

# **Service Manual**

**Tektronix**

**AGL1  
Analog Genlock Module**

**070-9301-00**

**CE**

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Company	date or purchase order number
Address	Repair Protection (1,2, or 3 years)
City, State, Postal code	Calibration Services (1,2,3,4, or 5 years)
Country	Instrument model and serial number
Phone	Instrument purchase date

# Table of Contents

<b>General Safety Summary</b> .....	<b>v</b>
<b>Service Safety Summary</b> .....	<b>vii</b>
<b>Preface</b> .....	<b>ix</b>
About This Manual .....	ix
Contacting Tektronix .....	x

## Specifications

<b>Specifications</b> .....	<b>1-1</b>
Product Description .....	1-1
Characteristics Tables .....	1-1
Certifications .....	1-3

## Operating Information

<b>Installation</b> .....	<b>2-1</b>
Preventing Component Damage .....	2-1
Module Installation .....	2-2
Instrument Backup and Restore .....	2-8
Module Removal .....	2-10
<b>Operating Information</b> .....	<b>2-11</b>
Operating Procedures .....	2-11
Module Timing .....	2-12
Reference Select .....	2-12
Reference Timing .....	2-13

## Theory of Operation

<b>Theory of Operation</b> .....	<b>3-1</b>
Block Level Description .....	3-1

## Performance Verification

<b>Performance Verification</b> .....	<b>4-1</b>
Verification Interval .....	4-1
Required Equipment .....	4-1
Test Equipment .....	4-1
Test Software .....	4-2
Preparation for Performance Verification .....	4-3
Test Equipment Connections .....	4-8
Test Equipment Settings .....	4-10
Performance Verification Procedures .....	4-11

## Adjustment Procedures

<b>Adjustment Procedures</b> .....	<b>5-1</b>
------------------------------------	------------

## Maintenance

<b>Maintenance</b> .....	<b>6-1</b>
Preparation .....	6-1
Inspection and Cleaning .....	6-3
After Repair Adjustments .....	6-3
Repackaging Instructions .....	6-4
<b>Removal and Replacement</b> .....	<b>6-7</b>
Tools Required .....	6-7
Replacing Subassemblies .....	6-7
Removing the Rear Panel .....	6-8
Replacing the Shield .....	6-9
Replacing the Rear Panel Connectors .....	6-9
<b>Troubleshooting Procedures</b> .....	<b>6-11</b>
Equipment Required .....	6-11
General Troubleshooting .....	6-12
Fault Symptom Table .....	6-13
Troubleshooting Flowcharts .....	6-14

## Options

<b>Options</b> .....	<b>7-1</b>
----------------------	------------

## Electrical Parts List

<b>Electrical Parts List</b> .....	<b>8-1</b>
------------------------------------	------------

## Diagrams

<b>Diagrams</b> .....	<b>9-1</b>
Interconnect Diagram .....	9-1

## Mechanical Parts List

<b>Mechanical Parts List</b> .....	<b>10-1</b>
Parts Ordering Information .....	10-1
Using the Replaceable Parts List .....	10-2

# List of Figures

<b>Figure 2–1: TG 2000 Platform rear panel slot numbering</b> .....	2–2
<b>Figure 2–2: Top cover removal</b> .....	2–3
<b>Figure 2–3: Removing the rear panel</b> .....	2–4
<b>Figure 2–4: Installing the module</b> .....	2–5
<b>Figure 2–5: Cable connections</b> .....	2–6
<b>Figure 2–6: Top screw</b> .....	2–7
<b>Figure 2–7: References window</b> .....	2–11
<b>Figure 2–8: Reference Select window</b> .....	2–12
<b>Figure 2–9: Reference timing example</b> .....	2–13
<b>Figure 2–10: Reference Timing window</b> .....	2–14
<b>Figure 3–1: Simplified block diagram</b> .....	3–1
<b>Figure 3–2: Block diagram of the clocks and frame reset signals</b> ....	3–2
<b>Figure 3–3: Block diagram of module timing delay</b> .....	3–3
<b>Figure 3–4: Comparison of module and system delay</b> .....	3–4
<b>Figure 3–5: Block diagram of the AGL1 reference timing delay</b> ....	3–4
<b>Figure 4–1: AGL1 performance verification equipment setup</b> .....	4–8
<b>Figure 4–2: Equipment hookup for checking return loss</b> .....	4–67
<b>Figure 6–1: Placing the module in the protective wrapping</b> .....	6–5
<b>Figure 6–2: Placing the module in the shipping carton</b> .....	6–6
<b>Figure 6–3: Removing a subassembly from a module</b> .....	6–8
<b>Figure 6–4: Flowchart for major difficulties with module</b> .....	6–14
<b>Figure 6–5: Flowchart for checking the current module installation slot</b> .....	6–15
<b>Figure 6–6: Flowchart for checking the module in a different slot</b> .....	6–16
<b>Figure 6–7: Flowchart for failure to power up</b> .....	6–17
<b>Figure 6–8: Flowchart for AGL1 not locking to an external signal</b> .....	6–18
<b>Figure 6–9: Flowchart for settings lost after power down</b> .....	6–19
<b>Figure 6–10: Measuring the battery charging circuit</b> .....	6–20
<b>Figure 9–1: AGL1 module connections</b> .....	9–1
<b>Figure 10–1: Exploded view</b> .....	10–4

## List of Tables

<b>Table 1–1: Electrical specifications</b> .....	<b>1–1</b>
<b>Table 1–2: Certifications and compliances</b> .....	<b>1–3</b>
<b>Table 2–1: Module slot assignments</b> .....	<b>2–2</b>
<b>Table 4–1: Equipment required for Performance Verification</b> .....	<b>4–1</b>
<b>Table 6–1: Required tools</b> .....	<b>6–7</b>
<b>Table 6–2: Equipment required for troubleshooting</b> .....	<b>6–11</b>
<b>Table 6–3: Fault symptom table</b> .....	<b>6–13</b>



# 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.*

While using this product, you may need to access other parts of the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating the system.

## Injury Precautions

**Use Proper Power Cord.** To avoid fire hazard, use only the power cord specified for this product.

**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.

**Avoid Overvoltage.** To avoid electric shock or fire hazard, do not apply potential to any terminal, including the common terminal, that varies from ground by more than the maximum rating for that terminal.

**Avoid Electric Shock.** To avoid injury or loss of life, do not connect or disconnect probes or test leads while they are connected to a voltage source.

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

**Do Not Operate Without Covers.** To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

**Use Proper Fuse.** To avoid fire hazard, use only the fuse type and rating specified for this product.

**Do Not Operate in Wet/Damp Conditions.** To avoid electric shock, do not operate this product in wet or damp conditions.

**Do Not Operate in an Explosive Atmosphere.** To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

**Avoid Exposed Circuitry.** To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.

**Product Damage  
Precautions**

**Use Proper Power Source.** Do not operate this product from a power source that applies more than the voltage specified.

**Provide Proper Ventilation.** To prevent product overheating, provide proper ventilation.

**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

You have purchased this optional service manual for the AGL1 Analog Genlock module. You can also purchase service manuals for the mainframe and other modules. Each module manual begins with a tab so that you can locate it after you add it to the mainframe manual binder.

## About This Manual

This manual contains information for servicing the AGL1 Analog Genlock module to a module level. The information is designed only for qualified service technicians who have moderate experience in analog circuits, digital circuits, and television technology. This manual is composed of the following sections:

- *Specifications* provides product specifications tables.
- *Operating Information* provides basic operating information.
- *Theory of Operation* is an overview of the main components of the module.
- *Performance Verification* contains procedures necessary to verify that the module is meeting the requirements listed in the *Specifications*.
- *Adjustment Procedures* does not contain any information, as there are no adjustments for the AGL1 Analog Genlock module.
- *Maintenance* contains installation, removal and replacement, and troubleshooting instructions.
- *Mechanical Parts list* contains the part numbers for replacement parts that you can order for this module. The exploded view illustration helps you to identify the parts.

## Contacting Tektronix

Product Support	<p>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</p> <p>Or contact us by e-mail: tm_app_supp@tek.com</p> <p>For product support outside of North America, contact your local Tektronix distributor or sales office.</p>
Service Support	<p>Contact your local Tektronix distributor or sales office. Or visit our web site for a listing of worldwide service locations.</p> <p><a href="http://www.tek.com">http://www.tek.com</a></p>
For other information	<p>In North America: 1-800-TEK-WIDE (1-800-835-9433) An operator will direct your call.</p>
To write us	<p>Tektronix, Inc. P.O. Box 1000 Wilsonville, OR 97070-1000</p>



# Specifications





# Specifications

This section contains the *Product Description*, which describes the product and accessories, and the *Characteristics Tables*, which list the product specifications.

## Product Description

The AGL1 Analog Genlock module enables the TG 2000 to lock to various analog video references. The AGL1 provides two loop through inputs and one terminating input on the rear panel. The AGL1 can lock to the following:

- NTSC (burst or sync)
- PAL (burst or sync)
- CW subcarrier at 3.58 or 4.43 MHz as well as 1, 5 and 10 MHz

## Characteristics Tables

This chapter contains the AGL1 Genlock module electrical and EMC compliance specifications. All specifications are guaranteed unless labeled “typical.” Typical specifications are provided for your convenience but are not guaranteed. Specifications that are marked with the ✓ symbol are checked in the *Performance Verification* section.

Table 1–1 lists the AGL1 electrical specifications. Table 1–2 lists the EMC compliance specifications. Refer to the *TG 2000 Signal Generation Platform User Manual* for a list of Environmental specifications.

**Table 1–1: Electrical specifications**

Characteristic	Description
Loop-Through Inputs	
✓ Return Loss	$\geq 40$ dB to 5 MHz, terminated into $75 \Omega$
✓ Input Dynamic Range	$\pm 6$ dB range (typically remains locked for valid inputs of $-14$ dB to $+6$ dB)
✓ Hum, typical	Remains locked with $\leq 1.0 V_{p-p}$ hum on 0 dB signal
✓ White Noise, typical	Signal/Noise ratio of $\geq 32$ dB, 5 MHz bandwidth on black burst, remains locked

Table 1-1: Electrical specifications (cont.)

Characteristic	Description
<b>Burst Lock Stability (Timing Change)</b>	
✓ Versus Input Amplitude	≤1 ns over ±3 dB range
✓ Versus APL	≤0.5 ns over 10% to 90% APL
✓ Versus Reference Frequency Change, typical	≤0.5 ns ±5 ppm shift
Versus Temperature, typical	≤0.15 ns/° C, 0° C to 40° C
✓ Jitter	≤1 ns (1° NTSC or PAL, nominal input amplitude, ≥50 dB signal/noise ratio, ≤-10 dB hum, typical <0.5°)
<b>Sync Lock Stability (Timing Change)</b>	
✓ Versus Input Amplitude	≤2 ns over ±3 dB range
✓ Versus APL	≤1.5 ns over 10% to 90% APL
✓ Versus Reference Frequency Change, typical	≤1.0 ns ±5 ppm shift
Versus Temperature, typical	≤0.2 ns/° C, 10° C to 40° C
✓ Jitter	≤2.5 ns (2° NTSC or PAL, nominal input amplitude, ≥50 dB signal/noise ratio, ≤-10 dB hum)
<b>CW Input</b>	
✓ Impedance/Return Loss	≥30 dB from 1 MHz to 10 MHz (75 Ω from 1 MHz to 10 MHz; internal termination, AC coupled)
✓ Input Amplitude Range	Remains locked from 1.0 to 2.25 V <sub>p-p</sub>
✓ Input Frequencies	± 10 ppm typical at 3.579545 MHz, 4.43361875 MHz, 1.00 MHz, 5.00 MHz, and 10.00 MHz
<b>CW Lock Stability</b>	
✓ Versus Input Amplitude	≤2 ns from 1 to 2.25 V <sub>p-p</sub>
✓ Jitter	≤1 ns (≤0.5° typical, NTSC or PAL, 2 V input amplitude, ≥50 dB signal/noise ratio, ≤-10 dB hum)
✓ Genlock Timing Offset Adjustment Range	Moves entire box relative to external reference. Adjustable to any point in the video frame for video input signals.

Table 1-1: Electrical specifications (cont.)

Characteristic	Description
✓ Color Framing	Correct color framing detected for signals having $\pm 45^\circ$ SCH $\Phi$ error and burst is present. Video signals only
Power Consumption, typical	+5 V: 3.5 Watts estimated -5 V: 3.25 Watts typical -2 V: 0.6 Watts typical +15 V: 0.75 Watts typical -15 V: 0.75 Watts typical Battery: 50 $\mu$ A maximum

## Certifications

Table 1-2: 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





# Operating Information



# Installation

This section contains instructions for installing the AGL1 Genlock module into the TG 2000 Platform mainframe. Listed below are the starting page numbers for the major topics in this section.

- Preventing component damage, page 2-1
- Module installation (including signal set installation), page 2-2
- Instrument backup and restore, page 2-8
- Module removal, page 2-10
- Operating information, page 2-11

## 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.

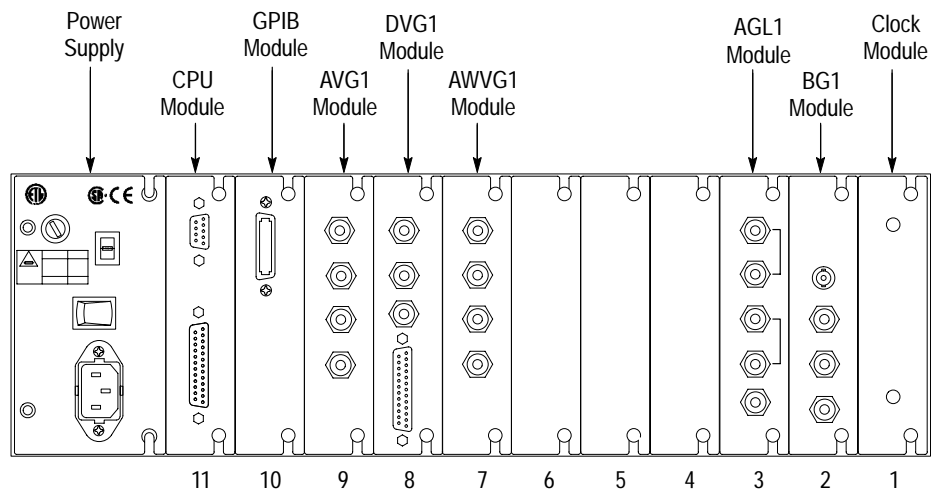
### Hardware Installation

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 2–1 lists the slot restrictions. Figure 2–1 shows a sample configuration with slot numbers.

**Table 2–1: 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 2–1: TG 2000 Platform rear panel 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. To remove the top cover, remove or loosen the screws shown in Figure 2-2.

