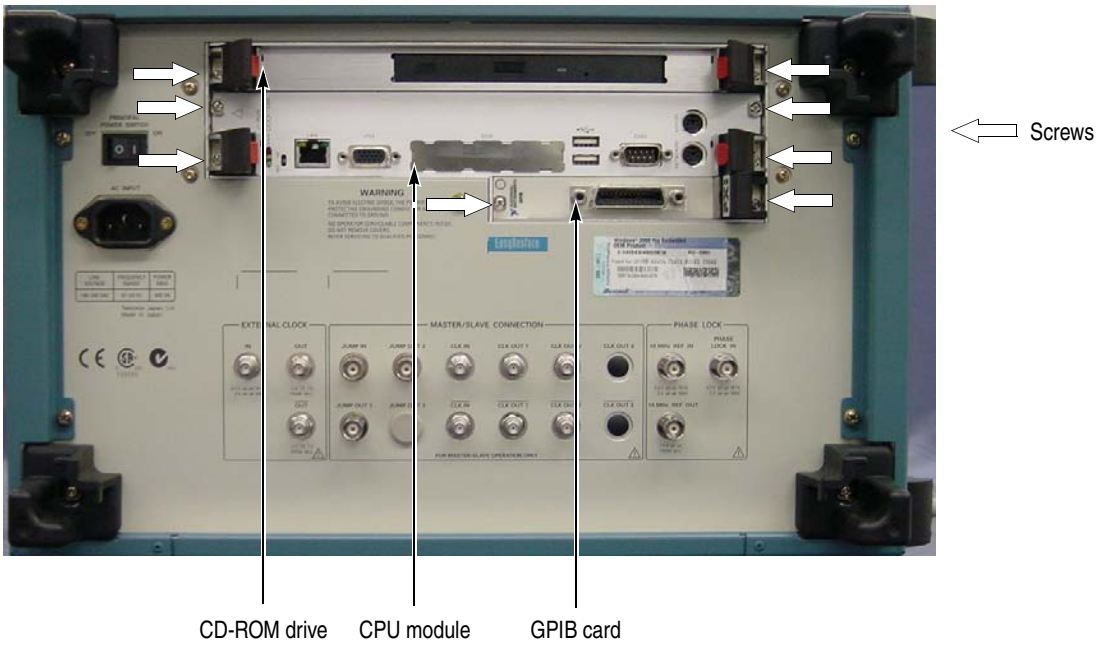


Figure 6-7: Modules on the rear panel

CD-ROM drive

You will need a screwdriver with a #1 Phillips tip (Items 1 and 2).

1. Orient the data timing generator so its bottom is down on the work surface and its rear is facing you.
2. Loosen the two screws with screwdriver.



Figure 6-8: Loosen the screws

3. To remove the CD-ROM module, press the eject knobs by pushing the red release button to the outside.

4. To install, reverse the procedure with the eject knobs are being opened outside.



Figure 6-9: CD-ROM module removal

CPU module

You will need a screwdriver with a #1 Phillips tip (Items 1 and 2).

1. Orient the data timing generator so its bottom is down on the work surface and its rear is facing you.

2. Loosen the four screws with screwdriver.



Figure 6-10: Loosen the screws

3. To remove the CPU module, press the eject knobs by pushing the red release button to the outside.

4. To install, reverse the procedure with the eject knobs are being opened outside.

Hard Disk drive

You will need a screwdriver with a #1 Phillips tip (Items 1 and 2) and a 5.5 mm Nutdriver.

1. Remove the CPU module.

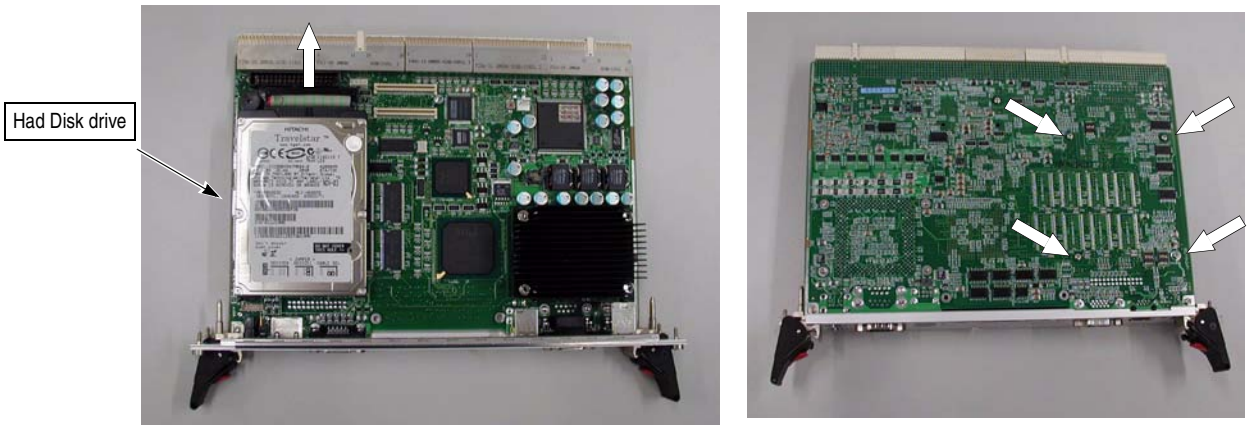


Figure 6-11: Hard Disk drive removal

2. Unplug the interconnect cable from the CPU module.
3. Orient the the CPU module so its bottom is up on the work surface.
4. Remove the four screws attaching the hard disk drive to the CPU module.
5. Remove the four spacer post using 5.5 mm nut driver.
6. To install, reverse the procedure.

NOTE. *The recommended bolting torque of the spacer post and the screw attaching the disk drive to the CPU module are 4 kgfcm.*

GPIB card

You will need a screwdriver with a #1 Phillips tip (Items 1 and 2).

1. Orient the data timing generator so its bottom is down on the work surface and its rear is facing you.
2. Loosen the two screws with screwdriver.



Figure 6-12: Loosen the screws

3. To remove the GPIB card, press the eject knob to the outside.
4. To install, reverse the procedure.

Cabinet

You will need a screwdriver with a Phillips #2 tip (Items 1 and 2). In order to remove the cabinet, it is necessary to remove seven screws.

1. Orient the data timing generator so that its Left side is down on the work surface.
2. Remove the three screws at the bottom of the cabinet.
3. Orient the data timing generator so its bottom is down on the work surface and its rear is facing you.
4. Remove the four screws at the rear of the cabinet. You need not to remove the screws attaching the feet.
5. Push the feet on the rear panel to slide out the main chassis.
6. When the main chassis comes out a little, grasp the front side of the main chassis then pull it out.
7. To install, reverse the procedure.

NOTE. *Take care not to bind or snag the cabinet on the internal cables when you remove it.*

When removing or installing the cabinet, take care not to damage the EMI gaskets on the cabinet, or the data timing generator may not meet its emissions requirements (EMI).



Figure 6-13: Cabinet removal

Feet and Rear-Panel

You will need a screwdriver with a Phillips #2 tip (Items 1 and 3).

1. Orient the data timing generator so its bottom is down on the work surface and its rear is facing you.
2. Remove the four screws at the feet and one screw on the rear panel.

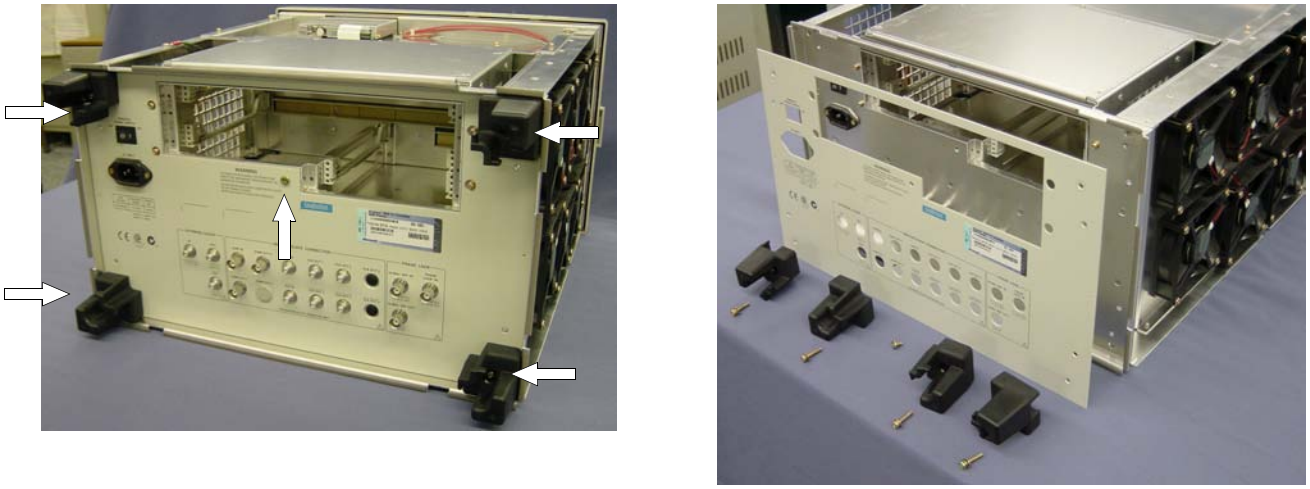


Figure 6-14: Remove the screws

3. To install, reverse the procedure.

Front-Panel Assembly

You will need a screwdriver with a Phillips #2 tip (Items 1 and 3), and 10 mm Nutdriver (Item 9)

1. Orient the data timing generator so its bottom is down on the work surface and its front is facing you.
2. Remove the four screws mounting the front-panel assembly to the main chassis.

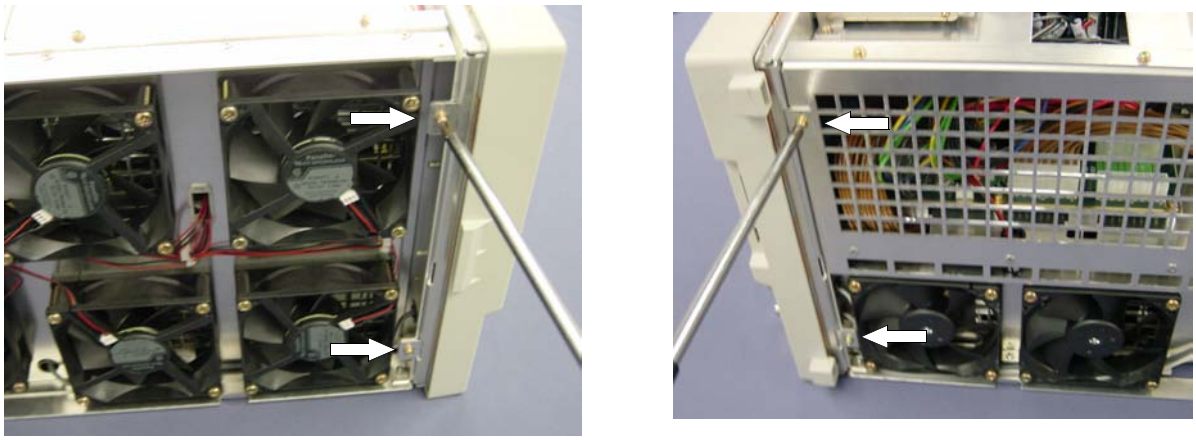


Figure 6-15: Front-Panel assembly removal

3. **DTG5334 Only:** Orient the data timing generator so its bottom is up on the work surface and remove the EXTERNAL CLOCK IN, CLOCK OUT, and CLOCK $\overline{\text{OUT}}$ connectors on the front panel with 10 mm Nutdriver.
4. Grasp the front-panel trim ring, pull the front-panel assembly toward you taking care not to damage the flat cable that connects the A10 board in the main frame with the front-panel module.

NOTE. *When removing or installing the cabinet, take care not to damage the EMI gaskets on the cabinet, or the data timing generator may not meet its emissions requirements (EMI).*



Figure 6-16: Front-Panel assembly removal

5. Unplug the flat cable connected to the A10 board in the main frame.
6. To install, reverse the procedure.

FD drive

You will need a screwdriver with a Phillips #2 tip (Items 1 and 3).

1. Orient the data timing generator so its bottom is down on the work surface and its front is facing you.
2. Disconnect the ribbon cable.
3. Remove the two screws, slide the FD drive toward the rear panel and pull it up.

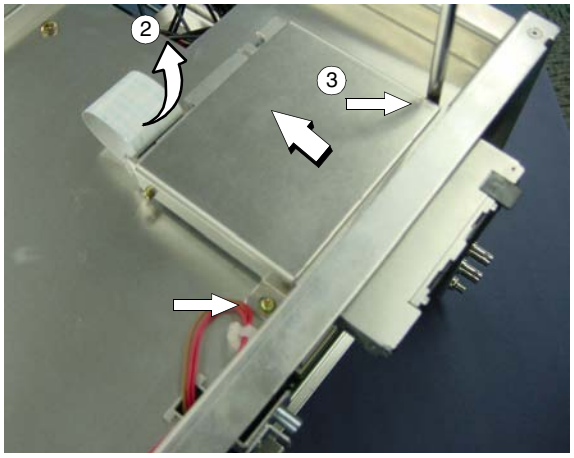


Figure 6-17: FD drive removal

4. To install, reverse the procedure.

Front-Panel Chassis

This procedure is required before removal and installation for the front-panel and front-panel buttons.

You will need a screwdriver with a #1 and #2 Phillips tip (Items 1, 2 and 3).

1. Remove the Front-Panel assembly immediately preceding this procedure.
2. Pull out the Knob from the front-panel by hand.
3. Orient the face of front-panel is down on the work surface.
4. Remove the filter from the front-panel frame.
5. Remove the front panel chassis from the bezel doing the following steps.

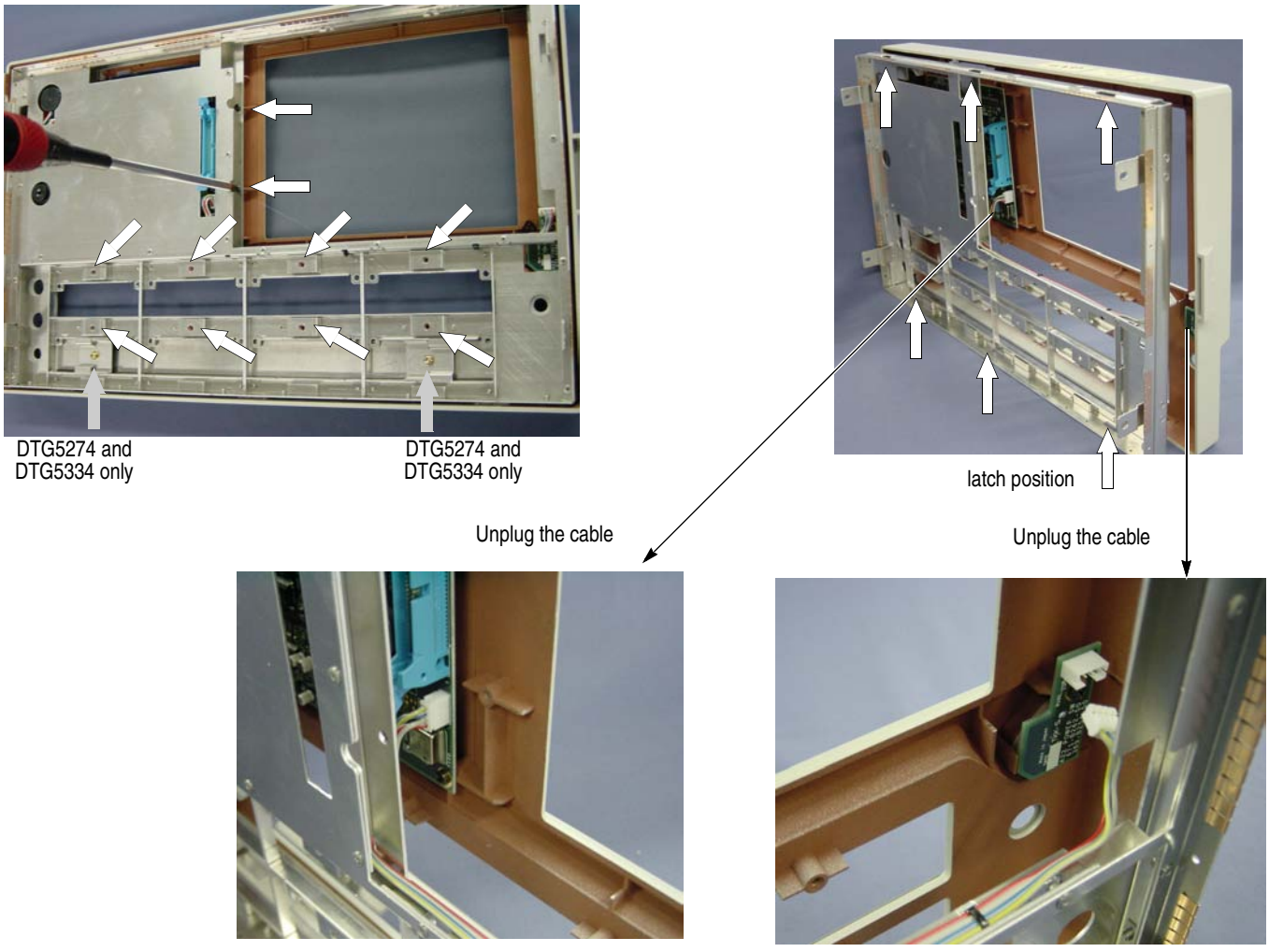


Figure 6-18: Front-panel chassis removal

a. Remove the ten tapping screws using the #1 Phillips screw driver.

b. (DTG 5274 only): Remove the two screws with the washer at the bottom side using the #2 Phillips screw driver.

c. (DTG 5274 only): Remove the bottom blank panel and the retaining panel.

d. Remove the front-panel bezel by releasing the latches a little. There are three of then on the top and bottom.

e. Unplug the two connectors from the A20 and A22 board on the front-panel bezel.

6. To install, reverse the procedure.

A20 Front Key & DC Output Board

This procedure includes removal and installation instructions for the front-panel and front-panel buttons.

You will need a screwdriver with a #1 Phillips tip (Items 1 and 2).

1. Remove the Front-Panel Chassis.

2. Unplug the rotary encoder cable connector J400 on the A20 Front Key & DC Output board.

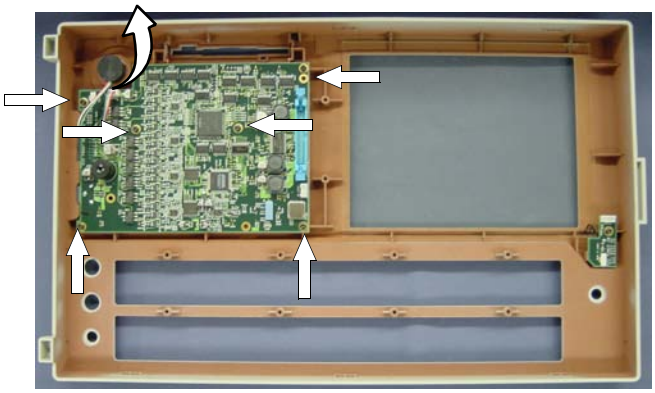


Figure 6-19: A20 Front Key & DC Output board removal

3. Remove the six tapping screws using the #1 Phillips screw driver.

4. Lift the A20 Front key & DC Output board.

5. To remove the rubber key, push the button from the front-panel surface.

6. To remove the Rotary encoder, pull out the Rotary encoder knob from the front-panel by hand, and remove a hexagon nut.

7. To install, reverse the procedure.

A22 Power Switch Board

This procedure includes removal and installation instructions for the front-panel and front-panel chassis.

You will need a screwdriver with a #2 Phillips tip (Items 1 and 2).

1. Remove the Front-Panel Chassis.
2. Remove a tapping screw attaching the A22 board to the front-panel using the #1 Phillips screw driver.

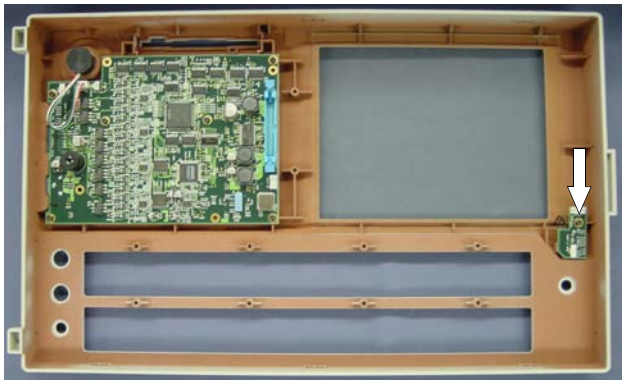


Figure 6-20: A22 Power Switch Board removal

3. To install, reverse the procedure.

Display Assembly

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Remove the Front-Panel assembly.
2. Orient the data timing generator so its bottom is down on the work surface and its front is facing you.
3. Unplug the cable connected to the Back Light board.
4. Remove the four screws on top and bottom of the display frame of the LCD that mount the display assembly to the chassis.
5. Unplug the cable connected to the A10 Connector & PCI Interface board.

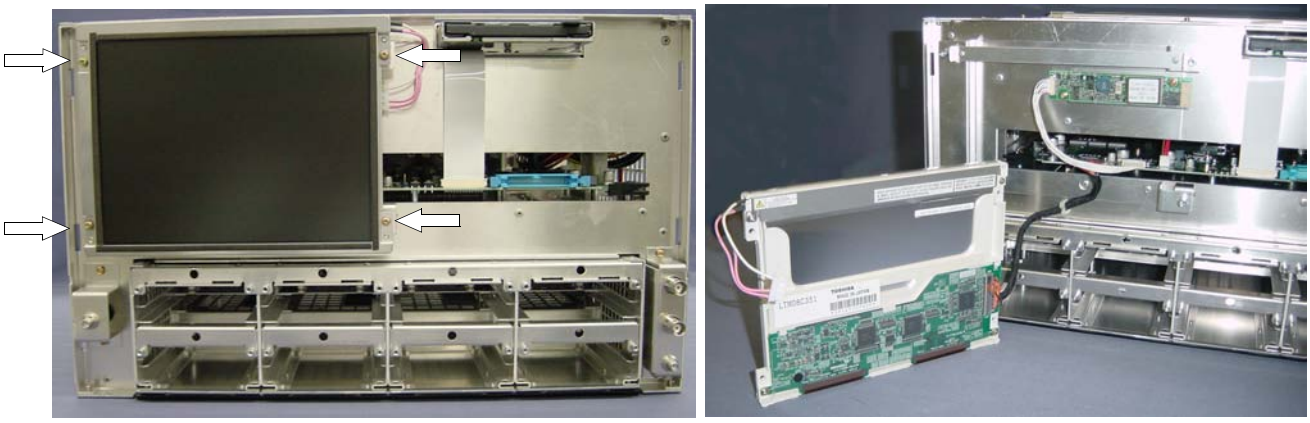


Figure 6-21: Display assembly removal

6. To install, reverse the procedure.

Inverter unit

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Remove the Display assembly.
2. Unplug the cable connected to J540 on the A10 Connector & PCI Interface board.
3. Remove the two screws.



Figure 6-22: Inverter board removal

4. To install, reverse the procedure.

Fan You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Locate the fan. The data timing generator has six fans on the left side and two fans on the right side.
2. Orient the data timing generator so its bottom is down on the work surface and its front is facing you.
3. Slide the cable connector at the fan to unplug the cable.
4. Remove the four screws attaching the fan to the main frame, and lift the fan away.

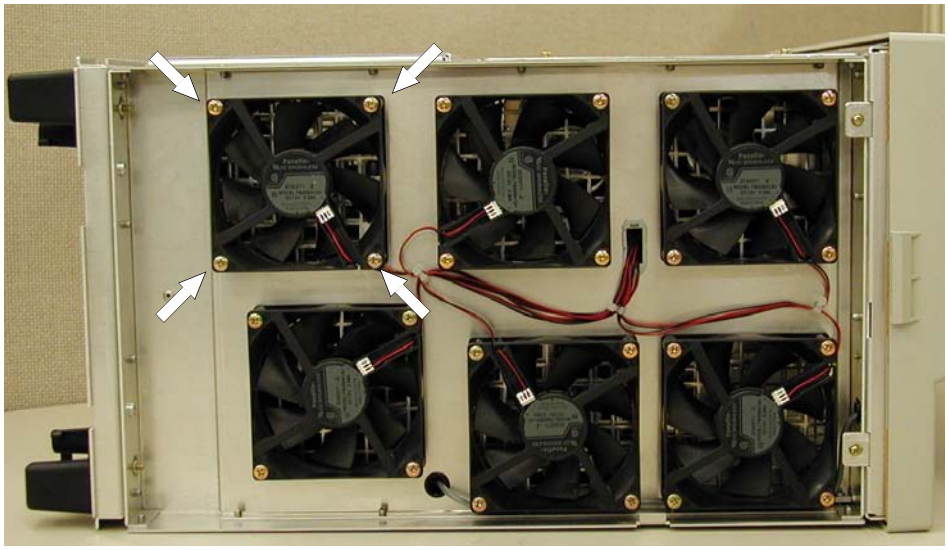


Figure 6-23: Fan removal

5. To install, reverse the procedure.

Procedures for Internal Modules (Lower)

You should have completed the *Access Procedure* before doing any procedure in this collection. This section describes removal/installation procedures for the following modules:

- Plug In Box
- A60 (DTG5274) / A61(DTG5334) / A62(DTG5078) / A63(DTG5078) Output Board
- A50 (DTG5274) / A51(DTG5334) / A54 (DTG5078) Main Board

Plug-In Box

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Remove the Front-Panel assembly.
2. Orient the data timing generator so its top is down on the work surface and its rear is facing you.
3. Remove the four screws attaching the support bracket and the Plug-In Box to the chassis.

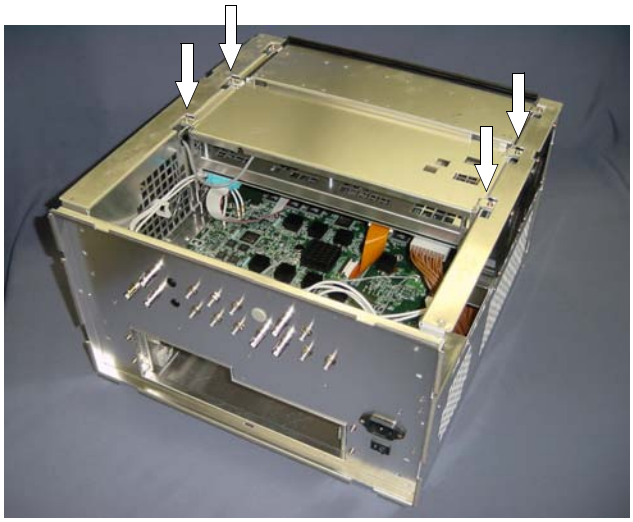
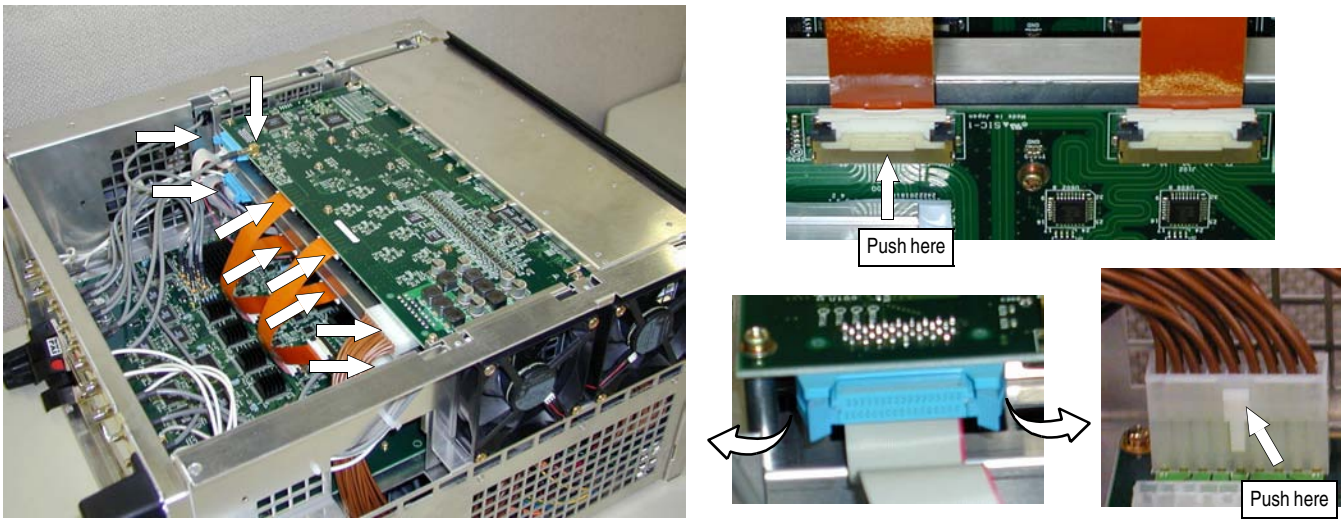


Figure 6-24: Support bracket removal

4. Unplug the following cables and connectors:

- DTG5078



DTG5078

Figure 6-25: Unplug the cables and connectors (DTG5078)

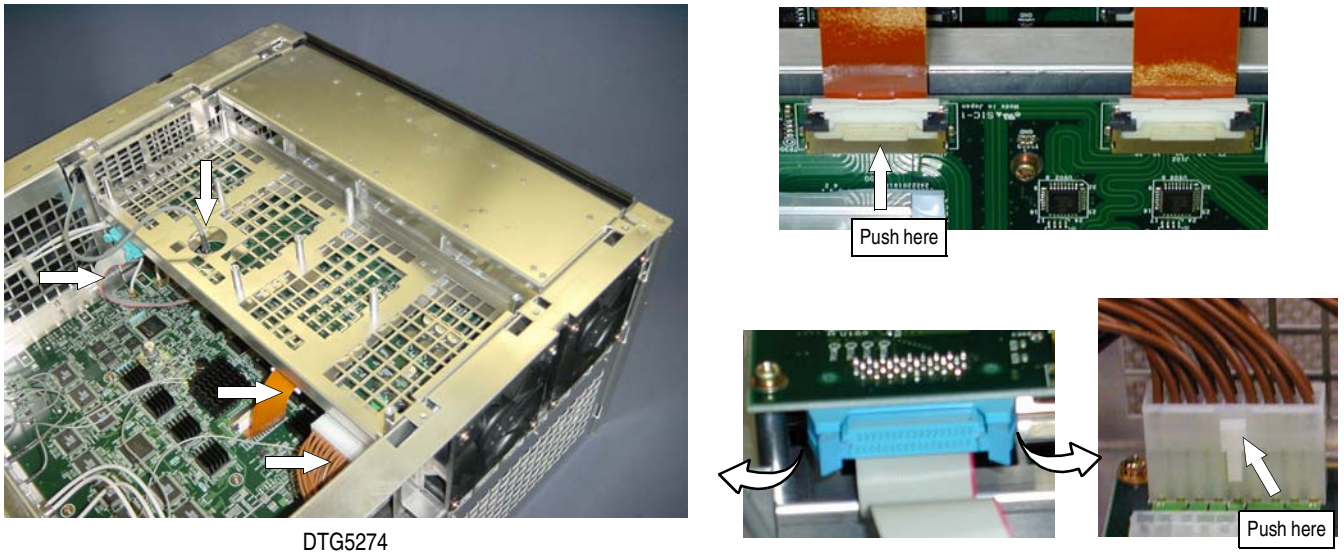
a. The coaxial cable to SKEW CAL IN connector at J300:
Grasp the cable root firmly and pull it. To avoid damaging the SMB cable, do not pull hard on the cable.

b. Two flat cables to A54 Main board:
Push the connector latch levers open to both sides.

c. Four flex cables to A54 Main board:
Pull the flex cable by pushing the upper button of the part of the connector.

d. Two power cables to A10 Connector board:
Push the latch lever to release, then unplug the connector.

- DTG5274



DTG5274

Figure 6-26: Unplug the cables and connectors (DTG5274)

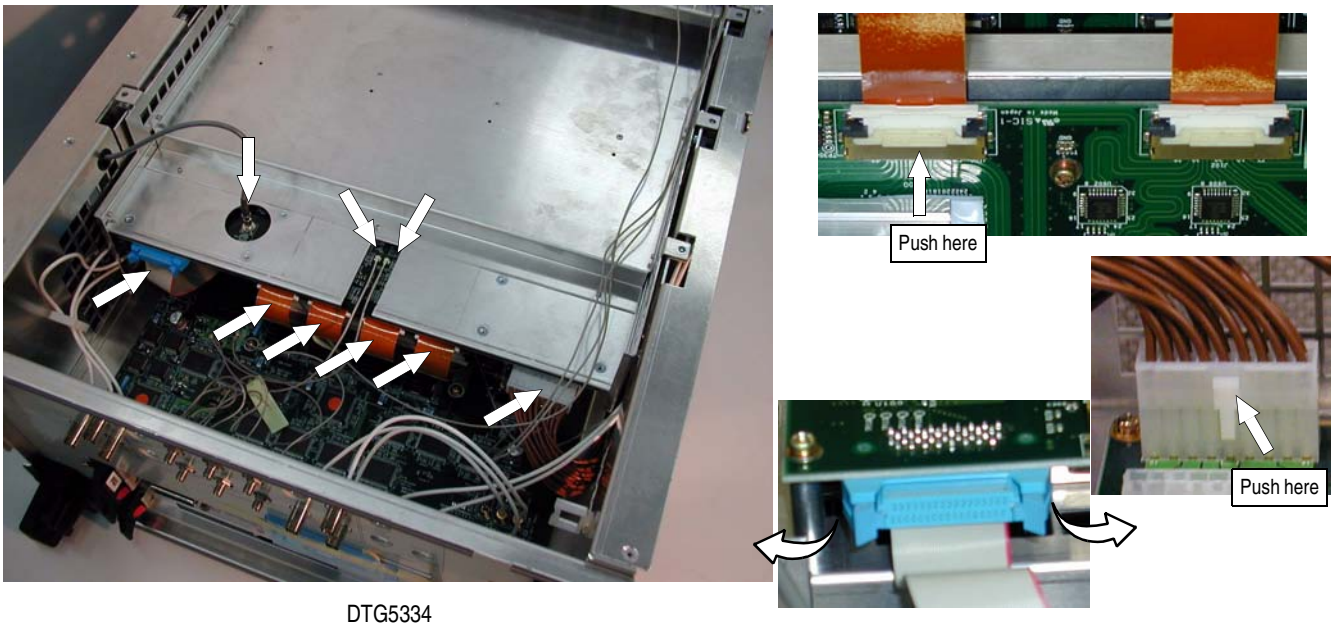
e. The coaxial cable to SKEW CAL IN connector at J300:
Grasp the cable root firmly and pull it. To avoid damaging the SMB cable, do not pull hard on the cable

f. One flat cable to A50 Main board:
Push the connector latch levers open to both sides.

g. One flex cable to A50 Main board:
Pull the flex cable by pushing the upper button of the part of the connector.

h. One power cable to A10 Connector board:
Push the latch lever to release, then unplug the connector.

