User Manual

Tektronix

BG1
Black Burst Generator

070-9298-01

This document supports software version 2.0 and above.

CE

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

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Country	Instrument model and serial number
Phone	Instrument purchase date

Table of Contents

Appendices

Glossary and Index

List of Figures

List of Tables

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

Only qualified personnel should perform service procedures.

To avoid potential hazards, use this product only as specified.

Injury Precautions

Avoid Electric Overload. To avoid electric shock or fire hazard, do not apply a voltage to a terminal that is outside the range specified for that terminal.

Product Damage Precautions

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

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:

DANGER
High Voltage

Protective Ground
(Earth) Terminal

ATTENTION
Refer to Manual

Double
Insulated

Certifications and Compliances

Refer to the specifications section for a listing of certifications and compliances that apply to this product.

Service Safety Summary

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

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

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

Use 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.

Preface

This manual documents the capabilities, specifications, operation, and installation of the BG1 Generator module.

About This Manual

This manual is composed of the following sections:

- *Getting Started* provides a product description, standard and optional accessories list, and an incoming inspection procedure.
- *Operating Basics* describes the windowed menu interface and how to control the module through the interface in conjunction with the front-panel controls.
- *Syntax and Commands* defines the syntax used in command descriptions, presents a list of all command subsystems, and presents detailed descriptions of all programming commands.
- *Appendices* provides additional information including the electrical specifications, compliances, and hardware installation procedures.

Related Manuals

The following documents are also available:

- The *BG1 Black Burst Generator Service Manual* describes how to service the module. This optional manual must be ordered separately.
- The *TG 2000 Signal Generation Platform User Manual* describes how to use the TG 2000 Platform. It also contains information about SCPI commands, programming structure, and status and events for the platform. Some of this information applies to all generator modules, including the DVG1 Generator module. This manual is a standard accessary to the TG 2000 Platform mainframe.
- The *TG 2000 Signal Generation Platform Service Manual* describes how to service the mainframe to the module level and provides general information about servicing generator modules. This optional manual must be ordered separately.
- A module user manual is included with each optional module. Contact your Tektronix representative for a list of generator and special function modules.

Contacting Tektronix

Product Support	For application-oriented questions about a Tektronix measurement product, call toll free in North America: 1-800-TEK-WIDE (1-800-835-9433 ext. 2400) 6:00 a.m. – 5:00 p.m. Pacific time Or, contact us by e-mail: tm_app_supp@tek.com For product support outside of North America, contact your local Tektronix distributor or sales office.
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Getting Started

Getting Started

The BG1 Generator module is a multiple-format black burst generator. The module can supply one of the six following black burst signals on the three rear-panel output connectors:

- NTSC with setup and no color frame reference
- NTSC with setup and color frame reference
- NTSC without setup
- NTSC without setup and with color frame reference
- PAL with color frame reference
- PAL without color frame reference

You can select the rear-panel Clock Out signal from the following signals:

- The 27 MHz master clock
- Two Direct Digital Synthesis (DDS) clocks, which you can set from 10 MHz to 100 MHz
- Two frame reset pulses

The timing of the outputs is time zero for reference timing. The output timing cannot be delayed.

The BG1 Generator module is supplied as a standard accessory with the TG 2000 Signal Generation Platform.

NOTE. *If the black burst or clock outputs are not required, the BG1 Generator module can be removed to provide a mainframe slot for another module.*

Accessories

Table 1–1 lists the standard and optional accessories for the module. Standard accessories are included with the module, and optional accessories are available for purchase to use with the module.

Table 1–1: Standard and optional accessories

Accessory	Typo of accessory	Part number
BG1 Black Burst Generator User Manual	Standard	070-9298-XX
T-10 Torx Tip	Standard	003-1604-XX
Screws (2 ea)	Standard	211-0725-XX
Blank rear panel	Standard	333-4113-00
BG1 Black Burst Generator Service Manual	Optional	070-9304-XX

Configuration

The module does not require any hardware configuration. You cannot reconfigure the signal outputs.

Installation

The module should be installed by qualified service personnel only. Refer to *Appendix C* for detailed instructions on how to install the module.

The module is shipped with the signal sets already installed. You cannot change the signals or signal sets for this module. (The SDP2000 Signal Development Program cannot create signals for the BG1 Generator module.) However, you can use an AVG1 Generator module to generate similar signals.

Functional Check

This procedure determines if your module is operating correctly. If you are not familiar with the operation of the module, it may be helpful to refer to Figure 2–1 on page 2–1 while performing this procedure.

Required Equipment

For this procedure, you will need a television monitor and a frequency counter or an oscilloscope.

Procedure

To check your module, follow these steps:

1. If the module is not installed in the TG 2000 Platform mainframe, install the module, using the installation procedures beginning on page C–2.
2. Power on the TG 2000 Signal Generation Platform. The platform runs a self test on all modules.
3. To determine if the self test was successful, press the **Modules** button. Check the display for the icon that represents the BG1 Generator module.
4. Push the **Modules** button and touch the **BG1** icon on the display.
5. Select either the **NTSC** or the **PAL** signal set.
6. Select **Black Burst** (the black burst signal without color frame reference).
7. Connect the BG1 Generator module Output 1 signal to the television monitor.
8. Set the monitor to the pulse-cross setting so that you can see the signal blanking areas.
9. Select **Black Burst + Frm Ref** (the black burst signal with color frame reference).
10. Check that the color frame reference signal appears as expected.
11. For NTSC users only, push the **Signal Sets** button, and then select the **NTSC no Setup** signal set. Select a signal and check that the signal displayed on the monitor changes appropriately.
12. Connect the Output 2 signal to the monitor. Check that the signal that was on Output 1 appears on Output 2.
13. Repeat step 12 for Output 3.
14. Connect the Clock Out signal to the frequency counter or oscilloscope.
15. From the Test Signals window, touch **Module Parameters**.
16. Touch **Clock Out**.

17. Touch **Clock Out**.
18. Change the clock frequency using either of these methods:
    - Turn the front-panel Navigation knob
    - Enter the value on the front-panel keypad and press **Enter**.
19. Check the frequency counter or the oscilloscope to be sure that the measured frequency changes accordingly.

Operating Basics

Functional Overview

This section provides an overview of the BG1 Generator module. If you are not familiar with the operation of the TG 2000 Signal Generation Platform, refer to the *TG 2000 Signal Generation Platform User Manual* before reading this section. Figure 2–1 shows the menu structure for basic module operations.