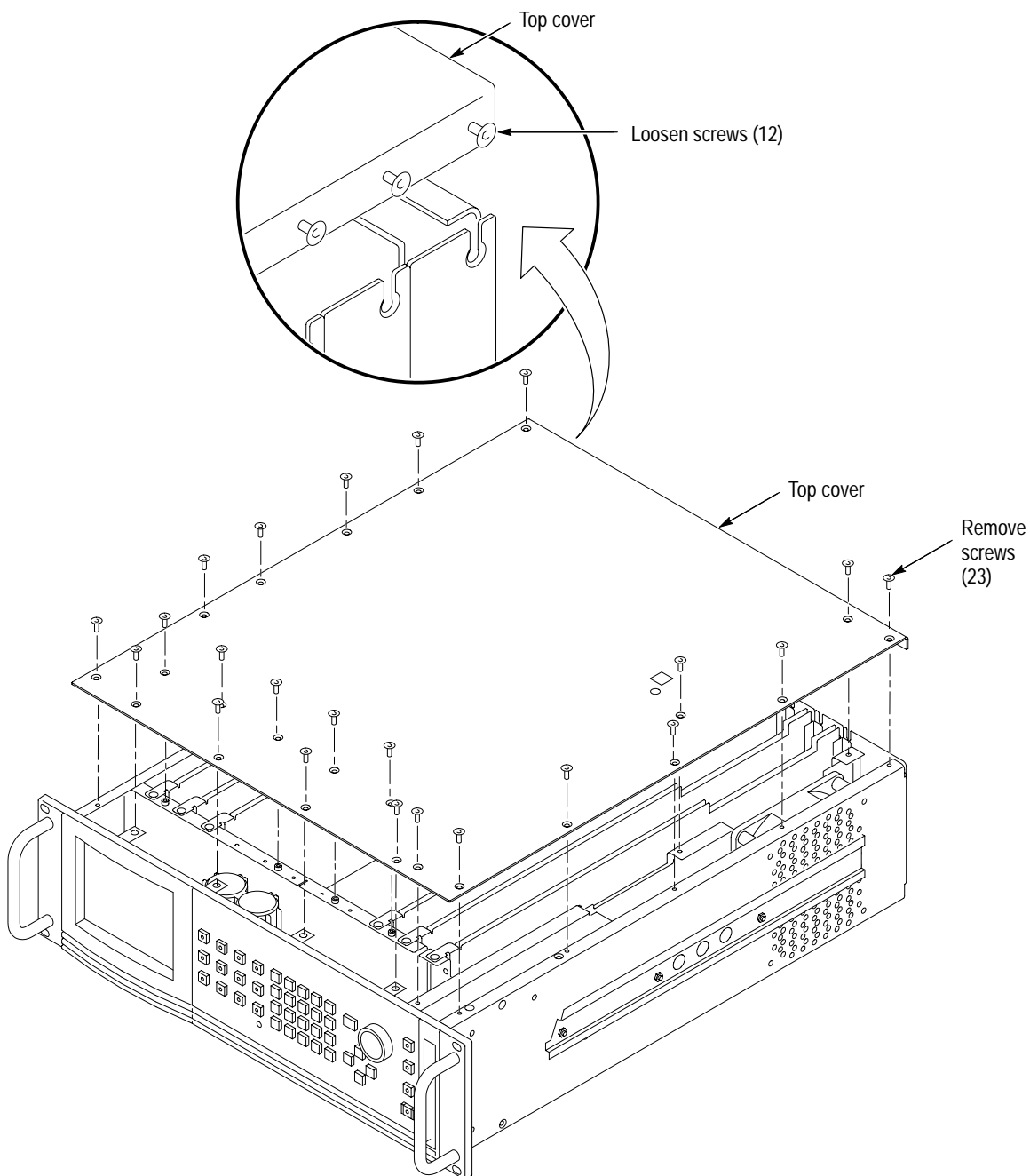
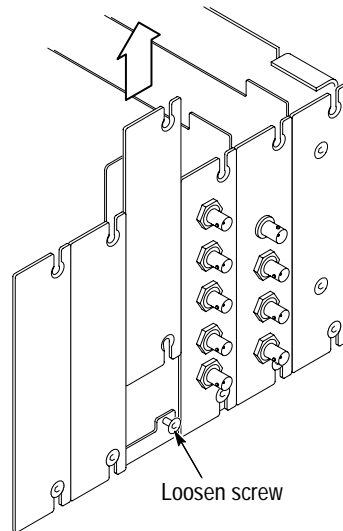


Figure 2-2: Top cover removal

5. Remove the appropriate rear panel as shown in Figure 2-3. Loosen, but do not remove the bottom screw. You will use it later to secure the module.



**Figure 2-3: Removing the rear panel**

6. While ensuring correct alignment of the module flange, lower the module into the desired slot as shown in Figure 2-4.

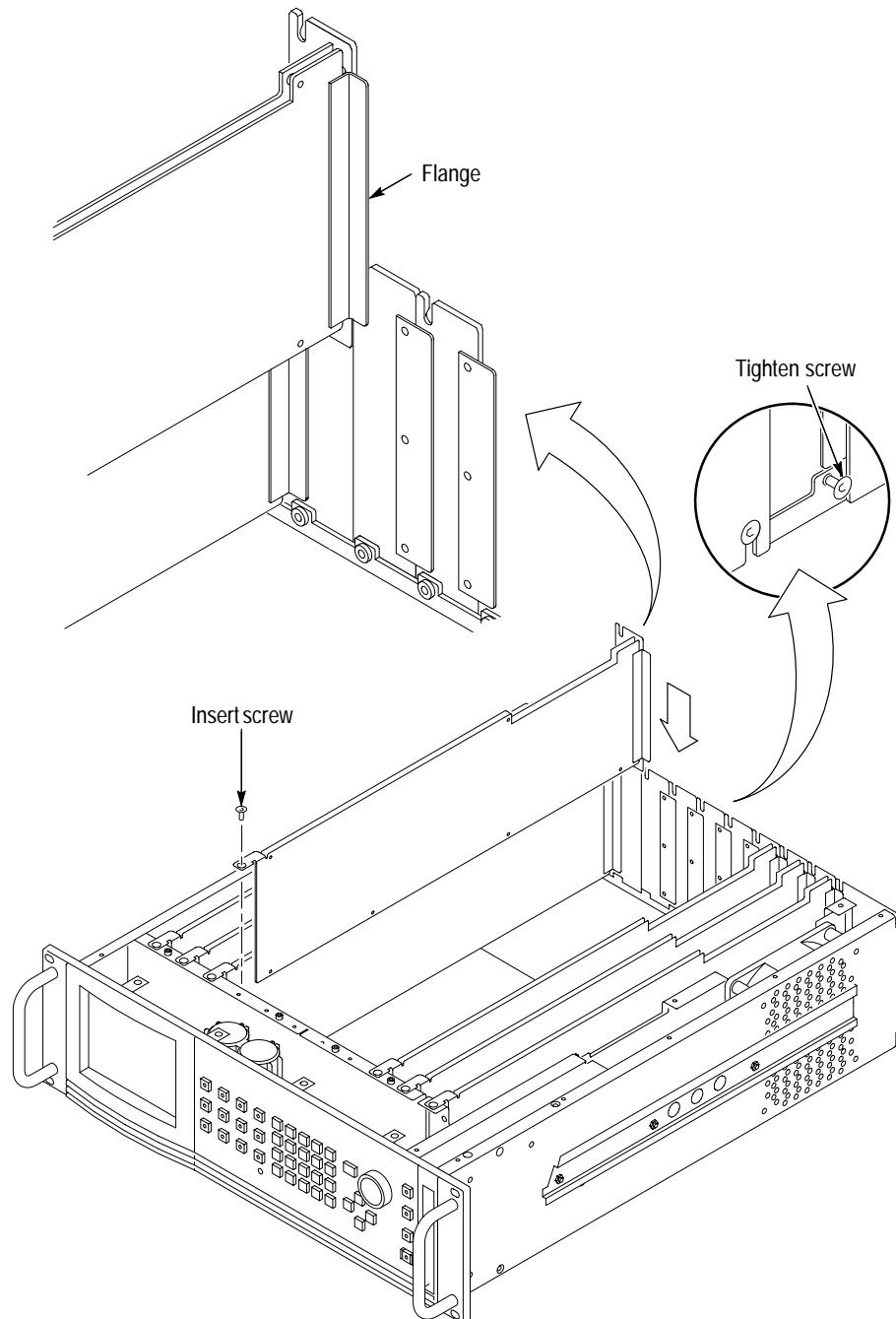
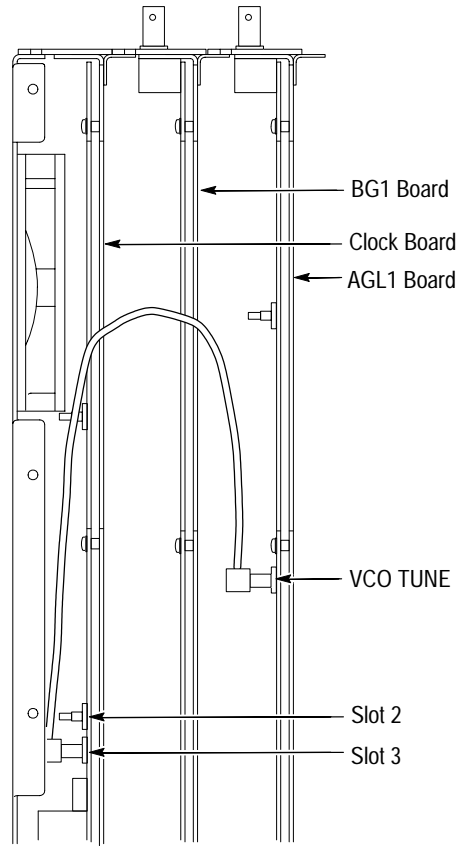


Figure 2-4: Installing the module

7. Connect the VCO tune cable from the AGL1 circuit board to the Clock board as shown in Figure 2-5. The connection to the Clock board depends upon in which slot the AGL1 is installed. If the module is in slot 2, connect the cable to **GL SLOT 2 IN**. If the module is in slot 3, connect to **GL SLOT 3 IN**.



**Figure 2-5: Cable connections**

8. Make sure that the backplane and the module connectors are exactly aligned before seating the module.

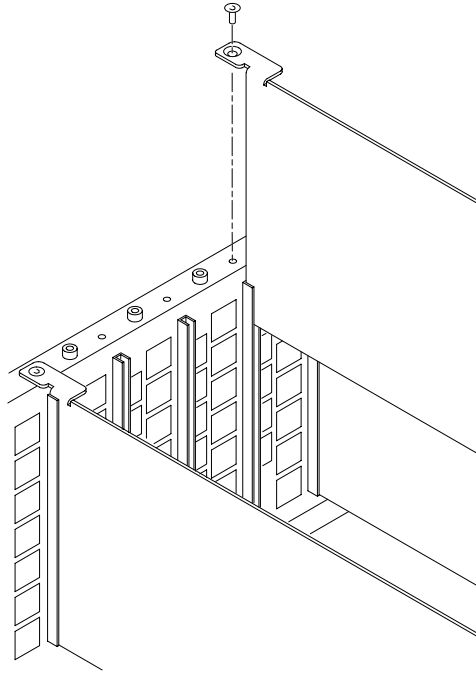


**CAUTION.** *The connectors must align before you attempt to press the module firmly in place. If the connectors do not align you can bend a pin that could damage the module, mainframe, or both when you apply power.*

---

9. Press down evenly on the module until it is firmly seated in the backplane connectors.

10. Refer to Figure 2-6 and insert and tighten the top screw, which comes with your module, and tighten the rear panel screw.



**Figure 2-6: Top screw**

11. Reinstall the top cover and insert and tighten all top cover screws. See Figure 2-2 on page 2-3.
12. 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. Wait for the instrument to perform self tests.
13. If you previously moved or removed a module and backed up the instrument, perform *Instrument Restore from Backup* now (page 2-9).

## Instrument Backup and Restore

You may be required to remove a module from the TG 2000 Platform mainframe during service. Before you remove a module, you should save its signal sets to disks. A module will lose its signal memory 30 seconds after removal from the mainframe.

**Required Equipment** You will need blank, DOS formatted 3.5 inch disks. You will need approximately one disk for each installed module, and one disk for the CPU.

**Instrument Backup** To save signal sets and instrument settings, perform these steps:

1. Insert the Troubleshooting disk supplied with the *TG 2000 Signal Generation Platform Service Manual* into the mainframe disk drive and push the front-panel **Sequences** button.
2. Touch **File Utilities** on the display, and then touch **Add Sequences from Disk**.
3. Select the **tgbackup.seq** sequence file, and then touch **Start Load**.
4. When you see the message, “The Load is Complete”, touch **OK**.
5. Touch **Quit**, and then touch **Quit** again.
6. Touch **Sequences** and then select the **tgbackup.seq** file to run (use the touch screen and the **Select** key). Be sure this file name appears in the box at the top of the window.
7. Touch **Run**. A popup message will tell you how many disks are needed. Touch **Quit**.
8. When you see the message, “Insert a Floppy Disk”, remove the troubleshooting disk and insert a blank formatted disk. Touch **Quit**.
9. After each backup disk is complete, a popup message will tell you to insert a disk. Replace the completed disk with a new disk, and touch **Quit**.
10. After the last backup disk is complete, touch **Quit** and then **Quit** again.

## Instrument Restore from Backup

To restore signal sets and instrument settings, perform these steps:

1. Insert the Troubleshooting disk supplied with *TG 2000 Signal Generation Platform Service Manual* into the mainframe disk drive and press the front-panel **Sequences** key.
2. Select the **tgrstore.seq** file, and then touch **Start Load**.
3. When you see the message, “The Load is Complete”, touch **OK**.
4. Touch **Quit**, and then touch **Quit** again.
5. Touch **Sequences** and then select the **tgrstore.seq** file to run (use the touch screen and the **Select** key). Be sure this file name appears in the box at the top of the window.
6. Touch **Run**. Insert any of the backup disks that you created when you performed the *Instrument Backup* procedure. Touch **Quit**.
7. Insert another disk and touch **Quit** each time you are prompted. (You can insert the disks in any order.)
8. When the Restore Complete window appears, turn the mainframe power off and then on again to cycle power.

## Module Removal

To remove a module, perform these steps:

1. Perform *Instrument Backup* on page 2–8.
2. Turn off the TG 2000 Platform mainframe by pressing the On/Standby front panel button and switching the rear panel power switch to off.
3. 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.

---

4. Remove all top-cover screws and remove the top cover. See Figure 2–2.
5. Remove the appropriate rear panel as shown in Figure 2–3. Loosen, but do not remove the bottom screw. You will use it later to secure the rear panel.
6. Refer to Figure 2–6 on page 2–7 and remove the top screw.



**CAUTION.** The module will lose its nonvolatile memory 30 seconds after you remove it from the TG 2000 Platform mainframe. Before removing the module, be sure you have performed *Instrument Backup* (step 1 of this procedure).

---

7. Remove the module and any associated cables.
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. If you will be installing a module, proceed to *Module Installation* on page 2–2. If you do not need to install a module, proceed to step 11.
11. Reinstall the top cover and insert and tighten all top cover screws.
12. Plug in the instrument power cord.

This completes the module removal procedure.



# Operating Information

This section provides an overview of the windowed menu structure for the AGL1 Analog Genlock Module and procedures for operating the controls in each window. It is assumed that you are familiar with the basic operation of the TG 2000. If not, refer to the *TG 2000 Mainframe User Manual* before reading this section.

## Operating Procedures

You control the AGL1 Analog GenLock Module through the front panel keys and the windowed menu interface of the TG 2000. Unlike other modules in the TG 2000, a soft key for the AGL1 Genlock Module does not appear in the Modules window.

You can access the controls for the AGL1 Genlock Module by pushing the Reference front panel button. The References window appears as shown in Figure 2–7.

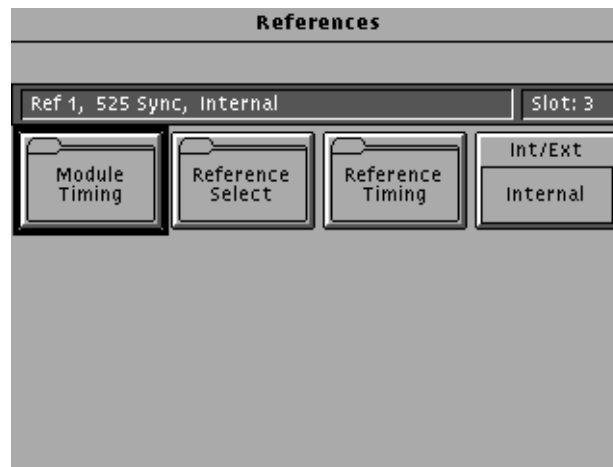


Figure 2–7: References window

Touch the **Int/Ext** soft key to select the internal reference or reference to an external signal.