- DTG5334



DTG5334

Figure 6-27: Unplug the cables and connectors (DTG5334)

i. The coaxial cable to SKEW CAL IN connector at J300:
Grasp the cable root firmly and pull it. To avoid damaging the SMB cable, do not pull hard on the cable

j. One flat cable to A51 Main board:
Push the connector latch levers open to both sides.

k. Four flex cables to A51 Main board:
Pull the flex cable by pushing the upper button of the part of the connector.

l. One power cable to A10 Connector board:
Push the latch lever to release, then unplug the connector.

m. Four coaxial cables to A51 Main board:
Push the latch lever to release, then unplug the connector.

n. Two coaxial cables to A51 Main board:
Unplug two coaxial cable from J1850 and J1851 on the A61 Output board.

5. Remove the two screws attaching the Plug-In Box to the chassis.

6. Remove the Plug-In Box:

- DTG5078 and DTG5274

  a. Tilt up the Plug-In Frame back a little, then slide it toward the rear panel.

  b. Lift the Plug-In Box up away from the chassis.

NOTE. *When removing and installing the Plug-In Box, be careful not to catch the cables.*

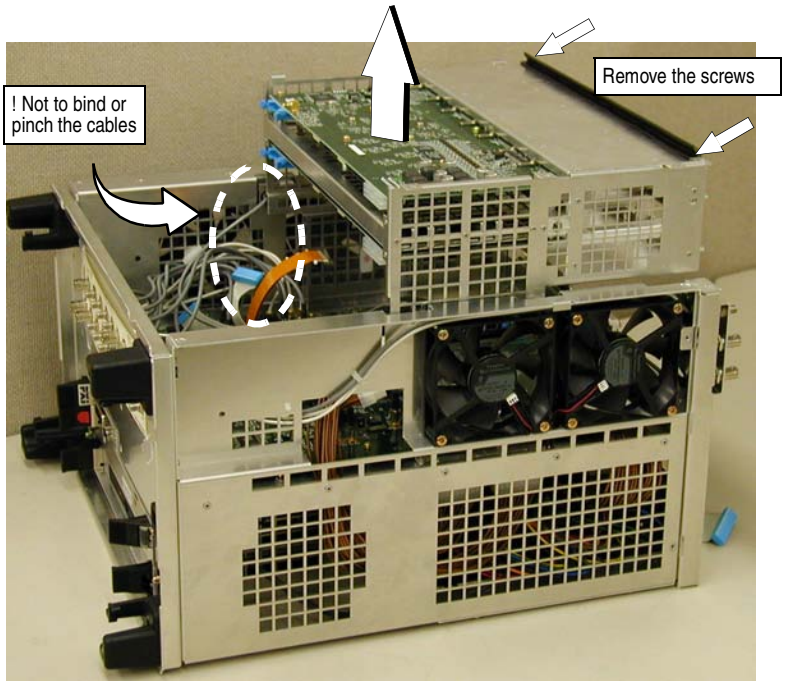


Figure 6-28: Plug-In Box removal (DTG5078 & DTG5274)

■ **DTG5334**

CAUTION. *Three coaxial cables are still connected between A61 Output board and A51 Main board / SYNC OUT connector. They are not visible from outside. Do not remove the Plug-In Box with those cables not removed.*

c. Tilt up the Plug-In Frame back a little, then slide it toward the rear panel.

d. Lift the front side of the Plug-In Frame up from the chassis, then dropped back flanges into the slot on the chassis. See Figure 6-29.

e. Unplug three coaxial cables from J1889, J1882 and J2125.

f. Lift the Plug-In Box up away from the chassis.

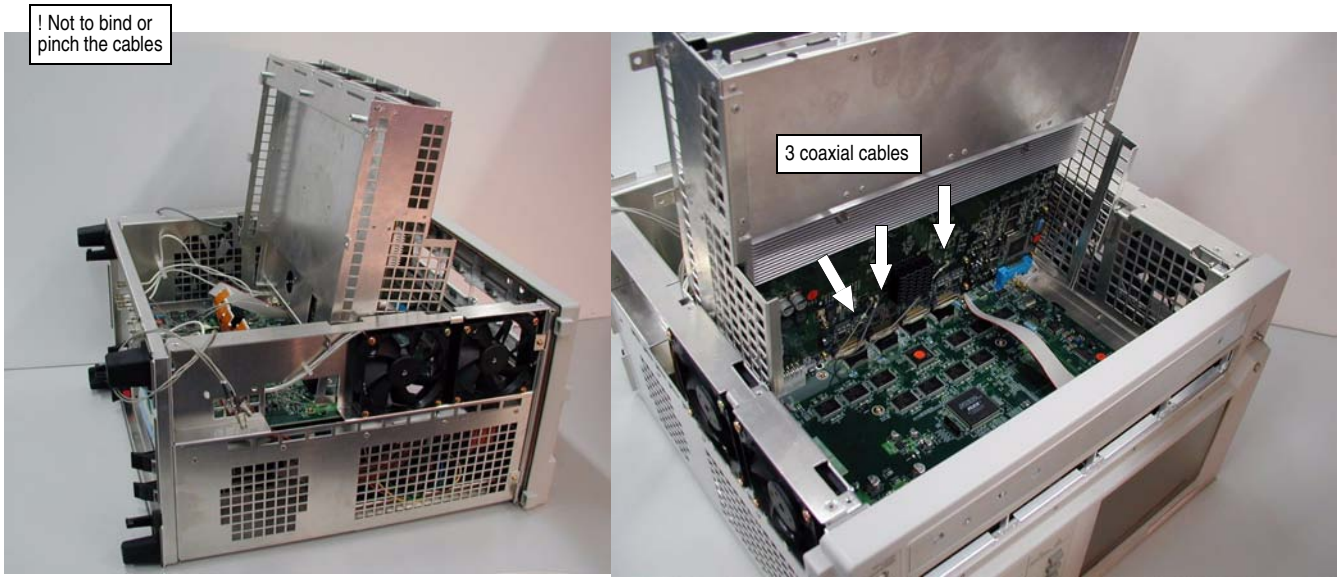


Figure 6-29: Plug-In Box removal (DTG5334)

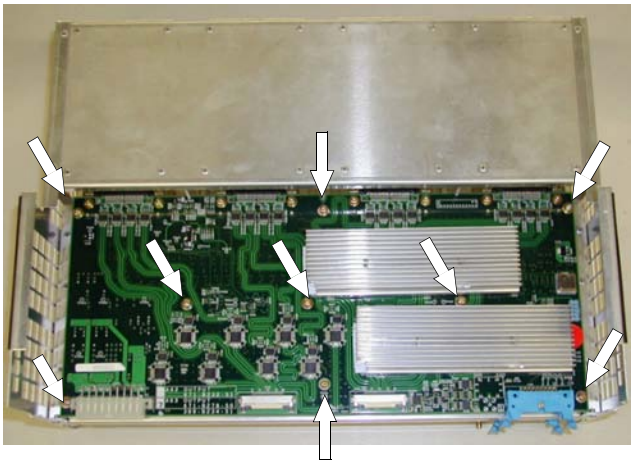
7. To install, reverse the procedure.

A60 /A61 /A62 / A63 Output board

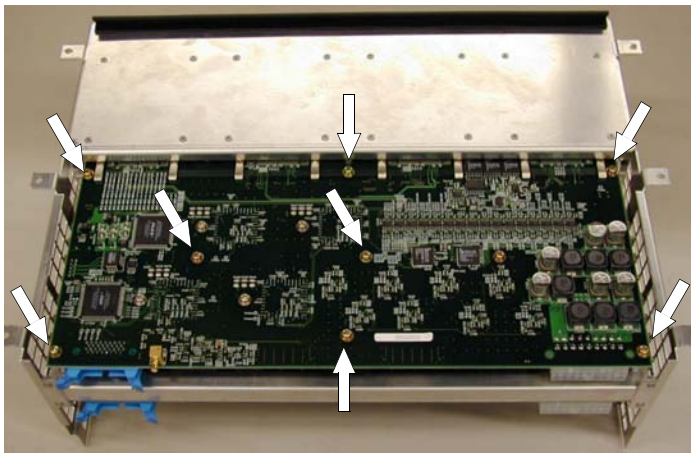
The DTG5078 contains the A62 and A63 Output board, the DTG5274 contains the A60 Output board, and the DTG5334 contains the A61 Output board. Each Output board is built in the Plug-In Box.

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

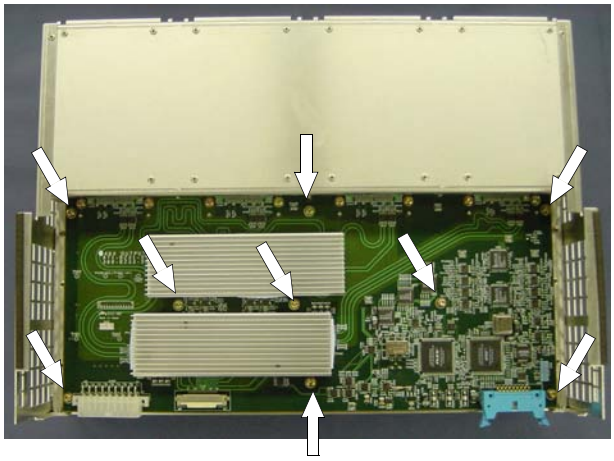
1. Remove the Plug-In Box.
2. Remove the nine (twelve: DTG5334) screws attaching the Output board to the Plug-In Box.



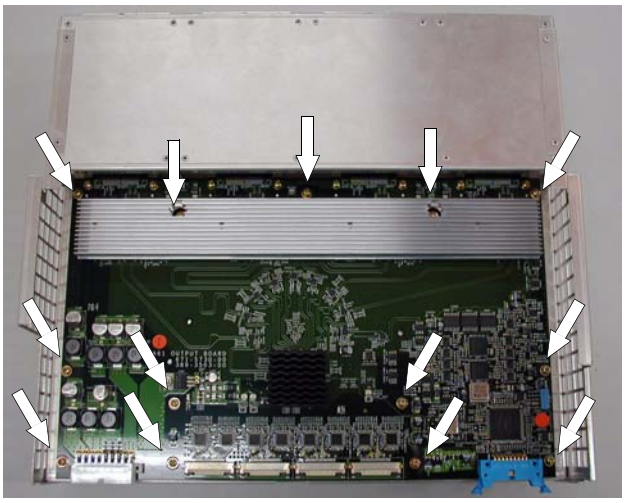
A62 Output board (DTG5078)



A63 Output board (DTG5078)



A60 Output board (DTG5274)



A61 Output board (DTG5334)

Figure 6-30: Unplug the cables and connectors

3. To install, reverse the procedure.

A50 / A51 / A54 Main board

The DTG5078 contains the A54 Main board, the DTG5274 contains the A50 Main board and the DTG5334 contains the A51 Main board.

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Remove the Plug-In Box.
2. Orient the data timing generator so its top is down on the work surface.
3. Unplug the following cables and connectors:

- DTG5078

  a. 18 coaxial cables to rear panel connectors:

  b. Two flat cables to A62/A63 Output board:
  Push the connector latch levers open to both sides.

  c. Four flex cables to A62/A63 Output board:
  Pull the flex cable by pushing the upper button of the part of the connector.

  d. One power cable to A10 Connector board:
  Push the latch lever to release, then unplug the connector.

- DTG5274

  e. 15 coaxial cables to rear panel connectors:

  f. One flat cable to A60 Output board:
  Push the connector latch levers open to both sides.

  g. One flex cable to A60 Output board:
  Pull the flex cable by pushing the upper button of the part of the connector.

  h. One power cable to A10 Connector board:
  Push the latch lever to release, then unplug the connector.

- DTG5334

  i. 19 coaxial cables to rear panel connectors:

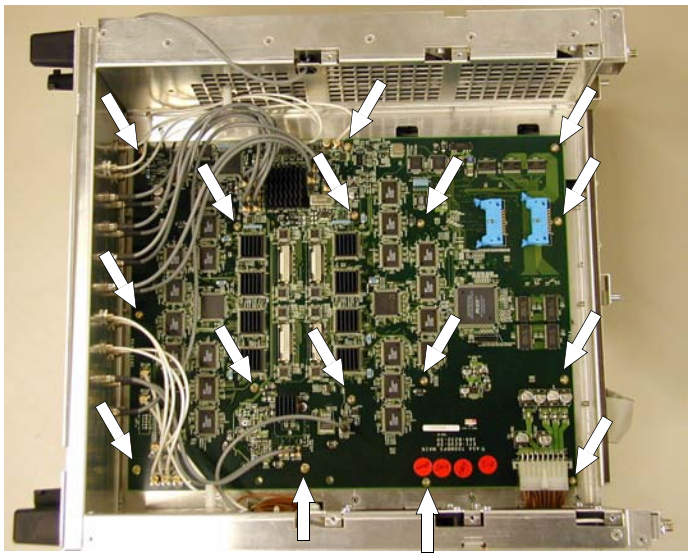
  j. One flat cable to A60 Output board:
  Push the connector latch levers open to both sides.

  k. Four flex cables to A60 Output board:
  Pull the flex cable by pushing the upper button of the part of the connector.

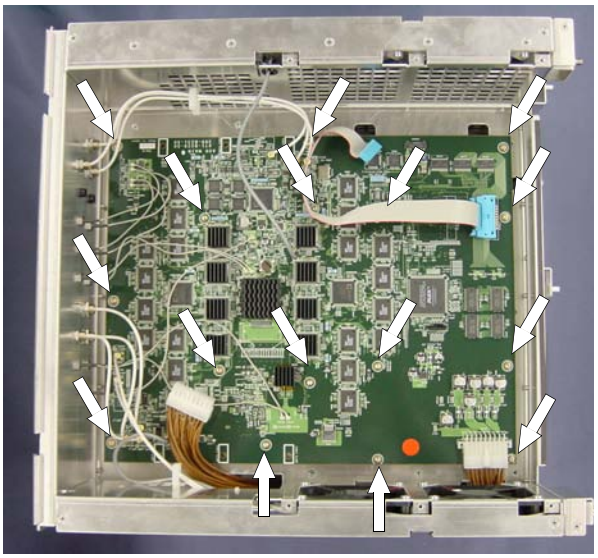
  l. One power cable to A10 Connector board:
  Push the latch lever to release, then unplug the connector.

4. Remove the 16 screws attaching the A50/A51/A54 Main board to the main chassis.

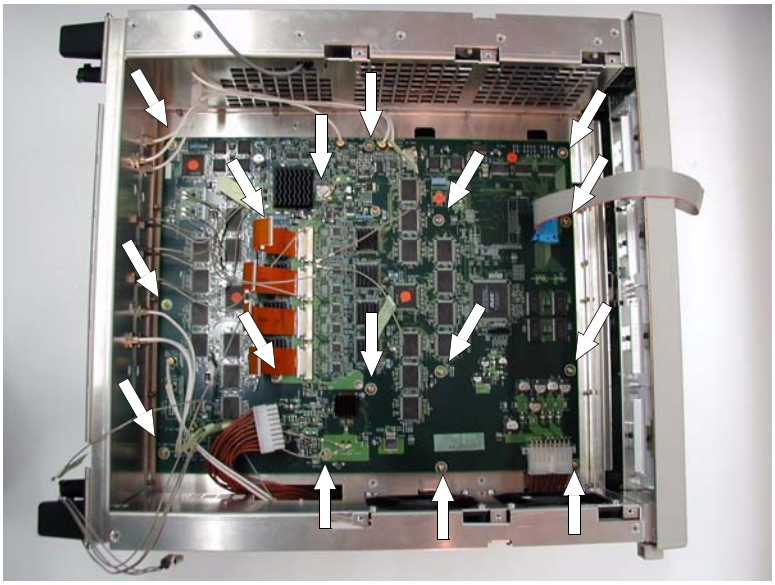
CAUTION. *A50/A51/A54 Main board has a connector (J100) on the back side of the Main board on the front-panel side, and is connected with A10 Connector & PCI Interface board by this connector. When you remove the A50/A51/A54 Main board, raise the board perpendicularly and carefully unplug each connector.*



A54 Main board (DTG5078)



A50 Main board (DTG5274)



A51 Main board (DTG5334)

Figure 6-31: 16 screws

5. Carefully lift the A50/A51/A54 Main board a little to unplug the connector on the back.

6. After unplugging the A10 Connector & PCI Interface board, lift the A50/A54 Main board from the chassis to complete the removal.

7. To install, reverse the procedure.

NOTE. *When you have exchanged A50/A51/A54 Main board, you need to enter the serial number. Refer to* Service Password *section on page 6-77.*

Procedures for Internal Modules (Upper)

You should have completed the *Access Procedure* before doing any procedure in this collection. This section describes removal/installation procedures for the following modules:

- A10 Connector Board
- A30 Compact PCI Back Plane
- Compact PCI Frame

Power Supply

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Remove the FD drive.
2. Orient the data timing generator so its bottom is down on the work surface and its front is facing you.
3. Release the three cables on the surface of the power supply from the cable holder, and free from the power supply chassis.
4. Remove the cables to chassis ground and AC connector.
5. Remove the six screws and lift up the power supply.

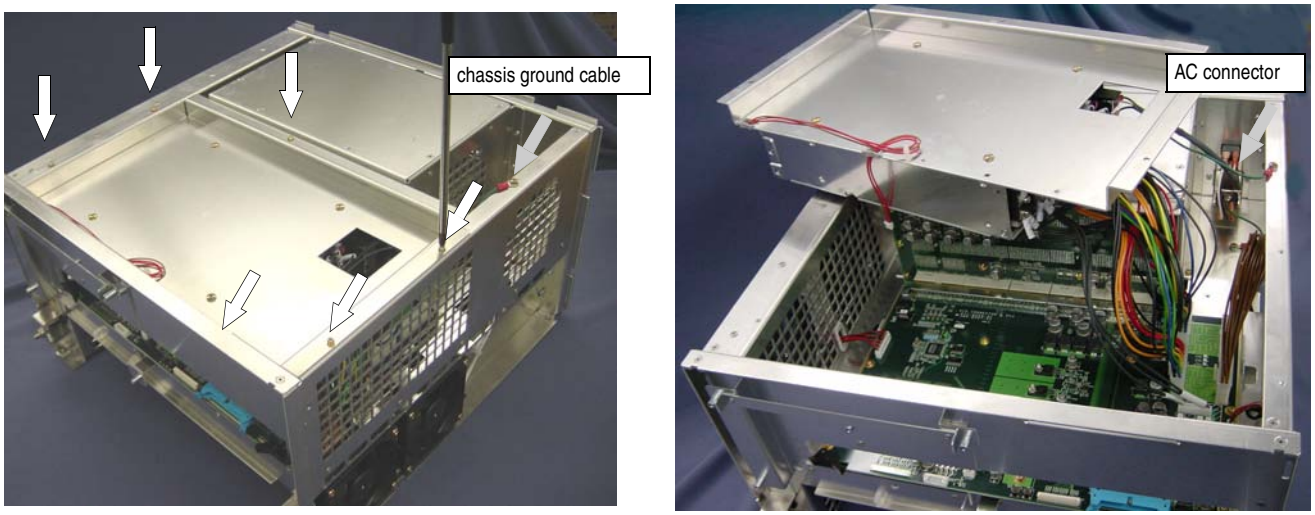


Figure 6-32: Power supply removal

6. To remove the power supply, lift up the module a little out of the main chassis and unplug the four cable connectors to the A10 Connector board.
7. Lift the module up out of the main chassis to complete the removal.
8. To install, reverse the procedure.

A10 Connector Board

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Remove the Front-Panel Assembly, Display Assembly, Power Supply, and A50/A51/A54 Main board immediately preceding this procedure.
2. Orient the data timing generator so its bottom is down on the work surface.
3. Unplug the following cables and connectors:
   - Two fan power cables
   - The flex cable to the FD drive
   - The flat cable to the A20 Front Key & DC Output board
   - The cable to the Inverter board
   - The power cables to the A54 Main board, A62 and A63 Output boards (DTG5078), to the A50 Main board, A60 Output board (DTG5274), to the A51 Main board, A61 Output board (DTG5334)
4. Remove the ten screws attaching the A10 Connector & PCI Interface board to the main chassis.

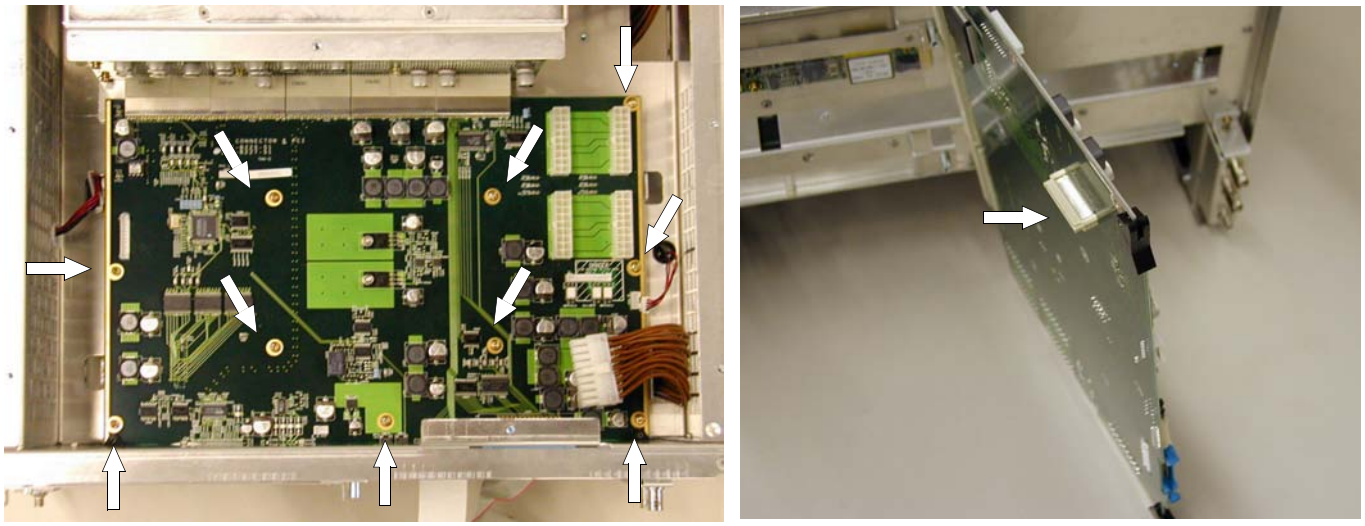


Figure 6-33: A10 Connector & PCI Interface board removal

CAUTION. *The A10 Connector & PCI Interface board has a connector (J410) on its back surface, that connects to the A50/A51/A54 Main board (See Figure 6-33) .*

When you remove the A10 Connector & PCI Interface board, remove the A50/A51/A54 Main board first. (Or raise the board perpendicularly and carefully unplug each connector.)

5. To remove the A10 Connector & PCI Interface board, press the eject knobs toward the outside, then pull out the board.

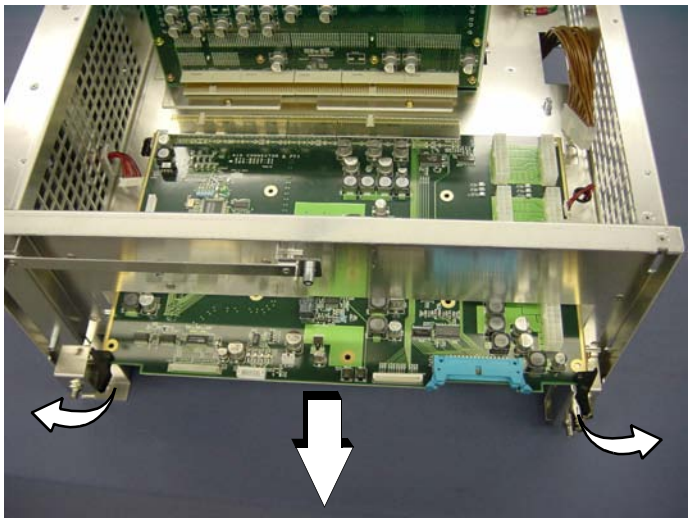


Figure 6-34: A10 Connector & PCI Interface board removal

6. To install, reverse the procedure.

Compact PCI Frame

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Remove the CPU unit, CD-ROM drive, GPIB card, Front-Panel Assembly, Display Assembly, Power Supply, A50/A51/A54 Main board and A10 Connector & PCI Interface board immediately preceding this procedure.
2. Orient the data timing generator so its bottom is down on the work surface.
3. Remove the four screws on the bottom and the four screws on the rear panel.
4. Lift the Compact PCI Frame up away from the main chassis.

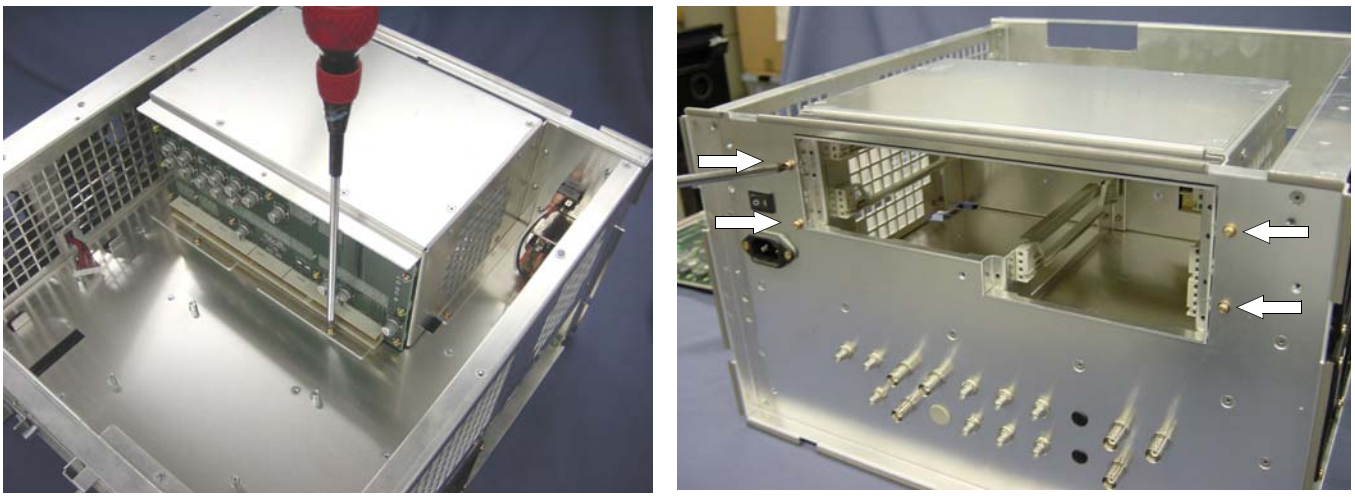


Figure 6-35: Compact PCI Frame removal

5. To install, reverse the procedure.

A30 Compact PCI Backplane

You will need a screwdriver with a #2 Phillips tip (Items 1 and 3).

1. Remove the Compact PCI Frame immediately preceding this procedure.
2. Orient the Compact PCI Frame so its rear is down on the work surface.
3. Remove the nine screws attaching the A30 Compact PCI Backplane board to the Compact PCI Frame.

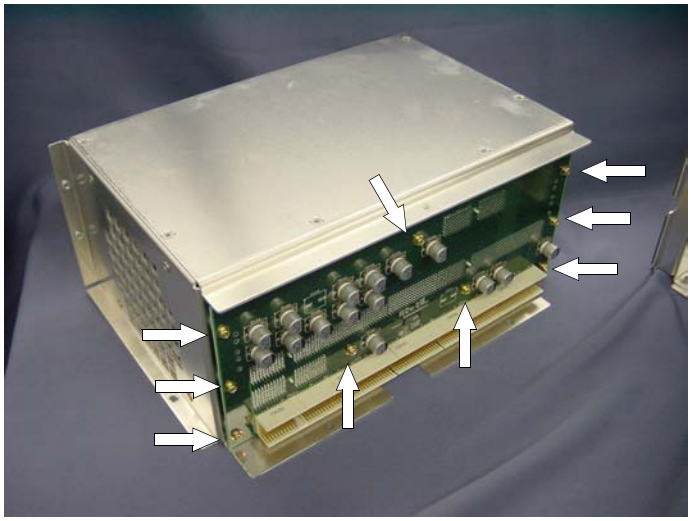


Figure 6-36: A30 Compact PCI Backplane removal

4. To install, reverse the procedure.

Troubleshooting

This section contains information to help you to isolate faulty modules in the data timing generator.

- Troubleshooting trees
- Diagnostics

Troubleshooting trees show how to find and isolate faulty modules. The Diagnostics section describes the diagnostics supplied with the data generator, its operation and status messages.

After troubleshooting and identifying the faulty part, follow the *Removal and Installation Procedures* section to exchange the modules.

Troubleshooting tree

This subsection consists of the following flowcharts:

- Figures 6-37 to 6-39: Primary Troubleshooting Procedure
- Figure 6-41: Troubleshooting Procedure A - Power Supply and A10 board section
- Figure 6-40: Troubleshooting Procedure B - Display section.