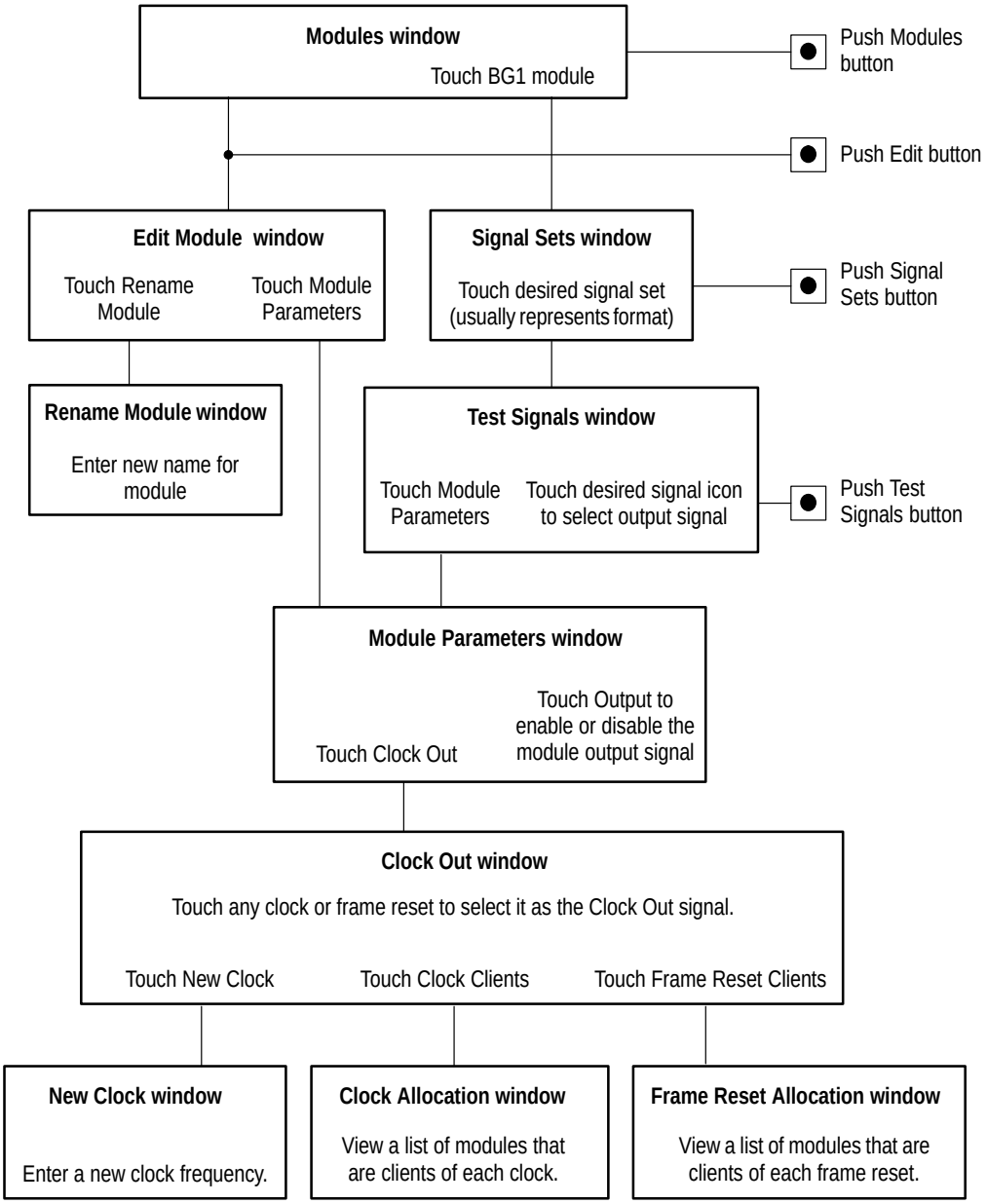


Figure 2–1: Basic menu structure for the BG1 Generator module

Outputs

The BG1 Generator module has four outputs: a clock output and three black burst signal outputs. All four outputs have standard BNC connectors.

Online Help

Push the front-panel **HELP** button to display a help window. The help window describes the window you were using when you pushed HELP.

If a help window is longer than the display, you can scroll through the help text using the Navigation arrow keys. To exit the help window, touch **Quit**.

Operating Procedures

This section is divided into the following basic topics:

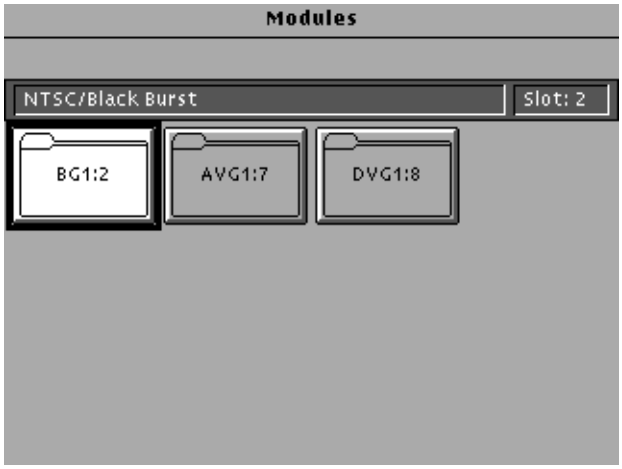
- Power on the mainframe and select the module
- Select the black burst signal
- Module parameters

Refer to Figure 2–1 on page 2–1 for information on how to access the appropriate window for these procedures.

Power On and Select the Module

After the module is installed in the mainframe, and the mainframe is installed in the rack or other location where it will be used, power on the mainframe and select the module by following these steps:

1. Set the rear-panel power switch to the **ON** position.
2. Press the front-panel **POWER** switch if necessary.
3. Wait for a few seconds as the mainframe executes confidence tests on the mainframe and modules. Check for any error messages that might appear.
4. When self tests are complete, check for an icon representing each installed generator module. After each module name is an area that can be used to indicate the slot number in which it is installed. If an installed module is not represented, refer to *Troubleshooting* in the *TG 2000 Signal Generation Platform Service Manual*.
5. Since you have just powered on the mainframe, the Modules window (shown below) is displayed. To select the module at other times, push the front-panel **Modules** button to access this window.