Touch the **Reference Timing** soft key to display the Reference Timing window. Refer to *Reference Timing* on page 2–13 for instructions on using the controls in this window.

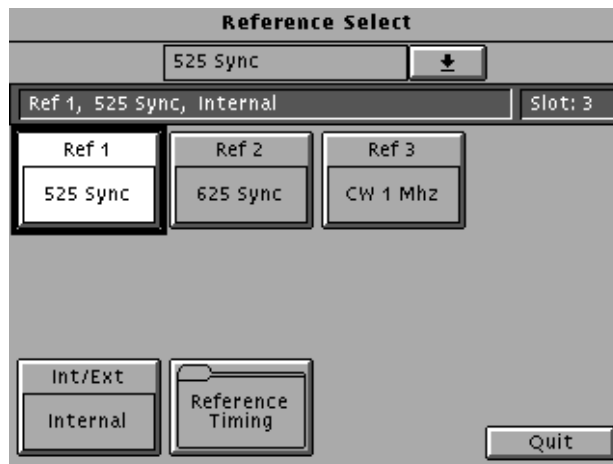
Touch the **Reference Select** soft key to display the Reference Select window. Refer to *Reference Select* on page 2–12 for instructions on using the controls in this window.

**Module Timing**

The **Module Timing** soft key displays the timing window for individual modules. This soft key appears whether the AGL1 is installed or not. For information on setting the timing for the module, refer to that module’s user manual.

**Reference Select**

The Reference Select window, shown in Figure 2–8, lets you select which reference input and signal type to which you want to lock. Each reference soft key is related to an AGL1 rear panel connector. Note that Ref 3 is used for CW signals only. To select a reference input, perform the following procedure.



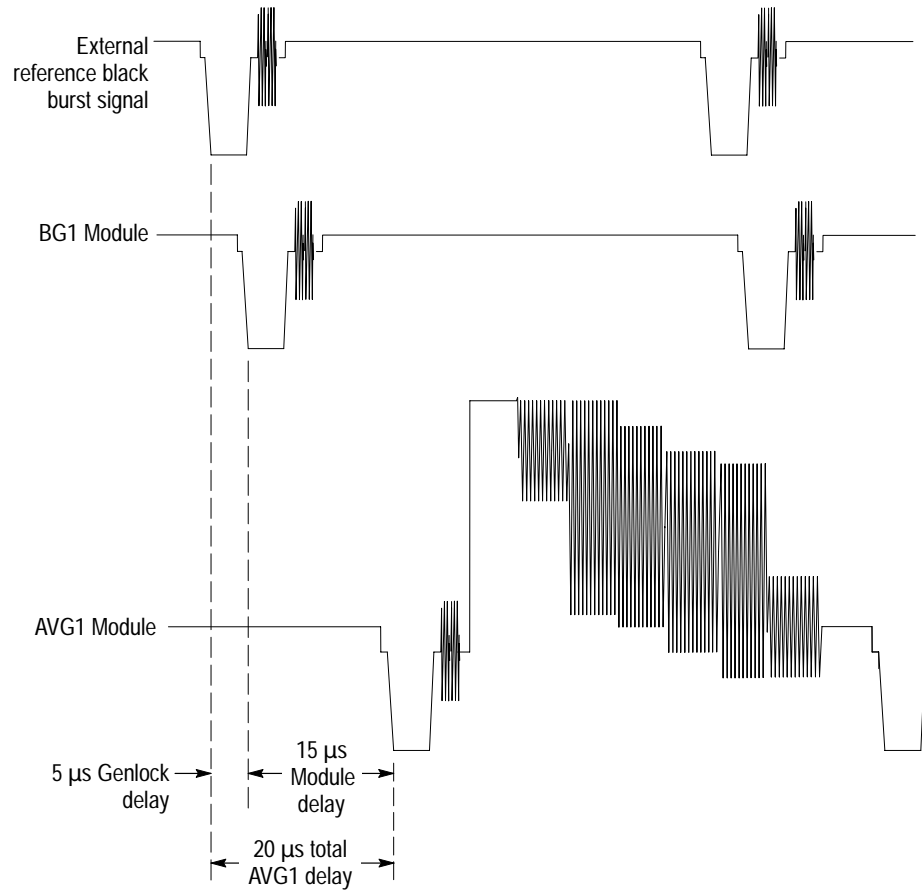
**Figure 2–8: Reference Select window**

1. Move to the appropriate soft key using the front-panel cursor keys.
2. Touch the list box (below the window title) or rotate the knob to display the list of valid signals for a given group.
3. Select your choice by pressing the Select key on the front panel.

From this window you can also select internal or external reference. This is the same selection you can make in the References window. Press the **Reference Timing** soft key to display the Reference Timing window.

**Reference Timing**

The Reference Timing window lets you adjust the timing offset of the TG 2000 relative to the external reference signal. For example, Figure 2–9 shows the AGL1 module locked to an external black burst signal and delayed 5  $\mu\text{s}$ . The AVG1 module is delayed an additional 15  $\mu\text{s}$  for a total of 20  $\mu\text{s}$ .



**Figure 2–9: Reference timing example**

Figure 2–10 shows the Reference Timing window.



**Figure 2–10: Reference Timing window**

To adjust the timing, perform the following procedure.

1. Select **Vertical** either by pressing the soft key or moving the browse ring to it and pressing Select on the front panel.
2. Rotate the navigation knob. Default is 0 lines. Rotating the knob counter-clockwise advances the timing. Rotating clockwise delays the timing.
3. Select **H Feel**.
4. Select either **Fine** or **Coarse** resolutions. Fine resolution is in nano seconds. Coarse increments are equal to a full cycle of the clock.
5. Select **Horizontal** and perform the same function until the desired time is reached. Default is 0.0000  $\mu$ sec.
6. Press **Quit** to exit the window. Press **Reset All** to set horizontal and vertical to zero.



# Theory of Operation



# Theory of Operation

This discussion provides an overview of the AGL1 Genlock module. This discussion also covers general interactions with the modules.

## Block Level Description

Figure 3-1 shows a simplified block diagram of where the AGL1 Genlock module fits into the TG 2000 Signal Generation Platform system.

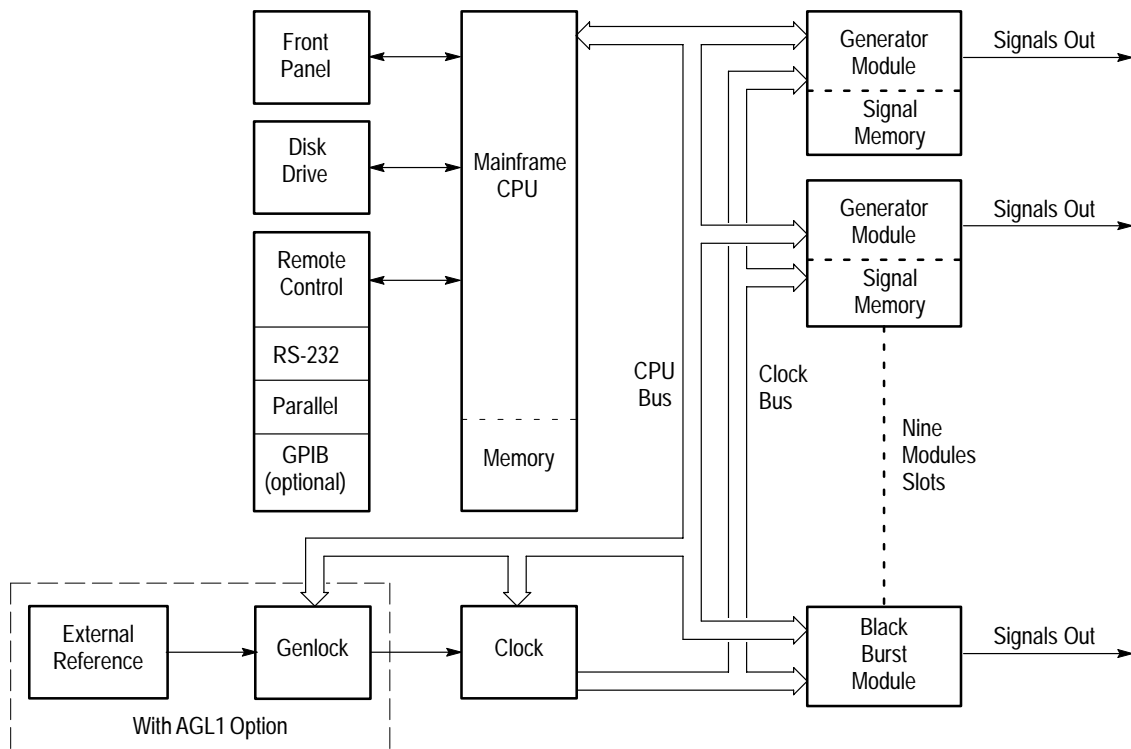


Figure 3-1: Simplified block diagram

### Clocks and Frame Reset Signals

The 27 MHz master clock synchronizes the clocks and frame reset pulses that control module timing as shown in Figure 3–2. The Clock module provides three high-speed clock signals: one at 27 MHz, and two at rates from 10 MHz to 100 MHz. In addition, there are two frame resets which allow different modules to operate in separate television standards, such as PAL and NTSC.

The TG 2000 Signal Generation Platform can generate different standards (such as PAL and NTSC) at the same time, using the 27 MHz or the two adjustable clocks and the two frame reset pulses. The clocks and frame reset pulses ensure that all modules driving the same format remain synchronized. The CPU configures the clock to generate the clock frequencies and frame reset pulses needed to support the different video formats.

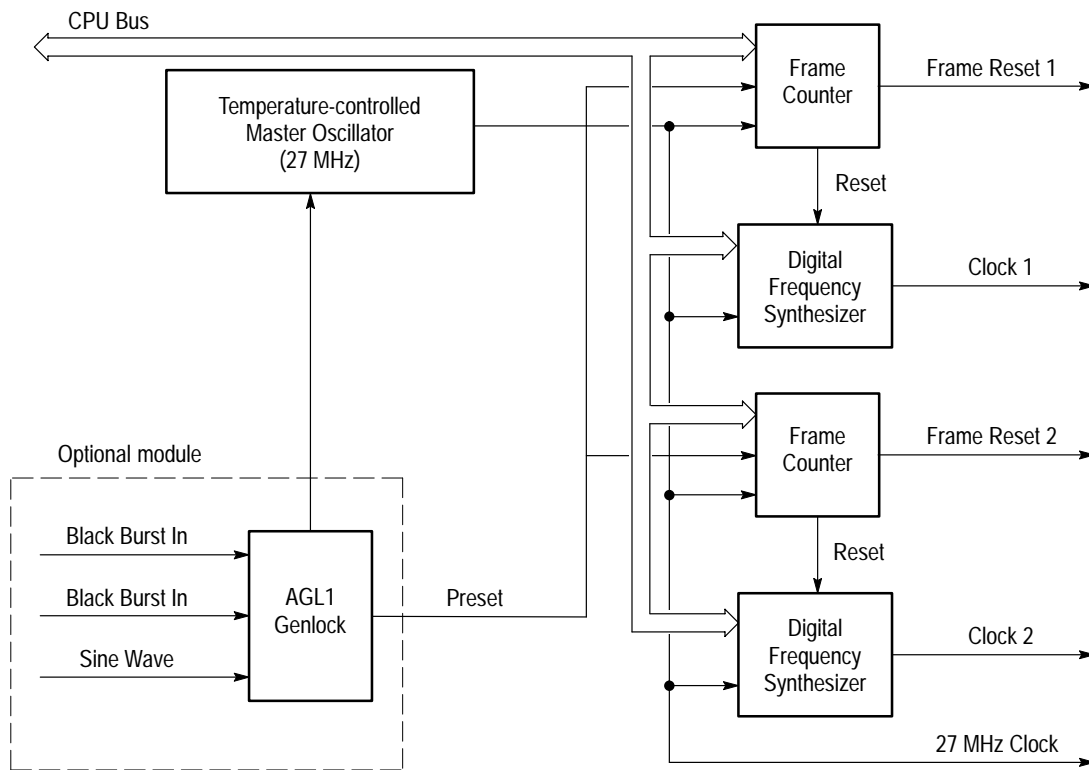


Figure 3–2: Block diagram of the clocks and frame reset signals



### External Reference Genlock

An external reference may be used by the optional AGL1 module to lock on one of several video standards. All modules using the same standard as the AGL1 Genlock module are locked to the external reference. Refer to the AGL1 Genlock module user manual for a list of the supported formats.

### Timing References

The TG 2000 Signal Generation Platform supports internal or external references and signal delay relative to this reference. Video reference signals synchronize the start of test signals of the same type, such as NTSC or PAL. The AGL1 module is required to use external references.

System delay and module timing delay are available to adjust for different signal path delays in an operating environment. System delay uses the optional AGL1 module to offset the system to an external reference signal. Once the reference is defined, you can add a common delay to all modules that generate the same format as the external reference.

Module timing delay, which is available with some modules, allows the delay of one module from other modules that generate a compatible format. Module timing delay does not require an AGL1 module.

Figure 3–4 shows the effects of the system delay and the individual module delay. Note that the BG1 module is at time zero for intermodule timing because it does not support module delay. The BG1 module and AVG1 module output signals are delayed 5  $\mu\text{s}$  by the AGL1 module. The AVG1 module is delayed an additional 15  $\mu\text{s}$  by the AVG1 module delay control.

### Timing Delay Block Diagram

Figure 3–3 shows how the module delay is implemented for the generator modules that support it. They have the ability to delay the clock and frame reset pulse for  $\pm$  half a frame. The delay is by a number of vertical lines plus a horizontal delay up to the duration of one scan line. The delay is set in the Module Timing window. (The variable system clocks also support module delay.)

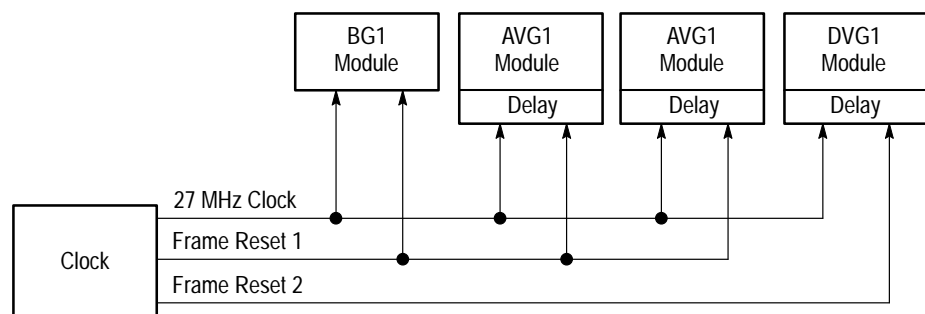


Figure 3–3: Block diagram of module timing delay

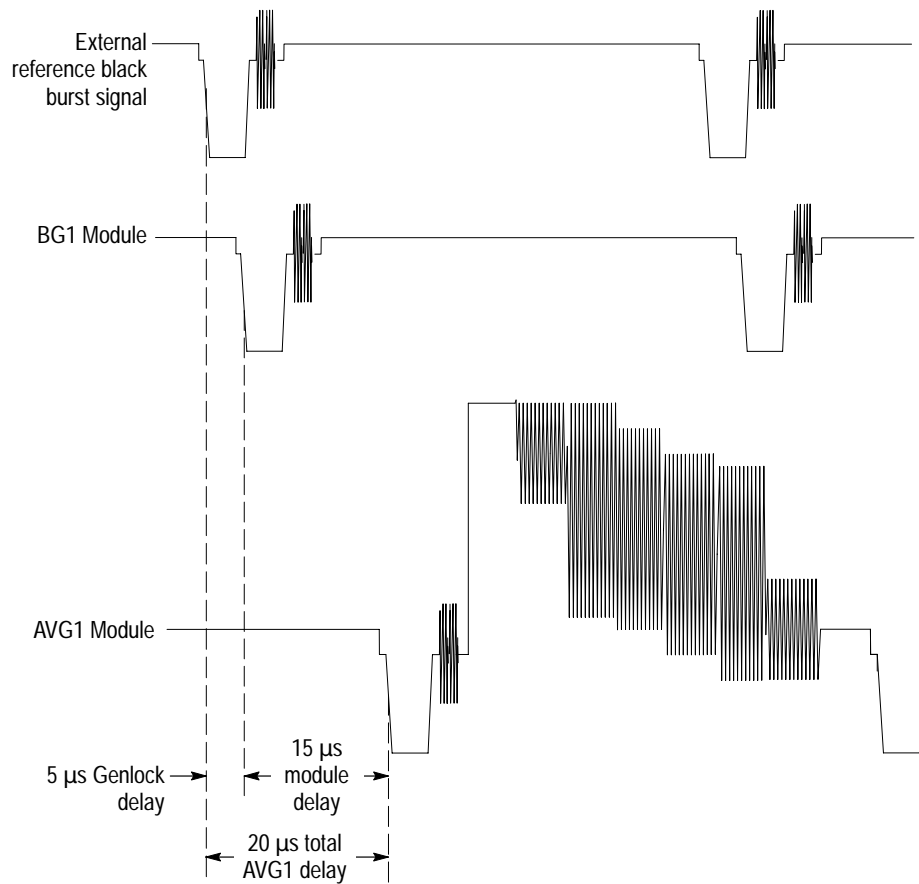


Figure 3-4: Comparison of module and system delay

### System Reference Delay with the AGL1 Module

Figure 3-5 shows how the AGL1 Genlock module can delay its lock signal to effectively delay the clock and frame pulses to all modules. Delaying the clock and frame pulses results in a corresponding delay in the module output. All generator modules using the same standard are affected equally by this delay.