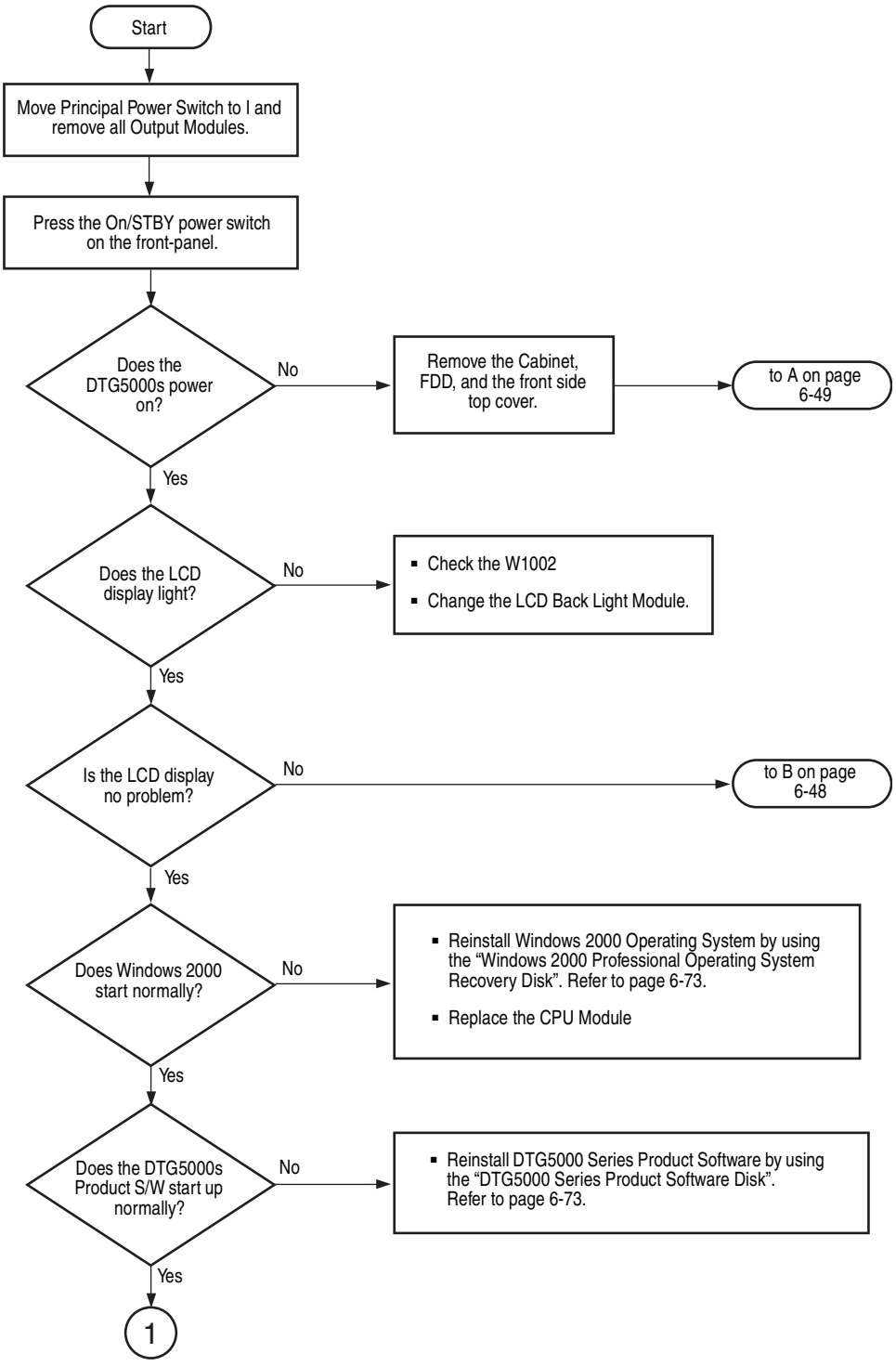


Figure 6-37: Primary troubleshooting procedure (1)

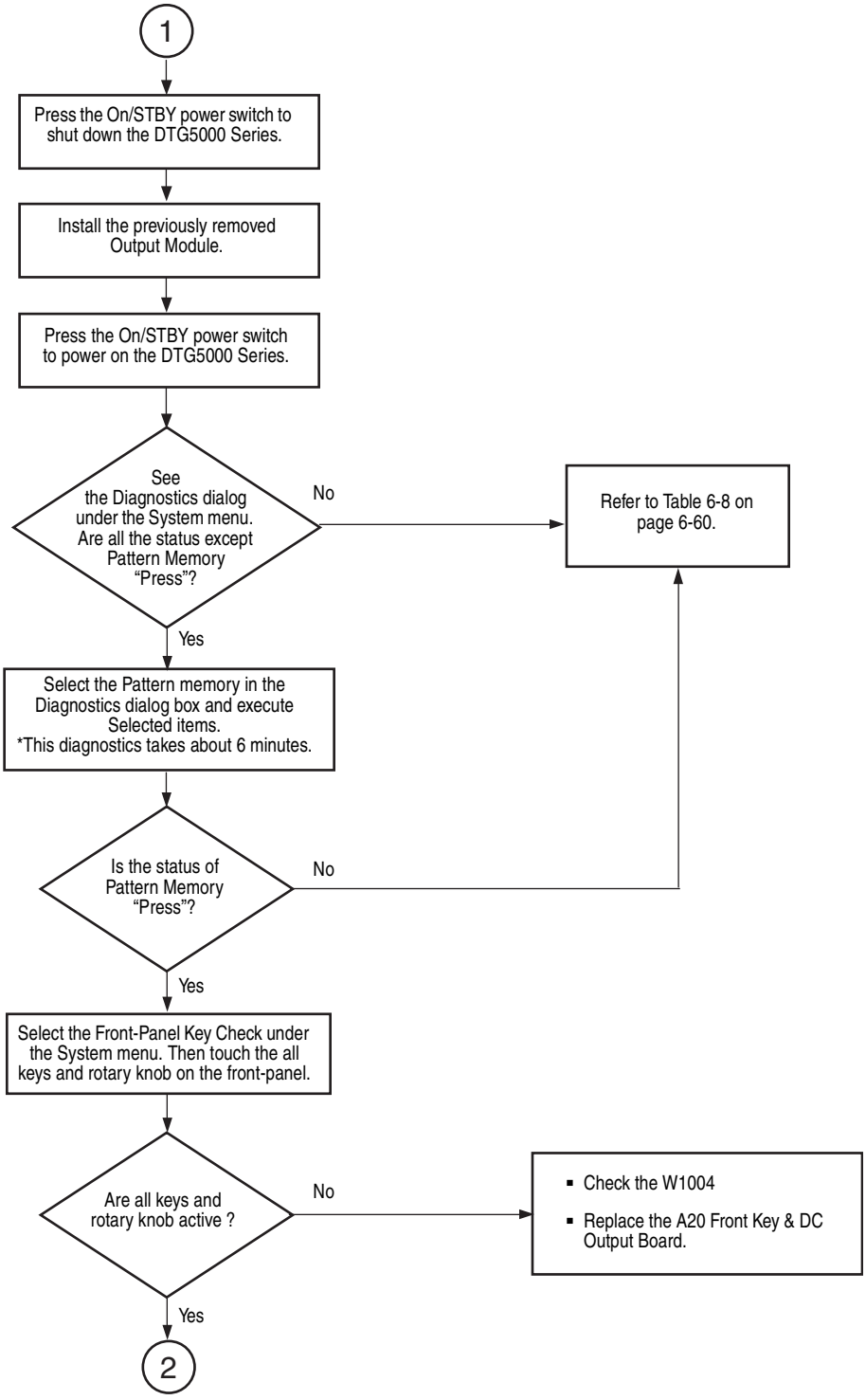


Figure 6-38: Primary troubleshooting procedure (2)

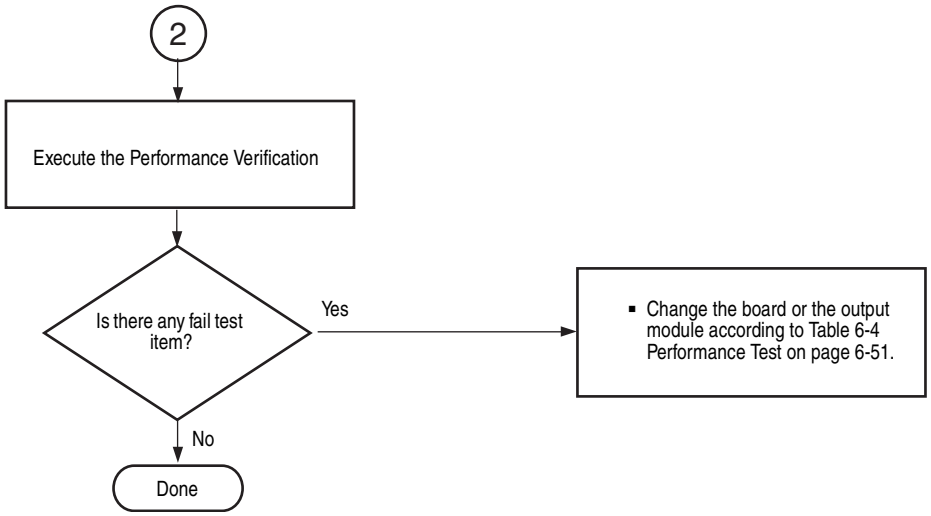


Figure 6-39: Primary troubleshooting procedure (3)

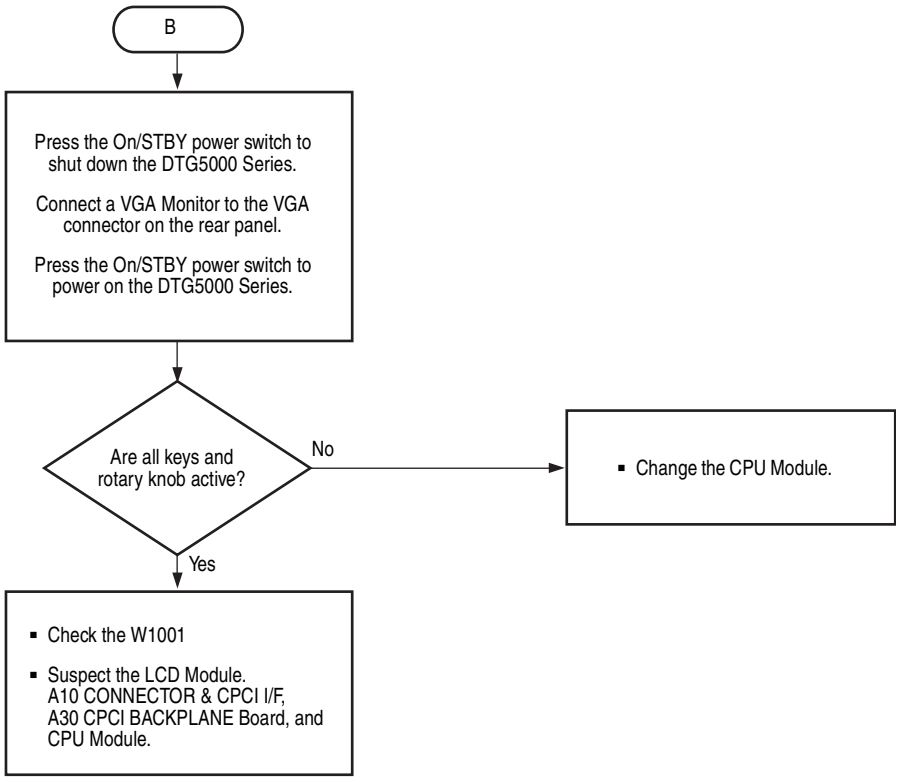


Figure 6-40: Troubleshooting procedure B - Display section

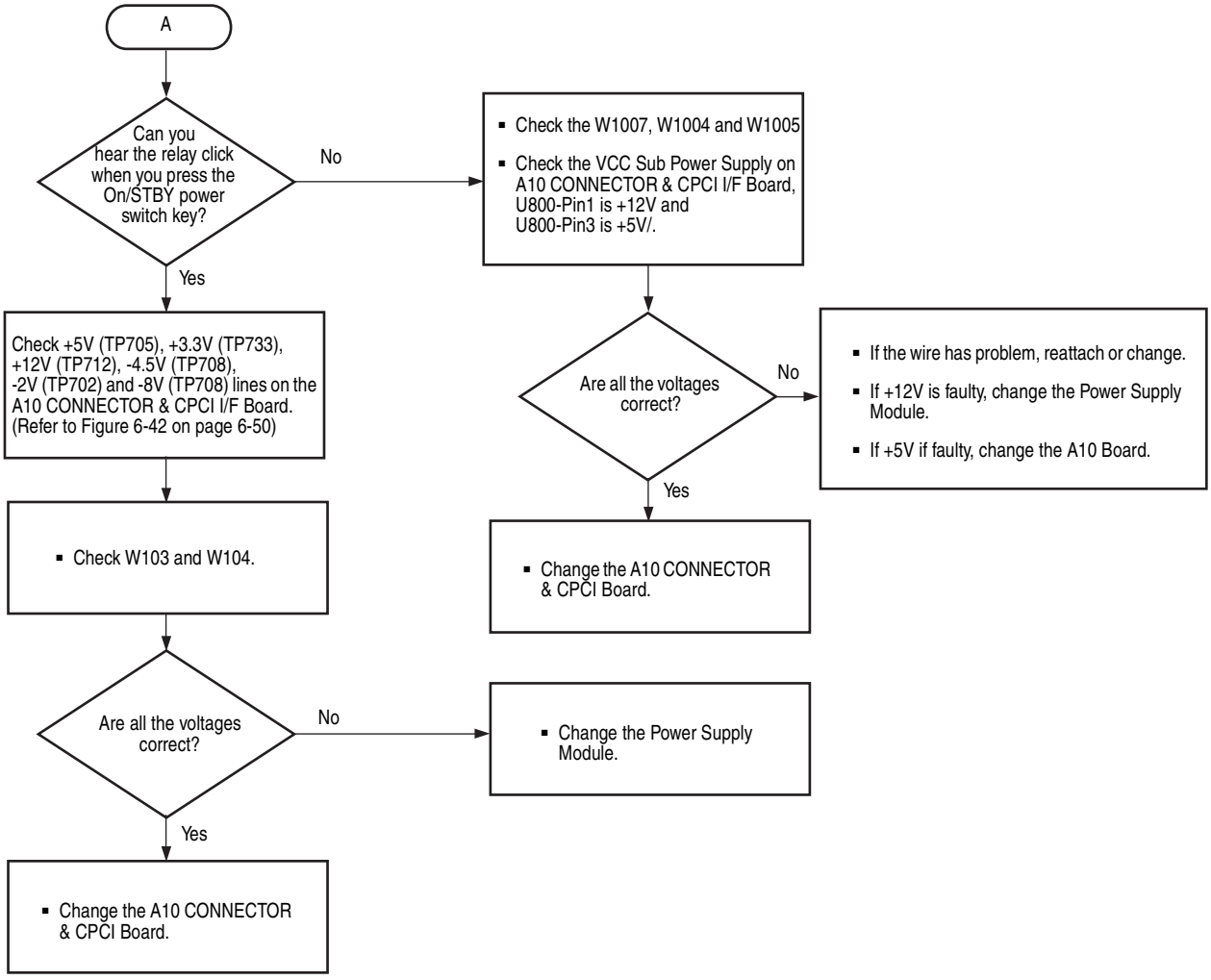


Figure 6-41: Troubleshooting procedure A - Power Supply and A10 board section

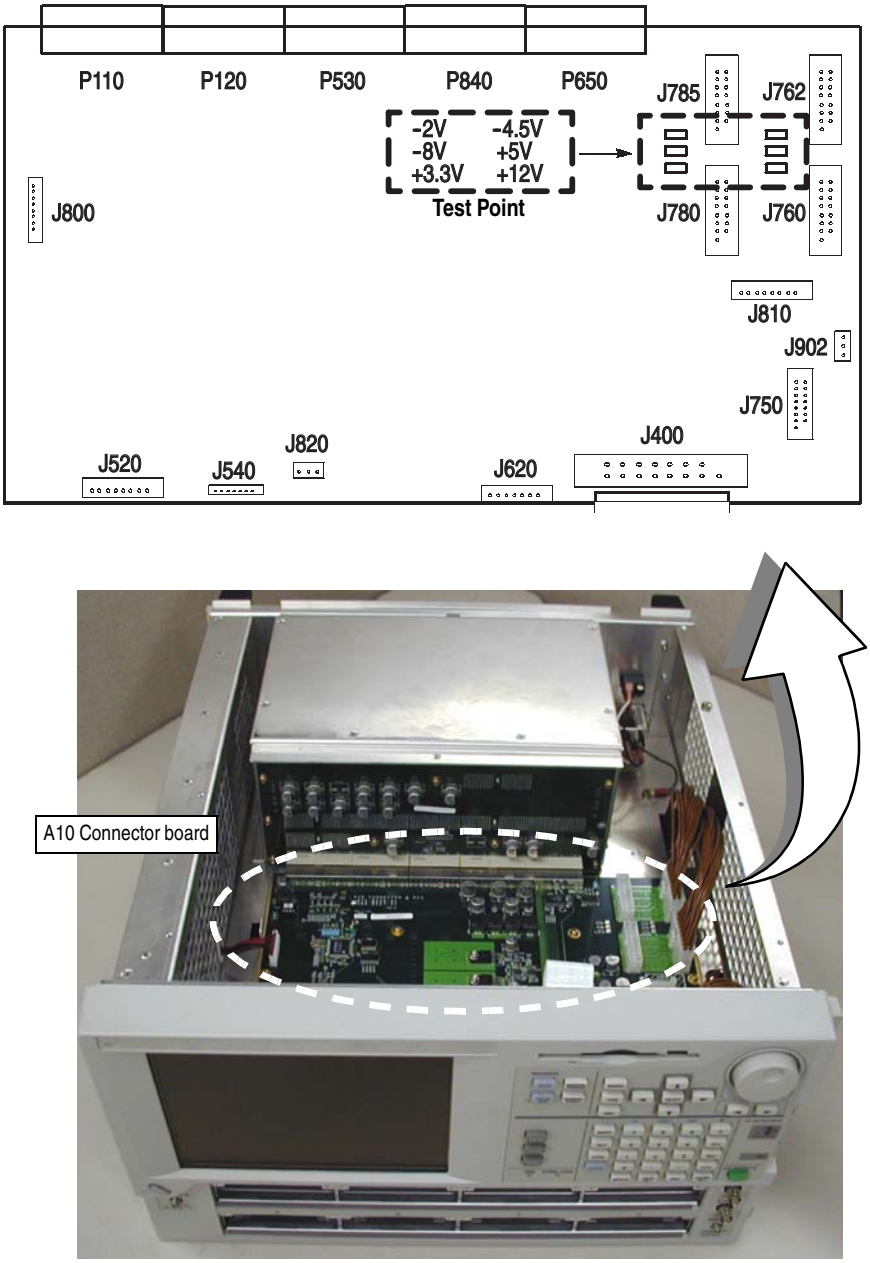


Figure 6-42: Test point on the A10 Connector board

Table 6-4: Performance Test

Performance test items	Action
DTG5000 series mainframe	
Sync output	■ Check W5018, W6006 (DTG5334) ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
Internal clock frequency	■ Check W5002 ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
External clock output	■ Check W5002 and W5003 ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
External clock input	■ Check W5001 ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
10 MHz reference input	■ Check W5019 ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
10 MHz reference output	■ Check W5020 ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
Phase lock input	■ Check W5021 ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
Internal automatic trigger and Trigger input	■ Check W5016 ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
Event input and sequence function	■ Check W5017, W5005, W5006, and W5007 ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
All jitter generation	■ DTG5078 -> Replace A62 Output board ■ DTG5274 -> Replace A60 Output board ■ DTG5334 -> Replace A61 Output board
Partial jitter generation	■ DTG5078 -> Replace A62 Output board ■ DTG5274 -> Replace A60 Output board ■ DTG5334 -> Replace A61 Output board
DC output	■ Replace the A20 Front Key & DC Output Board

Table 6-4: Performance Test (cont.)

Performance test items	Action
Skew and delay timing	■ DTG5078 -> Replace A62 Output board ■ DTG5274 -> Replace A60 Output board ■ DTG5334 -> Replace A61 Output board
Clock out random jitter	■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
Random jitter	■ DTG5078 -> Replace DTGM2x, A62 (Slot A to Slot D) Output board or A63 (Slot E to Slot H) Output board, and A54 Main board by turns. ■ DTG5274 -> Replace DTGM30, A60 Output board, and A50 Main board by turns. ■ DTG5334 -> Replace DTGM30, A61 Output board, and A51 Main board by turns.
Total jitter	■ DTG5078 -> Replace DTGM2x, A62 (Slot A to Slot D) Output board or A63 (Slot E to Slot H) Output board, and A54 Main board by turns. ■ DTG5274 -> Replace DTGM30, A60 Output board, and A50 Main board by turns. ■ DTG5334 -> Replace DTGM30, A61 Output board, and A51 Main board by turns.
Master-Slave operation	■ Check W5008, W5009, W5010, W5011, W5012, W5013, W5014(DTG5078 only), and W5015(DTG5078 only). ■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board
Output module	
Data output DC level	■ Replace the Output Module
Data format	■ DTG5078 -> Replace A54 Main board ■ DTG5274 -> Replace A50 Main board ■ DTG5334 -> Replace A51 Main board

Diagnostics

The data timing generator has two levels of internal diagnostics that focus on verifying and isolating faulty modules.

Both levels of internal diagnostics report any bad modules and/or interfaces. If a bad module and/or interface is found, use the troubleshooting procedures in this section to determine which module needs to be replaced.

The two levels of diagnostics are: power-on diagnostics and manual diagnostics. Both types diagnose the following items:

- Registers
- Clocks
- Outputs
- Sequence memory
- Pattern memory

Power On Diagnostic Test

When you power on the DTG5000 Series, it automatically executes a diagnostic test for all the diagnostics items, except the pattern memory cell test, while the Startup window remains on-screen. When detecting an error, this test displays an error message. If you see such a message, press the **ENTER** key and click the **OK** button to proceed with the next step. The DTG5000 software starts. When the DTG5000 Series contains an unsolved error, the test cannot be conducted normally.

Diagnostic Test from Menu

When you select **Diagnostics...** in the **System** menu, the Diagnostics dialog box appears. This box lists the results of the power-on or the latest diagnostic test. This test allows you to select the desired diagnostic items and the number of repetitions. Figure 6-43 shows a diagnostics dialog box of 1 master and no-slave configuration.

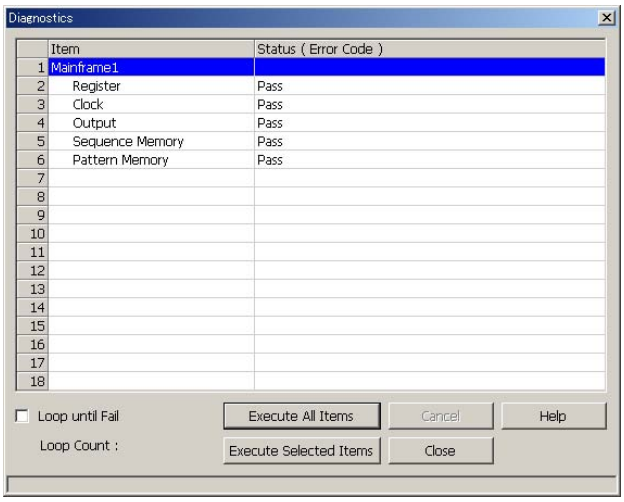


Figure 6-43: Diagnostics dialog box

The buttons and check box available in the dialog box are described in Table 6-5.

Table 6-5: Diagnostics dialog box buttons

Button	Description
Execute All Items	Executes diagnostics on all the test items.
Execute Selected Items	Executes diagnostics on one or more consecutive test items you selected. To select a test item, use the Up and/or Down arrow key. To select two or more items, use the Up and/or Down arrow key while holding down the SHIFT key.
Loop until Fail	If you select this checkbox, the diagnostic test repeats until it detects any fail. To cancel the test, click the Cancel button.
Cancel	Stops the test that is running. Available only during the test.
Close	Closes the dialog box.

Diagnostics Items

The diagnostics investigate the following items.

NOTE. *DTG5078 uses the A54 , A62 and A63 boards. DTG5274 uses the A50 and A60 boards. DTG5334 uses the A51 and A61 boards.*

DTGM10 uses the A74 board, DTGM20 uses the A72 board, DTGM21 uses the A82 board, DTGM30 uses the A70 board, DTGM31 uses the A80 board and DTGM32 uses the A81 board.

Register checks the following:

- For A50 or A51 or A54 board

  Write and read back the contents of the register in which read/write is possible.

  Write and read back the contents of the EVENT RAM.

  Check the data in the EEPROM.

- For A60 or A61 or A62 or A63 board

  Write and read back the contents of the register in which read/write is possible.

  Write and read back the contents of the Jitter Waveform Memory.

  Check the data in the EEPROM.

- For A70 or A72 or A74 or A80 or A81 or A82 board

  Write and read back the contents of the register in which read/write is possible.

Clock checks the following:

- PLL

  Set the maximum frequency to DDS, check the Lock/Unlock signal generated from PLL, and then check it at the minimum frequency.

Output: checks the following:

- Reference Level

  Measure the reference voltage of DAC for output level and make sure that the result is within the allowable level.

- Output Level

  Measure the output voltage and make sure that the result is within the allowable level.

- DLY10 Delay Time

Measure the delay time for each bit of DLY10 and make sure that the result is within the allowable level.

Does not perform this check for the slot E, F, G and H in the DTG5078 because these slots use another type of delay lines.

Sequence Memory checks the following:

- Data Bus

  Make sure that there is no error by executing the data bus test for the sequence memory.

- Address Bus

  Make sure that there is no error by executing the address bus test for the sequence memory.

- Memory Cell

  Make sure that there is no error by reading the written data after writing test pattern data to all the memory cells of the sequence memory.

Pattern Memory checks the following:

- Data Bus

  Make sure that there is no error by executing the data bus test for the pattern memory.

- Address Bus

  Make sure that there is no error by executing the address bus test for the pattern memory.

- Memory Cell

  Make sure that there is no error by reading the written data after writing test pattern data to all the memory cells of the pattern memory.

Operating procedure

1. Select **Diagnostics...** in the **System** menu, the Diagnostics dialog box appears.
2. If you want to execute all the test items, click the **Execute All Items** button to start the diagnostics.

   If you want to execute only the desired test items, select them by using the Up and/or Down arrow keys holding the SHIFT button, and then click the **Execute Selected Item** button to start the diagnostics.
   If you select the **Loop Until Fail** checkbox, the diagnostic test repeats until it detects Fail.

NOTE. *The diagnostic test resets all the hardware settings to the defaults. Before the test begins, you see a confirmation dialog box that asks you whether you want to save the current settings. Choose to save the settings, if necessary.*

The internal diagnostics do an exhaustive verification of proper function. This verification takes several minutes.

3. When the test is finished, the results are listed. Select the **Close** button. Then press the **ENTER** key to close the dialog box.

Diagnostic Results

Status lists the diagnostic results. When the DTG5000 Series contains an unsolved error, it cannot operate normally.

Table 6-6: Information on Status

Status	Description
Pass	The DTG5000 Series is operating normally.
Unknown	The results are unknown because the test has not finished yet. As the power-on diagnostic test can diagnose only part of the pattern memory, so this message is displayed in Pattern Memory section.
Fail (xxxxxxx)	The test detected an error. xxxxxxx represents an error code.
Executing	Now executing.

Error Codes

If Diagnostics detects a malfunction, it displays the character string “Fail” and the error code. The error code consists of a five-digit code and three arguments. The five-digit code consists of the mainframe number, the category, and the board and slot positions. The three arguments include supplementary information, which depends on the code.

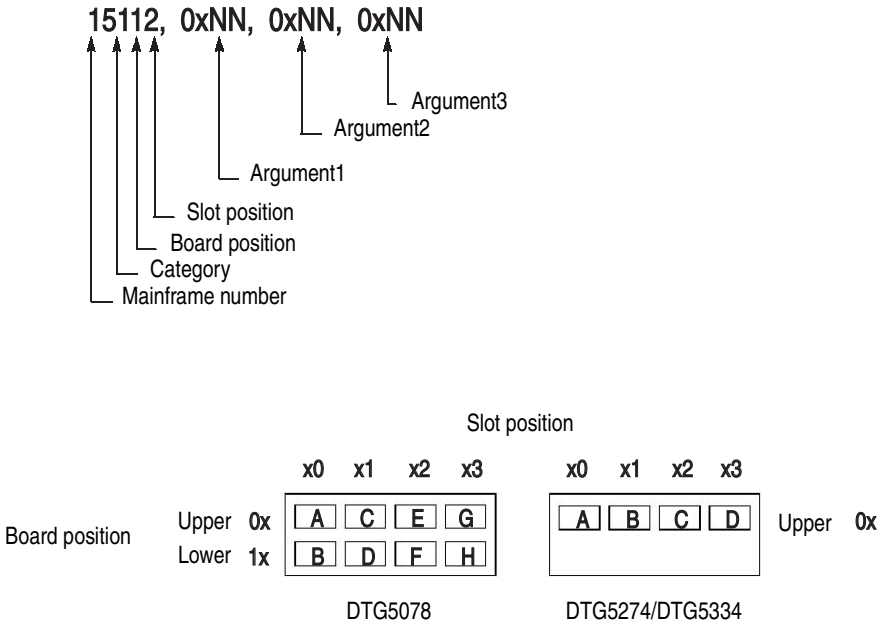


Figure 6-44: Diagnostics error code format

Table 6-7 describes the Category of the Diagnostics Error Code shown in Figure 6-44.

Table 6-7: Category of the Diagnostics Error Code

Category		Description	
Register	10	For A50/A51/A54	Register Read/Write Fail
	11		Sequence FPGA Register Read/Write Fail
	12		Sequence FPGA Event RAM Read/Write Fail
	13		EEPROM CAL Data Checksum Fail
Register	20	For A60/A61/A62/ A63	Register Read/Write Fail
	21		Jitter Waveform RAM Read/Write Fail
	22		EEPROM CAL Data Checksum Fail
Register	30	For A70/A72/A74/ A80/A81/A82	A70/A72/A74/A80/A81/A82 Register Read/Write Fail
Clock	40	PLL	Clock PLL Lock/Unlock Fail
Output	50	Reference Level	Output DAC Reference Fail
	51	Output Level	Output Level Fail
	52	DLY10 Delay Level	Output Delay Fail
Sequence Memory	60	Data Bus	Sequence Memory Data Bus Fail
	61	Address Bus	Sequence Memory Address Bus Fail
	62	Memory Bus	Sequence Memory Cell Fail
Pattern Memory	70	Data Bus	Sequence Memory Data Bus Fail
	71	Address Bus	Sequence Memory Address Bus Fail
	72	Memory Bus	Sequence Memory Cell Fail

Table 6-8 shows the error code and related modules reporting a failure.

Table 6-8: Error Codes

Error code	Description	Argument1	Argument2	Argument3	Related module
	/*--- Register Diagnostics ---*/				
11000	Mainframe1 A50/A54/A51 Register Read/Write Fail	This code means failed address	This code means failed address	This code means failed address	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
11100	Mainframe1 A50/A54/A51 Sequence FPGA Register Read/Write Fail	same as above	same as above	same as above	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
11200	Mainframe1 A50/A54/A51 Sequence FPGA Event RAM Read/Write Fail	same as above	same as above	same as above	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
11300	Mainframe1 A50/A54/A51 EEPROM CAL Data Checksum Fail	same as above	same as above	same as above	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
12000	Mainframe1 A60/A63/A61 Register Read/Write Fail	same as above	same as above	same as above	DTG5078: A63 or A54 or W6200 DTG5274: A60 or A50 or W6000 DTG5334: A61 or A51 or W6000
12010	Mainframe1 A62 Register Read/Write Fail	same as above	same as above	same as above	DTG5078: A62 or A54 or W6200
12100	Mainframe1 A60/A63/A61Jitter Waveform RAM Read/Write Fail	same as above	same as above	same as above	DTG5078: A63 DTG5274: A60 DTG5334: A61
12110	Mainframe1 A62 Jitter Waveform RAM Read/Write Fail	same as above	same as above	same as above	DTG5078: A62
12200	Mainframe1 A60/A63/A61 EEPROM CAL Data Checksum Fail	same as above	same as above	same as above	DTG5078: A63 DTG5274: A60 DTG5334: A61
12210	Mainframe1 A62 EEPROM CAL Data Checksum Fail	same as above	same as above	same as above	DTG5078: A62
13000	Mainframe1 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot A)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13001	Mainframe1 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot B (if DTG5274/ DTG5334) /Slot C (if DTG5078))	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
13002	Mainframe1 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot C (if DTG5274/ DTG5334) /Slot E (if DTG5078))	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13003	Mainframe1 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot D (if DTG5274/ DTG5334) /Slot G (if DTG5078))	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13010	Mainframe1 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot B)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13011	Mainframe1 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot D)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13012	Mainframe1 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot F)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13013	Mainframe1 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot H)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13100	Mainframe1 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot A)	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13101	Mainframe1 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot B (if DTG5274, DTG5334) /Slot C (if DTG5078))	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13102	Mainframe1 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot C (if DTG5274, DTG5334) /Slate E (if DTG5078))	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
13103	Mainframe1 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot D (if DTG5274, DTG5334) /Slot G (if DTG5078))	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
	/*--- Clock Diagnostics ---*/				
14000	Mainframe1 Clock PLL Lock/Unlock Fail	Refer to Note(1)	—	—	DTG5078: A54 DTG5274: A50 DTG5334: A51
	/*--- Output Diagnostics ---*/				
15000	Mainframe1 A60/A63/A61 Output DAC Reference Fail	0x0000:GND Level Fail 0x0001:+3 V Level Fail 0x0002: -4.5 V Level Fail	—	—	DTG5078: A63 DTG5274: A60 DTG5334: A61
15010	Mainframe1 A62 Output DAC Reference Fail	same as above	—	—	DTG5078: A62
15100	Mainframe1 Output Level Fail (The output module of Slot A)	0x0000: CH1 failure 0x0001: CH2 failure 0x0002: CH3 failure 0x0003: CH4 failure	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
15101	Mainframe1 Output Level Fail (The output module of Slot B (if DTG5274, DTG5334)/Slot C (if DTG5078))	same as above	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
15102	Mainframe1 Output Level Fail (The output module of Slot C (if DTG5274, DTG5334)/Slot E (if DTG5078))	same as above	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
15103	Mainframe1 Output Level Fail (The output module of Slot D (if DTG5274, DTG5334)/Slot G (if DTG5078))	same as above	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
15110	Mainframe1 Output Level Fail (The output module of Slot B)	same as above	—	—	Inserted Output Module or DTG5078: A62
15111	Mainframe1 Output Level Fail (The output module of Slot D)	same as above	—	—	Inserted Output Module or DTG5078: A62
15112	Mainframe1 Output Level Fail (The output module of Slot F)	same as above	—	—	Inserted Output Module or DTG5078: A62
15113	Mainframe1 Output Level Fail (The output module of Slot H)	same as above	—	—	Inserted Output Module or DTG5078: A62
15200	Mainframe1 Output Delay Fail (The output module of Slot A)	same as above	—	—	DTG5078: A63 DTG5274: A60 DTG5334: A61