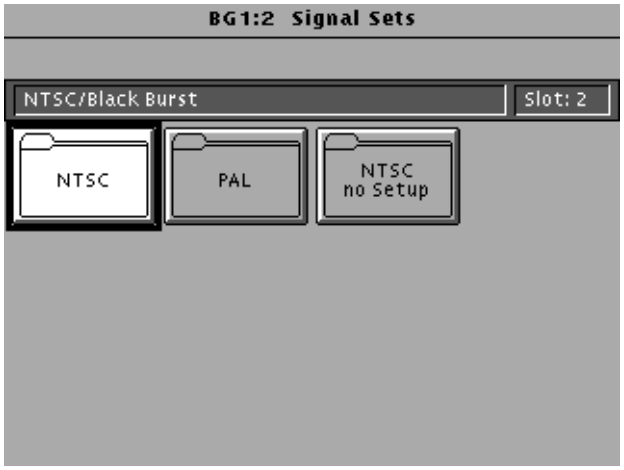


6. Touch the **BG1** icon on the display (or push the **Signal Sets** button if the BG1 icon is already highlighted). The installed signal sets for the module appear. Selections you make after this will pertain to the BG1 Generator module.

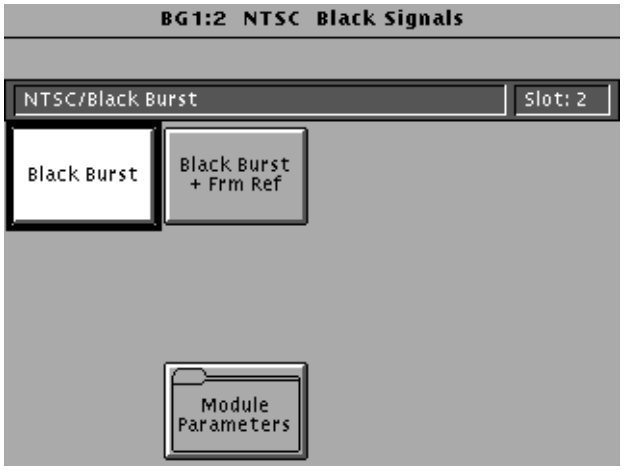
Select the Black Burst Output Signal

The black burst signal is supplied on three rear-panel outputs labeled Output 1, Output 2, and Output 3. To select the output signal, follow these steps:

1. Select the BG1 Generator module.
2. Push the **Signal Sets** button.
3. In the BG1 Signal Sets window (shown below) touch the desired signal set on the display. (In this example, **NTSC** is selected.)



4. The Test Signals window for the selected signal set appears, as shown in the following illustration. In this example, the Black Burst signal is active. Change to another signal by touching the signal icon.



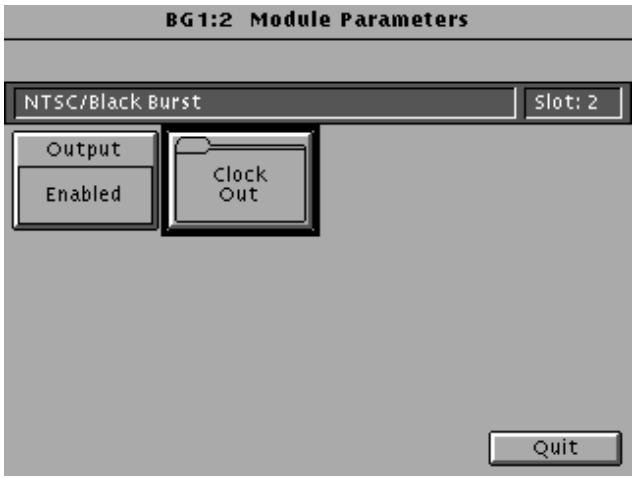
5. You can also select the output signal using the List window as follows:
   a. Push the front-panel **List** button to display the list of test signals.
   b. Use the Navigation arrow keys to highlight the module and signal
   c. Push the **Select** button.

Module Parameters

The following procedures discuss windows that are accessed through the Module Parameters window, shown below. Changes that you make to parameters in any of these windows affect the entire module.

To enter the Module Parameters window for the BG1 Generator module, follow these steps:

1. Select the BG1 Generator module if not already selected.
2. Push the **Test Signals** button.
3. Touch **Module Parameters** at the bottom of the screen. The Module Parameters window is shown below.



4. Another way to access this window is as follows:
   a. Push the **Modules** button.
   b. Ensure that the module is highlighted.
   c. Push the **Edit** button.
   d. Touch **Module Parameters**.

Enable/Disable Black Burst Outputs

When you disable the black burst outputs, the platform's clock and frame reset resources used by the BG1 Generator module are released. Disabling the black burst outputs does not disable the BG1 Generator module clock output.

To enable or disable the outputs, follow these steps:

1. In the Module Parameters window, shown on page 2–7, touch **Output** to enable or disable the Black Burst outputs (rear-panel Output 1, Output 2, and Output 3).
2. Touch **Quit** to exit.

Enable/Disable Clock Output

When you disable the clock, the platform's clock resource used by the clock output is released. Disabling the clock output does not disable the black burst outputs (rear-panel Output 1, Output 2, and Output 3). To disable or enable the clock output, follow these steps:

1. In the Module Parameters window, shown on page 2–7, touch **Clock Out**. The Clock Out window is shown on page 2–10.
2. To disable the clock output, touch **Disable Clock Out**.
3. To enable the clock output again, select one of the displayed signals.
4. Touch **Quit** to exit.

Select Clock Output

You can select the signal that is sent to the rear-panel Clock Out connector. You cannot select an unassigned resource as the output signal. To select the clock output, follow these steps:

1. In the Module Parameters window, shown on page 2–7, touch **Clock Out**.
2. In the Clock Out window, shown below, select the clock output signal by touching the desired signal on the display. The signals are:
   - Fixed clock (27 MHz)
   - Variable clock 1
   - Variable clock 2
   - Frame reset 1
   - Frame reset 2

Setting a New Clock Frequency

You can be set a new clock frequency to any frequency between 10 MHz and 100 MHz. The clock signal frequency that you select is sent to the rear-panel clock output.

To set the clock frequency, follow these steps:

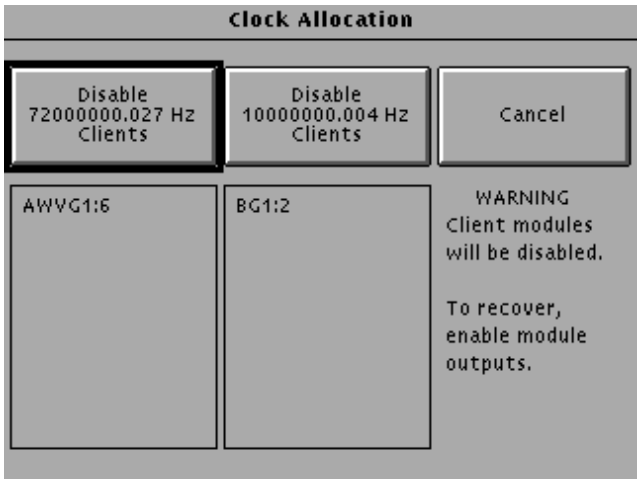
1. In the Module Parameters window, shown on page 2–7, touch **Clock Out**. The Clock Out window is shown on page 2–10.
2. In the Clock Out window, touch **New Clock**.
3. Set the frequency using either of these methods:
   - Rotate the Navigation knob (counterclockwise to decrease frequency and clockwise to increase frequency).
   - Enter a frequency value from the front-panel keypad and push the front-panel **Select** button.