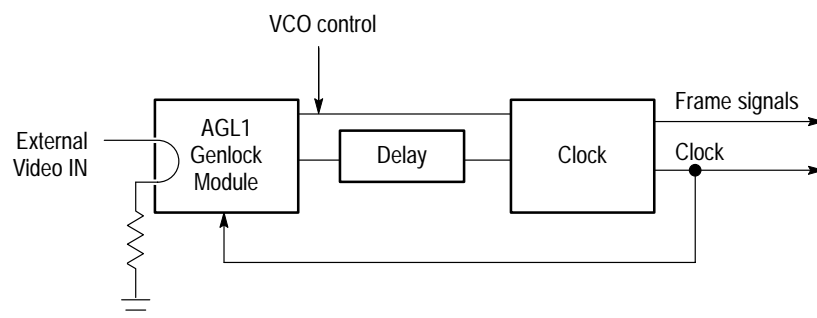


Figure 3-5: Block diagram of the AGL1 reference timing delay



# Performance Verification



# Performance Verification

Perform the following procedures to determine that your AGL1 Analog Genlock module is meeting the requirements listed in the *Specifications* section.

For a complete verification of instrument performance to full specifications, purchase a calibration service through your Tektronix representative.



**WARNING.** *Dangerous electric shock hazards exist inside the mainframe. Only qualified service personnel should perform these procedures.*

## Verification Interval

To ensure correct instrument operation, verification procedures should be performed once a year. Before performing any verification procedures, complete all relevant maintenance procedures outlined in the *Maintenance* section of this manual.

## Required Equipment

### Test Equipment

Table 4–1 lists the equipment required for the *Performance Verification* procedure.

**Table 4–1: Equipment required for Performance Verification**

Equipment	Use	Tektronix equivalent
Video signal generator	Signal source	TG 2000 with AVG1 and BG1 modules
Digital Signal Analyzer	Signal lock verification, measurements	Tektronix DSA 602A Digital Signal Analyzer oscilloscope with 11A33 and 11A34 Modules
Spectrum Analyzer	Return Loss	Tektronix 2712 Spectrum Analyzer
Mainframe, six units wide	Hold Tektronix DC 5010 module	Tektronix TM 5006
Frequency Counter	Frequency measurements	Tektronix DC 5010
Video Noise Generator	Hum and Jitter testing	Tektronix 1434

**Table 4-1: Equipment required for Performance Verification (cont.)**

Equipment	Use	Tektronix equivalent
Return Loss Bridge, Low Band	Return Loss	None: A57TLS/CR from Wideband Engineering
Return Loss Bridge, 75 $\Omega$	Return Loss	011-0103-00
BNC Termination, 75 $\Omega$	Signal termination	011-0102-01
BNC Termination, feed-through, 75 $\Omega$	Signal termination	011-0102-01
50 $\Omega$ to 75 $\Omega$ converter, 2	Impedance matching	
75 $\Omega$ low-loss BNC cables	Equipment connections	

**Test Software**

You will need the following files which are included on the AGL1 Service disk (063-2958-00) shipped with this manual. Instructions for loading the files are given in the following sections.

**AGL1 verification signal files  
(in directory *agl1*)**

---

glvideo.dnl

---

glcw.dnl

---

**DSA 602A setting files  
(in directory *dsa602A*)**

---

genlock1.fpb

---

genlock2.fpb

---

genlock3.fpb

---

fr\_time.fpb

---

clk\_time.fpb

---

linetime.fpb

---

## Preparation for Performance Verification

Follow all instructions for power on, instrument warmup, loading test signals, loading DSA presets (if applicable), and self calibration.

**Overview** This is a list of the steps that you will follow while preparing for and performing the *Performance Verification* procedure:

- Power on and warm up, page 4–3
- Create a preset of the current instrument state, page 4–4
- Perform an instrument backup, page 4–4
- Recall the Factory preset, page 4–5
- Load the test signals, page 4–5
- Load the DSA 602A Digital Signal Analyzer, page 4–6
- Perform Self Calibration, page 4–7
- Complete the *Performance Verification* procedure, page 4–11
- Restore signals, page 4–69
- Recall the preset you created, page 4–69

**Power On and Warm Up** Power on and warm up the mainframe as follows:

1. Connect the source and device under test (DUT) TG 2000 Platform mainframes to an appropriate AC power source.
2. Set the rear-panel power switches to the ON position.
3. Press the front-panel POWER switches if necessary.
4. Wait for a few seconds as the mainframes execute confidence tests on the mainframe and modules. Check to see if any error messages appear.

5. When the self tests are complete, the instruments will display icons representing each of the installed generator modules. If an installed module is not represented on the display, proceed to *Troubleshooting* on page 6–11.

---

**NOTE.** *The AGL1 Genlock module is not a generator module, and therefore is not displayed on the default startup screen.*

---

6. Allow 20 minutes of warm-up time before performing *Self Cal* or *Performance Verification*. During warm-up time, you can perform the remaining preparation steps.

### Create Preset

Before beginning the *Performance Verification* procedure, create a preset to save your instrument settings as follows:

1. Push the **Presets** button.
2. Touch **Presets** on the display.
3. Touch **Create** on the display.
4. Touch letters on the display to spell out a name for the new preset, and then touch **OK**.
5. Use the **Navigation** arrows to move the cursor to the new preset. Press the **Select** key.
6. Touch **Save To**. Your current instrument settings are saved to the new preset.

### Instrument Backup

Determine whether you will be replacing signals (see the following procedure, *Loading Test Signals*). If you will be replacing signals, perform *Instrument Backup* on page 2–8 now. During the backup procedure, you will create disks to restore the module signals after you finish the *Performance Verification* procedure.

If you do not wish to perform the backup, you can choose to restore the standard AVG1 test signals from the AVG1 Test Signals disks that were shipped with the *AVG1 Analog Video Generator User Manual*.



**Recall the Factory Preset**

Recall the Factory Preset as follows:

1. Push the **Presets** button.
2. Touch **Presets** on the display.
3. Use the **Navigation** arrows to move the cursor to the **Factory** preset. Press the **Select** key.
4. Touch **Recall**. The instrument is set to factory presets.

**Loading Test Signals**

The procedures require you to load test signals into the source TG 2000 Platform mainframe AVG1 Generator module from the AGL1 Service disk supplied with this manual. If you have more than one AVG1 Generator module installed, or if you have the optional memory upgrade installed, you may have enough memory capacity to add these signals to the source TG 2000 Platform mainframe AVG1 Generator module. If this is the case, use the *Add Signals* procedure on page 4–5.

If you do not have extended memory capabilities, you will need to replace the existing AVG1 Generator module signals. To do this, use the *Replace Signals* procedure on page 4–6.

**Add Signals.** To add the test signals, perform the following steps:

1. Insert the AGL1 Service disk supplied with this manual into the source TG 2000 Platform mainframe disk drive.
2. Push the **Disk** button on the TG 2000 Platform mainframe.
3. Touch **Add Signals** on the display.
4. Touch **Select Source**. In the resulting display, use the **Navigation** arrow and **Select** key to select **glvideo.dnl**.
5. Use the **Navigation** arrow and **Select** key to select **AVG1**.
6. Touch **Quit/Load**, and touch **Quit/Load** again.
7. Touch **Select Destination**.
8. Select **AVG1** on the left side of the display, and then use the right **Navigation** arrow to move the cursor to the **AVG1** folder.
9. Press the **Select** key.
10. Touch **Start Load**. When the load is complete, touch **OK**.
11. Touch **Quit**. If the tagged amount will not fit in the destination, use the *Replace Signals* procedure on page 4–6.

**Replace Signals.** To replace the test signals, do the following steps:

1. To save the instrument signals and settings, perform *Instrument Backup* on page 2–8.

---

**NOTE.** *If you are using only standard signals and settings, then you can use the test signal disks that are shipped with the module user manual to restore the signals at the end of the Adjustments procedure. In this case, you do not need to perform the Instrument Backup.*

---

2. Insert the AGL1 Service disk supplied with this manual into the source TG 2000 Platform mainframe disk drive.
3. Push the **Disk** button on the TG 2000 Platform mainframe.
4. Touch **Replace Signals** on the display.
5. Use the Navigation arrow buttons to move the cursor to the **glvideo.dnl** file.
6. Push the **Select** button.
7. Use the Navigation arrow buttons to move the cursor to the **AVG1** folder.
8. Push the **Select** button.
9. Touch **Start Replace**.
10. Touch **OK** to remove all current signals and replace them with the new selections. If you are prompted to disable the active signal, touch **Yes**.
11. When the load is complete, touch **OK**, and then touch **Quit**.

## Load DSA 602A Settings

These test procedures require a number of DSA 602A settings. The DSA 602A settings are in a directory called *DSA602A* on the AGL1 Service disk included with this manual. DSA 602A setting files have the extension *.fpb*.

To load the DSA 602A setting files, do the following steps:

1. Insert the AGL1 Service disk in the DSA 602A floppy-disk drive.
2. Press the **Utility** button until the DSA 602A displays the Directory Ops icon.
3. Touch **Directory Ops**.
4. Touch **chdir**.
5. Enter **DSA602A** by touching the on-screen characters.
6. Touch **Enter**.
7. Touch **Exit**.

8. Press the **Store/Recall** button.
9. Touch **Recall Setting**.
10. Touch **Disk** at the top of the Recall Setting window.
11. Select the file to recall from the displayed list. The DSA 602A configures itself to the specified setting.

### Perform Self Calibration

Perform instrument calibration as follows:

---

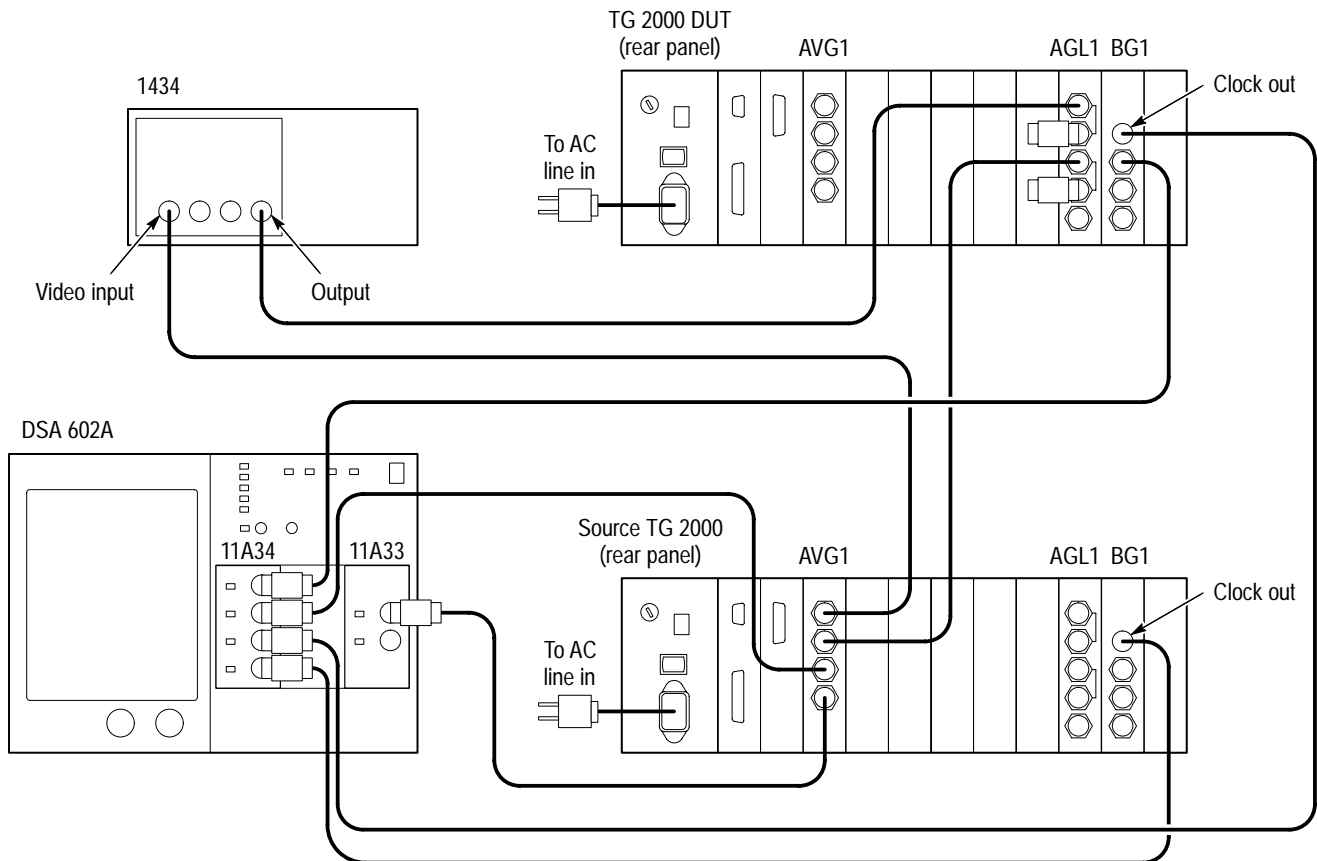
***NOTE.** The original calibration file will be replaced by the new one.*

---

1. Perform the Module self-calibration by performing the following steps:
  - a. Terminate the AGL1 Genlock module outputs 1, 2, and 3 in 75  $\Omega$ .
  - b. Push the **Utilities** button.
  - c. Touch the following on the DUT TG 2000 Signal Generation Platform:
    - **Module Self Cal**
    - **AGL1:X Self Cal**
    - **Start Cal**
  - d. When the self-calibration is successfully completed, the display will return to the Modules window, with no error message. This may take 2 to 5 minutes, depending on the module. An error message indicates a failed calibration. If the self-calibration fails, contact your Tektronix representative for assistance.

## Test Equipment Connections

The following steps describe how to connect the device under test (DUT) AGL1 Genlock module to the test equipment. Refer to Figure 4–1 while connecting the test equipment.