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
15201	Mainframe1 Output Delay Fail (The output module of Slot B (if DTG5274, DTG5334)/Slot C (if DTG5078))	same as above	—	—	DTG5078: A62 DTG5274: A60 DTG5334: A61
15202	Mainframe1 Output Delay Fail (The output module of Slot C (if DTG5274, DTG5334)/Slot E (if DTG5078))	same as above	—	—	DTG5078: A63 DTG5274: A60 DTG5334: A61
15203	Mainframe1 Output Delay Fail (The output module of Slot D (if DTG5274, DTG5334)/Slot G (if DTG5078))	same as above	—	—	DTG5078: A62 DTG5274: A60 DTG5334: A61
15210	Mainframe1 Output Delay Fail (The output module of Slot B)	same as above	—	—	DTG5078: A62
15211	Mainframe1 Output Delay Fail (The output module of Slot D)	same as above	—	—	DTG5078: A62
15212	Mainframe1 Output Delay Fail (The output module of Slot F)	same as above	—	—	DTG5078: A62
15213	Mainframe1 Output Delay Fail (The output module of Slot H)	same as above	—	—	DTG5078: A62
	/*Sequence Memory Diagnostics*/				
16000	Mainframe1 Sequence Memory Data Bus Fail	Failed address	Write data	Read data	DTG5078: A54 DTG5274: A50 DTG5334: A51
16100	Mainframe1 Sequence Memory Address Bus Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
16200	Mainframe1 Sequence Memory Cell Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
	/*- Pattern Memory Diagnostics -*/				
17000	Mainframe1 Pattern Memory Data Bus Fail	Failed address	Write data	Write data	DTG5078: A54 DTG5274: A50 DTG5334: A51
17100	Mainframe1 Pattern Memory Address Bus Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
17200	Mainframe1 Pattern Memory Cell Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
	/*--- Register Diagnostics ---*/				
21000	Mainframe2 A50/A54/A51 Register Read/Write Fail	This code mean failed address	This code mean failed address	This code mean failed address	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
21100	Mainframe2 A50/A54/A51 Sequence FPGA Register Read/Write Fail	same as above	same as above	same as above	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
21200	Mainframe2 A50/A54/A51 Sequence FPGA Event RAM Read/Write Fail	same as above	same as above	same as above	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
21300	Mainframe2 A50/A54/A51 EEPROM CAL Data Checksum Fail	same as above	same as above	same as above	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
22000	Mainframe2 A60/A63/A61 Register Read/Write Fail	same as above	same as above	same as above	DTG5078: A63 or A54 or W6200 DTG5274: A60 or A50 or W6000 DTG5334: A61 or A51 or W6000
22010	Mainframe2 A62 Register Read/Write Fail	same as above	same as above	same as above	DTG5078: A62 or A54 or W6200
22100	Mainframe2 A60/A63/A61 Jitter Waveform RAM Read/Write Fail	same as above	same as above	same as above	DTG5078: A63 DTG5274: A60 DTG5334: A61
22110	Mainframe2 A62 Jitter Waveform RAM Read/Write Fail	same as above	same as above	same as above	DTG5078: A62
22200	Mainframe2 A60/A63/A61 EEPROM CAL Data Checksum Fail	same as above	same as above	same as above	DTG5078: A63 DTG5274: A60 DTG5334: A61
22210	Mainframe2 A62 EEPROM CAL Data Checksum Fail	same as above	same as above	same as above	DTG5078: A62
23000	Mainframe2 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot A)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30,/DTGM31 /DTGM32/DTGM21 or DTG5078: A63 DTG5274: A60 DTG5334: A61
23001	Mainframe2 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot B (if DTG5274, DTG5334) /Slot C (if DTG5078))	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
23002	Mainframe2 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot C (if DTG5274, DTG5334) /Slot E (if DTG5078))	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
23003	Mainframe2 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot D (if DTG5274, DTG5334) /Slot G (if DTG5078))	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
23010	Mainframe2 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot B)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
23011	Mainframe2 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot D)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
23012	Mainframe2 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot F)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
23013	Mainframe2 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot H)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
23100	Mainframe2 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot A)	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
23101	Mainframe2 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot B (if DTG5274, DTG5334) /Slot C (if DTG5078))	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
23102	Mainframe2 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot B (if DTG5274, DTG5334) /Slot C (if DTG5078))	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
23103	Mainframe2 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot D (if DTG5274, DTG5334) /Slot G (if DTG5078))	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
	/*--- Clock Diagnostics ---*/				
24000	Mainframe2 Clock PLL Lock/Unlock Fail	Refer to Note(1)	—	—	DTG5078: A54 DTG5274: A50 DTG5334: A51

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
	/*--- Output Diagnostics ---*/				
25000	Mainframe2 A60/A63/A61 Output DAC Reference Fail	0x0000:GND Level Fail 0x0001:+3 V Level Fail 0x0002: -4.5 V Level Fail	—	—	DTG5078: A63 DTG5274: A60 DTG5334: A61
25010	Mainframe2 A62 Output DAC Reference Fail	same as above	—	—	DTG5078: A62
25100	Mainframe2 Output Level Fail (The output module of Slot A)	0x0000: CH1 failure 0x0001: CH2 failure 0x0002: CH3 failure 0x0003: CH4 failure	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
25101	Mainframe2 Output Level Fail (The output module of Slot B (if DTG5274, DTG5334) /Slot C (if DTG5078))	same as above	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
25102	Mainframe2 Output Level Fail(The output module of Slot C (if DTG5274, DTG5334) /Slot E (if DTG5078))	same as above	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
25103	Mainframe2 Output Level Fail(The output module of Slot D (if DTG5274, DTG5334) /Slot G (if DTG5078))	same as above	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
25110	Mainframe2 Output Level Fail (The output module of Slot B)	same as above	—	—	Inserted Output Module or DTG5078: A62
25111	Mainframe2 Output Level Fail (The output module of Slot D)	same as above	—	—	Inserted Output Module or DTG5078: A62
25112	Mainframe2 Output Level Fail (The output module of Slot F)	same as above	—	—	Inserted Output Module or DTG5078: A62
25113	Mainframe2 Output Level Fail (The output module of Slot H)	same as above	—	—	Inserted Output Module or DTG5078: A62
25200	Mainframe2 Output Delay Fail(The output module of Slot A)	same as above	—	—	DTG5078: A63 DTG5274: A60 DTG5334: A61
25201	Mainframe2 Output Delay Fail (The output module of Slot B (if DTG5274, DTG5334) /Slot C (if DTG5078))	same as above	—	—	DTG5078: A62 DTG5274: A60 DTG5334: A61

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
25202	Mainframe2 Output Delay Fail (The output module of Slot C (if DTG5274, DTG5334) /Slot E (if DTG5078))	same as above	—	—	DTG5078: A63 DTG5274: A60 DTG5334: A61
25203	Mainframe2 Output Delay Fail (The output module of Slot D (if DTG5274, DTG5334) /Slot G (if DTG5078))	same as above	—	—	DTG5078: A62 DTG5274: A60 DTG5334: A61
25210	Mainframe2 Output Delay Fail (The output module of Slot B)	same as above	—	—	DTG5078: A62
25211	Mainframe2 Output Delay Fail (The output module of Slot D)	same as above	—	—	DTG5078: A62
25212	Mainframe2 Output Delay Fail (The output module of Slot F)	same as above	—	—	DTG5078: A62
25213	Mainframe2 Output Delay Fail (The output module of Slot H)	same as above	—	—	DTG5078: A62
	/*Sequence Memory Diagnostics*/				
26000	Mainframe2 Sequence Memory Data Bus Fail	Failed address	Write data	Read data	DTG5078: A54 DTG5274: A50 DTG5334: A51
26100	Mainframe2 Sequence Memory Address Bus Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
26200	Mainframe2 Sequence Memory Cell Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
	/*- Pattern Memory Diagnostics -*/				
27000	Mainframe2 Pattern Memory Data Bus Fail	Fail address	Write data	Write data	DTG5078: A54 DTG5274: A50 DTG5334: A51
27100	Mainframe2 Pattern Memory Address Bus Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
27200	Mainframe2 Pattern Memory Cell Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
	/*--- Register Diagnostics ---*/				
31000	Mainframe3 A50/A54/A51 Register Read/Write Fail	This code mean failed address	This code mean failed address	This code mean failed address	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
31100	Mainframe3 A50/A54/A51 Sequence FPGA Register Read/Write Fail	same as above	same as above	same as above	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
31200	Mainframe3 A50/A54/A51 Sequence FPGA Event RAM Read/Write Fail	same as above	same as above	same as above	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
31300	Mainframe3 A50/A54/A51 EEPROM CAL Data Checksum Fail	same as above	same as above	same as above	DTG5078: A54 or A10 DTG5274: A50 or A10 DTG5334: A51 or A10
32000	Mainframe3 A60/A63/A61 Register Read/Write Fail	same as above	same as above	same as above	DTG5078: A63 or A54 or W6200 DTG5274: A60 or A50 or W6000 DTG5334: A61 or A51 or W6000
32010	Mainframe3 A62 Register Read/Write Fail	same as above	same as above	same as above	DTG5078: A62 or A54 or W6200
32100	Mainframe3 A60/A63/A61 Jitter Waveform RAM Read/Write Fail	same as above	same as above	same as above	DTG5078: A63 DTG5274: A60 DTG5334: A61
32110	Mainframe3 A62 Jitter Waveform RAM Read/Write Fail	same as above	same as above	same as above	DTG5078: A62
32200	Mainframe3 A60/A63/A61 EEPROM CAL Data Checksum Fail	same as above	same as above	same as above	DTG5078: A63 DTG5274: A60 DTG5334: A61
32210	Mainframe3 A62 EEPROM CAL Data Checksum Fail	same as above	same as above	same as above	DTG5078: A62
33000	Mainframe3 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot A)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33001	Mainframe3 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot B (if DTG5274/ DTG5334)/Slot C (if DTG5078))	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33002	Mainframe3 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot C (if DTG5274/ DTG5334)/Slot E (if DTG5078))	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33003	Mainframe3 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot D (if DTG5274/ DTG5334)/Slot G (if DTG5078))	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
33010	Mainframe3 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot B)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33011	Mainframe3 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot D)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33012	Mainframe3 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot F)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33013	Mainframe3 A70/A72/A74/A80/A81/ A82 Register Read/Write Fail (The output module of Slot H)	same as above	same as above	same as above	DTGM10/DTGM20/DTGM30/DTGM31/ DTGM32/DTGM21, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33100	Mainframe3 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot A)	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33101	Mainframe3 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot B (if DTG5274, DTG5334) /Slot C (if DTG5078))	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33102	Mainframe3 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot C (if DTG5274, DTG5334) /Slot E (if DTG5078))	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
33103	Mainframe3 A80/A81 EEPROM CAL Data Checksum Fail (The output module of Slot D (if DTG5274, DTG5334) /Slot G (if DTG5078))	same as above	same as above	same as above	DTGM31/DTGM32, or DTG5078: A63 DTG5274: A60 DTG5334: A61
	/*--- Clock Diagnostics ---*/				
34000	Mainframe3 Clock PLL Lock/Unlock Fail	Refer to Note(1)	—	—	DTG5078: A54 DTG5274: A50 DTG5334: A51

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
	/*--- Output Diagnostics ---*/				
35000	Mainframe3 A60/A63/A61 Output DAC Reference Fail	0x0000:GND Level Fail 0x0001:+3V Level Fail 0x0002: -4.5V Level Fail	—	—	DTG5078: A63 DTG5274: A60 DTG5334: A61
35010	Mainframe3 A62 Output DAC Reference Fail	same as above	—	—	DTG5078: A62
35100	Mainframe3 Output Level Fail (The output module of Slot A)	0x0000: CH1 failure 0x0001: CH2 failure 0x0002: CH3 failure 0x0003: CH4 failure	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
35101	Mainframe3 Output Level Fail (The output module of Slot B (if DTG5274, dtg5334) /Slot C (if DTG5078))	same as above	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
35102	Mainframe3 Output Level Fail (The output module of Slot C (if DTG5274, dtg5334) /Slot E (if DTG5078))	same as above	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
35103	Mainframe3 Output Level Fail (The output module of Slot D (if DTG5274, dtg5334) /Slot G (if DTG5078))	same as above	—	—	Inserted Output Module or DTG5078: A63 DTG5274: A60 DTG5334: A61
35110	Mainframe3 Output Level Fail (The output module of Slot B)	same as above	—	—	Inserted Output Module or DTG5078: A62
35111	Mainframe3 Output Level Fail (The output module of Slot D)	same as above	—	—	Inserted Output Module or DTG5078: A62
35112	Mainframe3 Output Level Fail (The output module of Slot F)	same as above	—	—	Inserted Output Module or DTG5078: A62
35113	Mainframe3 Output Level Fail (The output module of Slot H)	same as above	—	—	Inserted Output Module or DTG5078: A62
35200	Mainframe3 Output Delay Fail (The output module of Slot A)	same as above	—	—	DTG5078: A63 DTG5274: A60 DTG5334: A61
35201	Mainframe3 Output Delay Fail (The output module of Slot B (if DTG5274, dtg5334) /Slot C (if DTG5078))	same as above	—	—	DTG5078: A62 DTG5274: A60 DTG5334: A61

Table 6-8: Error Codes (cont.)

Error code	Description	Argument1	Argument2	Argument3	Related module
35202	Mainframe3 Output Delay Fail (The output module of Slot C (if DTG5274, dtg5334) /Slot E (if DTG5078))	same as above	—	—	DTG5078: A63 DTG5274: A60 DTG5334: A61
35203	Mainframe3 Output Delay Fail (The output module of Slot D (if DTG5274, dtg5334) /Slot G (if DTG5078))	same as above	—	—	DTG5078: A62 DTG5274: A60 DTG5334: A61
35210	Mainframe3 Output Delay Fail (The output module of Slot B)	same as above	—	—	DTG5078: A62
35211	Mainframe3 Output Delay Fail (The output module of Slot D)	same as above	—	—	DTG5078: A62
35212	Mainframe3 Output Delay Fail (The output module of Slot F)	same as above	—	—	DTG5078: A62
35213	Mainframe3 Output Delay Fail (The output module of Slot H)	same as above	—	—	DTG5078: A62
	/*Sequence Memory Diagnostics*/				
36000	Mainframe3 Sequence Memory Data Bus Fail	Failed address	Write data	Read data	DTG5078: A54 DTG5274: A50 DTG5334: A51
36100	Mainframe3 Sequence Memory Address Bus Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
36200	Mainframe3 Sequence Memory Cell Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
	/*- Pattern Memory Diagnostics -*/				
37000	Mainframe3 Pattern Memory Data Bus Fail	Failed address	Write data	Write data	DTG5078: A54 DTG5274: A50 DTG5334: A51
37100	Mainframe3 Pattern Memory Address Bus Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51
37200	Mainframe3 Pattern Memory Cell Fail	same as above	same as above	same as above	DTG5078: A54 DTG5274: A50 DTG5334: A51

System Recovery

If the operating system does not start up, you have to recover the OS by starting it from the recovery disk supplied with the OS. Recovering the system using the recovery disk deletes all data from the hard disk.

For this reason, you have to perform the following operations:

- Reinstalling the Windows 2000 operating system
- Setting up the Windows 2000 operating system
- Reinstalling the DTG5000 software
- Reinstalling the TekVISA software

Requirements for System Recovery

Prepare the following:

- Recovery disk labeled “Windows 2000 Professional Operating System Recovery Disk”
- Application installation disk labeled “DTG5000 Series Product Software”

The system cannot recognize any USB device during operation with the recovery disk. Thus prepare the following as well:

- PS/2 keyboard and PS/2 mouse

Operating Procedure



CAUTION. *Recovering the system using the recovery disk deletes all data on the hard disks. Back up the necessary data on a routine basis to avoid data loss.*

Installing the Windows 2000 Operating System

1. With the power off, connect the PS/2 keyboard and PS/2 mouse to the connectors on the rear panel.
2. Power on the unit.
3. Load the recovery CD-ROM in the CD-ROM drive on the rear panel.

4. Power off the DTG5000 Series once. Then power it on again. The system starts from the recovery disk.
5. The "PowerQuest EasyRestore End User License Agreement" window appears. Press any key as instructed in the message.
6. The EasyRestore dialog box opens. Click the **Continue** button.
7. The Warning dialog box opens. Click **Yes**.
8. After the entire image data in the drive has been copied, the Reboot dialog box opens. Remove the recovery CD-ROM from the drive, and then click the **Reboot** button.
9. The system restarts, and Windows 2000 Setup begins.
   Go to the next step, "Setting Up Windows 2000."

Setting Up Windows 2000

1. The Windows 2000 setup wizard "Welcome to the Windows 2000 Setup Wizard" appears on the data timing generator screen.
2. Click the Next button, the "License Agreement" dialog box appears.
3. Follow the on-screen instructions.
4. When the "**Personalize Your Software**" dialog box appears, "Name" and "Organization" have been added. Be sure to input "Name". "Organization" can be left blank.
5. Click the **Next** button.
6. When **"Your Product Key"** dialog box appears, enter the bar code number which is located at the rear panel of the mainframe.
7. Click the **Next** button to display the **Date and Time Settings** dialog box.
8. Confirm that the Date and the Time Settings information is correct, and the click the **Next** button.
9. The dialog box informs you the completion of Windows 2000 setup.
10. Click **Restart Now**, and Windows runs.

The computer name is DTG5000, and you can log on to Windows 2000 using the following user name and password.

- User name: Administrator
- Password: dtg5000

If you want to add the user name, or want to change the password, always use the **Control Panel > Users and Passwords**. For more information, consult Windows 2000 Help.

NOTE. *If you connect a second or third DTG5000 series data timing generator to the network, use different computer names for additional instruments.*

Reinstalling the DTG5000 Software

1. Load the "**DTG5000 Series Product Software CD-ROM**" in the CD-ROM drive. Double-click the **setup.exe** icon in the DTG5000Firmware folder to start the installer.
2. The message "Welcome to the InstallShield Wizard for Tektronix..." appears. Click **Next**.
3. The message "InstallShield Wizard Complete" appears. Click **Finish**. Windows 20000 operating system restarts, then the DTG5000 Software starts automatically.

Go to the next step, "Reinstalling the TekVISA Software".

Reinstalling the TekVISA Software

1. Before installing the TekVISA software, exit the DTG5000 software.
2. Double-click the **setup.exe** icon in the TekVISAforDTG5000 folder to start the installer.
3. Following the on-screen instructions of the installation wizard, install the software.
4. The message "InstallShield Wizard Complete" appears. Click **Finish**. Windows 20000 operating system restarts, then the DTG5000 Software starts automatically.

Service Password

The data timing generator has its own serial number on the A50/A51/A54 Main board. This serial number is used in order to differentiate each product. When the A50/A51/A54 Main board is exchanged, it is necessary to register this serial number.

Registration of a serial number is performed on the data timing generator as service mode and you need input the service password to enter the service mode.

Enable the Service mode

Do the following steps to set the data timing generator into the service mode:

1. Power on the data timing generator.
2. After starting up the DTG5000 software, select **System**, and then select **Service Password...** from the menu bar. The Service Password dialog box appears.
3. Enter **1603** as a password, then select **OK** button.

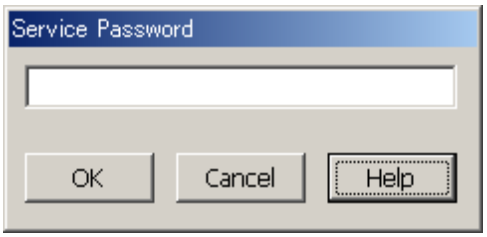


Figure 6-45: Service Password dialog box

The data timing generator is set up into the service mode.

Serial number registration

After you set the data timing generator into the service mode, you can register the serial number.

1. Select **System**, and then select **Set Serial Number...** from the menu bar. The Set Serial Number dialog box appears.
2. Enter a serial number labeled on the rear panel, then select **OK** button.

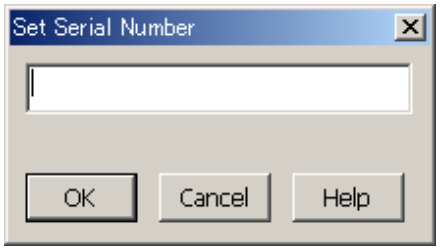


Figure 6-46: Set Serial Number dialog box

Replaceable Electrical Parts

Electrical Parts List

The modules that make up this instrument are a combination of mechanical and electrical subparts. Therefore, all replaceable modules are listed in *Replaceable Mechanical Parts*. Refer to that section for part numbers when using this manual.

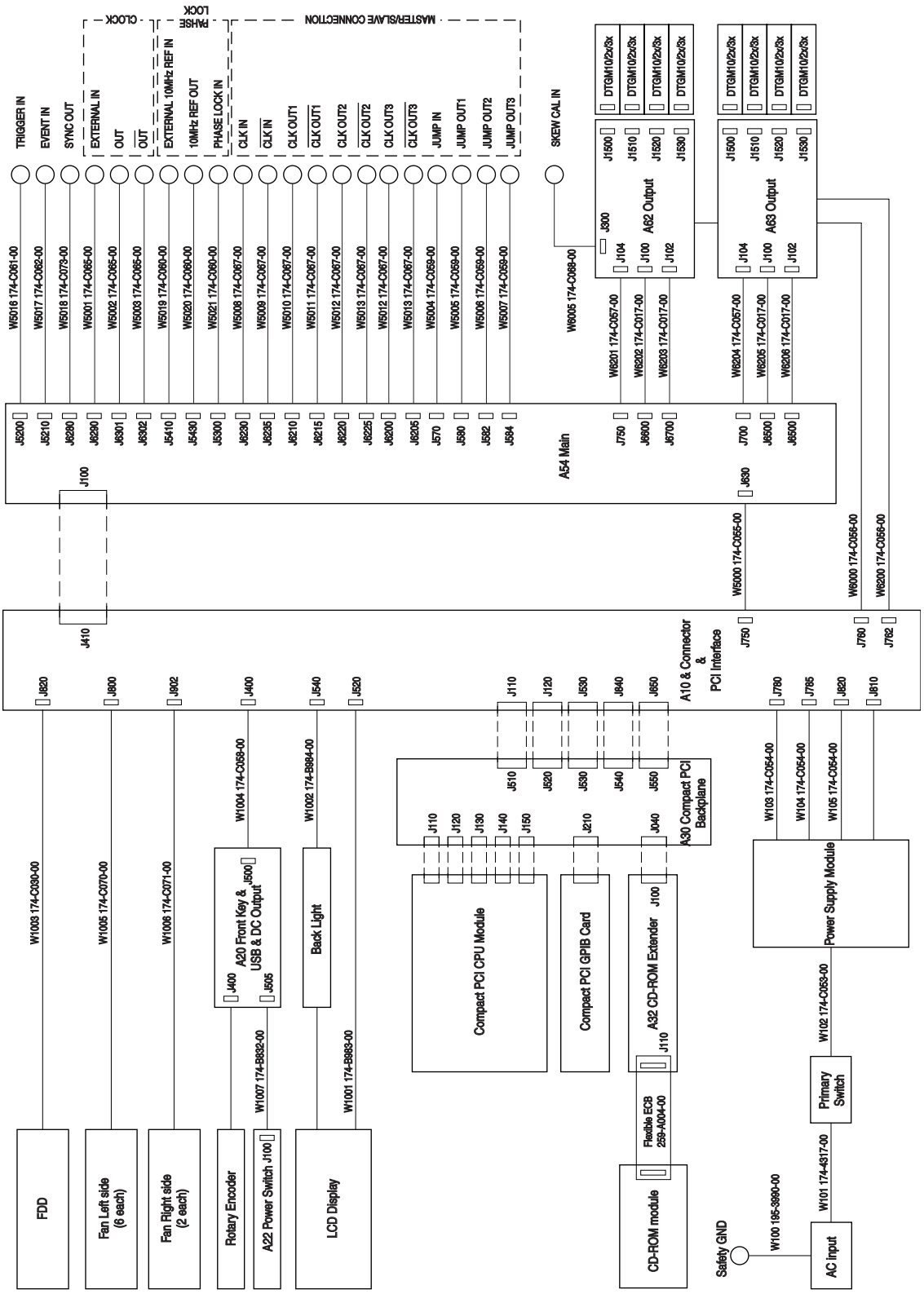
Diagrams

Diagrams

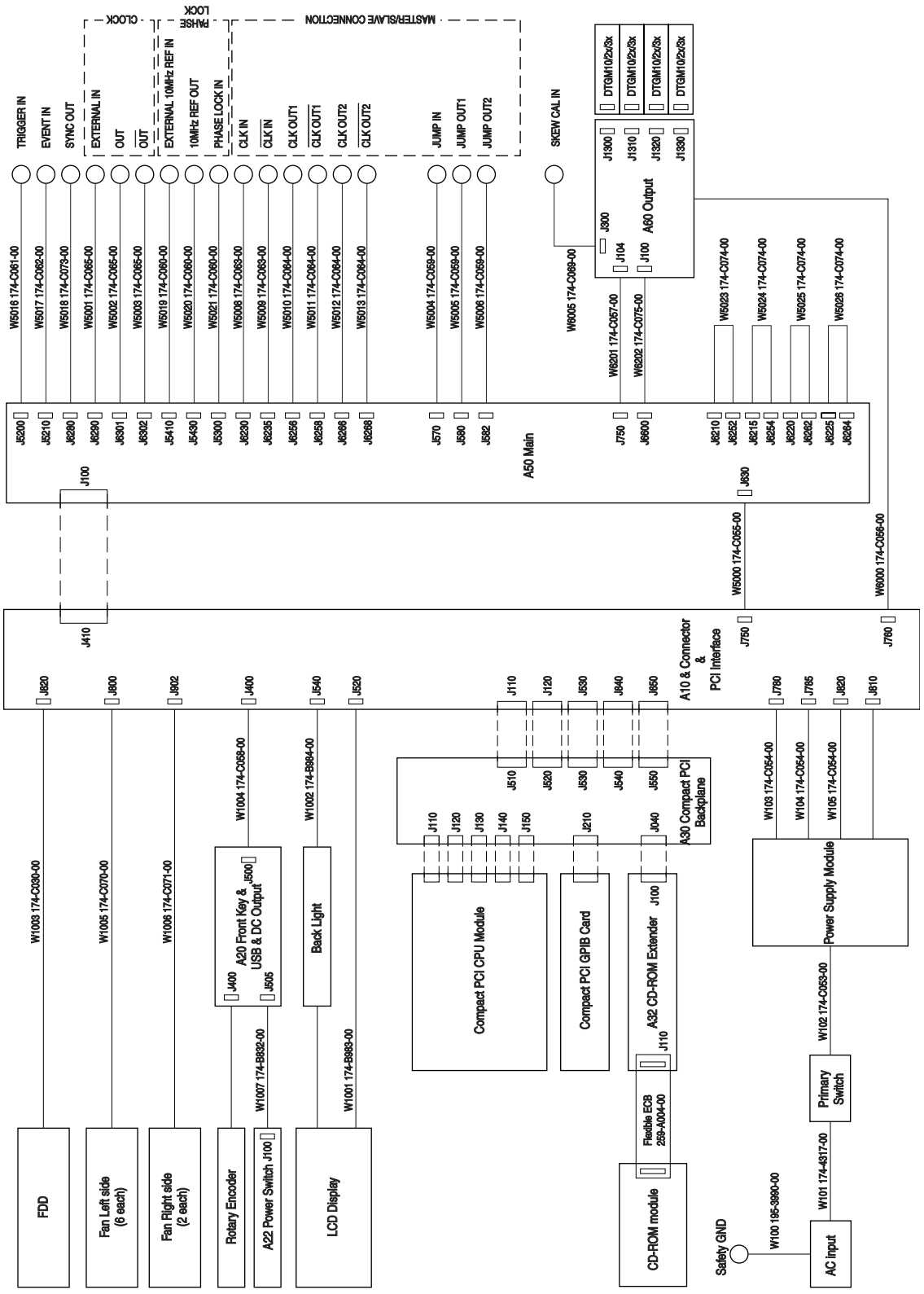
This section contains the following diagram:

- Block & Interconnect Diagram for the DTG5000 Series

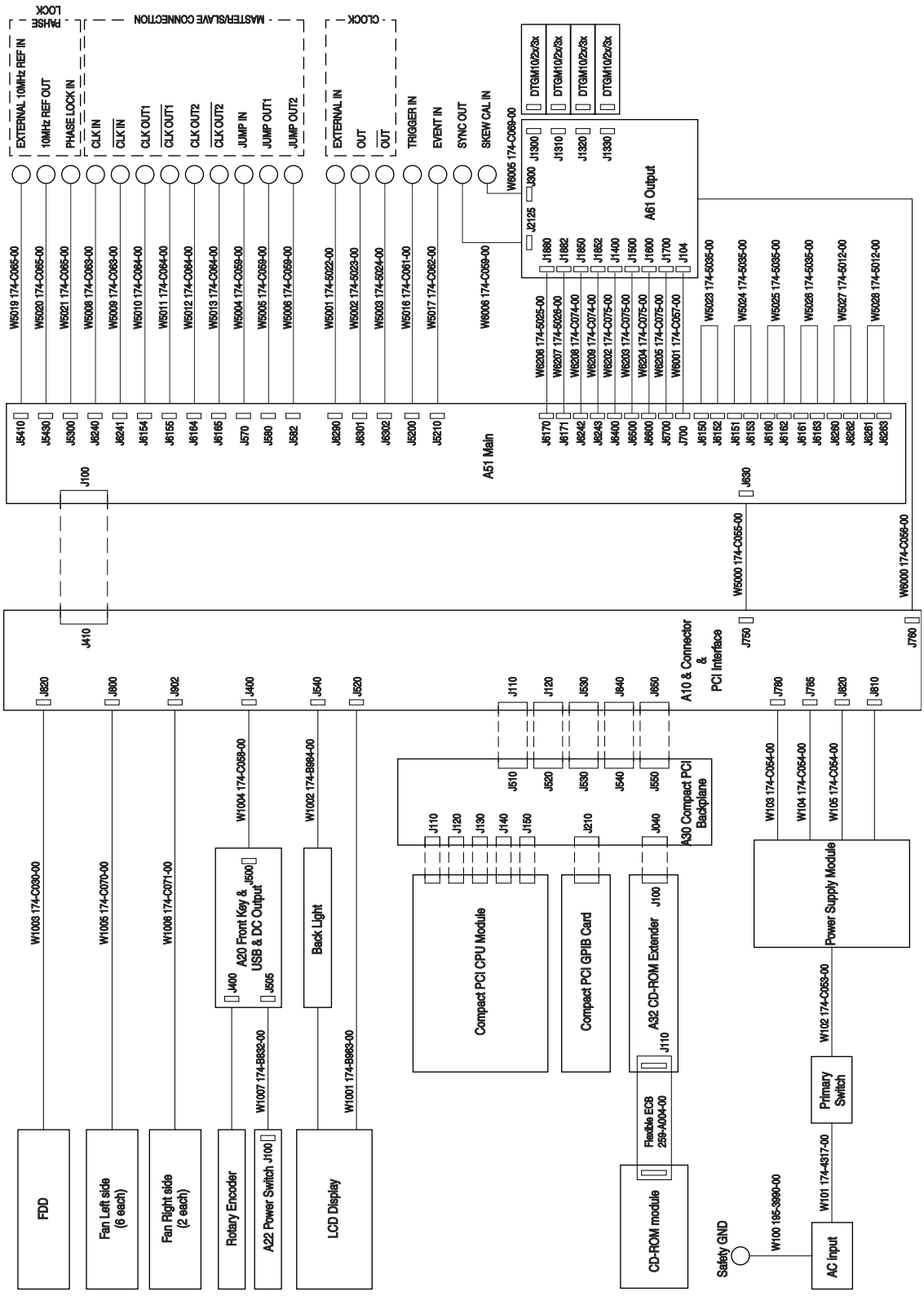
This diagram shows the modules and functional blocks in the data timing generator and how the modules in the data timing generator connect together.



Block and interconnection for DTG5078



Block and interconnection for DTG5274



Block and interconnection for DTG5334

Replaceable Mechanical Parts

Replaceable Mechanical Parts

This section contains a list of the replaceable modules for the DTG5000 Series Data Timing Generator. Use this list to identify and order replacement parts.

Parts Ordering Information

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

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

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

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

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

Part Number Revision Level

Tektronix part numbers contain two digits that show the revision level of the part. For most parts in this manual, you will find the letters XX in place of the revision level number.



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

Module Servicing

Modules can be serviced by selecting one of the following 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-TEK-WIDE, extension 6630.

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 mechanical and/or electrical components that are replaceable for the generator. 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 component number.
2	Tektronix Part Number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial Number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entries indicates the part is good for all serial numbers.
5	Qty	This indicates the quantity of parts used.
6	Name & Description	An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.
7	Mfr. Code	This indicates the code of the actual manufacturer of the part. (Code to name and address cross reference is located after this page.)
8	Mfr. Part Number	This indicates the actual manufacturer's or vendor's part number.