   Setting the clock to a frequency other than 27 MHz uses one of the platform's two variable clocks, depending on which one is available. If neither of the variable clocks is available, the clock allocation window appears. This provides you the chance to disable one of the clocks.
4. Touch **Quit** to return to the Clock Out window. Check that the new frequency appears, and is selected as the output signal.

Clock Allocation

A clock client is a module that uses the specified clock. When you disable clock clients, you free up the clock resources. To disable clock clients, follow these steps:

1. In the Module Parameters window, shown on page 2–7, touch **Clock Out**. The Clock Out window is shown on page 2–10.
2. In the Clock Out window, touch **Clock Clients**. The Clock Allocation window opens, as shown below. This window is also displayed if you attempt to use or define a clock when insufficient clock resources are available. If this occurs, you must disable some of the module clients before continuing.



3. The Clock Allocation window displays a list of all clients for each clock. In the example, the AWVG1 module is using variable clock 1 which is set for 72 MHz, and the BG1 module is using variable clock 2 which is set for 10 MHz.

   Touch **Disable** above the list of clock clients that you want to disable. To exit without disabling any clients, touch **Cancel**.

4. To recover the clock clients, enable the module outputs as follows:

   a. Push the **Modules** button and select the module you want to enable.

   b. Push the **Test Signals** button.

   c. Touch **Module Parameters**.

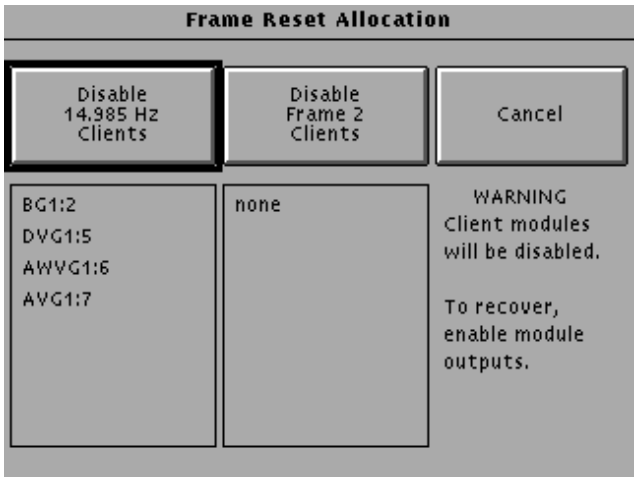
   d. Touch **Output** to enable the output.

   e. Touch **Quit** to exit.

Frame Reset Allocation

There are two frame reset pulses, Frame 1 and Frame 2. A frame reset client is a module that uses the specified frame reset pulse. When you disable frame reset clients, you free up the frame reset resources. To disable frame reset clients, follow these steps:

1. In the Module Parameters window, shown on page 2–7, touch **Clock Out**. The Clock Out window is shown on page 2–10.
2. In the Clock Out window, touch **Frame Reset Clients**. The Frame Reset Allocation window opens, as shown below. This window is also displayed if you attempt to use a frame reset when insufficient resources are available. If this occurs, you must disable some of the module clients before continuing.



3. The Frame Reset Allocation window displays a list of all clients for each frame reset pulse. In the example, the BG1, DVG1, AWVG1 and AVG1 modules are using frame reset 1 which is set for 14.985 Hz. Frame 2 is unused.
   a. Touch **Disable** above the list of frame reset clients that you want to disable.
   b. To exit without disabling any clients, touch **Cancel**.
4. To recover the frame reset clients, enable the module outputs as follows:
   a. Push the **Modules** button and select the module you want to enable.
   b. Push the **Test Signals** button.
   c. Touch **Module Parameters**.
   d. Touch **Output** to enable the output.
   e. Touch **Quit** to exit.

Syntax

Syntax

This section contains information on the Standard Commands for Programmable Instruments (SCPI) and the programming structure you can use to program your module.

Programming Model

Programming commands address specific modules and must conform to the proper syntax to achieve the desired result.

Addressing Module Test Signals

The following two steps must be performed before the test module will respond to signal parameter commands:

1. Select the module to be addressed before executing any commands. Many of the commands used by this module are shared by several modules and will be accepted without a reported error.
2. Enable the module using the `:OUTPut:STATe ON` command. The output state of the module must be enabled before test-signal parameters can be changed.

Command Arguments

Many commands will accept either string or numeric arguments. For example, a Boolean argument can either be “1” or “ON”.

Signal parameter commands that have a :STEP node can accept either a numeric value or they can accept a string argument that refers to the :STEP increment.

Signal parameter commands with a :STEP node will accept the following strings in addition to a numeric value:

UP. Use this argument to increase the parameter value one increment as defined by the :STEP value.

DOWN. Use this argument to decrease the parameter value one increment as defined by the :STEP value.

MINimum. Use this argument to set the parameter value to the minimum acceptable value.

MAXimum. Use this argument to set the parameter value to the maximum acceptable value.

DEFault. Use this argument to set the parameter value to the default value.

Argument Example

The following example demonstrates the effect of arguments used with a step value.

1. `:INSTrument:SELect "AVG1:#"` selects the analog video generator module located in the slot number indicated by the "#" symbol.
2. `:OUTPut:STATe ON` enables the module and displays the loaded test signal.
3. `:OUTPut:CIRCle:STATe ON` displays a circle on the video display.

***NOTE**. :OUTPut:CIRCle:DIAMeter uses an argument that is the percent of picture height.*

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4. `:OUTPut:CIRCle:DIAMeter DEFault` sets the circle diameter to 90 percent of the screen height.
5. `:OUTPut:CIRCle:DIAMeter:STEP 10` sets the step increment to 10 percent.
6. `:OUTPut:CIRCle:DIAMeter DOWN` changes the circle diameter to 80 percent of the screen height.
7. `:OUTPut:CIRCle:DIAMeter 50` changes the circle diameter to 50 percent of the screen height.
8. `:OUTPut:CIRCle:DIAMeter MAXimum` changes the circle diameter to 100 percent of the screen height.
9. `:OUTPut:CIRCle:DIAMeter MINimum` changes the circle diameter to 0 percent of the screen height.
10. `:OUTPut:CIRCle:DIAMeter UP` changes the circle diameter to 10 percent of the screen height.