Note: All cables are 75  $\Omega$  coaxial cables and all terminators are 75  $\Omega$ .

Figure 4–1: AGL1 performance verification equipment setup

1. On the DSA 602A, install the 11A34 module in the left slot.
2. On the DSA 602A, install the 11A33 module in the right slot.
3. Connect the source TG 2000 Platform mainframe to the test equipment as follows:
  - a. Connect a 75  $\Omega$  coaxial cable from the source AVG1 Generator module CHANNEL 1 connector to the video noise generator VIDEO INPUT connector.
  - b. Connect a 75  $\Omega$  coaxial cable from the source AVG1 Generator module CHANNEL 2 connector to the device under test (DUT) AGL1 Genlock module REF 2 connector. Connect a 75  $\Omega$  terminator to the second AGL1 REF 2 (loop-through) connector.
  - c. Connect a 75  $\Omega$  coaxial cable from the source AVG1 Generator module CH 3 connector to the DSA 602A 11A34 CH 2 connector: use a 75  $\Omega$  feedthrough terminator on the DSA 602A.
  - d. Connect a 75  $\Omega$  coaxial cable from the source AVG1 Generator module TRIGGER connector to the DSA 602A 11A33 CH 1 connector: use a 75  $\Omega$  feedthrough terminator on the DSA 602A.
  - e. Connect a 75  $\Omega$  coaxial cable from the the source BG1 Generator module CLOCK OUT connector to the DSA 602A 11A34 CH4 connector: use a 75  $\Omega$  feedthrough terminator on the DSA 602A.
4. Connect the TG 2000 Platform mainframe device under test (DUT) to the test equipment as follows:
  - a. Connect a 75  $\Omega$  coaxial cable from the DUT AGL1 Genlock module REF 1 connector to the video noise generator OUTPUT connector. Connect a 75  $\Omega$  terminator to the second AGL1 REF 1 (loop-through) connector.
  - b. Connect a 75  $\Omega$  coaxial cable from the DUT BG1 Generator module OUTPUT 1 to the DSA 602A 11A34 CH1 connector: use a 75  $\Omega$  feedthrough terminator on the DSA 602A.
  - c. Connect a 75  $\Omega$  coaxial cable from the DUT BG1 Generator module CLOCK OUT to the DSA 602A 11A34 CH3 connector: use a 75  $\Omega$  feedthrough terminator on the DSA 602A.

## Test Equipment Settings

1. Set up the 1434 Video Noise Generator as follows:
  - a. Set all buttons in the top two sections out except for the **INPUT** button in the A ATTEN section.
  - b. Set **Gain ON** and **+6dB** buttons in.
  - c. Press the **ATTENUATOR A** button in.
  - d. Press the + button to set the A ATTEN dB display to read **06**.
  - e. Press the **ATTENUATOR B** button in.
  - f. Press the + and **Fast** buttons to set the B ATTEN dB display to read **60**.
2. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Press the **Modules** button.
  - b. Touch **BG1**.
  - c. Touch **NTSC**.
  - d. Touch **Black Burst + Frm Ref**.
  - e. Touch **Module Parameters**.
  - f. Touch **Clock Out**.
  - g. Enter **27000000.000** on the keypad.
  - h. Press the **Enter** button.
  - i. Touch **Output** button to select **Enabled**.

## Performance Verification Procedures

**525 Sync Lock** Use this procedure to check 525 sync lock.

### Procedure: Signal Lock

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. If you have not already done so, load the **glvideo.dnl** test signals into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock1**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the ▼ icon at the top of the screen to display the NTSC test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **Full Field 0 IRE**.
  - f. Push the **Select** button.
  - g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.
  - i. Touch **Type** to select Vertical.
  - j. Touch **V Pos**.
  - k. Enter **10** on the keypad and push the **Test Signals** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **BG1**.
  - b. Touch **NTSC**.
  - c. Touch **Black Burst + Frm Ref**.

- d. Push the **References** button.
  - e. Touch **Reference Select**.
  - f. Touch **Ref 1** until it displays **525 Sync**.
  - g. Touch **Int/Ext** to select **External**.
6. Check that the DUT TG 2000 Platform mainframe signals lock:
    - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
    - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
    - c. On the DUT TG 2000, the **Locked** front-panel LED turns on and stops blinking after a few seconds.

**Procedure: –6 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for –6 dB as follows:
  - a. Push the **Modules** button and touch **AVG1**.
  - b. Touch **Genlock**.
  - c. Touch **Active Signal Parameters**.
  - d. Touch **Video**.
  - e. Use the front-panel Navigation arrow buttons to move the cursor to **Overall Gain**.
  - f. Enter **50** on the front-panel keypad and push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.




**Procedure: -14 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for -14 dB as follows:
  - a. Enter **20** on the front-panel keypad.
  - b. Push the **Select** button.
2. On the DUT TG 2000, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
4. On the source TG 2000, touch **Reset**.

**Procedure: +6 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +6 dB as follows:
  - a. Push the **Modules** button and touch **AVG1**.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the  icon at the top of the screen to display the NTSC test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **100 IRE +6dB**.
  - f. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.

3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.

**Procedure: Noise Lock**

This procedure verifies the Loop-Through White Noise specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +6 dB as follows:
  - a. Touch the ▼ icon at the top of the screen to display the NTSC test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **30dB Noise**.
  - c. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.

**Procedure: Color Frame**

This procedure verifies the Color Framing specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +45 SCH Phase Error as follows:
  - a. Touch the ▼ icon at the top of the screen to display the NTSC test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **100 IRE +6dB**.
  - c. Push the **Select** button.
  - d. Touch **Active Signal Parameters**.
  - e. Touch **Video**.
  - f. Use the front-panel Navigation arrow buttons to move the cursor to **SCH Phase**.
  - g. Enter **45** on the front-panel keypad and push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
4. Set up the source TG 2000 Platform mainframe signal for –45 SCH Phase Error as follows:
  - a. Enter **–45** on the front-panel keypad.
  - b. Push the **Select** button.
5. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.

6. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
7. On the source TG 2000 Platform mainframe, touch **Reset**.
8. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

You have completed the 525 Sync Lock verification procedures.

## 525 Sync Lock Stability

Use this procedure to check 525 Sync Lock Stability.

### Procedure: Amplitude

This procedure verifies the Sync Lock Stability Versus Input Amplitude and Jitter specifications. To verify this specification, do the following steps:

1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock2**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the ▼ icon at the top of the screen to display the NTSC test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **Full Field 100 IRE**.
  - f. Push the **Select** button.
  - g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.

- i. Touch **Type** to select **Vertical**.
        - j. Touch **V Pos**.
        - k. Enter **10** on the keypad and push the **Test Signals** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **BG1**.
  - b. Touch **NTSC**.
  - c. Touch **Black Burst + Frm Ref**.
  - d. Push the **References** button.
  - e. Touch **Reference Select**.
  - f. Touch **Ref 1**.
  - g. Touch the ▼ icon at the top of the screen to display the test signal list.
  - h. Use the Navigation arrow buttons to move the cursor to **525 Sync**.
  - i. Push the **Select** button.
6. Check for signal lock:
  - a. On the DUT TG 2000 Platform mainframe, the front-panel **Locked** LED is on and does not blink.
  - b. On the DSA 602A, the two clock waveforms are locked together and do not move.
7. On the DSA 602A, push the **Measure** button twice.
8. Wait for 50 hits.
9. Set up the source TG 2000 Platform mainframe signal for -3 dB as follows:
  - a. Push the **Modules** button.
  - b. Touch **AVG1**.
  - c. Touch **Genlock**.

- d. Touch **Active Signal Parameters**.
  - e. Touch **Video**.
  - f. Use the front-panel Navigation arrow buttons to move the cursor to **Overall Gain:Mstr**.
  - g. Enter **70** on the front-panel keypad and push the **Select** button.
10. Wait for 50 hits.
11. On the DSA 602A, check that the PkPk value is  $\leq 2$  ns.

**Procedure: APL**

This procedure verifies the Sync Lock Stability Versus APL specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Use the front-panel Navigation arrow buttons to move the cursor to **Active Video Gain**.
  - b. Enter **90** on the front-panel keypad and push the **Select** button.
2. On the DSA 602A, push the **Measure** button twice.
3. Wait for 50 hits.
4. On the source TG 2000, enter **10** on the front-panel keypad, then push the **Select** button.
5. Wait for an additional 50 hits.
6. On the DSA 602A, check that the PkPk value is  $\leq 1$  ns.
7. On the source TG 2000 Platform mainframe, touch **Reset**.
8. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

You have completed the 525 Sync Lock Stability verification procedures.

**NTSC Burst Lock** These procedures verify the Burst Lock Stability specifications. To verify these specifications, do the following steps:

**Procedure: Lock**

1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock1**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **Full Field 0 IRE**.
  - f. Push the **Select** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **BG1**.
  - b. Touch **NTSC**.
  - c. Touch **Black Burst + Frm Ref**.
  - d. Push the **References** button.
  - e. Touch **Reference Select**.
  - f. Touch **Ref 1**.
  - g. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - h. Use the front-panel Navigation arrow buttons to move the cursor to **NTSC Burst**.
  - i. Push the **Select** button.
  - j. Touch **Int/Ext** to select **External**.

6. Check that the DUT TG 2000 Platform mainframe acquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.

**Procedure: -6 dB Lock**

1. Set up the source TG 2000 Platform mainframe signal for -6 dB as follows:
  - a. Touch **Active Signal Parameters**.
  - b. Touch **Video**.
  - c. Use the front-panel Navigation arrow buttons to move the cursor to **Overall Gain**.
  - d. Enter **50** on the front-panel keypad and push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.




**Procedure: -14 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification in burst lock mode. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for -14 dB as follows:
  - a. Use the front-panel Navigation arrow buttons to move the cursor to **Overall Gain**.
  - b. Enter **20** on the front-panel keypad and push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
4. On the source TG 2000 Platform mainframe, touch **Reset**.
5. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

**Procedure: +6 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification in burst lock mode. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +6 dB as follows:
  - a. Push the **Modules** button and touch **AVG1**.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the  arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **100 IRE +6dB**.
  - f. Push the **Select** button.

2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

#### Procedure: Noise Lock

This procedure verifies the Loop-Through Input White Noise specification in burst lock mode. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +6 dB as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **30dB Noise**.
  - c. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000, the **Locked** front panel LED turns on and stops blinking after a few seconds.

**Procedure: Color Frame**

This procedure verifies the Color Framing specification in burst lock mode. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +45 SCH Phase Error as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **100 IRE +6dB**.
  - c. Push the **Select** button.
  - d. Touch **Active Signal Parameters**.
  - e. Touch **Video**.
  - f. Use the Navigation arrow buttons to move the cursor to **SCH Phase**.
  - g. Enter **45** on the front-panel keypad and push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
4. Set up the source TG 2000 Platform mainframe signal for –45 SCH Phase Error as follows:
  - a. Enter **–45** on the front-panel keypad.
  - b. Push the **Select** button.
5. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.

6. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
7. On the source TG 2000 Platform mainframe, touch **Reset**.
8. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

You have completed the NTSC Burst Lock verification procedures.

### NTSC Burst Lock Stability

Use this procedure to verify NTSC Burst Lock Stability performance.

#### Procedure: Amplitude

This procedure verifies the Burst Lock Stability Versus Input Amplitude specification. To verify this specification, do the following steps:

1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock2**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **Full Field 100 IRE**.
  - f. Push the **Select** button.
  - g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.

- i. Touch **Type** to select Vertical.
      - j. Touch **V Pos**.
      - k. Enter **10** on the keypad and push the **Test Signals** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **BG1**.
  - b. Touch **NTSC**.
  - c. Touch **Black Burst + Frm Ref**.
  - d. Push the **References** button.
  - e. Touch **Reference Select**.
  - f. Touch **Ref 1**.
  - g. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - h. Use the Navigation arrow buttons to move the cursor to **NTSC Burst**.
  - i. Push the **Select** button.
6. Check for signal lock:
  - a. On the DUT TG 2000 Platform mainframe, the front-panel **Locked** LED is on and does not blink.
  - b. On the DSA 602A, the two clock waveforms are locked together and do not move.
7. On the DSA 602A, push the **Measure** button twice.
8. Wait for 50 hits.
9. Set up the source TG 2000 Platform mainframe signal for -3 dB as follows:
  - a. Touch **Active Signal Parameters**.
  - b. Touch **Video**.
  - c. Use the Navigation arrow buttons to move the cursor to **Overall Gain**.
  - d. Enter **70** on the front-panel keypad and push the **Select** button.
10. Wait for an additional 50 hits.
11. On the DSA 602A, check that the PkPk value is  $\leq 1$  ns.
12. On the source TG 2000 Platform mainframe, touch **Reset**.


#### Procedure: APL

This procedure verifies the Burst Lock Stability Versus APL specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Touch **Active Video Gain**.
  - b. Enter **90** on the front-panel keypad and push the **Select** button.
2. On the DSA 602A, push the **Measure** button twice.
3. Wait for 50 hits.
4. On the source TG 2000 Platform mainframe, enter **10** on the front-panel keypad and push the **Select** button.
5. Wait for an additional 50 hits.
6. On the DSA 602A, check that the PkPk value is  $\leq 0.5$  ns.
7. On the source TG 2000 Platform mainframe, touch **Reset**.
8. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

#### Procedure: Frequency

This procedure verifies the Burst Lock Stability Versus Reference Frequency Range specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Touch the  arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **Low Freq 0 IRE**.
  - c. Push the **Select** button.
  - d. Push the **Modules** button and touch **BG1**.
  - e. Touch **NTSC**.
  - f. Touch **Black Burst + Frm Ref**.
  - g. Touch **Module Parameters**.
  - h. Touch **Clock Output**.
  - i. Enter **26999850.160** on the keypad and push the **Enter** button.

2. On the DSA 602A, restore loaded setting **genlock3**.
3. Check for signal lock:
  - a. On the DUT TG 2000 Platform mainframe, the front-panel **Locked** LED is on and does not blink.
  - b. On the DSA 602A, the two clock waveforms are stable (the clock waveform from the source TG 2000 may walk a little).
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **High Freq 0 IRE**.
  - f. Push the **Select** button.
  - g. Push the **Modules** button and touch **BG1**.
  - h. Touch **NTSC**.
  - i. Touch **Black Burst + Frm Ref**.
  - j. Touch **Module Parameters**.
  - k. Touch **Clock Out**.
  - l. Enter **27000149.856** on the keypad and push the **Enter** button.
5. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
6. Check for signal lock:
  - a. On the DSA 602A, the two clock waveforms are stable (the clock waveform from the source TG 2000 may walk a little).
  - b. On the DUT TG 2000 Platform mainframe, the front-panel **Locked** LED is on and does not blink.

7. Reset the source TG 2000 Platform mainframe signals as follows:
  - a. Enter **27000000.000** on the keypad.
  - b. Push the **Enter** button.

You have completed the NTSC Burst Lock Stability performance verification procedures.

**625 Sync Lock** Use this procedure to check 625 sync lock.

**Procedure: Signal Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock1**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **PAL**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **Black**.
  - f. Push the **Select** button.
  - g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.
  - i. Touch **Type** to select Vertical.
  - j. Touch **V Pos**.
  - k. Enter **7** on the keypad and push the **Select** button.
  - l. Push the **Test Signals** button.