Abbreviations

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

Mfr. Code to Manufacturer Cross Index

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

Manufacturers Cross Index

Mfr. code	Manufacturer	Address	City, state, zip code
S0482	SONY CONSUMER ELECTRONICS		TOKYO JAPAN
S7294	TOSHIBA CORPORATION	1-1-1 SHIBAURA	MINATO-KU, TOKYO JP
SH216	TEKTRONIX/JAPAN LTD	GOTEMBA PLANT 143-1 JINBA TOKYO INTERNATIONAL	SHIZUOKA, JP 10031
TK0AK	GAKUROKU INSATSU	722-2 KAWASHIMATA	GOTEMBA-SHISHIZUOKA, JP
TK0AR	KITAGAWA INDUSTRIES CO LTD	2-24-15 CHIYODA NAKA-KU NAGOYA-SHI	AICHI, JP
TK0AU	CHIYODA DENSHI CO LTD	2-5-12 MITA MEGURO-KU	TOKYO, JP
TK0BD	TAISHO DENKI KOGYO	TAISHO DENKI KOGYO	SETAGAYA-KU, TOKYO JP
TK1943	NEILSEN MANUFACTURING INC	3501 PORTLAND RD NE	SALEM, OR 97303
TK2565	VISION PLASTICS INC	26000 SW PARKWAY CENTER DRIVE	WILSONVILLE, OR 97070
TK2576	COSEL CO LTD	1-6-43 KAMIAKAE-MACHI	TOYAMA-SHITOYAMA, JP 930-0816
TK6314	MCX INC	1315 OREGON AVE	KLAMATH FALLS, OR 97601-6540
TK6592	SOURIAU USA	25 GRUMBACHER ROAD	YORK, PA 17402
0J9P9	GEROME MFG CO INC	PO BOX 737-403 NORTH MAIN	NEWBERG, OR 97132
0KB01	STAUFFER SUPPLY	810 SE SHERMAN	PORTLAND OR 97214
0KB05	NORTH STAR NAMEPLATE INC	LABEL PRODUCTS 5750 NE MOORE COURT	HILLSBORO, OR 97124-6474
76096	ELMA ELECTRONICS INC	41440 CHRISTY ST	FREMONT, CA 94538
78189	ILLINOIS TOOL WORKS INC SHAKEPROOF DIV	ST CHARLES ROAD	ELGIN IL 60120
7X318	KASO PLASTICS INC	5720-C NE 121ST AVE, STE 110	VANCOUVER, WA 98682
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
WAKA	WAKA MANUFACTURING CO LTD	WAKA-BLD 6 MINAMI-CHO SHINJUKU-KU	TOKYO,
SEIWA	SEIWA ELECTRIC MFG CO LTD	36 TERADASHINKE	JOYO-SHI, KYOTO JP 610-0121
BYOSADA	BYOSADA LTD	2-13-3 IWAMOTO-CHO~CHIYODA-KU	CHIYODA-KUTOKYO
NI	NATIONAL INSTRUMENT	SYUWASHIBAPARK BLD A 4F~2-4-1 SHIBAKOEN	MINATO-KUTOKYO
SANRITZ	SANRITZ AUTOMATION CO LTD	4-21 MINAMINARUSE~MACHIDA-SHI~MACHIDA	MACHIDATOKYO, JP 194-0045
WAKO	WAKO DENSHI	SEITO BLD~1-101-1 MINEOKA-CHO~HODOGAYA-KU	YOKOHAMA-SHIKANAGAWA
TEAC	TEAC CORPORATION	3-7-3 NAKA-CHO	MUSASHINO-SHITOKYO

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-1					**MAIN CHASSIS(1) (DTG5078)**		
01-001	211-0871-00			16	SCREW,MACHINE; M3 X 6MM L,PNH STL,ZN PL,CROSS REC,W/FLAT & LOCK WASHER	SH216	211-0871-00
01-002	671-B230-50			1	CIRCUIT BD ASSY; A54 700M/350 MBPS MAIN BOARD,389-B232-XX WIRED	SH216	671-B230-50
01-003	174-C017-00			4	CABLE ASSY RF, 38,50OHM,150MM L,FLAT FLEX,YFLEX	SH216	174-C017-00
01-004	174-C057-00			2	CA ASSY,SP,ELEC, 34,30AWG,30CM L,W/CONN(YAMAICHI NFS)	SH216	174-C057-00
01-005	211-0751-00			6	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
01-006	407-A727-00			1	BRACKET,SUPPORT, CHASSIS,MAIN	SH216	407-A727-00
01-007	441-A313-02			1	CHASSIS,ASSY, PLUG-IN BOX	SH216	441-A313-02
01-008	174-C069-00			1	CA ASSY,RF, 50OHM,COAX,55CM L,1.5D-QEW,SMA(PANEL) TO SMB-STR	SH216	174-C069-00
01-009	407-A718-00			1	BRACKET,ANGLE, FRONT,SMA	SH216	407-A718-00
01-010	211-0751-00			2	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
01-011	348-A141-00			32	SHLD GSKT,ELEC, CONDUCTIVE URETHANE FORM,1 X 4 MM,W/ADHESIVE TAPE	TK0AR	UC-3E1259
01-012	211-0751-00			2	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
01-013	131-1315-01			2	CONN,RF,JACK, BNC,50OHM,FEMALE,STR,PELTORA,PANEL MOUNT	TK6592	28JR306-1
01-014	407-A717-00			1	BRACKET,ANGLE, FRONT,BNC	SH216	407-A717-00
01-015	174-C062-00			1	CA ASSY,RF, 50OHM COAX,55CM L,PELTORA TO PELTRA,MKD-2	SH216	174-C062-00
01-016	174-C061-00			1	CA ASSY,RF, 50OHM COAX,55CM L,PELTORA TO PELTRA,MKD-1	SH216	174-C061-00
01-017	174-C073-00			1	CA ASSY,RF, 50OHM,COAX,55CM L,1.5D-QEW,SMA(PANEL) TO SMA-STR	WAKA	174-C073-00
01-018	441-A300-02			1	CHASSIS,ASSY, MAIN, AL, DTG5000	SH216	441-A300-02
01-019	174-C071-00			1	CA ASSY,SP,ELEC, 4,26AWG,30CM L,FOR FAN MOTER	SH216	174-C071-00
01-020	348-0948-00			2	GROMMET,PLASTIC, NYLON,BLACK,RING,9.5MM ID	SH216	348-0948-00
01-022	212-A049-00			8	SCREW,MACHINE, M4X30MM L,BDGH,STL ZN-C PL,CROSS REC	SH216	212-A049-00
01-023	174-C066-00			2	CA ASSY,RF, 50OHM,COAX,25CM L,1.5D-QEW,SMA(PANEL) TO SMB-STR	SH216	174-C066-00
01-024	174-C067-00			8	CA ASSY,RF, 50OHM,COAX,30CM L,1.5D-QEW,SMA(PANEL) TO SMB-STR	SH216	174-C067-00
01-025	174-C068-00			1	CA ASSY,RF, 50OHM,COAX,45CM L,1.5D-QEW,SMA(PANEL) TO SMB-STR	SH216	174-C068-00
01-026	131-1315-01			7	CONN,RF,JACK, BNC,50OHM,FEMALE,STR,PELTORA,PANEL MOUNT	TK6592	28JR306-1
01-027	344-A019-00			2	CLIP,CABLE, WIRE SADDLE,16 MM X 15.5 MM,66 NYLON	SH216	344-A019-00
01-028	174-C059-00			4	CA ASSY,RF, 50OHM COAX,20CM L,PELTORA TO PELTRA	SH216	174-C059-00

Replaceable Parts List (cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
01-029	174-C060-00			3	CA ASSY,RF, 50OHM COAX,30CM L,PELTORA TO PELTRA	SH216	174-C060-00
01-030	174-C056-00			2	CA ASSY,SP,ELEC, 18,18AWG,1-N,25CM L,MOLEX TO MOLEX	SH216	174-C056-00

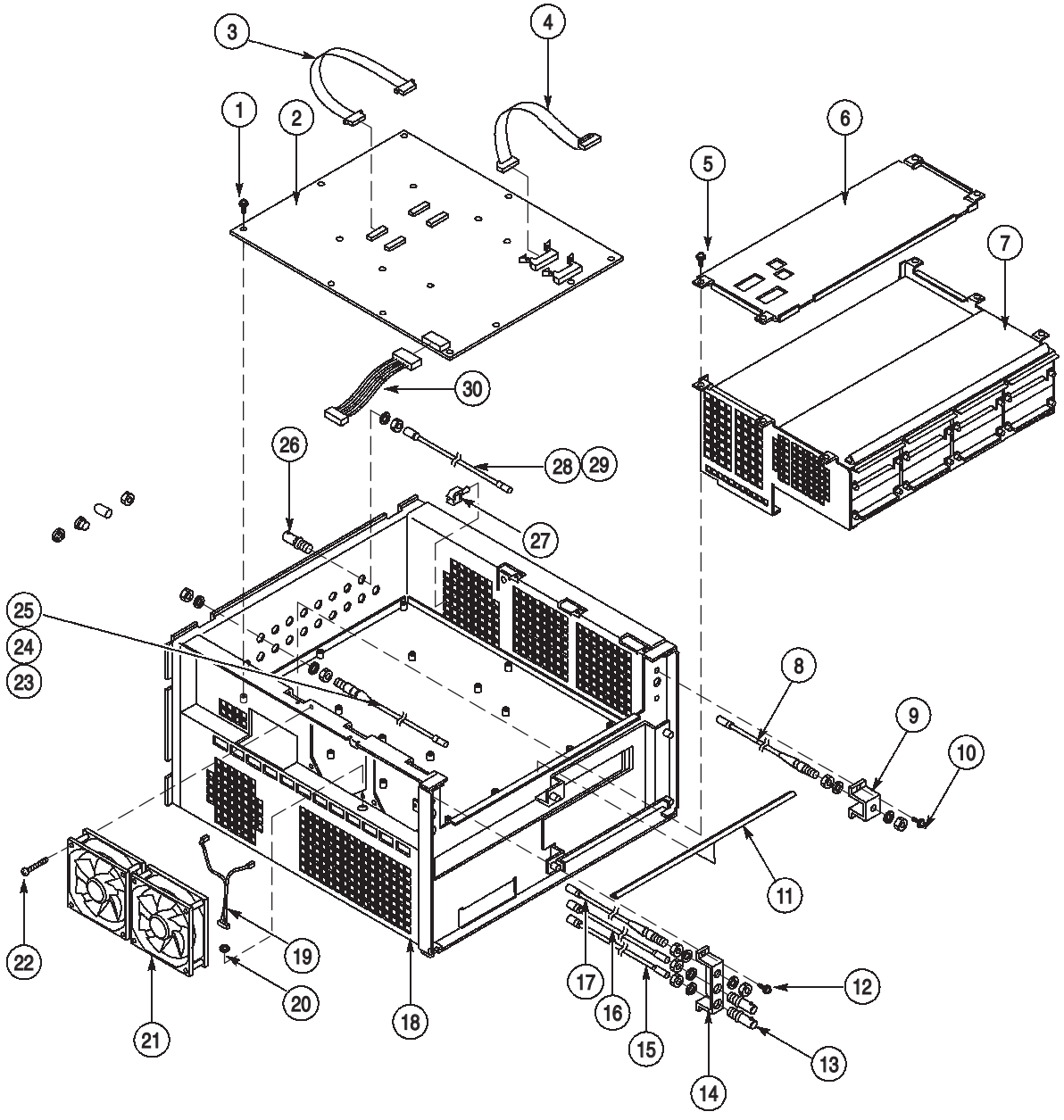


Figure 9-1: Main Chassis (1) (DTG5078)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-2					**MAIN CHASSIS (1) DTG5274**		
02-001	211-0871-00			16	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
02-002	671-B229-50			1	CIRCUIT BD ASSY:A50 3.3GBPS MAIN BOARD,389-3502-XX WIRED	SH216	671-B229-50
02-003	174-C075-00			1	CA ASSY,RF, 38,50OHM,100MM L,FLAT FLEX,YFLEX	SH216	174-C075-00
02-004	174-C057-00			1	CA ASSY,SP,ELEC, 34,30AWG,30CM L,W/CONN(YAMAICHI NFS)	SH216	174-C057-00
02-005	211-0751-00			6	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
02-006	407-A727-00			1	BRACKET,SUPPORT, CHASSIS,MAIN	SH216	407-A727-00
02-007	441-A313-02			1	CHASSIS,ASSY, PLUG-IN BOX, DTG5000	SH216	441-A313-02\
02-008	174-C069-00			1	CA ASSY,RF, 50OHM,COAX,55CM L,1.5D-QEW,SMA(PANEL) TO SMB-STR	SH216	174-C069-00
02-009	407-A718-00			1	BRACKET,ANGLE, FRONT,SMA	SH216	407-A718-00
02-010	211-0751-00			2	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
02-011	348-A141-00			32	SHLD GSKT,ELEC, CONDUCTIVE URETHANE FORM,1 X 4 MM,W/ADHESIVE TAPE	TK0AR	UC-3E1259
02-012	211-0751-00			2	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
02-013	131-1315-01			2	CONN,RF,JACK, BNC,50OHM,FEMALE,STR,PELTORA,PANEL MOUNT	TK6592	28JR306-1
02-014	407-A717-00			1	BRACKET,ANGLE, FRONT,BNC	SH216	407-A717-00
02-015	174-C062-00			1	CA ASSY,RF, 50OHM COAX,55CM L,PELTORA TO PELTRA,MKD-2	SH216	174-C062-00
02-016	174-C061-00			1	CA ASSY,RF, 50OHM COAX,55CM L,PELTORA TO PELTRA,MKD-1	SH216	174-C061-00
02-017	174-C073-00			1	CA ASSY,RF, 50OHM,COAX,55CM L,1.5D-QEW,SMA(PANEL) TO SMA-STR	WAKA	174C07300
02-018	441-A300-02			1	CHASSIS,ASSY, MAIN,AL,DTG5000	SH216	441-A300-02
02-019	174-C071-00			1	CA ASSY,SP,ELEC, 4,26AWG,30CM L,FOR FAN MOTER	SH216	174-C071-00
02-020	348-0948-00			2	GROMMET,PLASTIC, NYLON,BLACK,RING,9.5MM ID	SH216	348-0948-00
02-021	119-B103-00			2	FAN,TUBEAXIAL, 12V,225MA,2.7W,2950RPM,56.8CFM,42.1PA,FBA09A12HZ	SH216	119-B103-00
02-022	212-A049-00			8	SCREW,MACHINE, M4X30MM L,BDGH,STL ZN-C PL,CROSS REC	SH216	212-A049-00
02-023	174-C063-00			2	CA ASSY,RF, 50OHM,COAX,20CM L,SMA(PANEL) TO U.FL	SH216	174-C063-00
02-024	174-C064-00			4	CA ASSY,RF, 50OHM,COAX,15CM L,SMA(PANEL) TO U.FL	SH216	174-C064-00
02-025	174-C065-00			3	CA ASSY,RF, 50OHM,COAX,25CM L,SMA(PANEL) TO U.FL	SH216	174-C065-00
02-026	134-0218-00			1	BUTTON PLUG	TK2565	134-0218-00
02-027	134-A008-00			2	BUTTON,PLUG, NYLON66,BLACK	SH216	134-A008-00
02-028	131-1315-01			6	CONN,RF,JACK, BNC,50OHM,FEMALE,STR,PELTORA,PANEL MOUNT	TK6592	28JR306-1
02-029	344-A019-00			2	CLIP,CABLE, WIRE SADDLE,16 MM X 15.5 MM,66 NYLON	SH216	344-A019-00
02-030	174-C059-00			3	CA ASSY,RF, 50OHM COAX,20CM L,PELTORA TO PELTRA	SH216	174-C059-00

Replaceable Parts List (cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
02-031	174-C060-00			3	CA ASSY,RF, 50OHM COAX,30CM L,PELTORA TO PELTRA	SH216	174-C060-00
02-032	174-C056-00			1	CA ASSY,SP,ELEC, 18,18AWG,1-N,25CM L,MOLEX TO MOLEX	SH216	174-C056-00

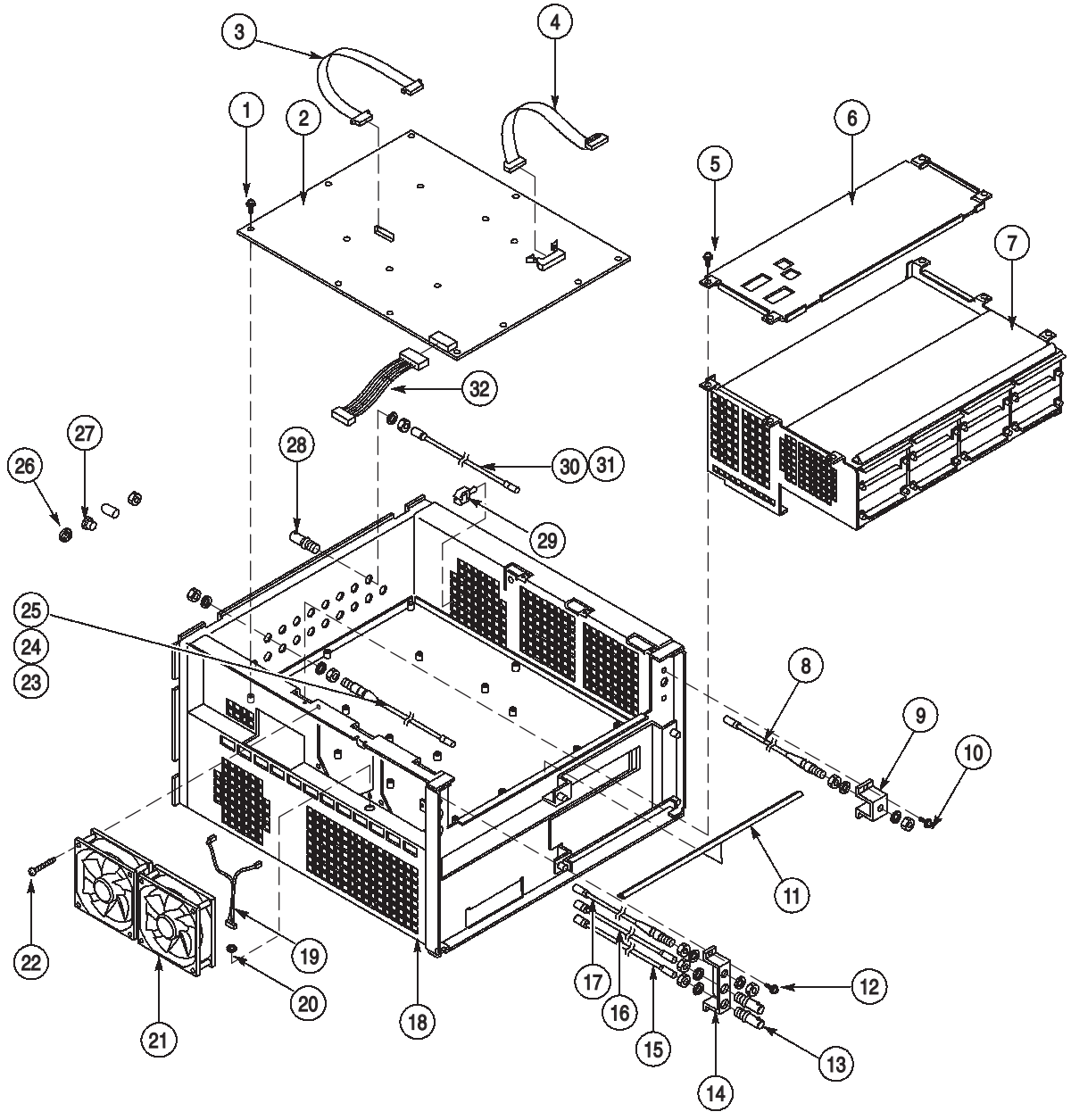


Figure 9-2: Main Chassis (1) (DTG5274)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-3					**MAIN CHASSIS (1) DTG5334**		
03-001	211-0871-00			16	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
03-002	671-5729-00			1	CIRCUIT BD ASSY:A50 3.35GBPS MAIN BOARD,389-B231-xx WIRED	SH216	671-5729-00
03-003	174-C075-00			1	CA ASSY,RF, 38,50OHM,100MM L,FLAT FLEX,YFLEX	SH216	174-C075-00
03-004	174-C057-00			1	CA ASSY,SP,ELEC, 34,30AWG,30CM L,W/CONN(YAMAICHI NFS)	SH216	174-C057-00
03-005	211-0751-00			6	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
03-007	441-2381-00			1	CHASSIS,ASSY, PLUG-IN BOX	TK1943	441238100
03-008	174-C069-00			1	CA ASSY,RF, 50OHM,COAX,55CM L,1.5D-QEW,SMA(PANEL) TO SMB-STR	SH216	174-C069-00
03-009	407-A718-00			1	BRACKET,ANGLE, FRONT,SMA	SH216	407-A718-00
03-010	211-0751-00			2	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
03-011	348-A155-00			32	SHLD GSKT,ELEC, CONDUCTIVE URETHANE FORM,1 X 4 MM,W/ADHESIVE TAPE	SEIWA	E02S040020ET
03-012	211-0751-00			2	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
03-013	131-1315-01			2	CONN,RF,JACK, BNC,50OHM,FEMALE,STR,PELTORA,PANEL MOUNT	TK6592	28JR306-1
03-014	407-A717-00			1	BRACKET,ANGLE, FRONT,BNC	SH216	407-A717-00
03-015	174-C062-00			1	CA ASSY,RF, 50OHM COAX,55CM L,PELTORA TO PELTRA,MKD-2	SH216	174-C062-00
03-016	174-C061-00			1	CA ASSY,RF, 50OHM COAX,55CM L,PELTORA TO PELTRA,MKD-1	SH216	174-C061-00
03-017	174-5021-00			1	CA ASSY,RF;50OHM,COAX,65CM L,SMA(PANEL) TO U.FL WITH MARK BAND:3	SH216	174-5021-00
03-018	441-2380-00			1	CHASSIS,ASSY, MAIN,AL,DTG5334	TK1943	441238000
03-019	174-C071-00			1	CA ASSY,SP,ELEC, 4,26AWG,30CM L,FOR FAN MOTER	SH216	174-C071-00
03-020	348-0948-00			2	GROMMET,PLASTIC, NYLON,BLACK,RING,9.5MM ID	SH216	348-0948-00
03-021	119-B103-00			2	FAN,TUBEAXIAL, 12V,225MA,2.7W,2950RPM,56.8CFM,42.1PA,FBA09A12HZ	SH216	119-B103-00
03-022	212-A049-00			8	SCREW,MACHINE, M4X30MM L,BDGH,STL ZN-C PL,CROSS REC	SH216	212-A049-00
03-023	174-C063-00			2	CA ASSY,RF, 50OHM,COAX,20CM L,SMA(PANEL) TO U.FL	SH216	174-C063-00
03-024	174-C064-00			4	CA ASSY,RF, 50OHM,COAX,15CM L,SMA(PANEL) TO U.FL	SH216	174-C064-00
03-025	174-C065-00			3	CA ASSY,RF, 50OHM,COAX,25CM L,SMA(PANEL) TO U.FL	SH216	174-C065-00
03-026	134-0218-00			1	BUTTON PLUG	TK2565	134-0218-00
03-027	134-A008-00			2	BUTTON,PLUG, NYLON66,BLACK	SH216	134-A008-00
03-028	131-1315-01			6	CONN,RF,JACK, BNC,50OHM,FEMALE,STR,PELTORA,PANEL MOUNT	TK6592	28JR306-1
03-029	344-A019-00			2	CLIP,CABLE, WIRE SADDLE,16 MM X 15.5 MM,66 NYLON	SH216	344-A019-00
03-030	174-C059-00			3	CA ASSY,RF, 50OHM COAX,20CM L,PELTORA TO PELTRA	SH216	174-C059-00

Replaceable Parts List (cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
03-031	174-C060-00			3	CA ASSY,RF, 50OHM COAX,30CM L,PELTORA TO PELTRA	SH216	174-C060-00
03-032	174-C056-00			1	CA ASSY,SP,ELEC, 18,18AWG,1-N,25CM L,MOLEX TO MOLEX	SH216	174-C056-00

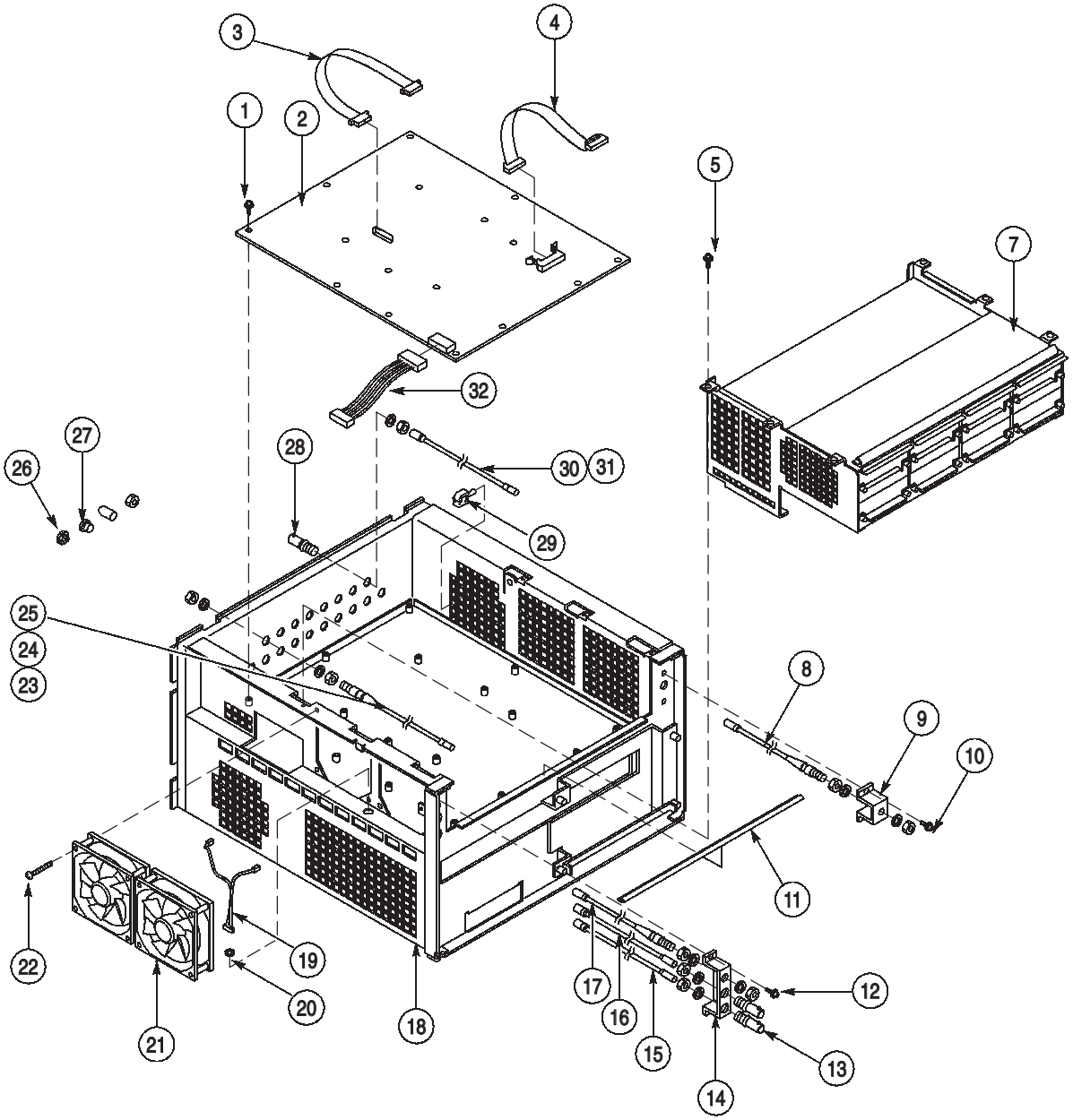


Figure 9-3: Main Chassis (1) (DTG5334)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-4					**DTG5078 MAIN CHASSIS (2)**		
04-001	212-A049-00			24	SCREW,MACHINE, M4X30MM L,BDGH,STL ZN-C PL,CROSS REC	SH216	212-A049-00
04-002	119-B103-00			6	FAN,TUBEAXIAL,12V,225MA,2.7W,2950RPM,56.8CFM,42.1PA, FBA09A12HZ	SH216	119-B103-00
04-003	174-C070-00			1	CA ASSY,SP,ELEC, 12,26AWG,15CM L,FOR FAN MOTER	SH216	174-C070-00
04-004	211-0751-00			5	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
04-005	174-C072-00			1	CA ASSY,SP,ELEC, 3,26AWG,35CM L,W/CONN XH TO PH(JST)	SH216	174-C072-00
04-006	211-0751-00			2	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
04-007	174-C030-00			1	CA ASSY,SP,ELEC, 26 COND,250MM L,FLAT FLEX	SH216	174-C030-00
04-008	211-8800-50			1	SCREW,MACHINE, M4X8MM L,BDGH,STL,ZN-C	SH216	211-8800-50
04-009	210-0008-00			1	#8 INTL,0.02THK,CM1	78189	1208-00-00-0541C
04-010	119-B191-00			1	GPIB INTERFACE CARD, COMPACT PCI,PXI-GPIB,/WINDOWS	NATIONAL INSTRUMENT	778039-0112
04-011	119-B190-00			1	CPU,UNIT, COMPACT PCI,CELERON 566MHz,128MB,815E, W/2.5IN HDD, DTG5078, DTG5274	SANRITZ AUTOMATION	SC2110-HD
	119-7085-00				CPU,UNIT, COMPACT PCI,CELERON 566MHz,256MB,815E, WO/2.5IN HDD, DTG5334		SC2110-56-2A(M)
04-012	211-8800-50			1	SCREW,MACHINE, M4X8MM L,BDGH,STL,ZN-C	SH216	211-8800-50
04-013	211-0751-00			8	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
04-014	213-A249-00			4	SCREW,MACHINE, M4X20 L,PNH,STL,ZN-C,CROSS REC,W/FLAT(MIGAKI) & LOCK WASHER	SH216	213-A249-00
04-015	348-1648-00			4	FOOT, REAR	SH216	348-1648-00
04-016	333-A456-53			1	PANEL,REAR, AL,PRINTED	SH216	333-A456-53
	333-4503-00				PANEL,REAR, AL,PRINTED, DTG5334	0KB05	333450300
04-017	260-2740-00			1	SWITCH,ROCKER, DPST,250VAC,10A W/I-O MKD	SH216	260-2740-00
04-018	211-1040-00			2	SCREW,MACHINE, M3X8MM L,FLH,STL,ZN-C,CROSS REC	SH216	211-1040-00
04-019	119-2683-00			1	FILTER,RFI, 6A,250VAC,50/60HZ	SH216	119-2683-00
04-020	174-4317-00			1	CA ASSY,SP,ELEC, 2,AWG18,12CM L,W/FASTON	SH216	174-4317-00
04-021	195-3990-00			1	LEAD,ELECTRICAL, AWG18,100MM L,5-4,W/LUG	TK6314	ORDER BY DESCRIPTION
04-022	211-8800-50			1	SCREW,MACHINE, M4X8MM L,BDGH,STL,ZN-C	SH216	211-8800-50
04-023	210-0008-00			1	#8 INTL,0.02THK,CM1	78189	1208-00-00-0541C
04-024	334-A630-01			1	MARKER,IDENT, MKD CONNECTOR NO.	SH216	334-A630-01
04-025	174-C055-00			1	CA ASSY,SP,ELEC, 18,18AWG,1-N,13CM L,MOLEX TO MOLEX	SH216	174-C055-00
04-026	671-B225-51			1	CIRCUIT BD ASSY:A10 CONNECTOR & PCI I/F BOARD,389-B227-xx WIRED	SH216	671-B225-51
04-027	211-0871-00			10	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
04-028	174-C058-00			1	CA ASSY,SP,ELEC, 60,30AWG,20CM L,W/CONN(YAMAICHI NFS)	SH216	174-C058-00\
04-029	211-0751-00			4	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	0KB01	211-0751-00
04-030	119-B125-00			1	DISPLY MONITOR, 8.4INCH,LCD,TFT,800X600,SVGA,3.3V,W BACK LIGHT	S7294	LTM08C351

Replaceable Parts List (cont.)