SCPI Commands and Queries

SCPI is a standard created by a consortium that provides guidelines for remote programming of instruments. These guidelines provide a consistent programming environment for instrument control and data transfer. This environment uses defined programming messages, instrument responses, and data format across all SCPI instruments, regardless of manufacturer. The TG 2000 generator uses a command language based on the SCPI standard.

The SCPI language is based on a hierarchical or tree structure (see Figure 3–1) that represents a subsystem. The top level of the tree is the root node; it is followed by one or more lower-level nodes.

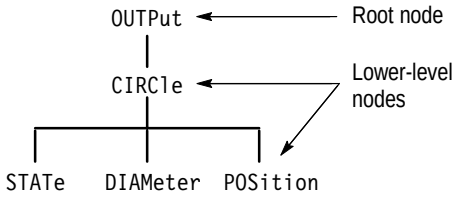

Figure 3–1: Example of SCPI subsystem hierarchy tree

You can create commands and queries from these subsystem hierarchy trees. Commands specify actions for the instrument to perform. Queries return measurement data and information about parameter settings.

For more information on SCPI commands, programming structure, and system status and events, refer to the *TG 2000 User Manual*.

Functional Command Groups

This section describes the commands in general categories. Commands to the module are divided into the following groups:

- MMEMory (see *TG 2000 Signal Generation Platform User Manual*)
- OUTPut
- SOURce

Items followed by question marks are queries; items without question marks are commands. Some items in this section have a question mark in parentheses (?) in the command header section; this indicates that the item can be both a command and a query.

MMemory

Two MMEMory commands are listed here for your reference. You can use these to set and query the output test signal for the module. Detailed information for using these commands (as well as other commands that can be used with the entire platform) are located in the *TG 2000 Signal Generation Platform User Manual*.

Table 3–1: :MMEMory commands

Command	Description
:MMEMory:LOAD:SIGNal	Load a signal into a module and identify that signal as the active signal (output signal) for that module
:MMEMory:SIGNal:ACTive?	List the active signal (output signal) for a module

Output

Use these commands to select the output characteristics of the module.

Table 3–2: :OUTPut commands

Command	Description
:OUTPut:CLOCk:STATe(?)	Set or query clock output
:OUTPut:STATe(?)	Set or query module output

Source

Use these commands to define the signal parameters for the module.

Table 3–3: :SOURce commands

Command	Description
:SOURce:CLOCk:FREQuency(?)	Set or query clock frequency

:OUTPut Commands

Use these commands to enable the actual output of the module. These commands do not release any resources controlled by the signal manager or the clock manager.

***NOTE**. The module must be selected with the INSTrument subsystem prior to using these commands.*

Command Tree

```
:OUTPut
   :CLOCk
      :STATe  <Boolean>
   :STATe     <Boolean>
```

:OUTPut:STATe(?)

Use this command to set or query the state of the module's output signal.

Syntax

```
:OUTPut:STATe <Boolean>
:OUTPut:STATe?
```

Parameters

Command	Query response
<Boolean> = ON or 1, OFF or 0	1, 0

Default Value ON

Errors and Events None

Dependencies None

Examples

Command: `:OUTP:STAT ON`

Query: `:OUTP:STAT?`

Response: 1

Related Commands None

:OUTPut:CLOCk:STATe(?)

Use this command to set or query the state of the module's clock output signal.

Syntax

```
:OUTPut:CLOCk:STATe <Boolean>
:OUTPut:CLOCk:STATe?
```

Parameters

Command	Query response
<Boolean> = ON or 1, OFF or 0	1, 0

Default Value ON

Errors and Events None

Dependencies None

Examples

Command: `:OUTP:CLOC:STAT ON`

Query: `:OUTP:CLOC:STAT?`

Response: 1

Related Commands :SOURce:CLOCk:FREQuency

:SOURce Commands

Use this command to select the module's clock frequency.

***NOTE**. The module must be selected with the INSTrument subsystem prior to using this command.*

Command Tree

```
:SOURce
   :CLOCk
      :FREQuency          <numeric_value>
         :STEP
      :SOURce             <clock>
```

:SOURce:CLOCk:FREQuency(?)

Use this command to set or query the module's clock frequency.

Syntax

```
:SOURce:CLOCk:FREQuency <numeric_value>
:SOURce:CLOCk:FREQuency?
```

Parameters

Command	Query response
<numeric_value> = <NR3> 10000000.00 Hz to 100000000.00 Hz	<NR2>

Default Value

Not applicable

Errors and Events

None

Dependencies

None

Examples

Command: `:SOUR:CLOC:FREQ 14e6`

Query: `:SOUR:CLOC:FREQ?`

Response: `14000000.0000`

Related Commands

OUTPut:CLOCk:STATe
:SOURce:CLOCk:FREQuency:STEP

:SOURce:CLOCk:FREQuency:STEP

Use this command to set or query the UP/DOWN step value of the clock frequency.

Syntax

```
:SOURce:CLOCk:FREQuency:STEP <numeric_value>
:SOURce:CLOCk:FREQuency:STEP?
```

Parameters

Command	Query response
<numeric_value> = <NRf>	<NR2>
MIN, MAX, DEF	

Default Value 1.0

Errors and Events –200 Execution error

Dependencies None

Examples Command: `:SOURce:CLOCk:FREQ:STEP 2`

Query: `:SOURce:CLOCk:FREQ:STEP?`

Response: Response: `2.0000`

Related Commands :SOURce:CLOCk:FREQuency

:SOURce:CLOCk:SOURce(?)

Use this command to select the clock or frame source for the clock output of the module.

Syntax

```
:SOURce:CLOCk:SOURce <clock>
:SOURce:CLOCk:SOURce?
```

Parameters

Command	Query response
FCLOck	FCLO
VCLOck1	VCLO1
VCLOck2	VCLO2
VFRAme1	VFRA1
VFRAme2	VFRA2
OFF	OFF

Default Value

Off

Errors and Events

–200 Execution error

Dependencies

Earlier hardware versions of the module may not support the variable frame selections. The actual frequency depends on the sequence of module startup.

Examples

Command: `:SOUR:CLOC:SOUR vclo2`

Query: `:SOUR:CLOC:SOUR?`

Response: `vclo2`

Related Commands

OUTPut:CLOCk:FREQuency

Appendices

Appendix A: Specifications

Table A–1 lists the Electrical specifications for the BG1 Generator module, and and Table A–2 lists the EMC compliance specifications. Specifications are guaranteed unless labeled “typical.” Typical specifications are provided for your convenience, but are not guaranteed.

Specifications are valid only when the module is properly installed in a TG 2000 Signal Generation Platform.

Refer to the *TG 2000 Signal Generation Platform User Manual* for a list of Environmental specifications.