5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **BG1**.
  - b. Touch **PAL**.
  - c. Touch **Black Burst + Frm Ref**.
  - d. Push the **References** button.
  - e. Touch **Reference Select**.
  - f. Touch **Ref 1**.
  - g. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - h. Use the Navigation arrow buttons to move the cursor to **625 Sync**.
  - i. Push the **Select** button.
  - j. Touch **Int/Ext** to select **External**.
6. Check that the DUT TG 2000 Platform mainframe has signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

**Procedure: -6 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for -6 dB as follows:
  - a. Touch **Active Signal Parameters**.
  - b. Touch **Video**.
  - c. Use the Navigation arrow buttons to move the cursor to **Overall Gain**.
  - d. Enter **50** on the front-panel keypad and push the **Select** button.
2. On the DUT TG 2000, touch **INT/EXT** to select **Internal**, then touch again to select **External**.

3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

**Procedure: -14 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for -14 dB as follows:
  - a. Enter **20** on the front-panel keypad.
  - b. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
4. On the source TG 2000 Platform mainframe, touch **Reset**.
5. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

**Procedure: +6 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +6 dB as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **White +6dB**.
  - c. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

**Procedure: Noise Lock**

This procedure verifies the Loop-Through Input White Noise specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +6 dB as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **30dB Noise**.
  - c. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.

3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

#### Procedure: Color Frame

This procedure verifies the Color Framing specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +45 SCH Phase Error as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **White +6dB**.
  - c. Push the **Select** button.
  - d. Touch **Active Signal Parameters**.
  - e. Touch **Video**.
  - f. Use the Navigation arrow buttons to move the cursor to **SCH Phase**.
  - g. Enter **45** on the front-panel keypad and push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

4. Set up the source TG 2000 Platform mainframe signal for –45 SCH Phase Error as follows:
  - a. Enter –45 on the front-panel keypad.
  - b. Push the **Select** button.
5. Switch the DUT TG 2000 Platform mainframe to **Internal**, then back to **External**.
6. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
7. On the source TG 2000 Platform mainframe, touch **Reset**.
8. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

You have completed the 625 Sync Lock verification procedures.



## 625 Sync Lock Stability

Use this procedure to check 625 Sync Lock Stability.

### Procedure: Amplitude

This procedure verifies the Sync Lock Stability Versus Input Frequency specification. To verify this specification, do the following steps:



1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock2**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **PAL**.

- d. Touch the  arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **Full Field White**.
  - f. Push the **Select** button.
  - g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.
  - i. Touch **Type** to select **Vertical**.
  - j. Touch **V Pos**.
  - k. Enter **7** on the keypad and push the **Select** button.
  - l. Push the **Test Signals** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **References** button.
  - b. Touch **Reference Select**.
  - c. Touch **Ref 1**.
  - d. Touch the  arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **PAL Burst**.
  - f. Push the **Select** button.
6. Check for signal lock:
  - a. On the DUT TG 2000 Platform mainframe, the front-panel **Locked** LED is on and does not blink.
  - b. On the DSA 602A, the two clock waveforms are stable and do not move.
7. Wait for 50 hits.
8. Set up the source TG 2000 Platform mainframe signal for -3 dB as follows:
  - a. Touch **Active Signal Parameters**.
  - b. Touch **Video**.
  - c. Use the Navigation arrow buttons to move the cursor to **Overall Gain**.
  - d. Enter **70** on the front-panel keypad and push the **Select** button.
9. Wait for an additional 50 hits.

10. Set up the source TG 2000 Platform mainframe signal for +3 dB as follows:
  - a. Enter **141** on the front-panel keypad.
  - b. Push the **Select** button.
11. Wait for an additional 50 hits.
12. On the DSA 602A, check that the PkPk value is  $\leq 2$  ns.
13. On the source TG 2000 Platform mainframe, touch **Reset**.
14. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

**Procedure: APL**

This procedure verifies the Sync Lock Stability Versus APL specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Touch the  arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **Full Field White**.
  - c. Push the **Select** button.
  - d. Touch **Active Signal Parameters**.
  - e. Touch **Video**.
  - f. Touch the  arrow icon at the top of the screen to display the test signal list.
  - g. Use the Navigation arrow buttons to move to **Active Video Gain**.
  - h. Enter **90** on the front-panel keypad.
  - i. Push the **Select** button.
2. On the DSA 602A, push the **Measure** button twice.
3. Wait for 50 hits.
4. On the source TG 2000 Platform mainframe, enter **10** on the keypad and push the **Select** button.
5. Wait for an additional 50 hits.
6. On the DSA 602A, check that the PkPk value is  $\leq 1$  ns.

7. On the source TG 2000 Platform mainframe, touch **Reset**.
8. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

You have completed the 625 Sync Lock Stability verification procedures.

**PAL Burst Lock** Use this procedure to check PAL Burst lock.

**Procedure: Lock**

1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock1**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **PAL**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **Black**.
  - f. Push the **Select** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **References** button.
  - b. Touch **Reference Select**.
  - c. Touch **Ref 1**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **PAL Burst**.
  - f. Push the **Select** button.
  - g. Touch **INT/EXT** to select **External**.



6. Check that the DUT TG 2000 Platform mainframe has signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

**Procedure: -6 dB Lock**

1. Set up the source TG 2000 Platform mainframe signal for -6 dB as follows:
  - a. Touch **Active Signal Parameters**.
  - b. Touch **Video**.
  - c. Use the Navigation arrow buttons to move the cursor to **Overall Gain**.
  - d. Enter **50** on the front-panel keypad and push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

**Procedure: -14 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification in burst lock mode. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for -14 dB as follows:
  - a. Enter **20** on the front-panel keypad.
  - b. Push the **Select** button.
2. On the DUT TG 2000, touch **INT/EXT** to select **Internal**, then touch again to select **External**.

3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
4. On the source TG 2000 Platform mainframe, touch **Reset**.
5. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

**Procedure: +6 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification in burst lock mode. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +6 dB as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **White +6dB**.
  - c. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000, the **Locked** front panel LED turns on and stops blinking after a few seconds.
4. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

**Procedure: Noise Lock**

This procedure verifies the Loop-Through Input White Noise specification in burst lock mode. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **30dB Noise**.
  - c. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

**Procedure: Color Frame**

This procedure verifies the Color Framing specification in burst lock mode. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signal for +45 SCH Phase Error as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **White +6dB**.
  - c. Push the **Select** button.
  - d. Touch **Active Signal Parameters**.
  - e. Touch **Video**.
  - f. Use the Navigation arrow buttons to move the cursor to **SCH Phase**.
  - g. Enter **45** on the front-panel keypad and push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.


3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
4. Set up the source TG 2000 Platform mainframe signal for –45 SCH Phase Error as follows:
  - a. Enter **–45** on the front-panel keypad.
  - b. Push the **Select** button.
5. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
6. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 7 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
7. On the source TG 2000 Platform mainframe, touch **Reset**.
8. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

You have completed the PAL Burst Lock verification procedures.

**PAL Burst Lock Stability** Use this procedure to verify PAL Burst Lock Stability performance.

**Procedure: Amplitude**

This procedure verifies the Burst Lock Stability Versus Input Amplitude specification. To verify this specification, do the following steps:

1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock2**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **PAL**.
  - d. Touch the  arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **Full Field White**.
  - f. Push the **Select** button.
  - g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.
  - i. Touch **Type** to select Vertical.
  - j. Touch **V Pos**.
  - k. Enter **7** on the keypad and push the **Select** button.
  - l. Push the **Test Signals** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button.
  - b. Touch **BG1**.
  - c. Touch **PAL**.
  - d. Touch **Black Burst + Frm Ref**.

- e. Push the **References** button.
        - f. Touch **Reference Select**.
        - g. Touch **Ref 1**.
        - h. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
        - i. Use the Navigation arrow keys to move the cursor to **PAL Burst**.
        - j. Push the **Select** button.
6. Check for signal lock:
  - a. On the DUT TG 2000 Platform mainframe, the front-panel **Locked** LED is on and does not blink.
  - b. On the DSA 602A, the two clock waveforms are stable and do not move.
7. On the DSA 602A, push the **Measure** button twice.
8. Wait for 50 hits.
9. Set up the source TG 2000 Platform mainframe signal for –3 dB as follows:
  - a. Touch **Active Signal Parameters**.
  - b. Touch **Video**.
  - c. Use the Navigation arrow buttons to move the cursor to **Overall Gain**.
  - d. Enter **70** on the front-panel keypad and push the **Select** button.
10. Wait for an additional 50 hits.
11. Set up the source TG 2000 Platform mainframe signal as follows:
  - a. Enter **141** on the front-panel keypad.
  - b. Push the **Select** button.
12. Wait for an additional 50 hits.
13. On the DSA 602A, check that the PkPk value is  $\leq 1$  ns.
14. On the source TG 2000 Platform mainframe, touch **Reset**.
15. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

**Procedure: APL**

This procedure verifies the Burst Lock Stability Versus APL specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow keys to move the cursor to **Full Field White**.
  - c. Push the **Select** button.
  - d. Touch **Full Field White**.
  - e. Touch **Active Signal Parameters**.
  - f. Touch **Video**.
  - g. Use the Navigation arrow buttons to move the cursor to **Active Video Gain**.
  - h. Enter **90** on the front-panel keypad and push the **Select** button.
2. On the DSA 602A, push the **Measure** button twice.
3. Wait for 50 hits.
4. On the source TG 2000, enter **10** on the front-panel keypad, then push the **Select** button.
5. Wait for an additional 50 hits.
6. On the DSA 602A, check that the PkPk value is  $\leq 500$  ps.
7. On the source TG 2000 Platform mainframe, touch **Reset**.
8. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

You have completed the PAL Burst Lock Stability verification procedures.

**Genlock Timing**      These procedures verify the Genlock Timing Offset Adjustment Range specification.

**Procedure: Vertical Timing**

1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **fr\_time**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **Full Field 0 IRE**.
  - f. Push the **Select** button.
  - g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.
  - i. Touch **Type** to select **Vertical**.
  - j. Touch **V Pos**.
  - k. Enter **10** on the keypad and push the **Select** button.
  - l. Push the **Test Signals** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **BG1**.
  - b. Touch **NTSC**.
  - c. Touch **Black Burst + Frm Ref**.
  - d. Push the **References** button.
  - e. Touch **Reference Select**.



- f. Touch **Ref 1**.
  - g. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - h. Use the front-panel Navigation arrow buttons to move the cursor to **NTSC Burst**.
  - i. Push the **Select** button.
  - j. Touch **Reference Timing**.
  - k. Touch **Vertical**.
  - l. Enter **0** on the keypad and push the **Select** button.
6. On the DSA 602A, push the **Measure** button twice.
  7. On the DSA 602A, check that the PkPk reading is 60  $\mu\text{s}$  ( $\pm 10 \mu\text{s}$ ).
  8. Set up the DUT TG 2000 Platform mainframe signals as follows:
    - a. Enter **1** on the keypad.
    - b. Push the **Select** button.
  9. On the DSA 602A, check that the PkPk reading is 120  $\mu\text{s}$  ( $\pm 10 \mu\text{s}$ ).
  10. Set up the DUT TG 2000 Platform mainframe signals as follows:
    - a. Enter **10** on the keypad.
    - b. Push the **Select** button.
  11. On the DSA 602A, check that the PkPk reading is 695  $\mu\text{s}$  ( $\pm 30 \mu\text{s}$ ).
  12. Set up the DUT TG 2000 Platform mainframe signals as follows:
    - a. Enter **-10** on the keypad.
    - b. Push the **Select** button.
  13. On the DSA 602A, check that the PkPk reading is 1.4 ms ( $\pm 0.1 \text{ ms}$ ).
  14. Reset the DUT TG 2000 Platform mainframe signals as follows:
    - a. Enter **0** on the keypad.
    - b. Push the **Select** button.

**Procedure: Horizontal Fine Timing**

1. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Touch **Horizontal**.
  - b. Touch **H Feel** to select **Fine**.
  - c. Enter **.0099** on the keypad (if necessary).
  - d. Push the **Select** button.
2. On the DSA 602A, restore loaded setting **clk\_time**.
3. On the DSA 602A, push the **Measure** button twice.
4. On the DSA 602A, check that the PkPk reading is ~200 ps. Write this value down.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Enter **.01** on the keypad.
  - b. Push the **Select** button.
6. On the DSA 602A, check that the PkPk reading has changed less than 500 ps (0.5 ns) from the value in step 4.
7. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Enter **.0284** on the keypad.
  - b. Push the **Select** button.
8. On the DSA 602A, push the **Measure** button twice.
9. On the DSA 602A, check that the PkPk reading is ~200 ps. Write this value down. You may have to adjust the Main Position to get the signal within the histogram box.
10. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Enter **.0285** on the keypad.
  - b. Push the **Select** button.
11. On the DSA 602A, check that the PkPk reading has changed less than 500 ps (0.5 ns) from the value in step 9.
12. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Enter **.0469** on the keypad.
  - b. Push the **Select** button.

13. On the DSA 602A, push the **Measure** button twice.
14. On the DSA 602A, check that the PkPk reading is ~200 ps. Write this value down. You may have to adjust the Main Position to get the signal within the histogram.
15. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Enter **.0470** on the keypad.
  - b. Push the **Select** button.
16. On the DSA 602A, check that the PkPk reading has changed less than 500 ps (0.5 ns) from the value in step 14.

#### Procedure: Horizontal Coarse Timing

1. On the DSA 602A, restore loaded setting **linetime**.
2. Set up the DSA 602A as follows:
  - a. Push the **Measure** button.
  - b. Touch **Measurements** menu.
3. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Touch **Horizontal**.
  - b. Touch **H Feel** to select **Coarse**.
  - c. Enter **0** on the keypad and push the **Select** button.
4. On the DSA 602A, write down the value of the cross reading.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Enter **8** on the keypad.
  - b. Push the **Select** button.
6. On the DSA 602A, check that the cross reading has changed ~8  $\mu$ s from the value in step 4.
7. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Enter **-8** on the keypad.
  - b. Push the **Select** button.
8. On the DSA 602A, check that the cross reading has changed ~-8  $\mu$ s from the value in step 4.

9. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Enter **0** on the keypad.
  - b. Push the **Select** button.

You have completed the Timing verification procedures.

## Hum and Jitter

These procedures verify the Loop-Through Inputs Hum, the Burst Lock Stability Jitter, and the Sync Lock Stability Jitter specifications.

### Procedure: 525 Sync


1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock1**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **Full Field 0 IRE**.
  - f. Push the **Select** button.
  - g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.
  - i. Touch **Type** to select **Vertical**.
  - j. Touch **V Pos**.
  - k. Enter **10** on the keypad and push the **Select** button.
  - l. Push the **Test Signals** button.
5. Remove the terminator from the DUT TG 2000 Platform mainframe REF1 loopthrough connector.

6. Set up the 1434 as follows:
  - a. Push the **A** button in the Attenuator Select section.
  - b. Use the + key to enter **12 dB** as shown in the A ATTEN dB display (this compensates for removing the termination).
  - c. Push the **HUM** button in the B section to the ON position.
  - d. Push the **B** button in the Attenuator Select section.
  - e. Use the – and fast keys to enter **02 dB** as shown in the B ATTEN dB display.
7. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **BG1**.
  - b. Touch **NTSC**.
  - c. Touch **Black Burst + Frm Ref**.
  - d. Push the **References** button.
  - e. Touch **Reference Select**.
  - f. Touch **Ref 1**.
  - g. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - h. Use the Navigation arrow keys to move the cursor to **525 Sync**.
  - i. Push the **Select** button.
8. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
9. Check that the DUT TG 2000 reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
10. On the 1434, use the – and fast keys to enter **55 dB** as shown in the B ATTEN dB display.


11. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1**.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **50 dB Noise**.
  - f. Push the **Select** button.
12. On the DSA 602A, restore loaded setting **genlock2**.
13. On the DSA 602A, adjust the Main Position to put one transition of the clock waveform into the histogram box, if necessary.
14. On the DSA 602A, push the **Measure** button twice.
15. Wait for 50 hits.
16. On the DSA 602A, check that the PkPk value shown in the measurements box is  $\leq 2$  ns.