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
04-031	174-B983-00			1	CA ASSY,SP,ELEC, 30,30AWG,20CM,W/HLDR,W SHIELD,DF19-30S-1C CONN	TK0BD	174-B983-00
04-032	211-0751-00			4	SCREW,MACHINE, M3X8MM L,PNH,STL,ZN-C,CROSS REC W/FLAT&LOCK WASHERS	SH216	211-0751-00
04-033	174-B984-00			1	CA ASSY,SP,ELEC, 8,26AWG,13CM L,W/HLDR	TK6314	174-B984-00
04-034	119-B126-00			1	INVERTER UNIT, COLD-CATHODE TUBE INVERTER FOR LTM08C351,12VDC,0.9A	SH216	119-B126-00
04-035	211-0871-00			2	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
04-036	348-0948-00			6	GROMMET,PLASTIC, NYLON,BLACK,RING,9.5MM ID	SH216	348-0948-00
04-037	344-0472-00			2	BUSHING,NYLON,GRAY	SH216	344-0472-00

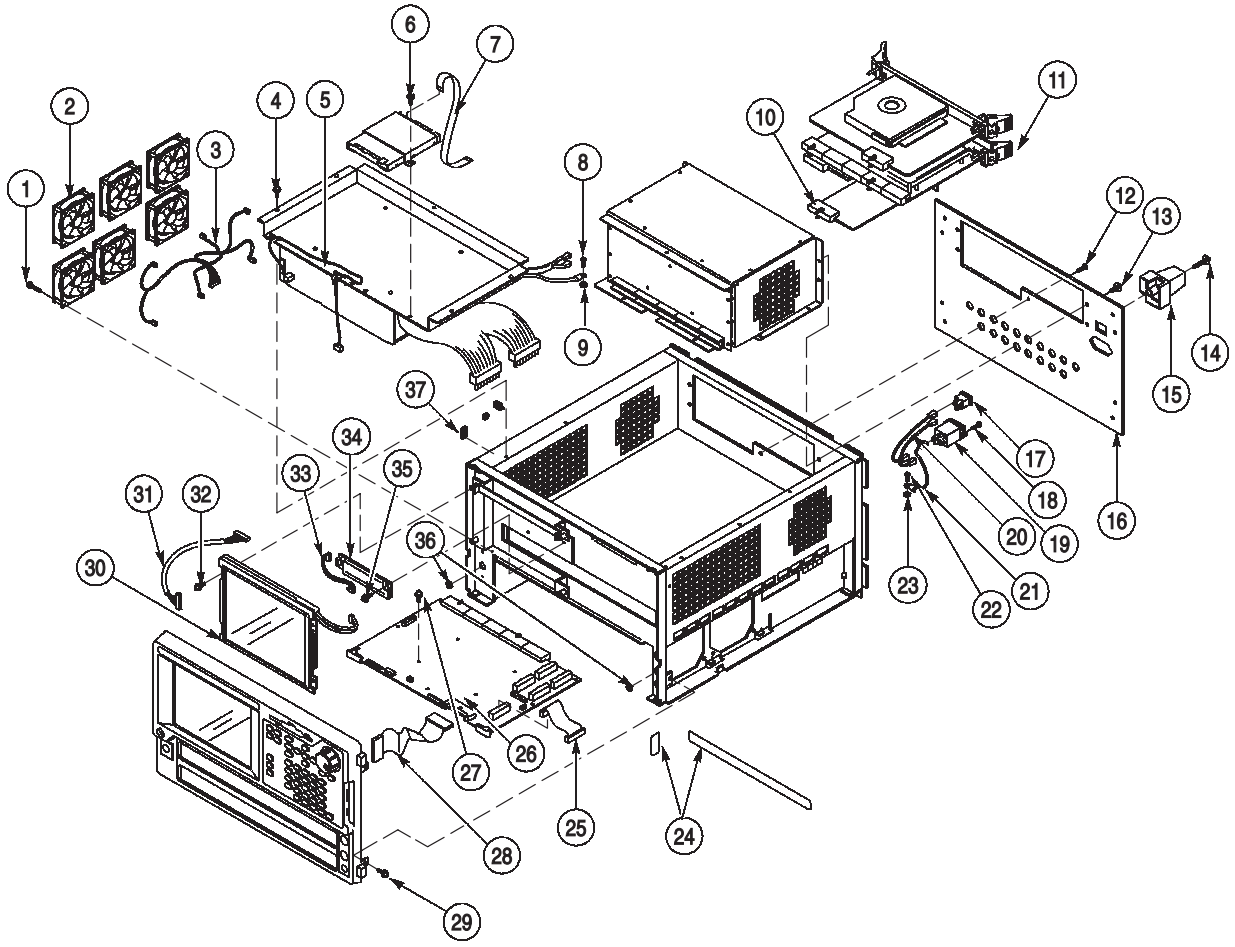


Figure 9-4: Main Chassis (2)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-5					**MAIN CHASSIS & CABINET**		
05-001	348-A155-00			40	GASKET, SHIELD:CONDUCTIVE URETHAN FORM, 2MM x 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
05-002	211-8800-50			4	SCREW,MACHINE, M4X8MM L,BDGH,STL,ZN-C	SH216	211-8800-50
05-003	211-8800-50			3	SCREW,MACHINE, M4X8MM L,BDGH,STL,ZN-C	SH216	211-8800-50
05-004	334-1378-50			1	MARKER,IDENT, MKD SERIAL NO. FOR TEK	TK0AK	334137850

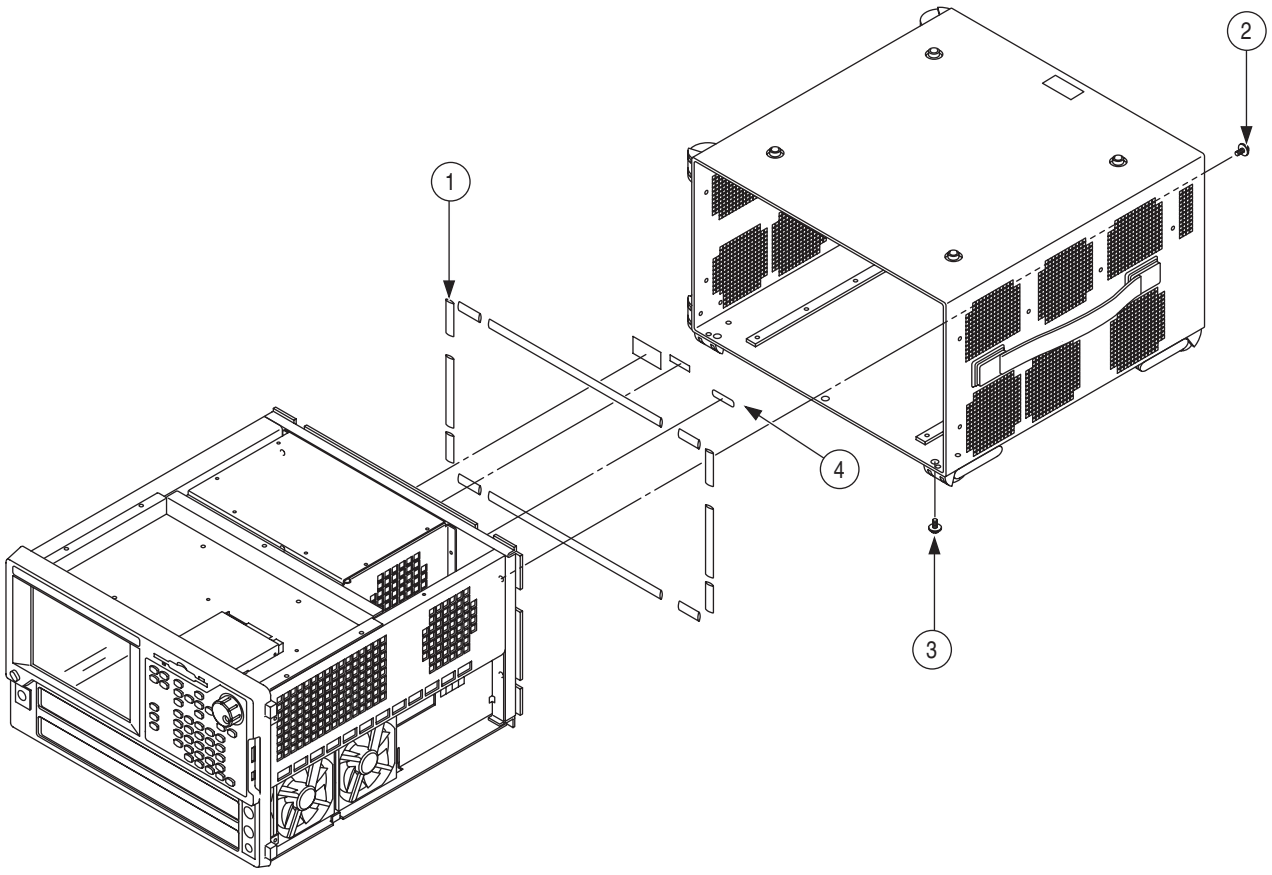


Figure 9-5: Main Chassis & Cabinet

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-6					**A30 & COMPACT PCI FRAME**		
06-001	671-B227-50				CIRCUIT BD ASSY:A30 COMPACT PCI BACK PLANE BOARD,389-B229-XX WIRED	SH216	671-B227-50
06-002	426-A200-01			1	FRAME,ASSY, COMPACT PCI,DTG5000	SH216	426-A200-01
06-003	348-1632-00			52	SHLD GASKET,ELEK, CONDUCTIVE URETHANE FOAM,9.5 MM SQ,W/ADHESIVE	TK0AR	UC-300278
06-004	351-A173-00			3	GUIDE,CKT BD, BOTTOM,COMPACT PCI	SH216	351-A173-00
06-005	351-A174-00			3	GUIDE,CKT BD, TOP,COMPACT PCI	SH216	351-A174-00
06-006	211-0871-00			9	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00

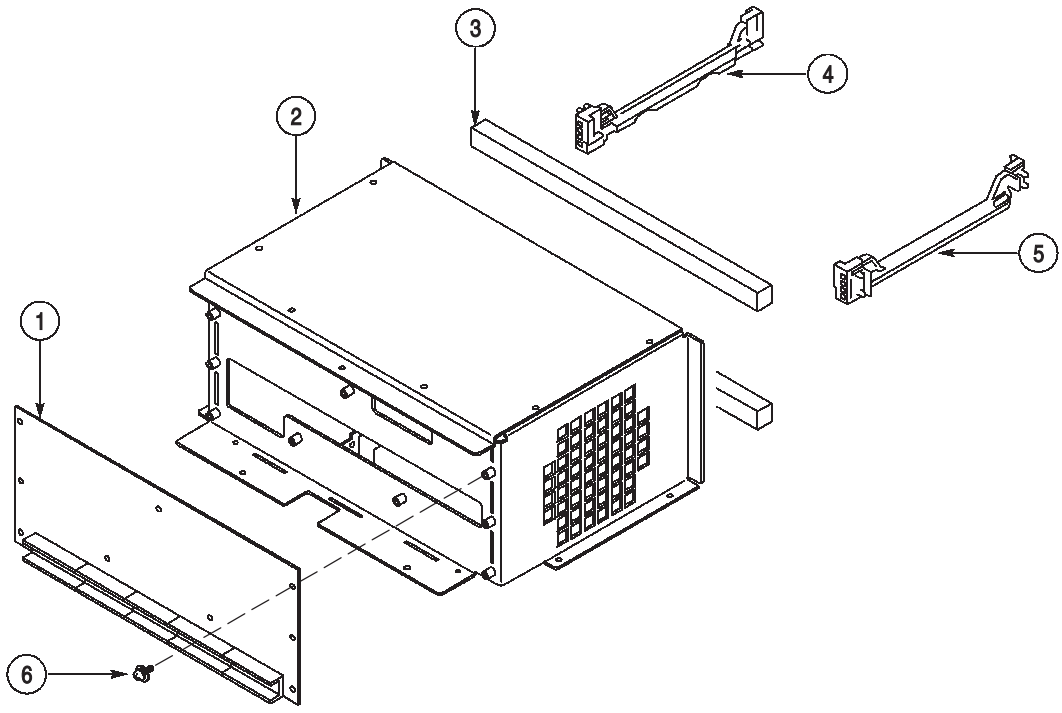


Figure 9-6: A30 & Compact PCI Frame

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-7					**POWER SUPPLY**		
07-001	344-0395-00			2	CLIP,CABLE, EDGE SADDLE,GRAY,20MM X 10.0MM,66-NYLON,ACCOM 1.6 to 1.0MM THK	SH216	344-0395-00
07-002	211-8800-50			4	SCREW,MACHINE, M4X8MM L,BDGH,STL,ZN-C	SH216	211-8800-50
07-003	407-A712-01			1	BRACKET,POWER SUPPLY, AL,T1.6	SH216	407-A712-01
07-004	174-C053-00			1	CA ASSY,SP,ELEC, 3,18AWG,15CM Lx1 LUG TO LUG,25 CMx2 LUG M4 TO FSTN W/TUBE	SH216	174-C053-00
07-005	174-C054-00			2	CA ASSY,SP,ELEC, 18,18AWG,25CM L,MOLEX TO LUG M4	SH216	174-C054-00
07-006	119-B189-00 119-7115-00			1	POWER SUPPLY POWER SUPPLY, DTG5334	SH216 TK2576	119-B189-00 AC9-ECLACD-00 -XSOA

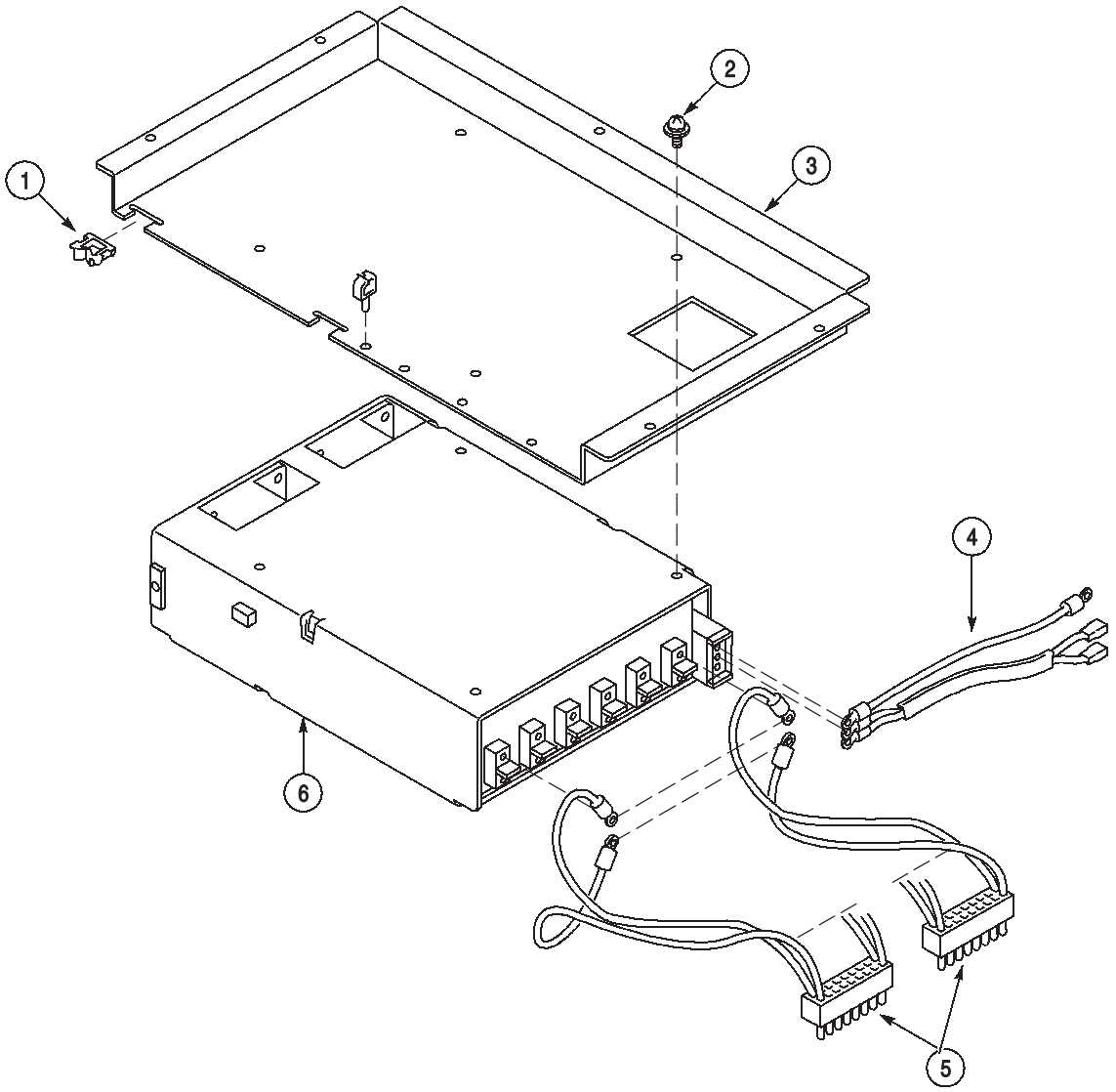


Figure 9-7: Power Supply

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-8					**FLOPPY DISK DRIVE UNIT**		
08-001	119-5953-00			1	FLOPPY DISK DRIVE, 3.5 INCH 3-MODE W/INTERFACE	SH216	119-5953-00
08-002	407-A716-01			1	BRACKET,FDD, AL,T1.6	SH216	407-A716-01
08-003	211-A275-00			2	SCREW,MACHINE, M2.6X5MM L,PNH,STL,ZN-C,CROSS REC,W/K-PLAIN & LOCK WASH	SH216	211-A275-00

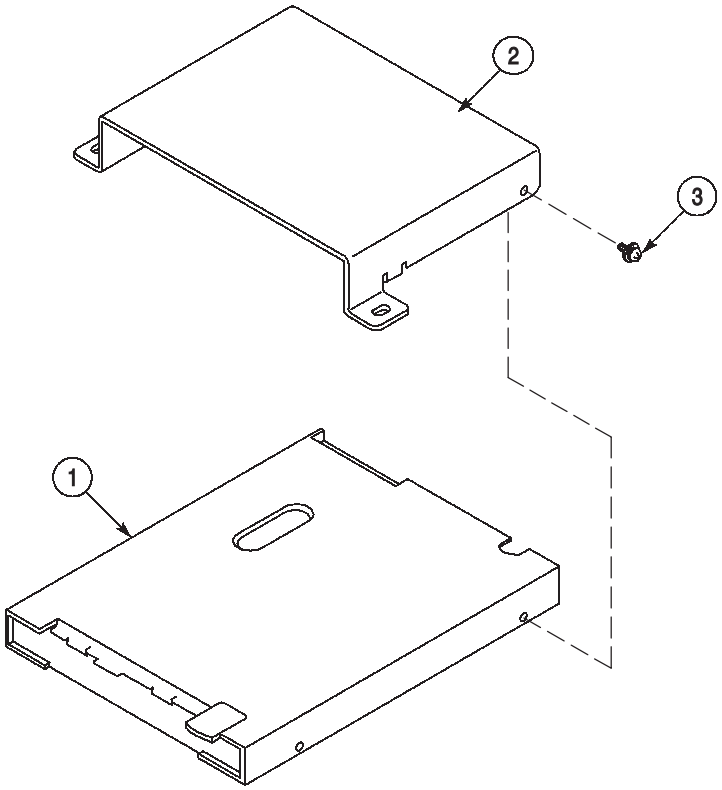


Figure 9-8: Floppy Disk Drive

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-9					**A10 CONNECTOR & PCI Interface**		
09-001	105-A068-00			2	EJECTOR,BD,CBE-15	TK0AR	CBE-15
09-002	671-B225-51			1	CIRCUIT BD ASSY:A10 CONNECTOR & PCI I/F BOARD,389-B227-XX WIRED	SH216	671-B225-51

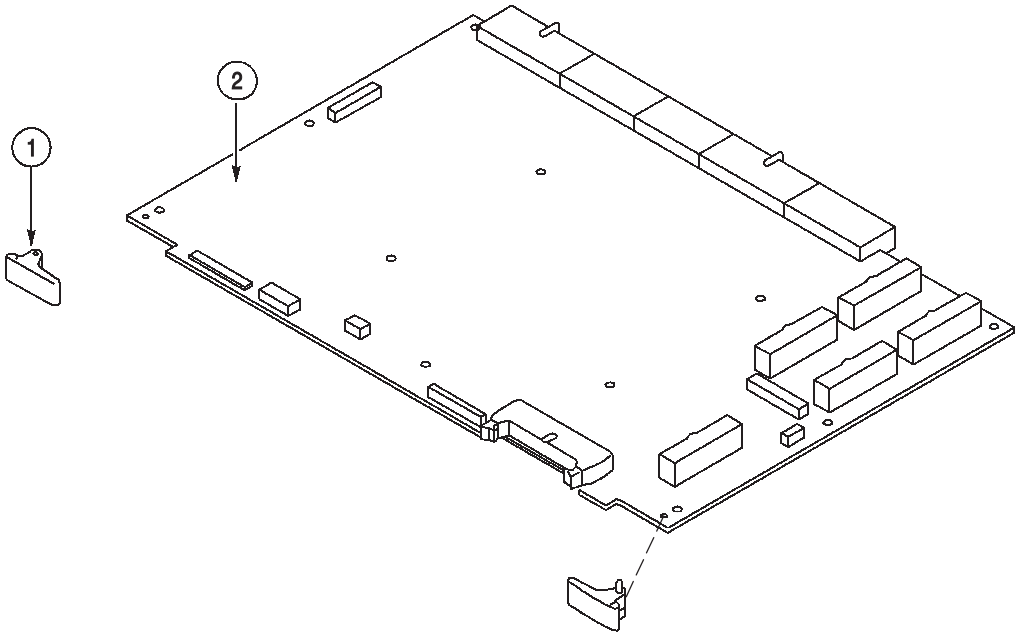


Figure 9-9: A10 Connector & PCI Interface

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-10					**A32 CDROM Extender**		
10-001	333-A457-00			1	PANEL,ASSY, CPCI,CD-ROM UNIT	SH216	333-A457-00
10-002	671-B228-50			1	CIRCUIT BD ASSY:A32 CD ROM EXTENDER BOARD,389-B230-XX WIRED	SH216	671-B228-50
10-003	407-A737-00				BRACKET,CD-ROM, LEFT,STL,T1.6,DTG5000	SH216	407-A737-00
10-004	259-A004-00			1	FLEX CIRCUIT, A34 CD_ROM CONNECT	SH216	259-A004-00
10-005	119-B199-00			1	CD-ROM DRIVE UNIT, 12/8CM,CD/CD-ROM,X24	TEAC	CD-224E-C39
10-006	407-A736-00			1	BRACKET,CD-ROM, RIGHT,STL,T1.6,DTG5000	SH216	407-A736-00
10-007	211-A269-00			4	SCREW,MACHINE, M2X4MM L,PNH,STL ZN-C,CROSS REC,W/FLAT(6MM OD) WASHER	SH216	211-A269-00
10-008	211-0905-00			4	SCREW,MACHINE, M3X6MM L,PNH,STL ZN-C,CROSS REC	SH216	211-0905-00

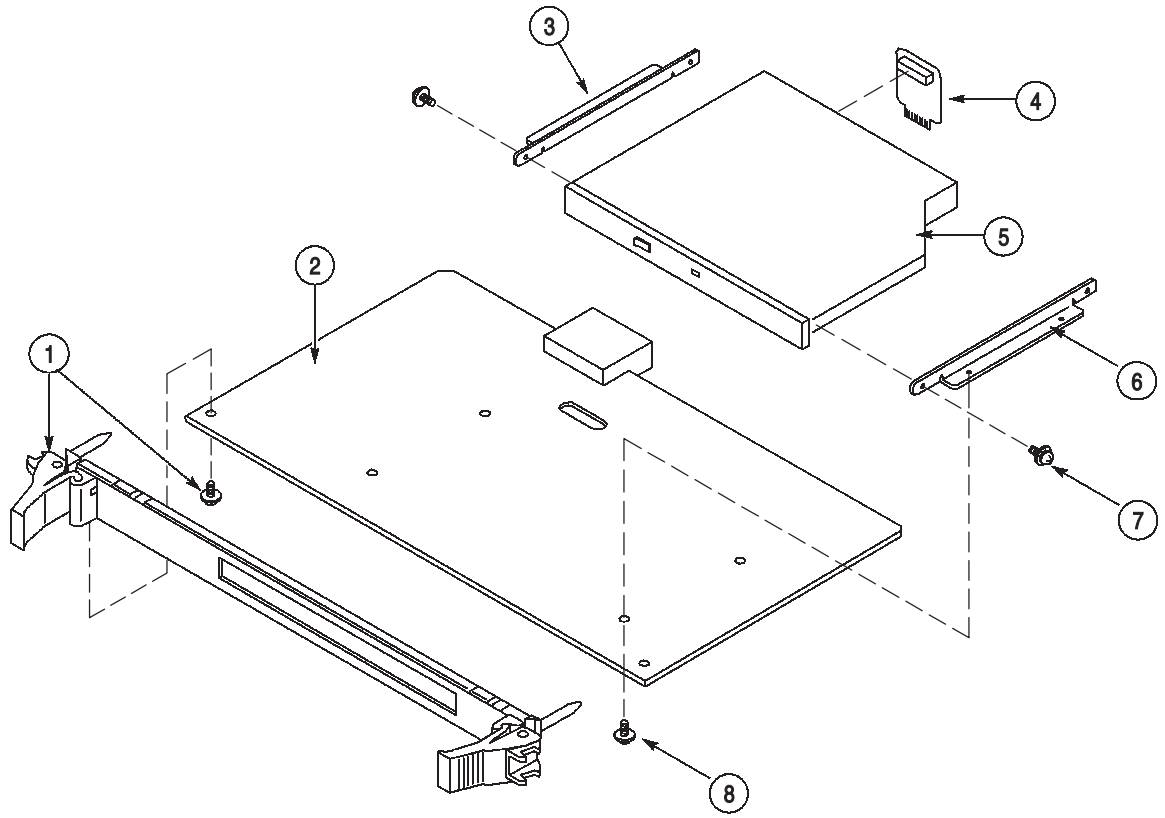


Figure 9-10: A32 CDROM Extender

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-11					**CPU Unit DTG5334**		
11-001	119-7085-00			1	CPU, UNIT,COMPACT PCI,CELERON 566MHz,256MB,815E, WO/2.5IN HDD; DTG5334	SANRITZ	SC2110-56-2A(M)
11-002	129-1611-00				SPACER,POST:15MM L,M3 EXT,M2.6INT,BRASS,NI PL,5.5MM HEX	SH216	129-1611-00
11-003	650-4736-00			1	HDD UNIT; 2.5 IN,40 GB,IDE,O/S WIN2000 SP4, F/W V2.x.x, TEKVISA V2.x.x, INSTALLED; DTG5000	SH216	650-4736-00
11-004	174-5061-00			1	CA,ASSY,SP,ELEC:44,28AWG,FLAT,5CML,2MM CTR	SANRITZ	SC2040HD-00 HDD CABLE
11-005	211-0953-00			1	SCREW,MACHINE; M2,6 X 6MM L,PNH,SST,CROSS REC;PSC1125	SH216	211-0953-00

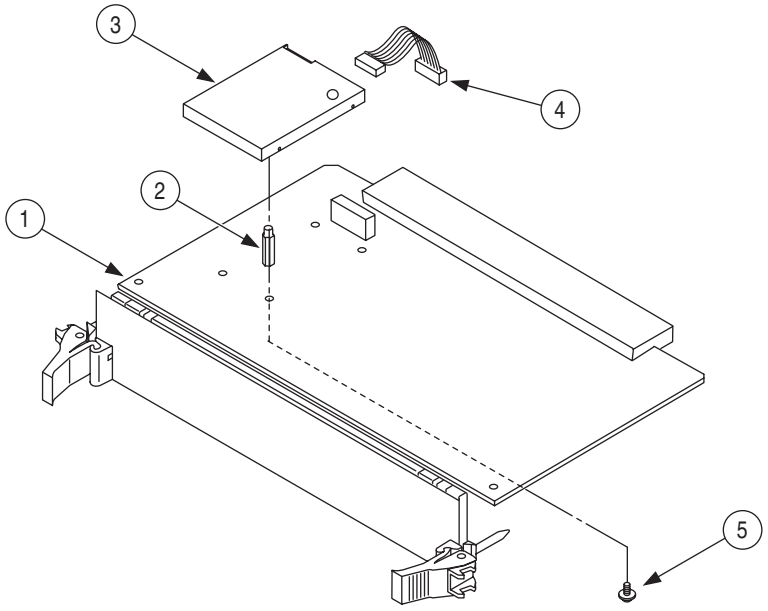


Figure 9-11: CPU Unit

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-12					**FRONT PANEL (DTG5078)**		
12-001	334-A612-00			1	MAKER,IDENT, SKEW-CAL,DTG5000 (LEXAN Film)	SH216	334-A612-00
12-002	334-A617-52			1	MARKER,IDENT:MKD,DTG5078	SH216	334-A617-52
12-003	200-A534-00			1	BEZEL,FRONT:DTG5000	SH216	200-A534-00
12-004	348-A141-00			63	SHLD GSKT,ELEC, CONDUCTIVE URETHANE FORM,1 X 4 MM,W/ADHESIVE TAPE	TK0AR	UC-3E1259
12-005	378-A050-00			1	FILTER,LCD, ACRYL,WCA200,191.6MM X 149.5MM X 1.2MM T	SH216	378-A050-00
12-006	671-B262-50			1	CIRCUIT BD ASSY:A22,POWER SW BOARD,389-B254-00 WIRED	SH216	671-B262-50
12-007	213-1127-00			17	SCREW,TPG, M3X8MM L,PNH,STL,BLK ZN PL,CROSS REC	SH216	213-1127-00
12-008	174-B832-00			1	CA ASSY,SP,ELEC, 4,26AWG,W/CONN BOTH END,30CM L,W53	SH216	174-B832-00
12-009	343-A318-00			2	STRAP,TIEDOWN, BLACK NYLON	SH216	343-A318-00
12-010	441-A311-03			1	CHASSIS,ASSY, FRAME FRONT	SH216	441-A311-03
12-011	348-A159-00			15	GASKET,SHIELD, FINGER TYPE,BE-CU,8.13MM W X 2.79MM H X 406.4MM L	SH216	348-A159-00
12-012	348-A128-00			41	SHLD GASKET,ELEK, FINGER TYPE,5.1MM L X 6.4MM W,BE-CU	SH216	348-A128-00
12-013	348-A155-00			68	GASKET,SHIELD, CONDUCTIVE URETHAN FORM,2MM X 4MM,W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
12-014	671-B226-50			1	CIRCUIT BD ASSY:A20 FRONT KEY & DC OUTPUT BOARD,389-B228-XX WIRED	SH216	671-B226-50
12-015	366-A060-01			1	RUBBER,SET, SILICON,DTG5000	SH216	366-A060-01
12-016	260-A156-00			1	SWITCH,ROTARY, ENCODER,5VDC,70MA INCREMENTAL,260-A153-00 W/CONN	SH216	260-A156-00
12-017	334-A613-01			1	MARKER,IDENT:OUTPUT,DTG5000	SH216	334-A613-01
12-018	334-A610-01			1	MARKER,IDENT:A-C-E-G	SH216	334-A610-01
12-019	334-A611-01			1	MARKER,IDENT:B-D-F-H	SH216	334-A611-01
12-020	334-A609-00			1	MAKER,IDENT, KEYBOARD,DTG5000 (LEXAN Film)	SH216	334-A609-00
12-021	366-A058-00			1	SHELL,KNOB, SILVER GRAY,38MMODx12MMH	SH216	366-A058-00

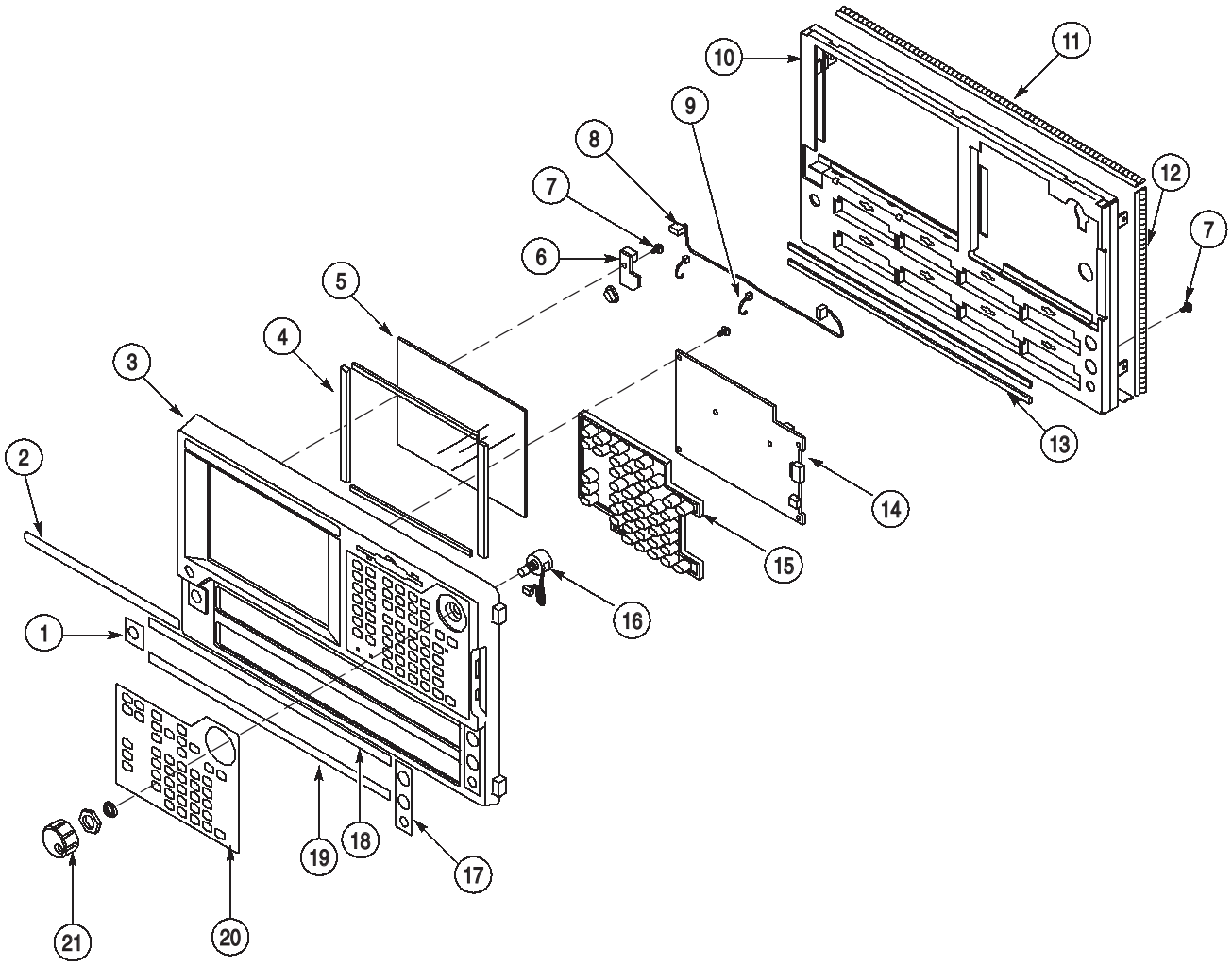


Figure 9-12: Front Panel (DTG5078)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-13					**FRONT PANEL (DTG5274)**		
13-001	334-A612-00			1	MAKER,IDENT, SKEW-CAL,DTG5000 (LEXAN Film)	SH216	334-A612-00
13-002	334-A618-52			1	MARKER,IDENT:MKD,DTG5274	SH216	334-A618-52
13-003	200-A534-00			1	BEZEL,FRONT:DTG5000	SH216	200-A534-00
13-004	348-A141-00			63	SHLD GSKT,ELEC, CONDUCTIVE URETHANE FORM,1 X 4 MM,W/ADHESIVE TAPE	TK0AR	UC-3E1259
13-005	378-A050-00			1	FILTER,LCD, ACRYL,WCA200,191.6MM X 149.5MM X 1.2MM T	SH216	378-A050-00
13-006	671-B262-50			1	CIRCUIT BD ASSY:A22,POWER SW BOARD,389-B254-00 WIRED	SH216	671-B262-50
13-007	213-1127-00			17	SCREW,TPG, M3X8MM L,PNH,STL,BLK ZN PL,CROSS REC	SH216	213-1127-00
13-008	174-B832-00			1	"CA ASSY,SP,ELEC, 4,26AWG,W/CONN BOTH END,30CM L,W53	SH216	174-B832-00
13-009	343-A318-00			2	STRAP,TIEDOWN, BLACK NYLON	SH216	343-A318-00
13-010	441-A311-03			1	CHASSIS,ASSY, FRAME FRONT	SH216	441-A311-03
13-011	348-A159-00			15	GASKET,SHIELD, FINGER TYPE,BE-CU,8.13MM W X 2.79MM H X 406.4MM L	SH216	348-A159-00
13-012	348-A128-00			41	SHLD GASKET,ELEK, FINGER TYPE,5.1MM L X 6.4MM W,BE-CU	SH216	348-A128-00
13-013	348-A155-00			68	GASKET,SHIELD, CONDUCTIVE URETHAN FORM,2MM X 4MM,W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
13-014	671-B226-50			1	CIRCUIT BD ASSY:A20 FRONT KEY & DC OUTPUT BOARD,389-B228-XX WIRED	SH216	671-B226-50
13-015	366-A060-01			1	RUBBER,SET, SILICON,DTG5000	SH216	366-A060-01
13-016	260-A156-00			1	SWITCH,ROTARY, ENCODER,5VDC,70MA INCREMENTAL,260-A153-00 W/CONN	SH216	260-A156-00
13-017	211-0871-00			2	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
13-018	407-A728-00			2	BRACKET, BKANKPANEL,DTG5274,AL	SH216	407-A728-00
13-019	348-A141-00			66	SHLD GSKT,ELEC, CONDUCTIVE URETHANE FORM,1 X 4 MM,W/ADHESIVE TAPE	TK0AR	UC-3E1259
13-020	386-A876-00			1	SUBPANEL,FRONT, BLANK,DTG5274,AL	SH216	386-A876-00
13-021	333-A461-00			2	PANEL,FRONT, BLANK,DTG5274,POLYCARBONATE	SH216	333-A461-00
13-022	334-A613-01			1	MARKER,IDENT:OUTPUT,DTG5000	SH216	334-A613-01
13-023	334-A619-01			1	"MARKER,IDENT:A-B-C-D	SH216	334-A619-01
13-024	334-A620-00			1	MAKER,IDENT, BLANK,DTG5000,LEXAN FILM	SH216	334-A620-00
13-025	334-A609-00			1	MAKER,IDENT, KEYBOARD,DTG5000 (LEXAN Film)	SH216	334-A609-00
13-026	366-A058-00			1	SHELL,KNOB, SILVER GRAY,38MMODx12MMH	SH216	366-A058-00