Table A–1: Electrical specifications

Characteristics	Description
Black Burst Outputs	
Sync Amplitude Accuracy	± 2%. All rear panel outputs except clock output
Burst Amplitude Accuracy	± 5%. Relative to sync amplitude
SCH Phase Error, typical	Phase error ≤ 5°
DC Offset	≤ ± 50 mV
Return Loss/Output Impedance	≥ 36 dB to 6 MHz. 75 Ω
Clock Output	
Amplitude	0.4 V p-p ± 0.1 V. Into 75 Ω, AC coupled, square wave
Return Loss/Output Impedance, typical	≥ 15 dB 1 MHz to 100 MHz, 75 Ω
Frequency Range, typical	10 MHz to 100 MHz
Frequency Accuracy	As displayed on front panel ± 1 ppm, when not genlocked
Nonharmonic Spurs, typical	–45 dBc or better
Power Consumption, typical	+5 Volts: 2.0 Watts typical –5 Volts: 1.1 Watts typical –2 Volts: 0.3 Watts typical +15 Volts: 0 Watts typical –15 Volts: 0 Watts typical Battery: 0 µA typical

Certifications

Table A–2: Certifications and compliances

Characteristics	Description
EMC Compliance	Meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility when it is used with the product(s) stated in the specifications table. Refer to the EMC specification published for the stated products. May not meet the intent of the directive if used with other products.
FCC Compliance	Emissions comply with FCC Code of Federal Regulations 47, Part 15, Subpart B, Class A Limits

Standards Conformance

The BG1 Generator module conforms to the following standards:

- EBU N14
- SMPTE RP 154

Appendix B: SCPI Conformance Information

All commands in the BG1 Generator module are based on SCPI Version 1994.0. Table B–1 lists all commands supported by the module. The columns at right show whether or not a command is defined in the SCPI 1994.0 Standard.

Table B–1: SCPI 1994.0 conformance information

Command			Defined in SCPI	Not defined In SCPI
OUTPut	CLOCk	STATe(?)		✓
	STATe(?)			✓
SOURce	CLOCk	FREQuency(?)		✓
		STEP(?)		✓
		SOURce(?)		✓

WARNING

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

Appendix C: Installation

This section contains instructions for installing the module into the TG 2000 Platform mainframe.

Preventing Component Damage

CAUTION. *Electrostatic discharge (ESD) can damage components on this module and mainframe. To prevent ESD or other component damage, follow the steps below when installing, removing, or handling modules:*

1. Wear a grounded antistatic wrist strap to discharge the static voltage from your body while installing or removing modules from the TG 2000 Platform mainframe.
2. Transport and store modules in a static-protected bag or container.
3. Do not slide the module over any surface.
4. Handle modules as little as possible.
5. Do not touch module components or connector pins.
6. Do not use any devices capable of generating or holding a static charge in the work area where you remove, install, or handle modules.
7. Avoid handling modules in areas that have a floor or work-surface covering capable of generating a static charge.
8. Do not remove the module circuit board assembly from the shield. The shield provides important support and protection for the surface-mount components.

Module Installation

A T-10 torx tip screwdriver is the only tool you need to install the module. A T-10 torx tip is supplied with the module.

To install the module into the TG 2000 Platform mainframe, perform these steps:

1. Set the TG 2000 Platform mainframe rear-panel power switch to off.
2. Unplug the power cord.
3. Select the slot you will use to install the module. Table C–1 lists the slot restrictions. Figure C–1 shows a sample configuration with slot numbers.

Table C–1: Module slot assignments

Module	Slots in which the module can be installed
AGL1 Genlock module	Slot 2 or 3
AVG1 Generator module	Slots 2 through 10
AWVG1 Generator module	Slots 2 through 10
BG1 Generator module	Slot 2 through 10
Clock module	Slot 1
CPU module	Slot 11
DVG1 Generator module	Slots 2 through 10
GP1 GPIB Interface module	Slot 10

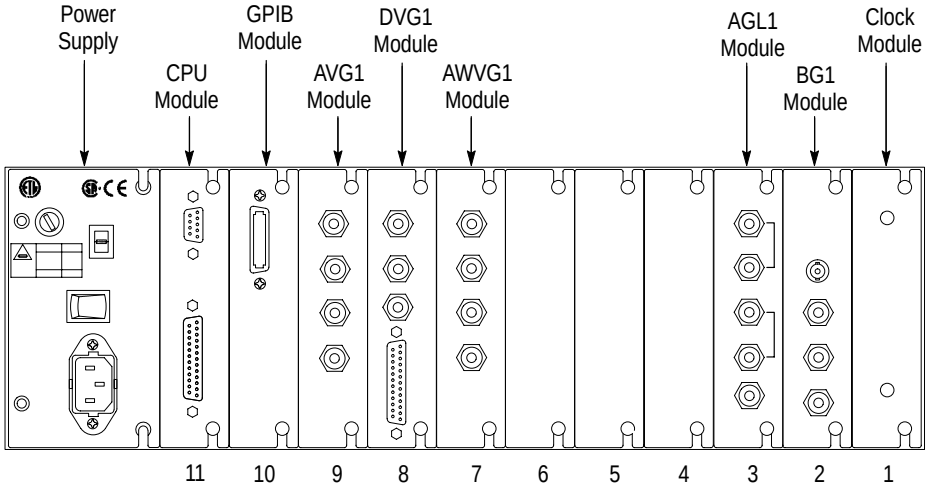

Figure C–1: TG 2000 Platform mainframe rear panel, showing slot numbering

WARNING. *To avoid a shock hazard, always remove the power cord before removing the top cover. Failure to remove the power cord can result in serious injury or death.*