**Procedure: NTSC Burst**

1. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **References** button.
  - b. Touch **Reference Select**.
  - c. Touch **Ref 1**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **NTSC Burst**.
  - f. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. On the DSA 602A, push the **Measure** button twice.
4. On the DSA 602A, adjust the Main Position to put one transition of the clock waveform into the histogram box (if necessary).
5. Wait for 50 hits.

6. On the DSA 602A, check that the PkPk time value shown in the measurements box is  $\leq 1$  ns.
7. On the 1434, use the – and fast keys to enter **02 dB** as shown in the B ATTEN dB display.
8. On the DSA 602A, restore loaded setting **genlock1**.
9. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1**.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the  arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **Full Field 0 IRE**.
  - f. Push the **Select** button.
10. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
11. Check that the DUT TG 2000 has signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a number of seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a number of seconds.

#### Procedure: 625 Sync

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **PAL**.
  - d. Touch the  arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **Black**.
  - f. Push the **Select** button.

- g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.
  - i. Touch **Type** to select **Vertical**.
  - j. Touch **V Pos**.
  - k. Enter **7** on the keypad and push the **Select** button.
  - l. Push the **Test Signals** button.
2. Set up the DUT TG 2000 Platform mainframe signals as follows:
- a. Push the **Modules** button and touch **BG1**.
  - b. Touch **PAL**.
  - c. Touch **Black Burst + Frm Ref**.
  - d. Push the **References** button.
  - e. Touch **Reference Select**.
  - f. Touch **Ref 1**.
  - g. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - h. Use the Navigation arrow keys to move the cursor to **625 Sync**.
  - i. Push the **Select** button.
3. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
4. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
- a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
5. On the 1434, use the + and fast keys to enter **55 dB** as shown in the B ATTN dB display.
6. On the DSA 602A, restore loaded setting **genlock2**.



7. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow keys to move the cursor to **50 dB Noise**.
  - c. Push the **Select** button.
8. On the DSA 602A, push the **Measure** button twice.
9. On the DSA 602A, adjust the Main Position to put one transition of the clock waveform in the histogram box if necessary.
10. Wait for 50 hits.
11. On the DSA 602A, check that the PkPk value shown in the measurements box is  $\leq 2$  ns.

#### Procedure: PAL Burst

1. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **BG1**.
  - b. Touch **PAL**.
  - c. Touch **Black Burst + Frm Ref**.
  - d. Push the **References** button.
  - e. Touch **Reference Select**.
  - f. Touch **Ref 1**.
  - g. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - h. Use the Navigation arrow keys to move the cursor to **PAL Burst**.
  - i. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. On the DSA 602A, push the **Measure** button twice.
4. On the DSA 602A, adjust the Main Position to put one transition of the clock waveform in the histogram box.
5. Wait for 50 hits.


6. On the DSA 602A, check that the PkPk value shown in the measurements box is  $\leq 1$  ns.
7. On the 1434, use the – and fast keys to enter **02 dB** as shown in the B ATTEN dB display.
8. On the DSA 602A, restore loaded setting **genlock1**.
9. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow keys to move the cursor to **Black**.
  - c. Push the **Select** button.
10. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Touch **Int/Ext** to select **Internal**.
  - b. Touch **Int/Ext** to select **External**.
11. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.
12. Set up the 1434 as follows to turn hum off hum settings:
  - a. Push the **A** button in the Attenuator Select section.
  - b. Use the – key to enter **06 dB** as shown in the A ATTEN dB display.
  - c. Deselect the **HUM** button in the B section (Hum OFF).
  - d. Push the **B** button in the Attenuator Select section.
  - e. Use the + and fast keys to enter **60 dB** as shown in the B ATTEN dB display.

You have completed the Hum and Jitter verification procedures.

**REF 2** Use this procedure to verify Reference 2 timing performance.

**Procedure: Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. If not continuing from the previous procedure, load the test signal files from *glvideo.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. On the DSA 602A, restore loaded setting **genlock1**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1**.
  - b. Touch **Genlock**.
  - c. Touch **NTSC**.
  - d. Touch the  arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **Full Field 0 IRE**.
  - f. Push the **Select** button.
  - g. Touch **Module Parameters**.
  - h. Touch **Trigger Output**.
  - i. Touch **Type** to select **Vertical**.
  - j. Touch **V Pos**.
  - k. Enter **10** on the keypad and push the **Select** button.
  - l. Push the **Test Signals** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **BG1**.
  - b. Touch **NTSC**.
  - c. Touch **Black Burst + Frm Ref**.
  - d. Push the **References** button.

- e. Touch **Reference Select**.
  - f. Touch **Ref 2**.
  - g. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - h. Use the Navigation arrow keys to move the cursor to **525 Sync**.
  - i. Push the **Select** button.
6. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
7. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

**Procedure: -14 dB Lock**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Touch **Active Signal Parameters**.
  - b. Touch **Video**.
  - c. Touch **Overall Gain**.
  - d. Enter **20** on the keypad and push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

4. On the source TG 2000 Platform mainframe, touch **Reset**.
5. On the source TG 2000 Platform mainframe, push the **Test Signals** button.

**Procedure: Bounce**

This procedure verifies the Loop-Through Input Dynamic Range specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow keys to move the cursor to **Slow Bounce**.
  - c. Push the **Select** button.
2. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two main window field 1 line 10 pulses are lined up with each other.
  - b. On the DSA 602A, the two lower window clock signals become stable after a few seconds.
  - c. On the DUT TG 2000 Platform mainframe, the **Locked** front panel LED turns on and stops blinking after a few seconds.

**CW Lock** Use this procedure to verify CW lock performance.

---

**NOTE.** *You need to load new test signals into the source TG 2000 in order to perform the CW tests (CW Lock, CW Stability, and 10 MHz CW Lock). Load the verification signal files from glcw.dnl into the source TG 2000 (refer to Loading Test Signals on page 4–5).*

---

#### **Procedure: Lock and Input Amplitude**

This procedure verifies the CW Input Amplitude Range and Input Frequencies specifications. To verify these specifications, do the following steps:

1. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
2. On the DUT TG 2000 Platform mainframe, move the coaxial cable from the AGL1 Ref 1 connector to the Ref 3 connector.
3. On the DSA 602A, restore loaded setting **genlock2**.
4. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1**.
  - b. Touch **Genlock**.
  - c. Touch **CW**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **3.58 MHz 1.0 V**.
  - f. Push the **Select** button.
5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **References** button.
  - b. Touch **Reference Select**.
  - c. Touch **Ref 3**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the front-panel Navigation arrow buttons to move the cursor to **CW 3.58 MHz**.
  - f. Push the **Select** button.

6. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
7. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two clock signals become stable after a few seconds.
  - b. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
8. Set up the source TG 2000 Platform mainframe as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the front-panel Navigation arrow buttons to move the cursor to **3.58 MHz 2.0 V**.
  - c. Push the **Select** button.
9. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two clock signals become stable after a few seconds.
  - b. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
10. Set up the source TG 2000 Platform mainframe as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the front-panel Navigation arrow buttons to move the cursor to **3.58 MHz 2.25 V**.
  - c. Push the **Select** button.
11. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two clock signals become stable after a few seconds.
  - b. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.

**Procedure: Frequency**

This procedure verifies the CW Input Frequencies specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **CW**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the front-panel Navigation arrow buttons to move the cursor to **1.0 MHz 2.0 V**.
  - f. Push the **Select** button.
2. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **References** button.
  - b. Touch **Reference Select**.
  - c. Touch **Ref 3**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow buttons to move the cursor to **CW 1 MHz**.
  - f. Push the **Select** button.
3. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two clock signals become stable after a few seconds.
  - b. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
4. Set up the source TG 2000 Platform mainframe as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the front-panel Navigation arrow buttons to move the cursor to **4.43 MHz 2.0 V**.
  - c. Push the **Select** button.



5. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **CW 4.43 MHz**.
  - c. Push the **Select** button.
6. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two clock signals become stable after a few seconds.
  - b. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
7. Set up the source TG 2000 Platform mainframe as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the front-panel Navigation arrow buttons to move the cursor to **5 MHz 2.0 V**.
  - c. Push the **Select** button.
8. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - b. Use the Navigation arrow buttons to move the cursor to **CW 5 MHz**.
  - c. Push the **Select** button.
9. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two clock signals become stable after a few seconds.
  - b. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.

You have completed the CW Lock verification procedures.

**CW Stability** Use this procedure to verify CW Stability performance.

---

**NOTE.** *This test requires verification files from glcw.dnl. Refer to Loading Test Signals on page 4–5.*

---

#### **Procedure: Amplitude**

This procedure verifies the CW Lock Stability Versus Input Amplitude specification. To verify this specification, do the following steps:

1. If you are not continuing from the previous procedure, load the verification signal files from *glcw.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. If not continuing from the previous procedure, move the coaxial cable from the DUT TG 2000 AGL1 Ref 1 connector to the Ref 3 connector.
4. On the DSA 602A, restore loaded setting **genlock2**.
5. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **CW**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **3.58 MHz 2.25 V**.
  - f. Push the **Select** button.
6. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **References** button.
  - b. Touch **Reference Select**.
  - c. Touch **Ref 3**.

- d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
      - e. Use the Navigation arrow buttons to move the cursor to **CW 3.58 MHz**.
      - f. Push the **Select** button.
7. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
8. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DSA 602A, the two clock signals become stable after a few seconds.
  - b. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
9. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Touch **Active Signal Parameters**.
  - b. Touch **Video**.
  - c. Touch **Overall Gain Mstr**.
  - d. Enter **44** on the keypad and push the **Select** button.
10. Check that the DUT TG 2000 Platform mainframe remains locked:
  - a. On the DSA 602A, the two clock signals remain stable after a few seconds.
  - b. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED does not blink.
11. On the DUT TG 2000 Platform mainframe, touch **Reset**.

#### Procedure: Jitter

This procedure verifies the CW Lock Stability Jitter specification. To verify this specification, do the following steps:

1. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button and touch **AVG1** on the display.
  - b. Touch **Genlock**.
  - c. Touch **CW**.

- d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
      - e. Use the Navigation arrow keys to move the cursor to **3.58 MHz 50 dB Noise**.
      - f. Push the **Select** button.
  2. On the DSA 602A, push the **Measure** button twice.
  3. On the DSA 602A, check that the PkPk value shown in the measurements box is < 0.5 ns.

You have completed the CW Stability verification procedures.

### 10 MHz CW Lock

This procedure verifies the CW Input Frequencies specification.

---

***NOTE.** This test requires verification files from *glcw.dnl*. Refer to Loading Test Signals on page 4–5 for instructions on loading verification signals.*

---

#### Procedure: Lock

1. If you are not continuing from the previous procedure, load the verification signal files from *glcw.dnl* into the source TG 2000 Platform mainframe (refer to *Loading Test Signals* on page 4–5).
2. If you have not already done so, connect the test equipment as directed in *Test Equipment Connections* on page 4–9.
3. If not continuing from the previous procedure, move the coaxial cable from the DUT TG 2000 AGL1 Ref 1 connector to the Ref 3 connector.
4. Set up the DC 5010 as follows:
  - a. Connect a coaxial cable from the source TG 2000 BG1 Generator module **CLOCK OUT** to the DC 5010 Channel B input.
  - b. On the DC 5010, push the **Averages** button to set the resolution to **0.1 Hz**.
  - c. On the DC 5010, push the **Ratio B/A** button.
  - d. Write down the current DC 5010 display value.

5. Set up the source TG 2000 Platform mainframe signals as follows:
  - a. Push the **Modules** button.
  - b. Touch **BG1** on the display.
  - c. Touch any icon.
  - d. Touch **Module Parameters**.
  - e. Touch **Clock Out**.
  - f. Enter **10 MHz** on the keypad and push the **Select** button.
6. On the DC 5010, check that the display reads approximately 10 MHz.
7. Move the cable from the DC 5010 Channel B input to the DUT TG 2000 AGL1 REF 3 connector.
8. Move the DUT TG 2000 Platform mainframe BG1 Generator module CLOCK OUT cable from the DSA 602 to the DC 5010 Channel A input.
9. Set up the DUT TG 2000 Platform mainframe signals as follows:
  - a. Push the **References** button.
  - b. Touch **Reference Select**.
  - c. Touch **Ref 3**.
  - d. Touch the ▼ arrow icon at the top of the screen to display the test signal list.
  - e. Use the Navigation arrow keys to move the cursor to **CW 10 MHz**.
  - f. Push the **Select** button.
10. On the DUT TG 2000 Platform mainframe, touch **INT/EXT** to select **Internal**, then touch again to select **External**.
11. Check that the DUT TG 2000 Platform mainframe reacquires signal lock:
  - a. On the DUT TG 2000 Platform mainframe, the **Locked** front-panel LED turns on and stops blinking after a few seconds.
  - b. On the DC 5010, the frequency displayed matches the reading from step 4d.

You have completed the 10 MHz CW Lock verification procedures.

**Return Loss** This procedure verifies the Loop-Through Inputs Return Loss specification. It does not matter which video standard you choose for this check.

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***NOTE.** Perform the Return Loss Check only if you replace the clock board.*

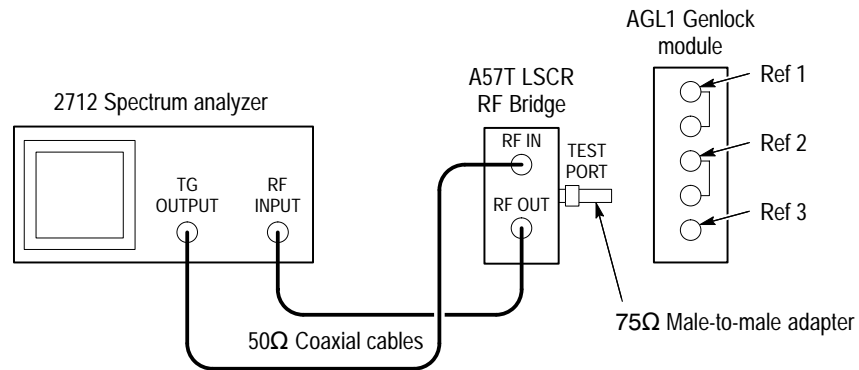
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**Test Equipment Required:**

- Spectrum analyzer (this procedure was prepared using a Tektronix 2712 Spectrum Analyzer.)
- RF bridge (A57TTL/CR low frequency) from Wideband Engineering
- Precision coaxial cables, two 50  $\Omega$  and one 75  $\Omega$
- 75  $\Omega$  male-to-male adapter

**Procedure: Check Return Loss from 100 KHz to 6 MHz**

1. Make the following connections, as shown in Figure 4–2.
  - a. Connect a precision 50 $\Omega$  cable from the spectrum analyzer RF Input to the RF Output on the RF Bridge.
  - b. Connect a precision 50 $\Omega$  cable from the spectrum analyzer TG Output to the RF Input on the RF Bridge.
  - c. Connect a 75  $\Omega$  male-male adapter to the RF bridge 75  $\Omega$  Test Port.
2. Select the following on the spectrum analyzer:
  - a. Select **Demod/TG**.
  - b. Turn on the tracking generator and set the tracking generator fixed level to **0.00 dBm**.
  - c. Set the Span/Div to 1 MHz and the Resolution Bandwidth to 3 kHz.
  - d. Set the Reference Level to the first major division down from the top of the analyzer display.
  - e. Set the Vertical Scale to 10 dB.



**Figure 4-2: Equipment hookup for checking return loss**

3. Adjust the spectrum analyzer External Attenuation Amplifier as follows:
  - a. Disconnect either of the cables connected from the spectrum analyzer to the RF Bridge.
  - b. Set the spectrum analyzer frequency to 5 MHz.
  - c. Turn on and set the Marker to 6 MHz.
  - d. Reconnect the cable to the RF Bridge.
  - e. Write down the Reference Level Readout value.
  - f. Adjust the External Attenuation Amplitude (on the Input menu if using the 2712 Spectrum Analyzer) by the value in step e. The Reference Level Readout should now be 0.00 dBm.