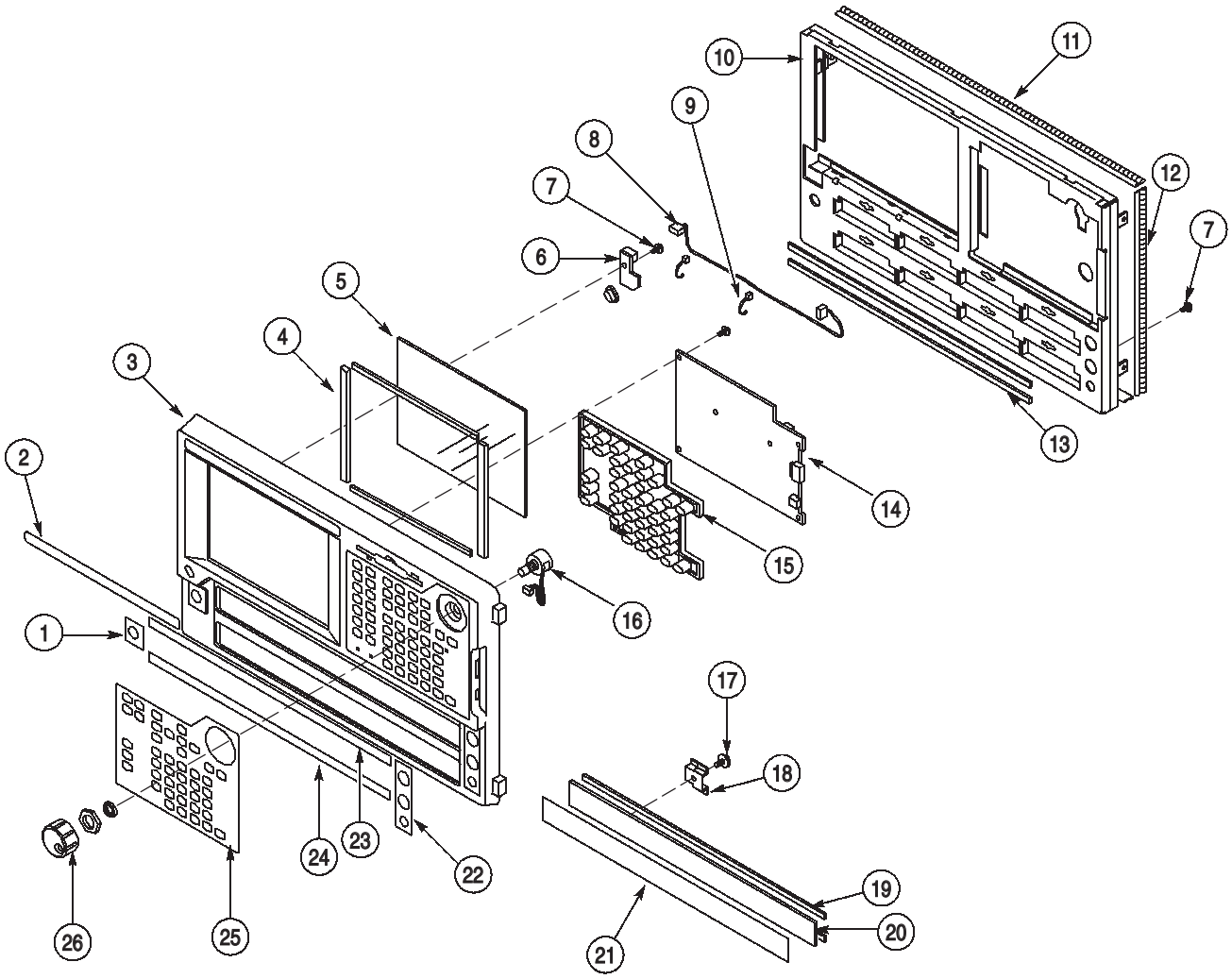


Figure 9-13: Front Panel (DTG5274)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-14					**FRONT PANEL (DTG5334)**		
14-001	334-A612-00			1	MAKER,IDENT, SKEW-CAL,DTG5000 (LEXAN Film)	SH216	334-A612-00
14-002	335-1218-00			1	MARKER,IDENT:MKD,DTG5334	0KB05	335121800
14-003	200-A534-00			1	BEZEL,FRONT:DTG5000	SH216	200-A534-00
14-004	348-A155-00			63	GASKET,SHIELD, CONDUCTIVE URETHAN FORM,2MM X 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
14-005	378-A050-00			1	FILTER,LCD, ACRYL,WCA200,191.6MM X 149.5MM X 1.2MM T	SH216	378-A050-00
14-006	671-B262-50			1	CIRCUIT BD ASSY:A22,POWER SW BOARD,389-B254-00 WIRED	SH216	671-B262-50
14-007	213-1127-00			17	SCREW,TPG, M3X8MM L,PNH,STL,BLK ZN PL,CROSS REC	SH216	213-1127-00
14-008	174-B832-00			1	"CA ASSY,SP,ELEC, 4,26AWG,W/CONN BOTH END,30CM L,W53	SH216	174-B832-00
14-009	343-A318-00			2	STRAP,TIEDOWN, BLACK NYLON	SH216	343-A318-00
14-010	441-A311-03			1	CHASSIS,ASSY, FRAME FRONT	SH216	441-A311-03
14-011	348-1625-00			15	GASKET,SHIELD, FINGER TYPE,BE-CU,8.13MM W X 2.79MM H X 406.4MM L	S0482	348-1625-00
14-012	348-A128-00			41	SHLD GASKET,ELEK, FINGER TYPE,5.1MM L X 6.4MM W,BE-CU	SH216	348-A128-00
14-013	348-A155-00			68	GASKET,SHIELD, CONDUCTIVE URETHAN FORM,2MM X 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
14-014	671-B226-50			1	CIRCUIT BD ASSY:A20 FRONT KEY & DC OUTPUT BOARD,389-B228-XX WIRED	SH216	671-B226-50
14-015	366-A060-01			1	RUBBER,SET, SILICON,DTG5000	SH216	366-A060-01
14-016	260-A156-00			1	SWITCH,ROTARY, ENCODER,5VDC,70MA INCREMENTAL,260-A153-00 W/CONN	SH216	260-A156-00
14-017	211-0871-00			2	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
14-018	407-A728-00			2	BRACKET, BKANKPANEL,DTG5274,AL	SH216	407-A728-00
14-019	348-A155-00			66	SHLD GSKT,CONDUCTIVE URETHANE FORM, 2 MM X 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
14-020	386-7425-00			1	SUBPANEL,FRONT, BLANK,DTG5334,AL	0J9P9	86742500
14-021	333-1219-00			2	MARKER,FRONT, BLANK,DTG5334,POLYCARBONATE	SH216	333-1219-00
14-022	334-A613-01			1	MARKER,IDENT:OUTPUT,DTG5000	SH216	334-A613-01
14-023	334-A619-01			1	"MARKER,IDENT:A-B-C-D	SH216	334-A619-01
14-024	334-A620-00			1	MAKER,IDENT, BLANK,DTG5000,LEXAN FILM	SH216	334-A620-00
14-025	334-A609-00			1	MAKER,IDENT, KEYBOARD,DTG5000 (LEXAN Film)	SH216	334-A609-00
14-026	366-A058-00			1	SHELL,KNOB, SILVER GRAY,38MMODx12MMH	SH216	366-A058-00

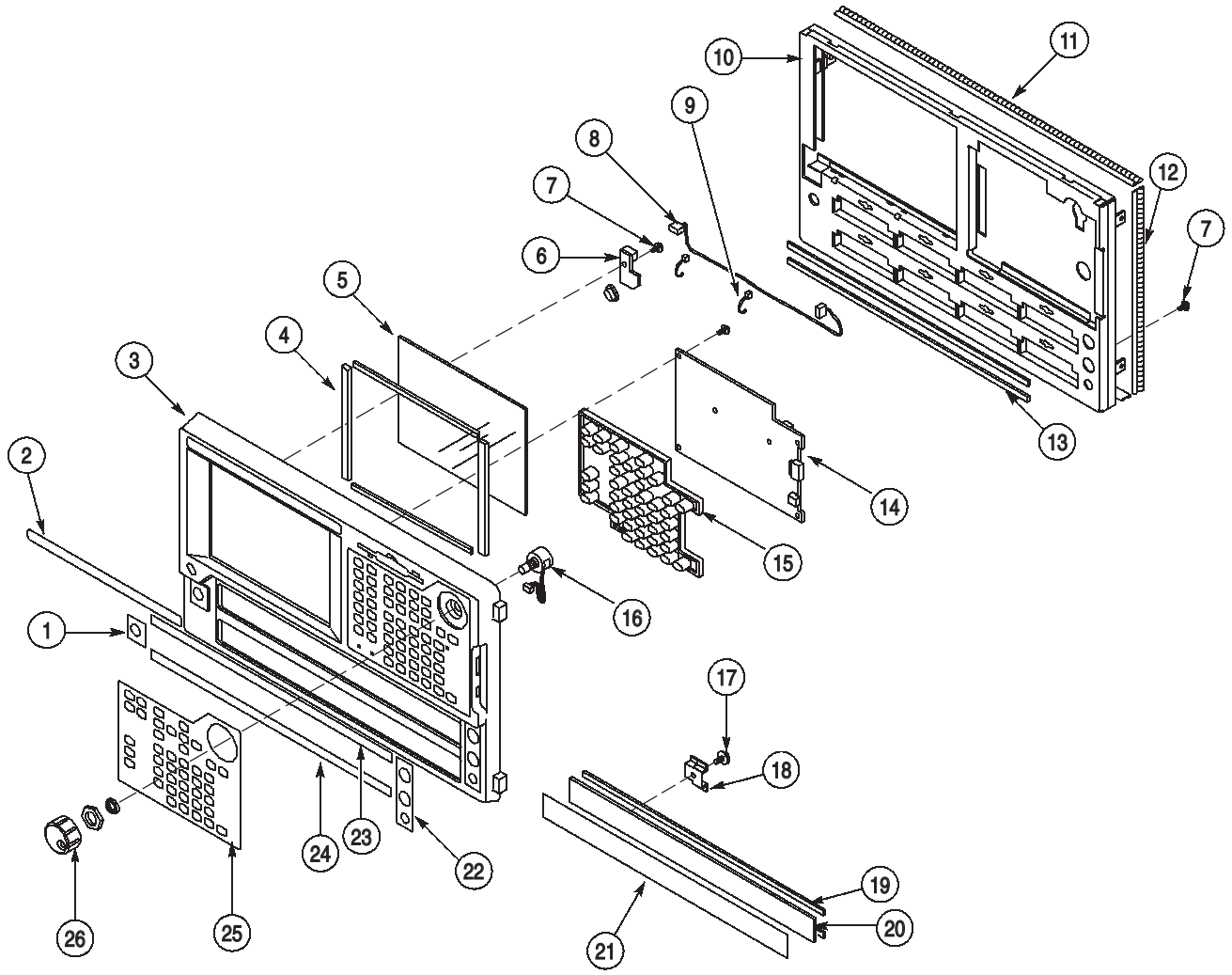


Figure 9-14: Front Panel (DTG5334)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-15					**CABINET**		
15-000	437-0509-01			1	CABINET ASSY, W/FEET AND HANDLE	SH216	437-0509-01
15-001	214-B287-00				FASTENER, POP RIVET,FLAT HEAD,METAL,T1.0 TO T3.2"	SH216	214-B287-00
15-002	348-A154-00			4	FOOT PAD, CABINET FEET,BLACK,GLASS-FIBRE REINFORCED PLASTIC	SH216	348-A154-00
15-003	214-B282-01			4	FASTENER,BAG	SH216	214-B282-01
15-004	390-1216-00			1	CABINET: DTG5000	SH216	390-1216-00
15-005	200-2191-00			2	CAP,RETAINER	TK2565	200-2191-00
15-006	367-0247-01			1	HANDLE CARRYING	SH216	367-0247-01
15-007	348-1515-00			1	FOOT:ELMA 63-526	76096	63-526

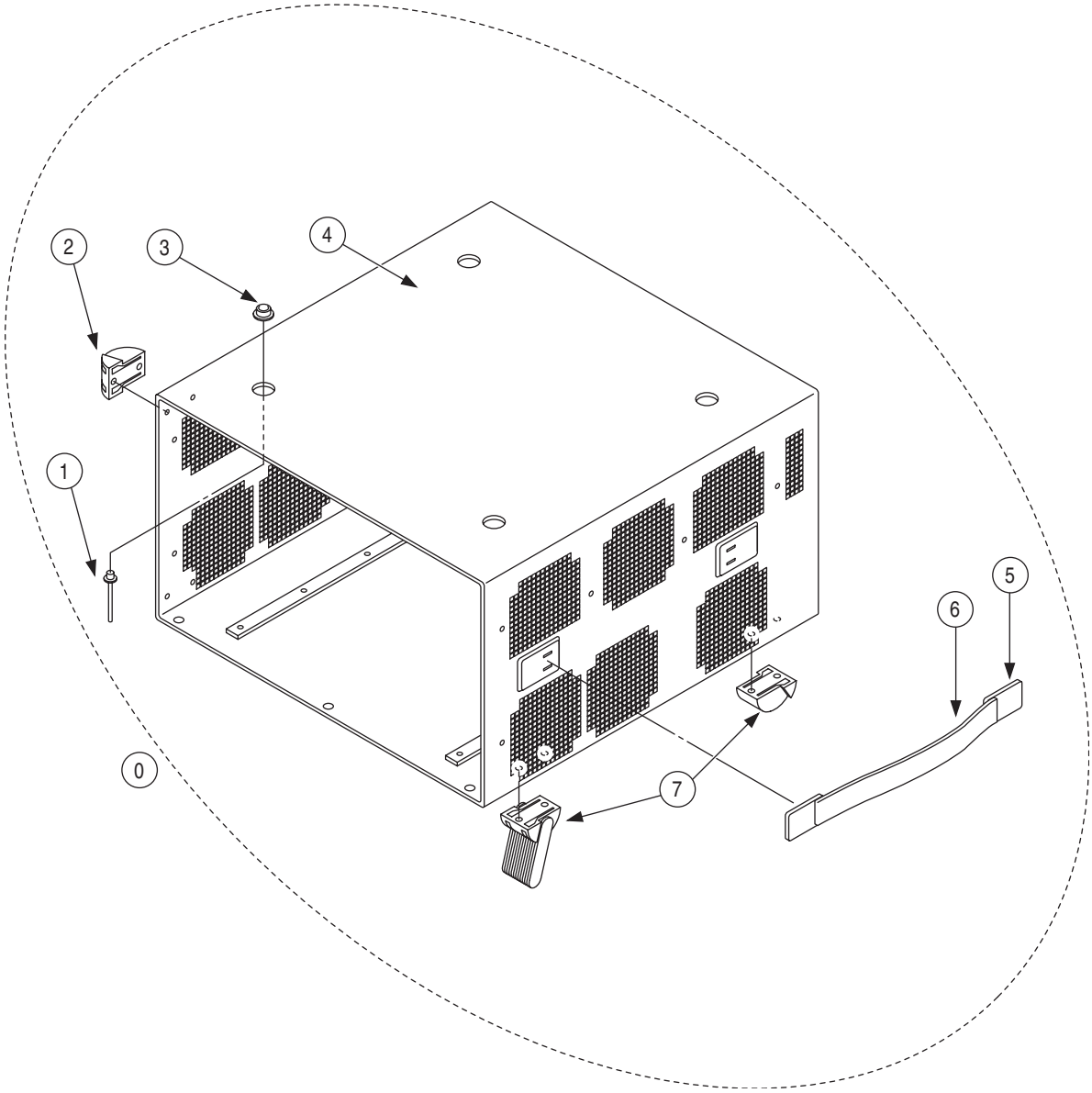


Figure 9-15: Cabinet

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-16					**PLUG-IN BOX (DTG5078)**		
16-001	441-A313-02			1	CHASSIS,ASSY, PLUG-IN BOX	SH216	441-A313-02
16-002	348-A141-00			16	SHLD GSKT,ELEC, CONDUCTIVE URETHANE FORM,1 X 4 MM,W/ADHESIVE TAPE	TK0AR	UC-3E1259
16-003	211-0871-00			9	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
16-004	671-B232-51			1	CIRCUIT BD ASSY:A62 700MBPS OUTPUT BOARD,389-B234-XX WIRED	SH216	671-B232-51
16-005	211-0871-00			9	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
16-006	671-B278-51			1	CIRCUIT BD ASSY:A63 OUTPUT,389-B234-51 WIRED	SH216	671-B278-51
16-007	348-1472-00			33	SHIELD GASKET	TK0AR	UC-300281

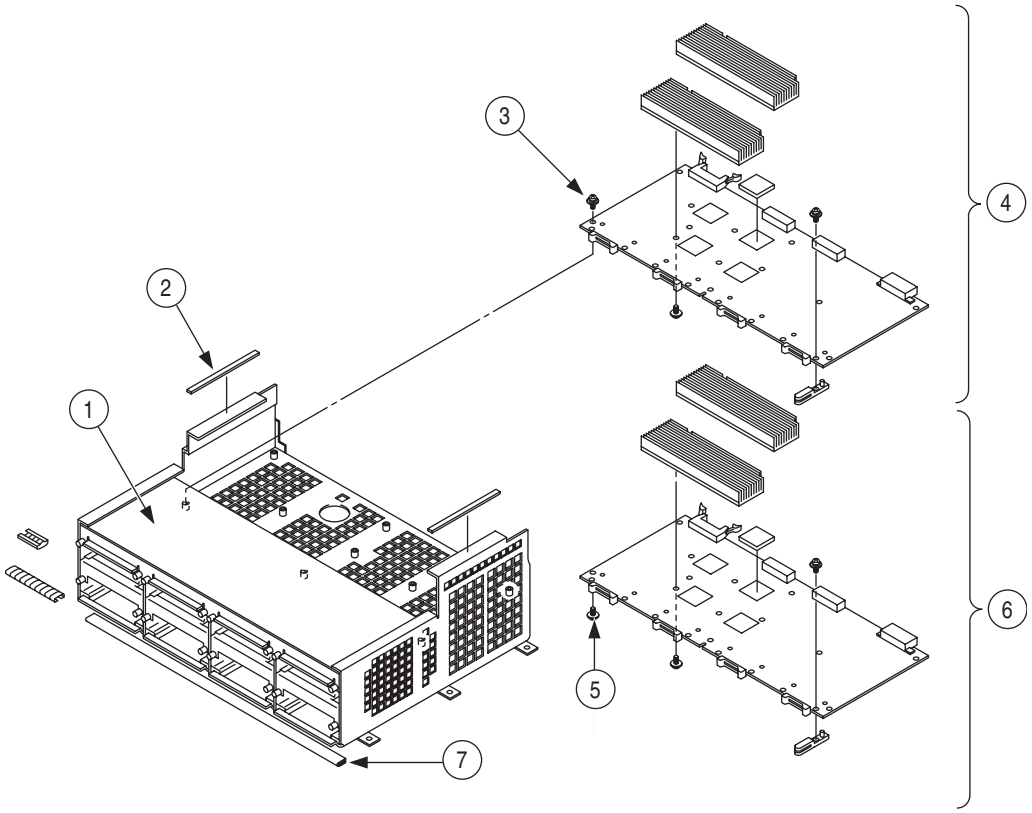


Figure 9-16: Plug-In Box (DTG5078)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-17					**PLUG-IN BOX (DTG5274)**		
17-001	441-A313-02			1	CHASSIS,ASSY, PLUG-IN BOX	SH216	441-A313-02
17-002	348-A141-00			16	SHLD GSKT,ELEC, CONDUCTIVE URETHANE FORM,1 X 4 MM,W/ADHESIVE TAPE"	TK0AR	UC-3E1259
17-003	211-0871-00			9	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
17-004	671-B231-51			1	CIRCUIT BD ASSY:A60 3.3G/1.65GBPS OUTPUT BOARD,389-B233-XX WIRED	SH216	671-B231-51
17-005	348-1472-00			33	SHIELD GASKET	TK0AR	UC-300281

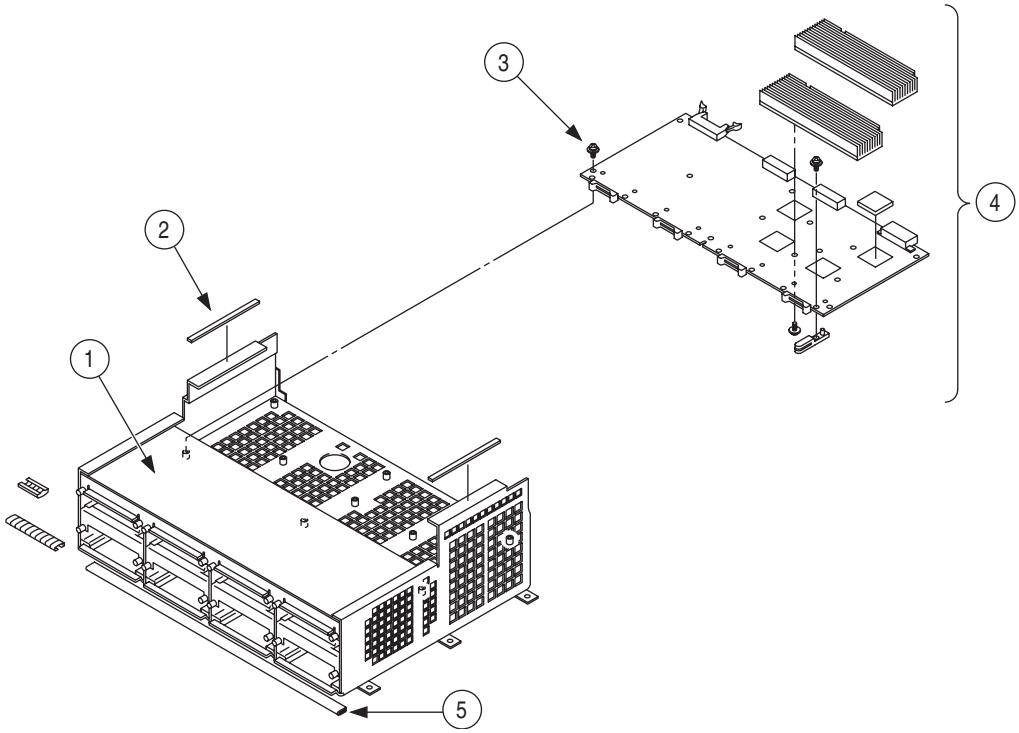


Figure 9-17: Plug-In Box (DTG5274)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-18					**PLUG-IN BOX (DTG5334)**		
18-001	441-2381-00			1	CHASSIS,ASSY, PLUG-IN BOX	TK1943	441238100
18-002	348-A155-00			8	SHLD GSKT,ELEC, CONDUCTIVE URETHANE FORM,2 X 4 MM,W/ADHESIVE TAPE"	SEIWA	E02S040020ET
18-003	211-0871-00			9	SCREW,MACHINE, M3X6MM L,PNH,STL,ZN PL,CROSS REC,W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
18-004	671-5730-00			1	CIRCUIT BD ASSY:A61 3.35GBPS OUTPUT BOARD,389-3503-XX WIRED	SH216	671-5730-00
18-005	348-1472-00			33	SHIELD GASKET	TK0AR	UC-300281

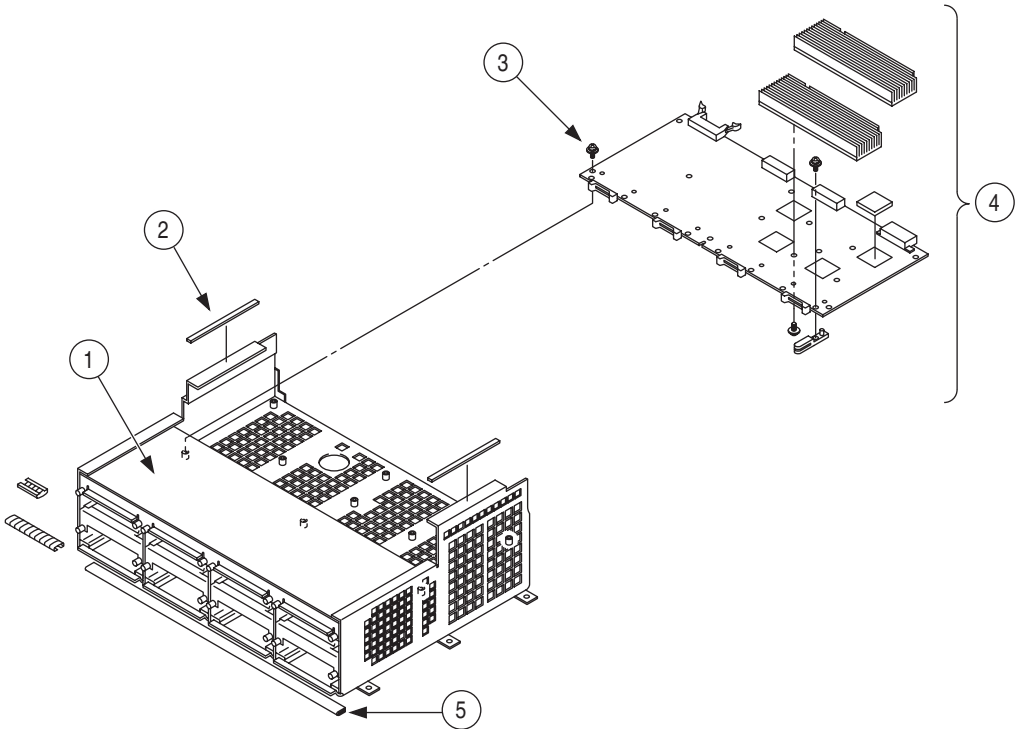


Figure 9-18: Plug-In Box (DTG5334)

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-19					**DTG5078 FBLANK PLUG-IN**		
19-001	333-A462-00			8	PANEL,FRONT, BLANK PLUG-IN,POLYCARBONATE	SH216	333-A462-00
19-002	214-B284-00			16	FASTENER ASSY, M2.5 SCREW,PRESSMOUNT,SPRING-LOADED	SH216	214-B284-00
19-003	348-A155-00			40	GASKET,SHIELD, CONDUCTIVE URETHAN FORM,2MM X 4MM,W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
19-004	441-A316-01			8	CHASSIS,ASSY, BLANK PLUG-IN	SH216	441-A316-01

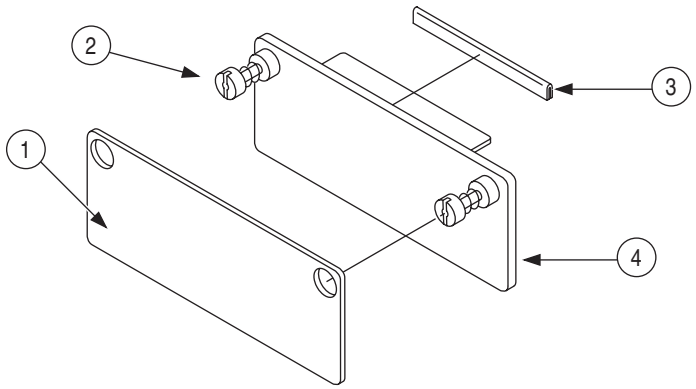


Figure 9-19: Blank Plug-In

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-20					**DTGM10**		
20-000	116-A020-50			1	OUTPUT MODULE DTGM10	SH216	116-A020-50
20-001	333-A458-01			1	PANEL, FRONT:DTGM10, POLYCARBONATE	SH216	333-A458-01
20-002	211-1039-00			2	SCREW, MACHINE:M2.5X6MM L, FLH, STL, CR PL, CROSS REC	SH216	211-1039-00
20-003	386-A873-00			1	SUBPANEL, FRONT:PLUG-IN	SH216	386-A873-00
20-004	348-A155-00			5	GASKET, SHIELD:CONDUCTIVE URETHAN FORM, 2MM X 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
20-005	259-A005-01			1	FLEX CIRCUIT:A80 ON/OFF LED, W/LED	SH216	259-A005-01
20-006	214-B284-00			1	FASTNER ASSY:M2.5 SCREW, PRESSMOUNT, SPRING-LOADED	SH216	214-B284-00
20-007	348-A156-00			10	GASKET, SHIELD:FINGER TYPE, BE-CU, 8.13MM W X 2.79MM H X 406.4MM L	TK0AR	78-010-02
20-008	348-A157-00			1	GASKET, SHIELD:CONDUCTIVE SHEET, FOR DTG PLUG-IN	TK0AU	348-A157-00
20-009	211-A151-00			8	SCREW, MACHINE:M2.5X6MM L, PNH, STL, ZN-C , CROSS REC, W/KOGATA-PLAIN & SPLIT WSHR	SH216	211-A151-00
20-010	211-A242-00			4	SCREW, MACHINE:M3X12MM L, STL, BLK, W/K-PLAIN & SPLIT, KOGATAMARU	SH216	211-A242-00
20-011	211-0871-00			1	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
20-012	211-0871-00			2	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
20-013	407-A740-00			1	BRACKET:PLUG-IN BOARD, A5052P-H32(34), T1.0	SH216	407-A740-00
20-014	441-A306-02			1	CHASSIS, MAIN:PLUG-IN	SH216	441-A306-02
20-015	334-1378-50			1	MARKER, INDENT:MKD SERIAL NO.	TK0AK	334137850

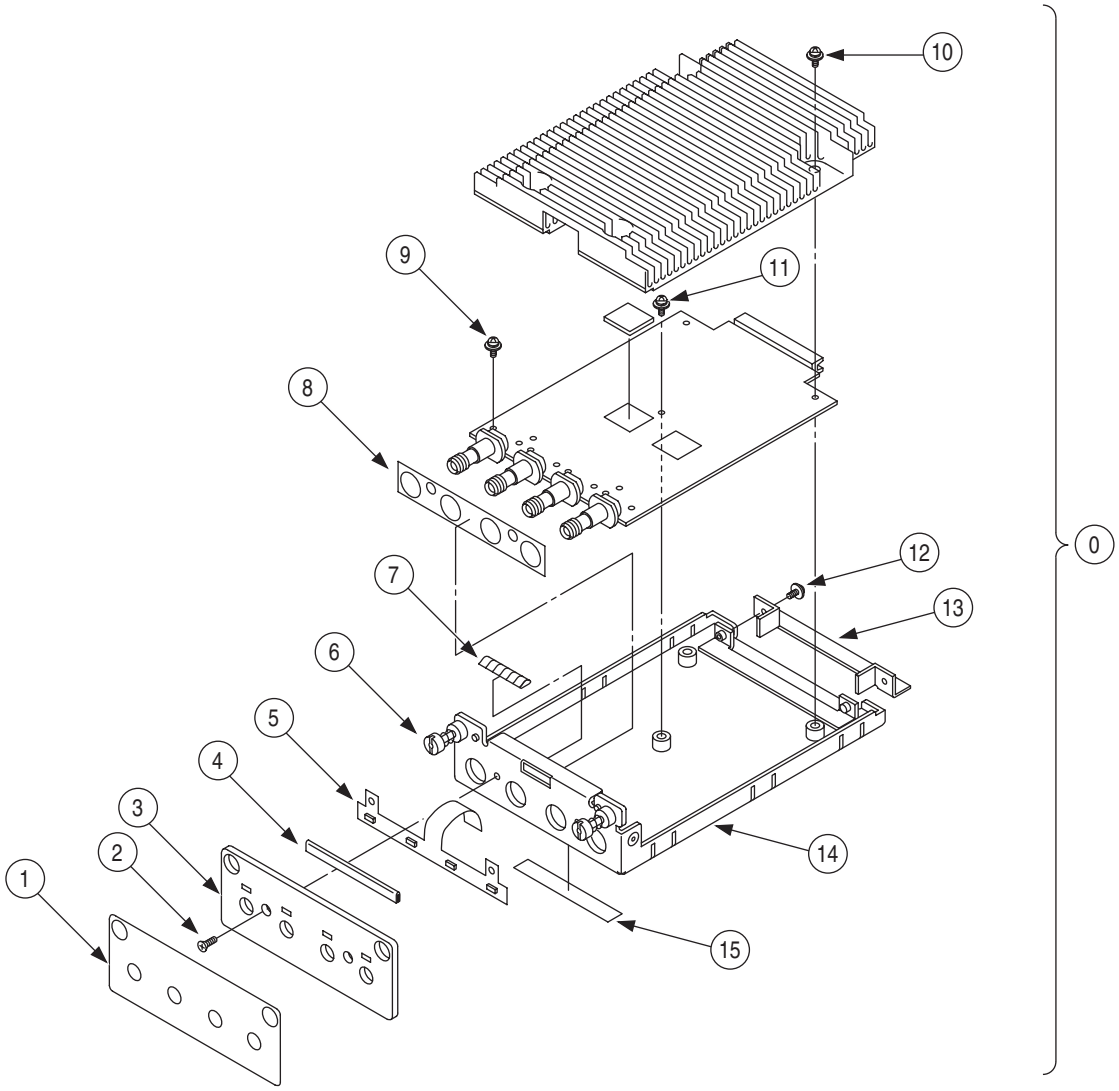


Figure 9-20: DTGM10

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-21					**DTGM20**		
21-000	116-A021-50			1	OUTPUT MODULE DTGM20	SH216	116-A021-50
21-001	333-A459-01			1	PANEL, FRONT:DTGM20, POLYCARBONATE	SH216	333-A459-01
21-002	211-1039-00			2	SCREW, MACHINE:M2.5X6MM L, FLH, STL, CR PL, CROSS REC	SH216	211-1039-00
21-003	386-A873-00			1	SUBPANEL, FRONT:PLUG-IN	SH216	386-A873-00
21-004	348-A155-00			5	GASKET, SHIELD:CONDUCTIVE URETHAN FORM, 2MM X 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
21-005	259-A005-01			1	FLEX CIRCUIT:A80 ON/OFF LED, W/LED	SH216	259-A005-01
21-006	214-B284-00			1	FASTNER ASSY:M2.5 SCREW, PRESSMOUNT, SPRING-LOADED	SH216	214-B284-00
21-007	348-A156-00			10	GASKET, SHIELD:FINGER TYPE, BE-CU, 8.13MM W X 2.79MM H X 406.4MM L	TK0AR	78-010-02
21-008	348-A157-00			1	GASKET, SHIELD:CONDUCTIVE SHEET, FOR DTG PLUG-IN	TK0AU	348-A157-00
21-009	211-A151-00			8	SCREW, MACHINE:M2.5X6MM L, PNH, STL, ZN-C , CROSS REC, W/KOGATA-PLAIN & SPLIT WSHR	SH216	211-A151-00
21-010	211-A242-00			4	SCREW, MACHINE:M3X12MM L, STL, BLK, W/K-PLAIN & SPLIT, KOGATAMARU	SH216	211-A242-00
21-011	211-0871-00			1	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
21-012	211-0871-00			2	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
21-013	407-A740-00			1	BRACKET:PLUG-IN BOARD, A5052P-H32(34), T1.0	SH216	407-A740-00
21-014	441-A306-02			1	CHASSIS, MAIN:PLUG-IN	SH216	441-A306-02
21-015	334-1378-50			1	MARKER, INDENT:MKD SERIAL NO.	TK0AK	334137850