4. Refer to Figure C–2 and remove or loosen all screws to remove the top cover.

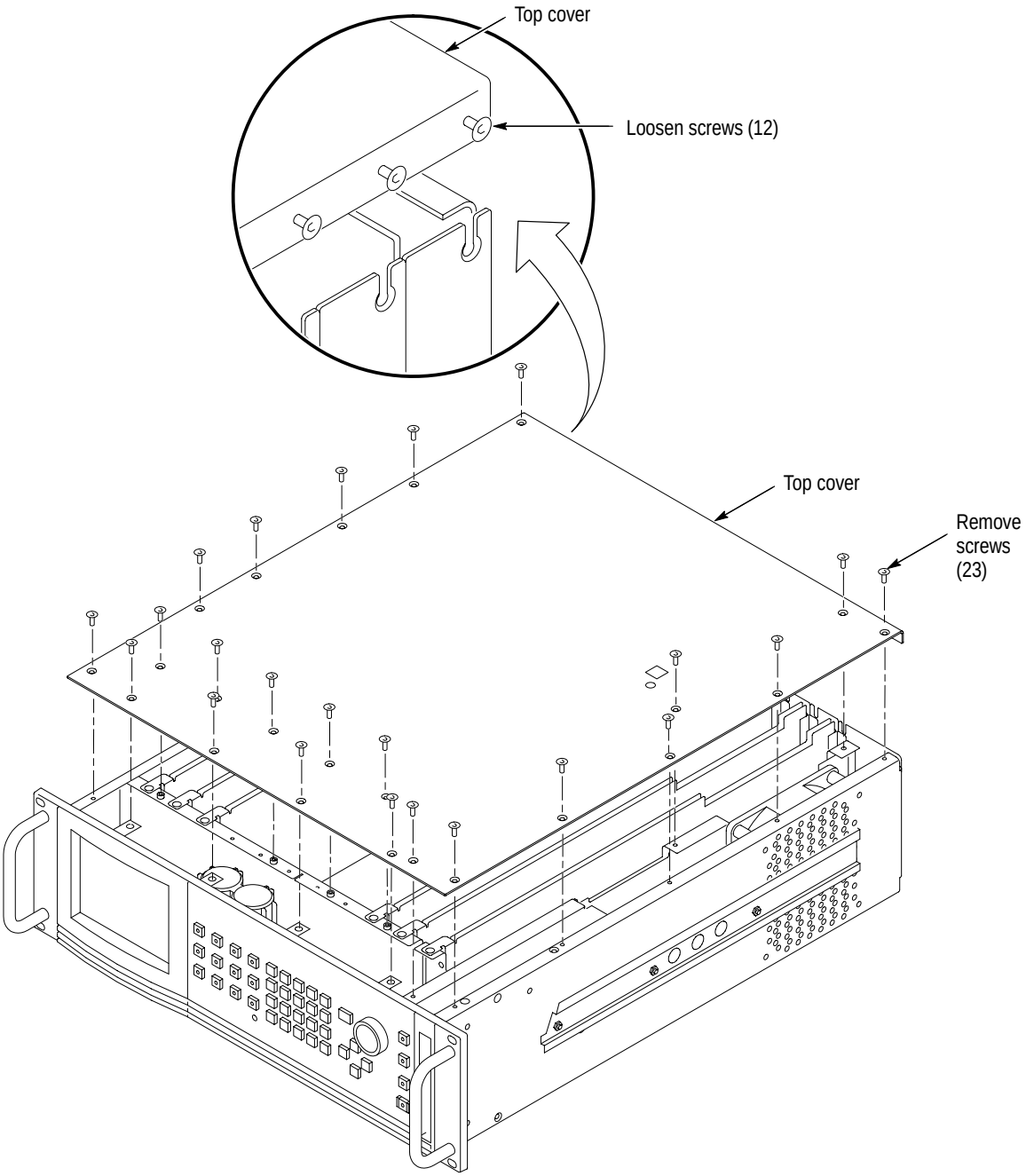

Figure C–2: Top cover removal

5. Remove the appropriate rear panel as shown in Figure C–3. Loosen, but do not remove the bottom screw. You will use it later to secure the module.

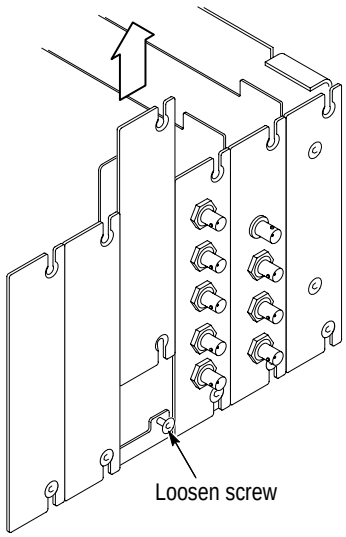

Figure C–3: Rear panel removal

6. While ensuring correct alignment of the module flange as shown in Figure C–4, lower the module into the desired slot as shown in Figure C–5.

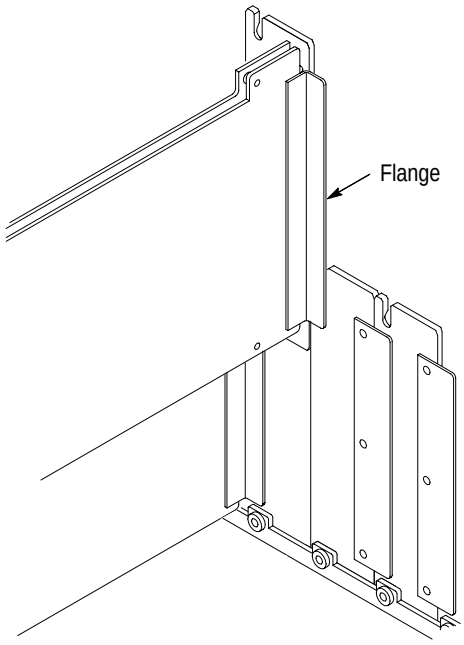

Figure C–4: Module flange

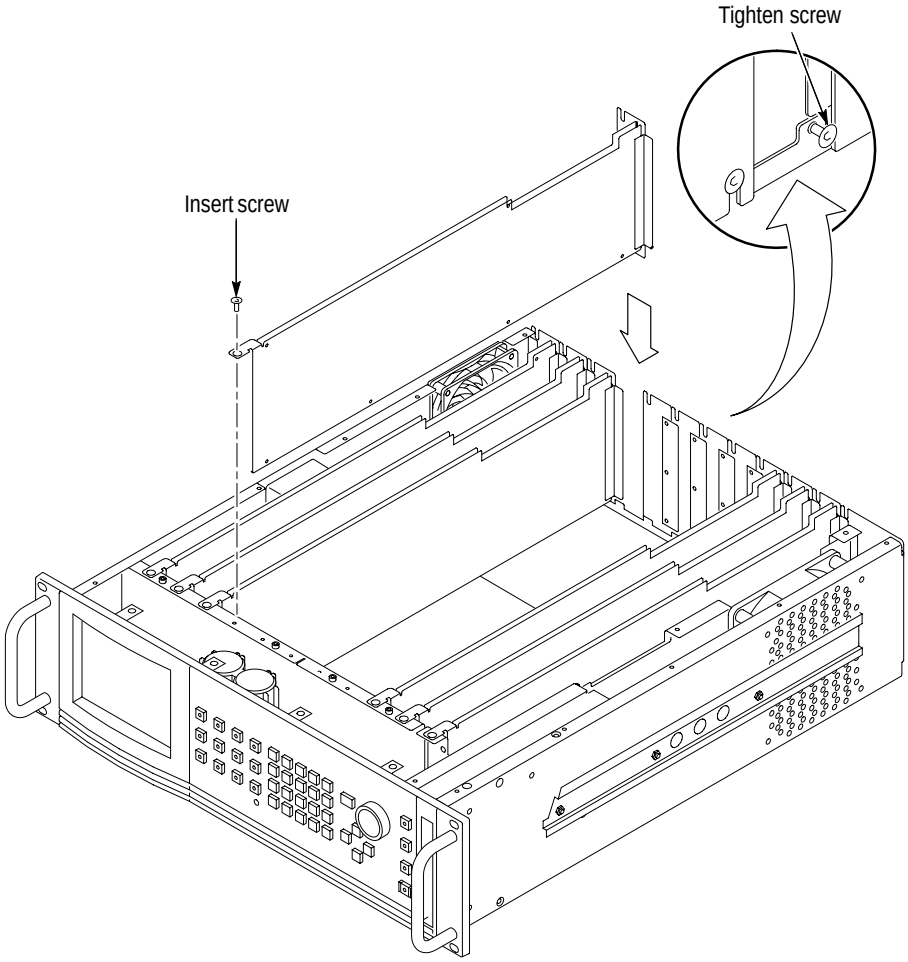

Figure C–5: Module Installation

7. Ensure that the connectors on the Backplane board and the module exactly match before seating the module.

CAUTION. *The connectors must exactly match before you attempt to press the module firmly in place. If the connectors do not match, you might bend a pin that could damage the module, mainframe, or both when power is applied.*

8. Press down evenly on the module until it is firmly in place.

9. Insert and tighten the top screw, supplied with your module, as shown in Figure C–6.

10. Tighten the rear panel screw.

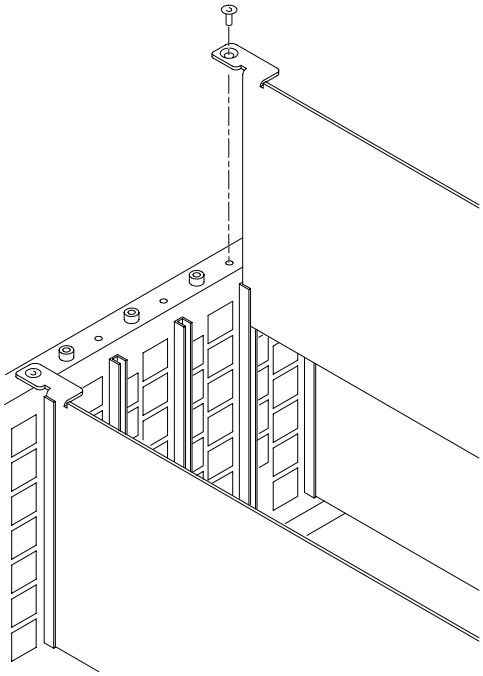

Figure C–6: Top screw

11. Replace the top cover.

12. Insert and tighten all top cover screws.

13. Plug in the instrument power cord. Power on the mainframe by setting the rear-panel power switch to ON and pressing the front-panel power switch.

14. Wait for the instrument to perform self tests.

Module Removal

Before removing any of the generator modules that allow you to load signals, such as the AVG1 Generator module and the DVG1 Generator module, you should save the signal sets to a disk. Refer to the module's user manual for instructions on backing up the signal sets. However, you do not need to back up the BG1 Generator module signals because they are not lost when the module is removed from the platform.

To remove the module, follow these steps:

1. Turn off the platform by pressing the front-panel **On/Standby** switch and switching the rear panel power switch to off.
2. Unplug the power cord.

WARNING. *To avoid a shock hazard, always unplug the power cord before removing the top cover. Failure to unplug the power cord can result in serious injury or death.*

3. Remove all top-cover screws and remove the top cover. See Figure C–2 on page C–3.
4. Remove the appropriate rear panel as shown in Figure C–3 on page C–4. Loosen, but do not remove the bottom screw. You will use it later to secure the rear panel.
5. Refer to Figure C–6 on page C–6 and remove the top screw.
6. Remove the module. To leave the slot empty, proceed to step 8 of this procedure.
7. To install a module in the empty slot, proceed to *Module Installation* on page C–2.
8. To ensure proper cooling and adherence to EMI shielding requirements, install a blank panel to cover any empty slots in the rear panel. A spare blank panel is included in the TG 2000 Platform mainframe accessories kit.
9. Tighten the screws on the blank rear panel.
10. Reinstall the top cover and insert and tighten all top cover screws.

Glossary and Index

Glossary

Black Burst

Also called “color black,” black burst is a composite video signal consisting of all horizontal and vertical synchronization information and burst. Typically used as the house reference synchronization signal in television facilities.

Burst

A small reference packet of the subcarrier sine wave sent on every line of video. Since the carrier is suppressed, this phase and frequency reference is required for synchronous demodulation of the color difference signals in the receiver.

Color Frame Reference Flag

The color frame reference flag is the white flag that can be selected to be on the black burst signals of the BG1 module. The flag occurs on field 1, line 10 for the NTSC and NTSC without setup test signals. The flag occurs on field 1, line 7 for the PAL test signals.

Composite Video

A single video signal containing all of the necessary information to reproduce a color picture. Created by adding quadrature amplitude modulated U and V to the luminance signal.

Frame

A frame (sometimes called a “picture”) contains all the information required for a complete picture. For interlaced scan systems, there are two fields in a frame.

NTSC

National Television System Committee. The organization that developed the television standard currently in use in the United States, Canada and Japan. Now generally used to refer to that standard.

PAL

Phase Alternate Line. Refers to one of the television systems used in Europe and many other parts of the world. The phase of one of the color difference signals alternates from line to line to help cancel out phase errors.

SCPI

Standard Commands for Programmable Instruments. SCPI is a standard that provides guidelines for remote programming of instruments. These guidelines provide a consistent programming environment for instrument control and data transfer.

Signal Set

A set of industry standard test signals provided by Tektronix on floppy disks.

Soft key

An item on the display that changes state or initiates an action when you touch it on screen. You use soft keys to select test signals or enter a file name.

Termination

In order to accurately send a signal through a transmission line, there must be an impedance at the end that matches the impedance of the source and of the line itself. Amplitude errors and reflections will otherwise result. Video is a 75 Ω system, so a 75 Ω terminator must be put at the end of the signal path.

Time Zero

Time zero is the reference time for the TG 2000 mainframe and is the timing of the outputs of the BG1 module. When you adjust the Genlock module timing, you are adjusting the time zero reference. When you adjust the timing of an individual module, the timing of that module is offset from the time zero reference.

Index

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