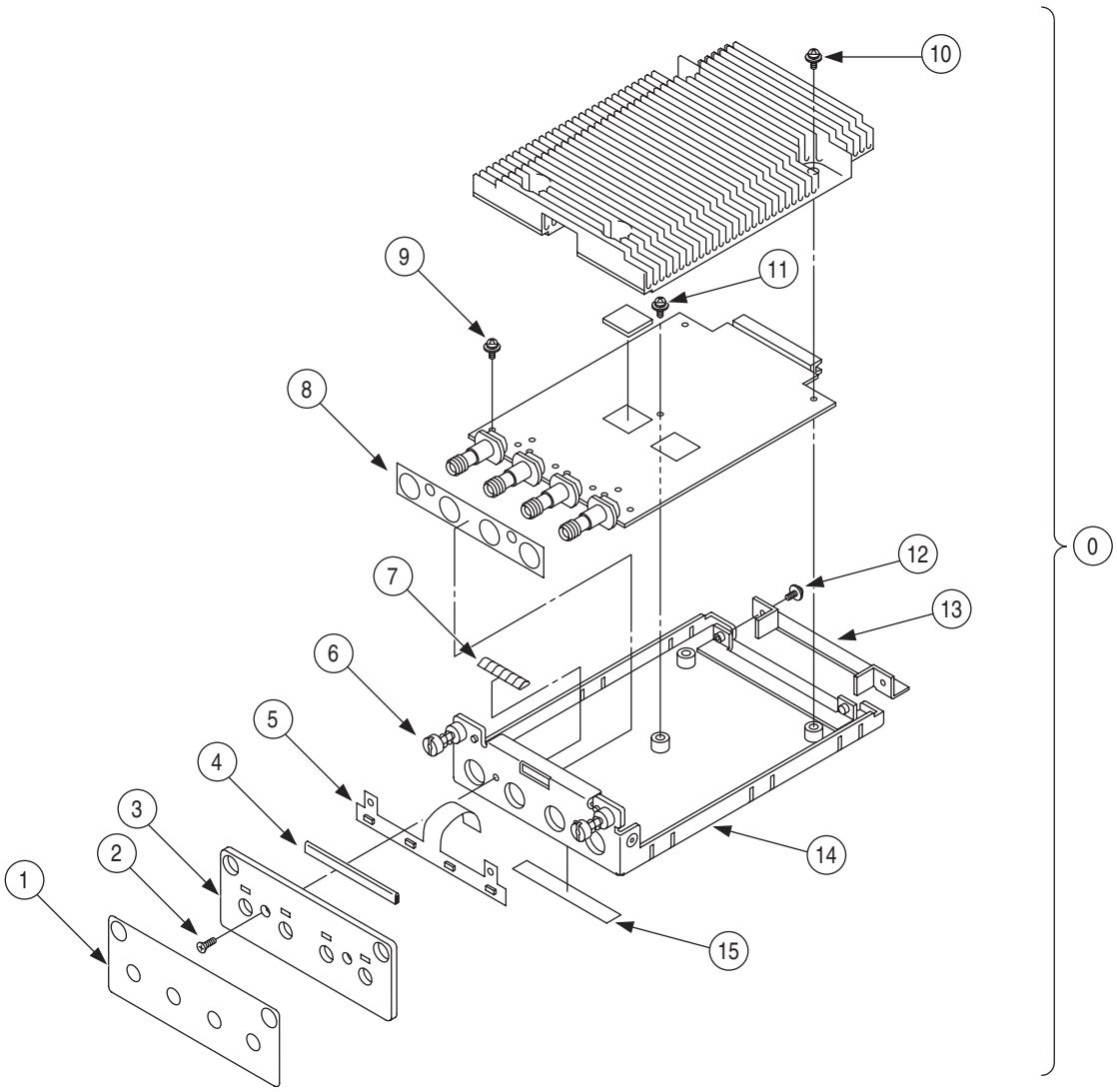


Figure 9-21: DTGM20

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-22					**DTGM21**		
22-000	116-1126-00			1	OUTPUT MODULE DTGM21	SH216	116-1126-00
22-001	333-4500-00			1	PANEL, FRONT:DTGM21, POLYCARBONATE	SH216	333-4500-00
22-002	211-1039-00			2	SCREW, MACHINE:M2.5X6MM L, FLH, STL, CR PL, CROSS REC	SH216	211-1039-00
22-003	386-7428-00			1	SUBPANEL, FRONT:PLUG-IN	0J9P9	386742800
22-004	348-A155-00			5	GASKET, SHIELD:CONDUCTIVE URETHAN FORM, 2MM X 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
22-005	259-0182-00			1	FLEX CIRCUIT:A80 ON/OFF LED, W/LED	SH216	259-0182-00
22-006	441-2382-00			1	FASTNER ASSY:M2.5 SCREW, PRESSMOUNT, SPRING-LOADED	TK1943	441238200
22-007	348-A156-00			10	GASKET, SHIELD:FINGER TYPE, BE-CU, 8.13MM W X 2.79MM H X 406.4MM L	TK0AR	78-010-02
22-008	348-A157-00			1	GASKET, SHIELD:CONDUCTIVE SHEET, FOR DTG PLUG-IN	TK0AU	348-A157-00
22-009	211-A151-00			8	SCREW, MACHINE:M2.5X6MM L, PNH, STL, ZN-C , CROSS REC, W/KOGATA-PLAIN & SPLIT WSHR	SH216	211-A151-00
22-010	131-A018-00			4	BUS, CONDUCTOR; SHUNT ASSY,GREEN	SH216	131-A018-00
22-011	211-A242-00			4	SCREW, MACHINE:M3X12MM L, STL, BLK, W/K-PLAIN & SPLIT, KOGATAMARU	SH216	211-A242-00
22-012	211-0871-00			1	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
22-013	211-0871-00			2	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
22-014	407-A740-00			1	BRACKET:PLUG-IN BOARD, A5052P-H32(34), T1.0	SH216	407-A740-00
22-015	441-2382-00			1	CHASSIS, MAIN:PLUG-IN	TK1943	441238200
22-016	334-1378-50			1	MARKER, INDENT:MKD SERIAL NO.	TK0AK	334137850

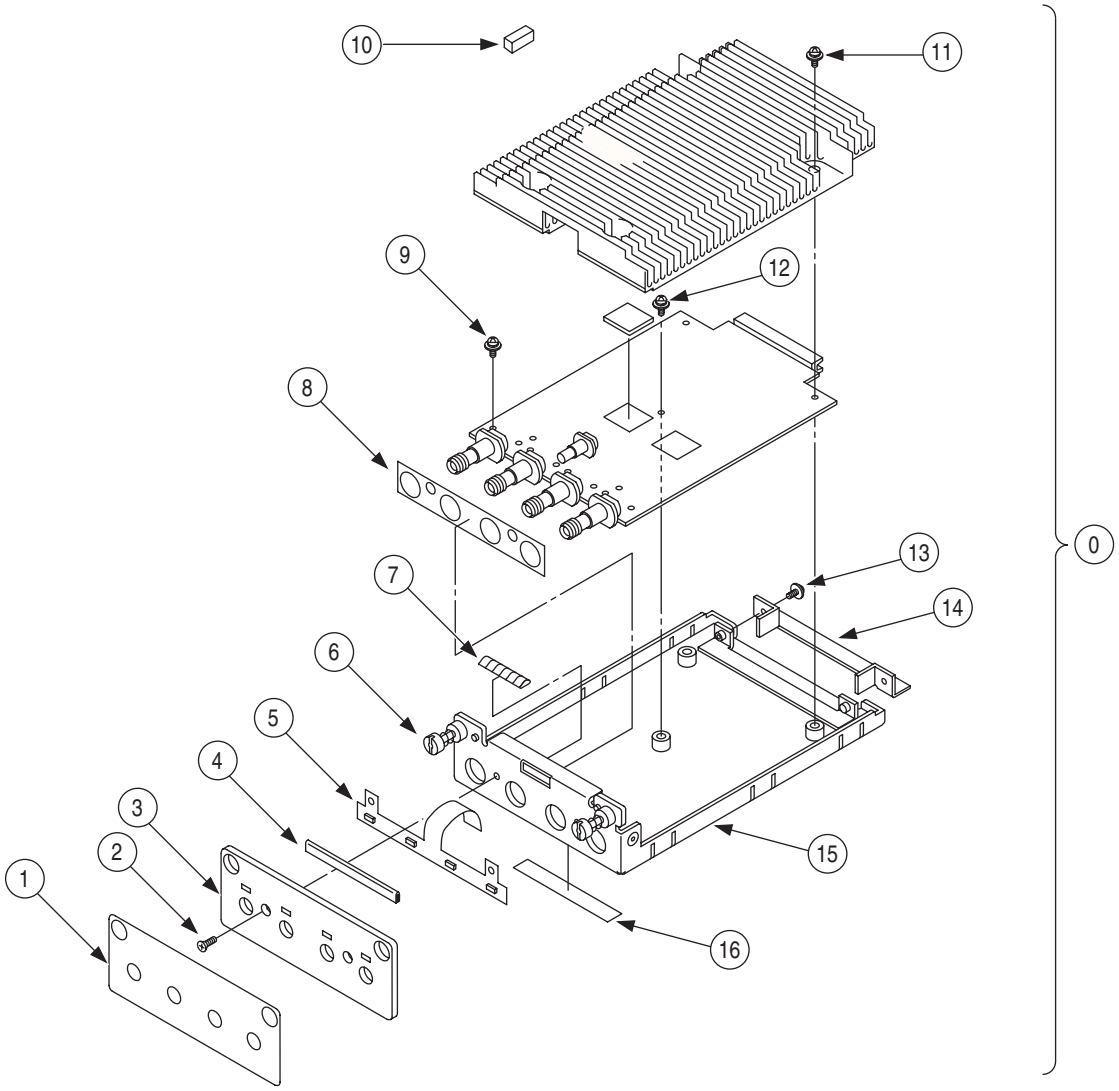


Figure 9-22: DTGM21

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-23					**DTGM30**		
23-000	116-A022-51				OUTPUT MODULE DTGM30	SH216	116-A022-51
23-001	333-A460-01			1	PANEL, FRONT:DTGM30, POLYCARBONATE	SH216	333-A460-01
23-002	211-1039-00			2	SCREW, MACHINE:M2.5X6MM L, FLH, STL, CR PL, CROSS REC	SH216	211-1039-00
23-003	386-A873-00			1	SUBPANEL, FRONT:PLUG-IN	SH216	386-A873-00
23-004	348-A155-00			5	GASKET, SHIELD:CONDUCTIVE URETHAN FORM, 2MM X 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
23-005	259-A005-01			1	FLEX CIRCUIT:A80 ON/OFF LED, W/LED	SH216	259-A005-01
23-006	214-B284-00			1	FASTNER ASSY:M2.5 SCREW, PRESSMOUNT, SPRING-LOADED	SH216	214-B284-00
23-007	348-A156-00			10	GASKET, SHIELD:FINGER TYPE, BE-CU, 8.13MM W X 2.79MM H X 406.4MM L	TK0AR	78-010-02
23-008	348-A157-00			1	GASKET, SHIELD:CONDUCTIVE SHEET, FOR DTG PLUG-IN	TK0AU	348-A157-00
23-009	211-A151-00			8	SCREW, MACHINE:M2.5X6MM L, PNH, STL, ZN-C , CROSS REC, W/KOGATA-PLAIN & SPLIT WSHR	SH216	211-A151-00
23-010	211-A242-00			4	SCREW, MACHINE:M3X12MM L, STL, BLK, W/K-PLAIN & SPLIT, KOGATAMARU	SH216	211-A242-00
23-011	211-0871-00			1	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
23-012	211-0871-00			2	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
23-013	407-A740-00			1	BRACKET:PLUG-IN BOARD, A5052P-H32(34), T1.0	SH216	407-A740-00
23-014	441-A306-02			1	CHASSIS, MAIN:PLUG-IN	SH216	441-A306-02
23-015	334-1378-50			1	MARKER, INDENT:MKD SERIAL NO.	TK0AK	334137850

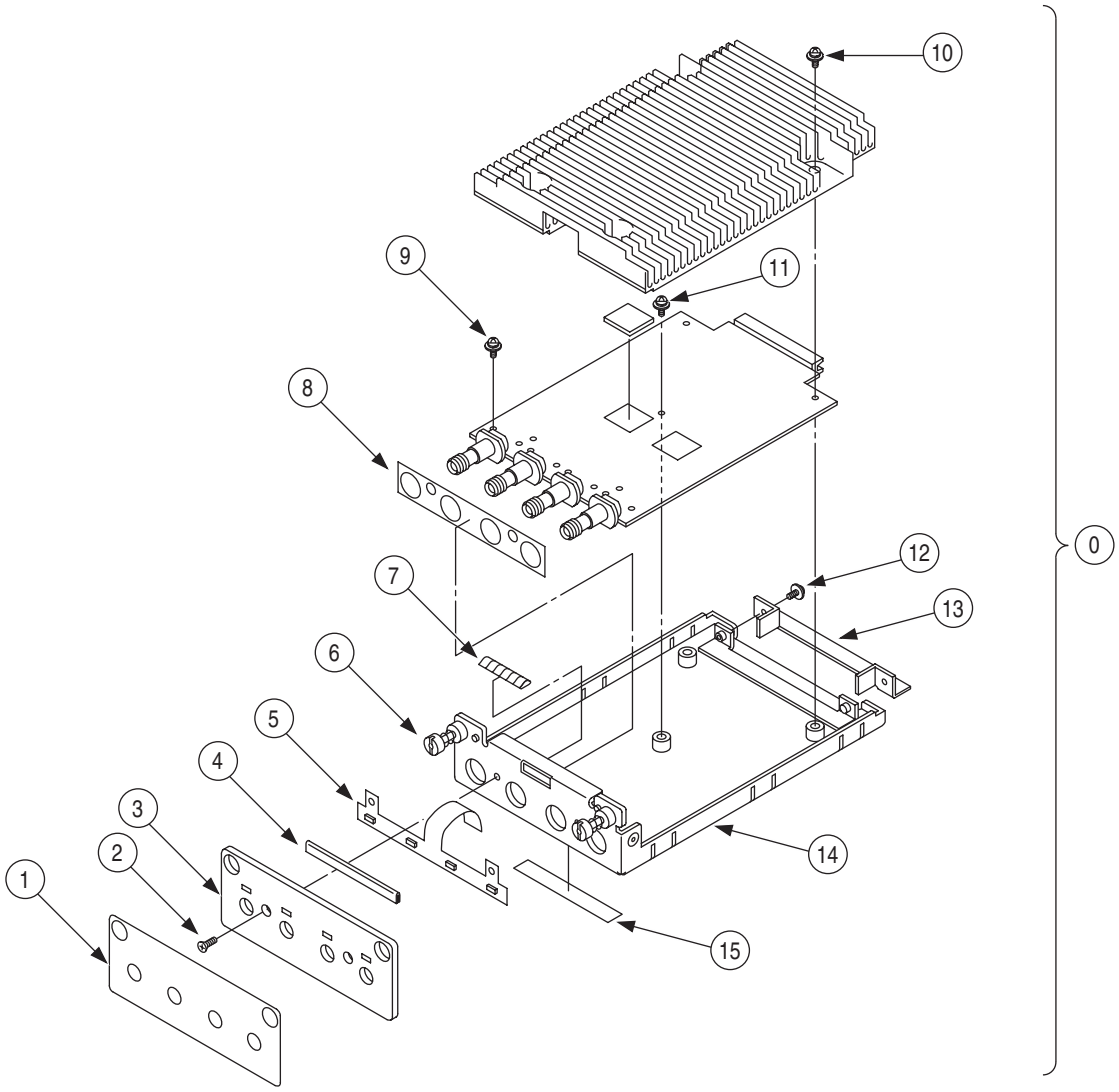


Figure 9-23: DTGM30

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-24					**DTGM31**		
24-000	116-1127-00				OUTPUT MODULE DTGM31	SH216	116-1127-00
24-001	333-4501-00			1	PANEL, FRONT:DTGM31, POLYCARBONATE	SH216	333-4501-00
24-002	211-1039-00			2	SCREW, MACHINE:M2.5X6MM L, FLH, STL, CR PL, CROSS REC	SH216	211-1039-00
24-003	386-7428-00			1	SUBPANEL, FRONT:PLUG-IN	0J9P9	386742800
24-004	348-A155-00			5	GASKET, SHIELD:CONDUCTIVE URETHAN FORM, 2MM X 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
24-005	259-0182-00			1	FLEX CIRCUIT:A80 ON/OFF LED, W/LED	SH216	259-0182-00
24-006	441-2382-00			1	FASTNER ASSY:M2.5 SCREW, PRESSMOUNT, SPRING-LOADED	TK1943	441238200
24-007	348-A156-00			10	GASKET, SHIELD:FINGER TYPE, BE-CU, 8.13MM W X 2.79MM H X 406.4MM L	TK0AR	78-010-02
24-008	348-A157-00			1	GASKET, SHIELD:CONDUCTIVE SHEET, FOR DTG PLUG-IN	TK0AU	348-A157-00
24-009	211-A151-00			8	SCREW, MACHINE:M2.5X6MM L, PNH, STL, ZN-C , CROSS REC, W/KOGATA-PLAIN & SPLIT WSHR	SH216	211-A151-00
24-010	211-A242-00			4	SCREW, MACHINE:M3X12MM L, STL, BLK, W/K-PLAIN & SPLIT, KOGATAMARU	SH216	211-A242-00
24-011	211-0871-00			1	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
24-012	211-0871-00			2	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
24-013	407-A740-00			1	BRACKET:PLUG-IN BOARD, A5052P-H32(34), T1.0	SH216	407-A740-00
24-014	441-2382-00			1	CHASSIS, MAIN:PLUG-IN	TK1943	441238200
24-015	334-1378-50			1	MARKER, INDENT:MKD SERIAL NO.	TK0AK	334137850

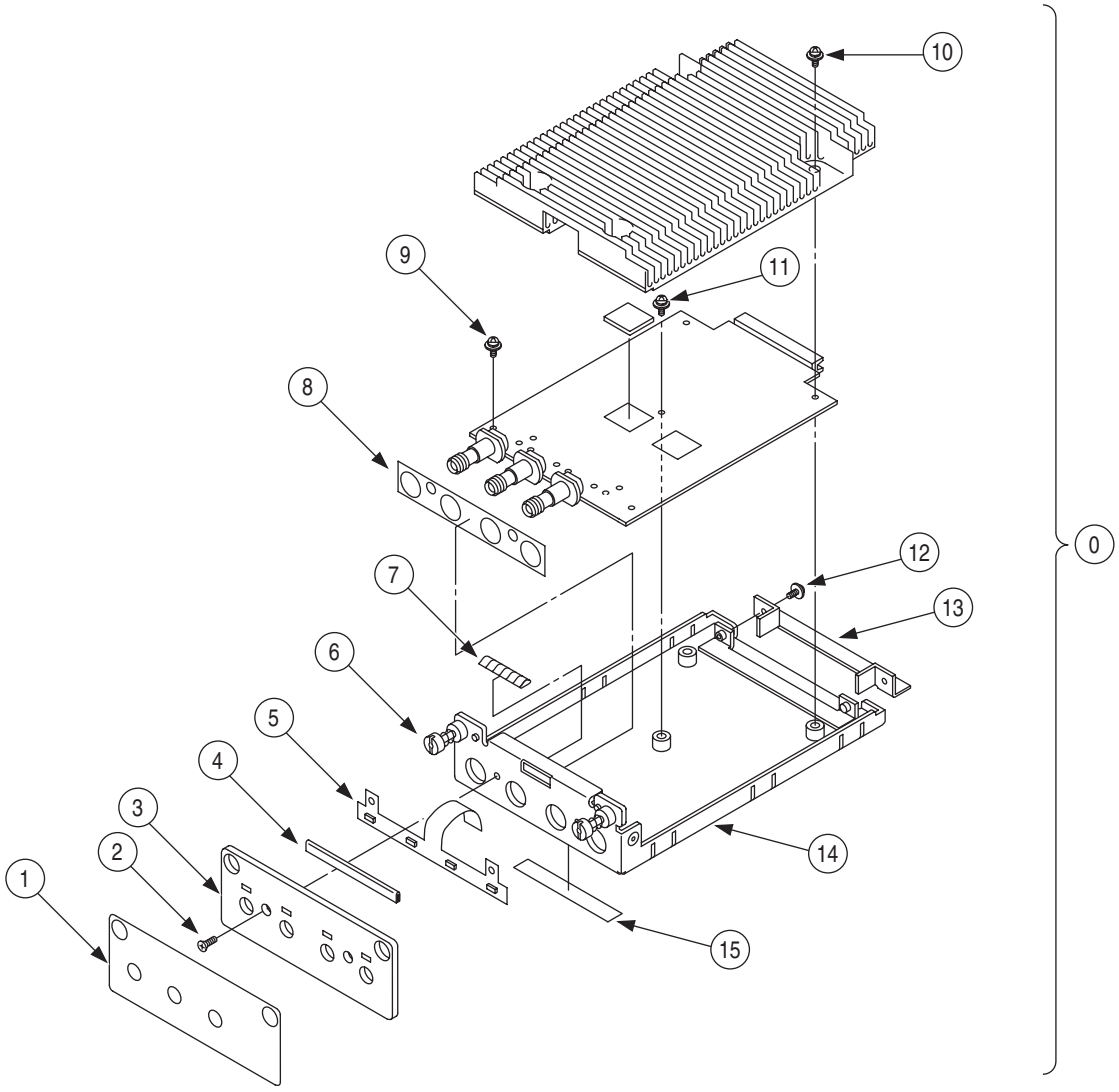


Figure 9-24: DTGM31

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-25					**DTGM32**		
25-000	116-1128-00				OUTPUT MODULE DTGM32	SH216	116-1128-00
25-001	333-4502-00			1	PANEL, FRONT:DTGM31, POLYCARBONATE	SH216	333-4502-00
25-002	211-1039-00			2	SCREW, MACHINE:M2.5X6MM L, FLH, STL, CR PL, CROSS REC	SH216	211-1039-00
25-003	386-7428-00			1	SUBPANEL, FRONT:PLUG-IN	0J9P9	386742800
25-004	348-A155-00			5	GASKET, SHIELD:CONDUCTIVE URETHAN FORM, 2MM X 4MM, W/CONDUCTIVE ADHESIVE	SEIWA	E02S040020ET
25-005	259-0182-00			1	FLEX CIRCUIT:A80 ON/OFF LED, W/LED	SH216	259-0182-00
25-006	441-2381-00			1	FASTNER ASSY:M2.5 SCREW, PRESSMOUNT, SPRING-LOADED	TK1943	441238100
25-007	348-A156-00			10	GASKET, SHIELD:FINGER TYPE, BE-CU, 8.13MM W X 2.79MM H X 406.4MM L	TK0AR	78-010-02
25-008	348-A157-00			1	GASKET, SHIELD:CONDUCTIVE SHEET, FOR DTG PLUG-IN	TK0AU	348-A157-00
25-009	211-A151-00			8	SCREW, MACHINE:M2.5X6MM L, PNH, STL, ZN-C , CROSS REC, W/KOGATA-PLAIN & SPLIT WSHR	SH216	211-A151-00
25-010	211-A242-00			4	SCREW, MACHINE:M3X12MM L, STL, BLK, W/K-PLAIN & SPLIT, KOGATAMARU	SH216	211-A242-00
25-011	211-0871-00			1	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
25-012	211-0871-00			2	SCREW, MACHINE:M3X6MM L, PNH, STL, ZN PL, CROSS REC, W/FLAT(7MM OD)& LOCK WASHER	SH216	211-0871-00
25-013	407-A740-00			1	BRACKET:PLUG-IN BOARD, A5052P-H32(34), T1.0	SH216	407-A740-00
25-014	441-2382-00			1	CHASSIS, MAIN:PLUG-IN	TK1943	441238200
25-015	334-1378-50			1	MARKER, INDENT:MKD SERIAL NO.	TK0AK	334137850

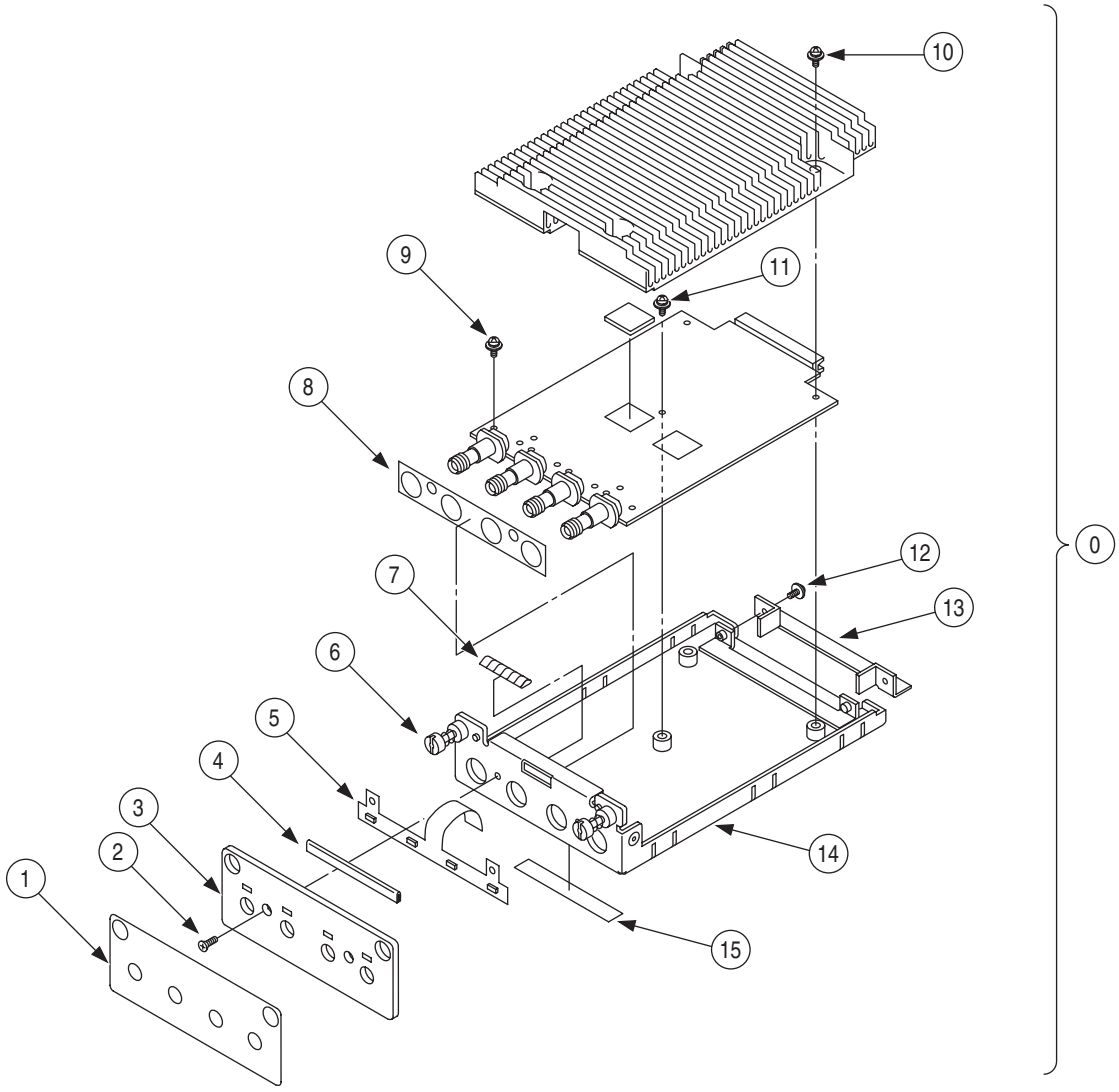


Figure 9-25: DTGM32

Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty.	Name & description	Mfr. code	Mfr. part number
9-26					**OP1RR (RACK MOUNT)**		
26	020-A052-00			1	COMPONENT KIT:FIELD KIT,RACK-MOUNT,DTG5000	SH216	020-A052-00
26-1	407-A720-00			1	BRACKET,LEFT: RACK-MOUNT,AL,t2.0mm	SH216	407-A720-00
26-2	426-A203-00			2	MOUNT BASE,LEFT RACK-MOUNT,AL,t4.0mm	SH216	426-A203-00
26-3	213-A250-00			6	SCREW,MACHINE_FM4X8 L,FLH,STL,ZN-C PL,CROSS REC	SH216	213-A250-00
26-4	407-A721-00			1	BRACKET,RIGHT: RACK-MOUNT,AL,t2.0mm	SH216	407-A721-00

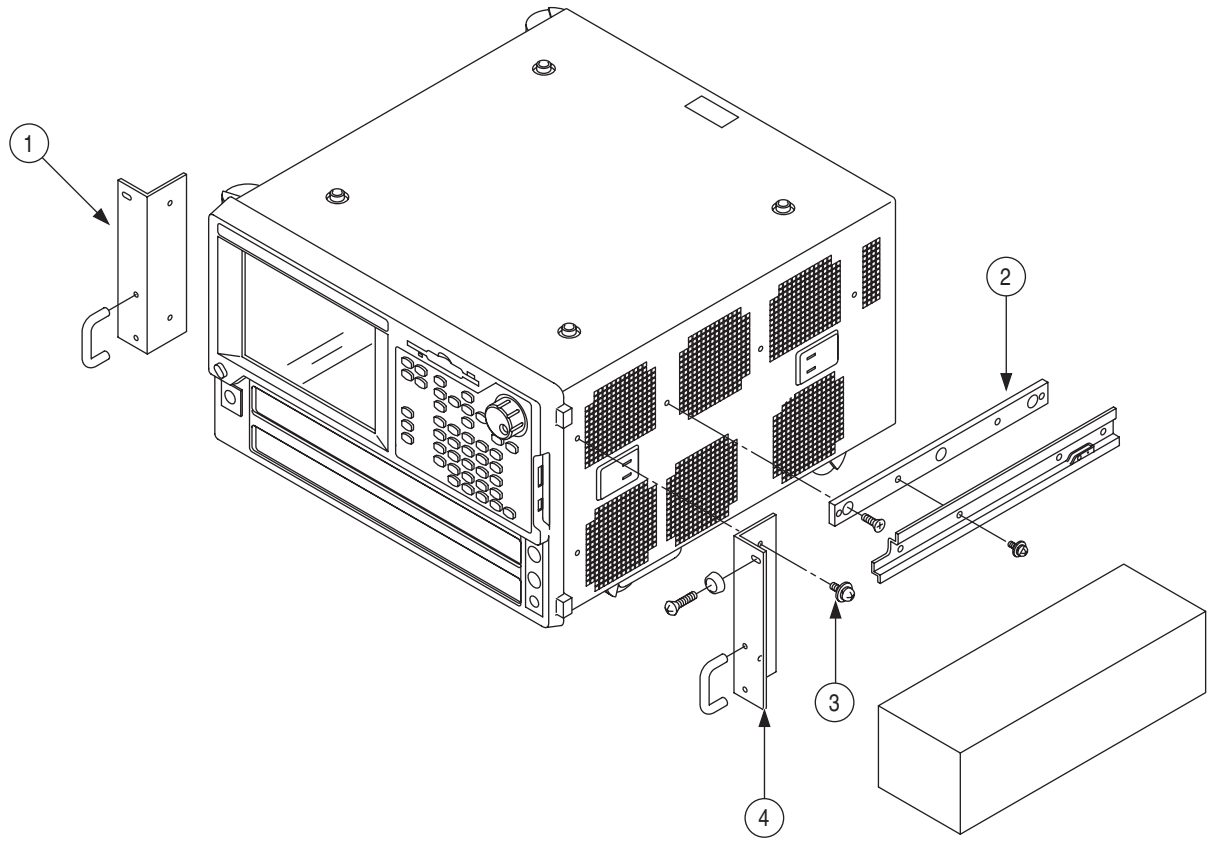


Figure 9-26: Op 1R (Rack Mount)

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