- 4.** Verify bridge function as follows:
  - a.** Connect the precision, high-frequency termination to the 75  $\Omega$  Test Port on the RF Bridge.
  - b.** Check that the frequency response from 0 MHz to 6 MHz is  $\leq -40$  dBm.
  - c.** Return the spectrum analyzer frequency marker to 6 MHz if it was moved.
  - d.** Remove the precision high-frequency terminator from the RF Bridge.
- 5.** Connect the Test Port of the RF Bridge to the REF 1 connector on the DUT TG 2000 AGL1 Genlock module, using a male-to-male 75  $\Omega$  adapter.
- 6.** Connect the precision feedthrough terminator to the loopthrough connector.
- 7.** Check that the Reference Level readout on the spectrum analyzer is  $\leq -40$  dBm from 100 KHz to 5 MHz.
- 8.** Repeat steps 5 through 7 for signal REF 2 on the DUT TG 2000 AGL1 Genlock module.
- 9.** Remove the precision feedthrough terminator from the loopthrough connector.
- 10.** Repeat steps 5 and 7 for signal REF 3 on the DUT TG 2000 AGL1 Genlock module. Check that the Reference Level readout on the spectrum analyzer is  $\leq -40$  dBm from 1 MHz to 5 MHz.

This completes the AGL1 Return Loss verification procedure.

This completes the AGL1 Genlock Module performance verification procedures. Proceed to the next page to restore backed-up instrument settings and presets.



**Restore Signals** If you performed an instrument backup before beginning the *Performance Verification* procedure, use the disks you created to restore the signals now, using the procedure on page 2–9. If you did not perform an instrument backup, load the AVG1 Test Signal disks supplied with the *AVG1 Analog Video Generator User Manual*.

**Recall Preset** Recall the preset you created as follows:

1. Push the **Presets** button.
2. Touch **Presets** on the display.
3. Use the **Navigation** arrows to move the cursor to the preset that you created before beginning the *Performance Verification* procedure. Press the **Select** key.
4. Touch **Recall**. Your instrument settings are recalled.





# Adjustment Procedures





# Adjustment Procedures

The AGL1 Analog Genlock module does not require any adjustments.





# Maintenance





# Maintenance

This section contains instructions and procedures for maintaining the AGL1 Analog Genlock module. For information on servicing the mainframe, refer to the *TG 2000 Signal Generation Platform Service Manual*.

The following information can be found in this section:

- Preparation page 6–1
- Inspection and cleaning page 6–3
- After repair adjustments page 6–3
- Repackaging instructions page 6–4
- Removal and replacement procedures page 6–7
- Troubleshooting procedures page 6–11

If the instrument does not function properly, troubleshooting and corrective measures should be taken immediately to prevent additional problems.

---

**NOTE.** Contact your local Tektronix representative for information on where to return your instrument if it requires repair during the warranty period.

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## Preparation

Please read and follow these preparation instructions before attempting to perform any maintenance or service to the instrument.

### Servicing Prerequisites

Make sure of the following before beginning any instrument service:

- The maintenance or service of this instrument must be performed by qualified service personnel only.
- Read the *Service Safety Summary* located at the beginning of this manual before attempting to perform any maintenance or service to the instrument.
- Read the *Operating Information* section of this manual before attempting to perform any maintenance or service to the instrument.

## Electrostatic Damage Prevention

This instrument contains electrical components that are susceptible to damage from electrostatic discharge. Static voltages of 1 kV to 30 kV are common in unprotected environments.



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

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Observe the following precautions to avoid static damage:

- Minimize handling of static-sensitive components.
- Transport and store static-sensitive components or assemblies in their original containers, on a metal rail, or on conductive foam. Label any package that contains static-sensitive assemblies or components.
- Discharge the static voltage from your body by wearing a wrist strap while handling these components. Servicing static-sensitive assemblies or components should only be performed at a static-free workstation by qualified personnel.
- Nothing capable of generating or holding a static charge should be allowed on the workstation surface.
- Keep the component leads shorted together whenever possible.
- Pick up components by the body, never by the leads.
- Do not slide the components over any surface.
- Avoid handling components in areas that have a floor or work surface covering capable of generating a static charge.
- Use a soldering iron that is connected to earth ground.
- Use only special antistatic, suction-type or wick-type desoldering tools.

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**NOTE.** *A 2% RMA flux content solder is recommended for making repairs in this instrument. Cleaning of rosin residue is not recommended. Most cleaning solvents tend to reactivate the rosin and spread it under components where it may cause corrosion under humid conditions. The rosin residue, if left alone, does not exhibit these corrosive properties.*

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## Inspection and Cleaning

Preventive maintenance consists of cleaning, visual inspection, performance checking, and, if needed, readjustment. The preventive maintenance schedule established for the instrument should be based on the environment in which it is operated and the amount of use. Under average conditions, scheduled preventive maintenance should be performed every 2000 hours of operation.

### General Care

Protect the module from adverse weather conditions. The module is not waterproof.



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**CAUTION.** To avoid damage to this module, do not expose it to sprays, liquids, or solvents. Do not flex the circuit board if you remove the board from its mounting shield. The circuit board can be damaged by flexing. The shield provides necessary structural support to the circuit board.

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### Cleaning and Visual Inspection

Clean the mainframe and modules often enough to prevent dust or dirt from accumulating. Refer to *Cleaning and Visual Inspection* in the *TG 2000 Signal Generation Platform Service Manual*.

### Performance Verification and Readjustments

Check module performance after each 2000 hours of operation or every 12 months. This will help to ensure maximum performance and assist in locating defects that may not be apparent during regular operation. Performance verification and adjustment procedures are included in this manual.

## After Repair Adjustments

After replacing the module or subassembly, allow the mainframe and module to warm up for 20 minutes, and then perform the self calibration as follows:

1. Push the **Utilities** button.
2. Touch the following on the TG 2000 Signal Generation Platform:
  - a. **Module Self Cal**
  - b. **AGL1:X Self Cal** (X represents the slot number of the replaced module)
  - c. **Start Cal**
3. When the self calibration is successfully completed, the display will return to the Modules window with no error message. This may take 2 to 5 minutes, depending on the module. An error message indicates a failed calibration. If the self cal fails, contact your Tektronix representative for assistance.

## Repackaging Instructions

Use the following instructions to prepare your instrument for shipment to a Tektronix, Inc., Service Center:

- 1.** Attach a tag to the instrument showing: the owner, complete address and phone number of someone at your firm who can be contacted, the instrument serial number, and a description of the required service.
- 2.** Package the instrument in the original packaging materials. Figures 6–1 and 6–2 illustrate how to repack the module in the original packaging materials. If the original packaging materials are not available, follow these directions:
  - a.** Obtain a carton of corrugated cardboard having inside dimensions six or more inches greater than the dimensions of the instrument. Use a shipping carton that has a test strength of at least 250 pounds (113.5 kg).
  - b.** Surround the module with a protective (anti-static) bag.
  - c.** Pack dunnage or urethane foam between the instrument and the carton. If using Styrofoam kernels, overfill the box and compress the kernels by closing the lid. There should be three inches of tightly packed cushioning on all sides of the instrument.
- 3.** Seal the carton with shipping tape, industrial stapler, or both.

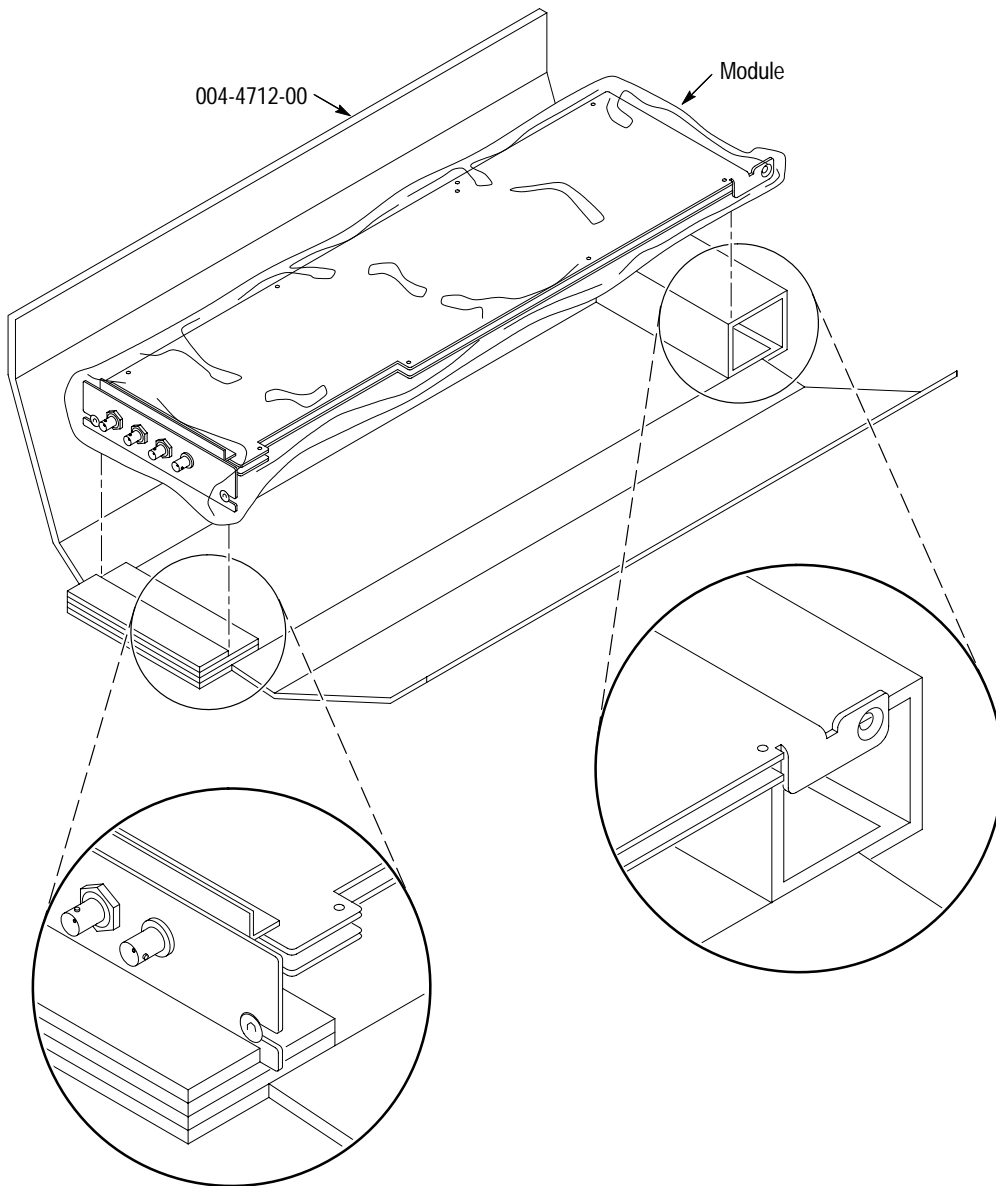


Figure 6-1: Placing the module in the protective wrapping

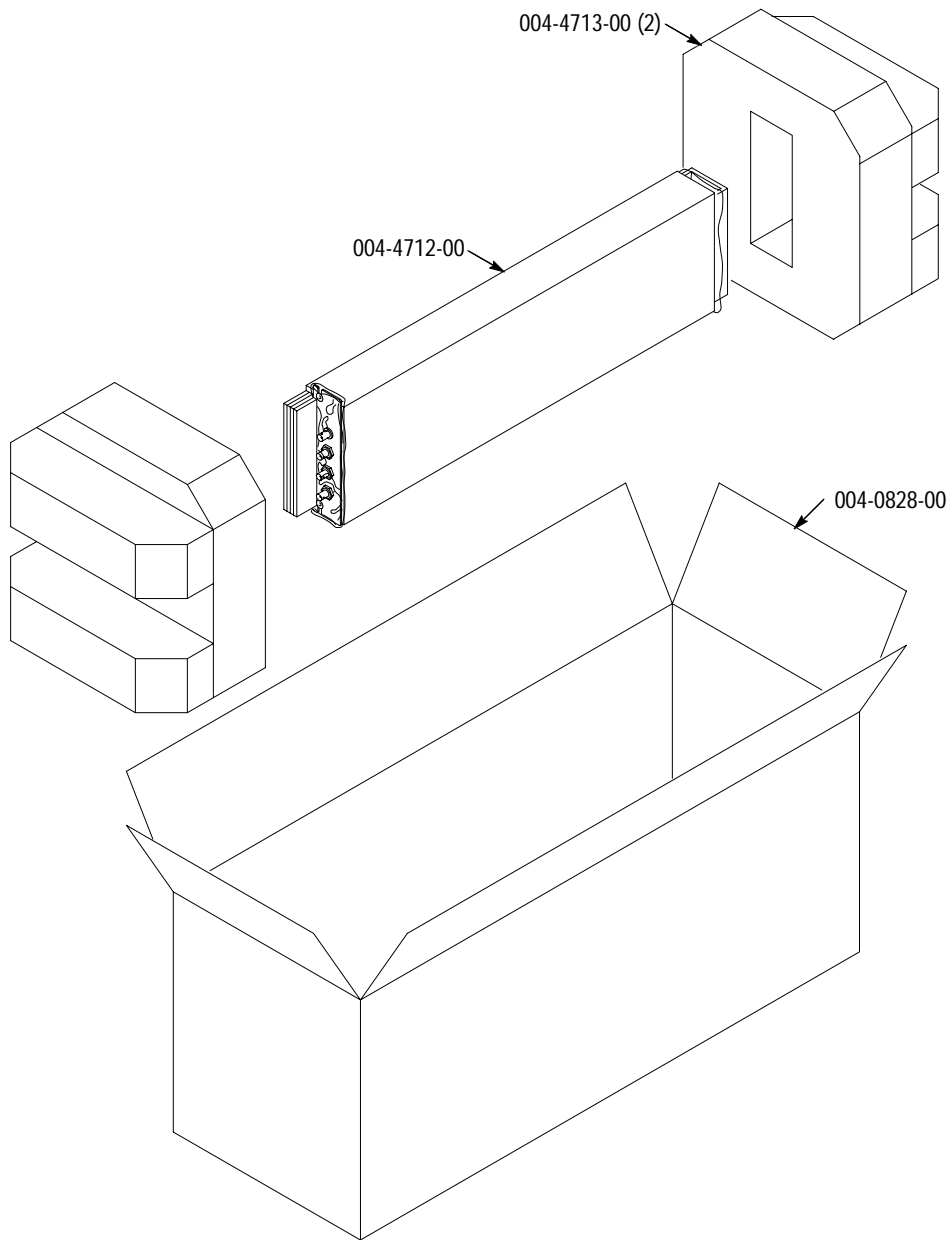


Figure 6-2: Placing the module in the shipping carton

# Removal and Replacement

This section contains the instructions on how you can remove and replace the AGL1 Analog Genlock module customer-replaceable parts.

## Tools Required

The following tools are required to perform the removal and replacement procedures:

**Table 6-1: Required tools**

Tool	Use
Torx screwdriver handle	Removing the module from the mainframe
T-10 Torx tip	Removing the module from the mainframe
9/16 inch box wrench	Removing the rear panel

## Replacing Subassemblies

There is one delay board subassembly (small circuit board) attached to the AGL1 circuit board. To remove the board, perform the following procedure:

1. Perform *Instrument Backup* on page 2-8.
2. Use the *Module Removal* procedure on page 2-10 to remove the AGL1 Genlock module.
3. Remove the subassembly from the AGL1 Genlock module by moving the retaining tabs away from the Delay board and swinging the board down and out. See Figure 6-3.

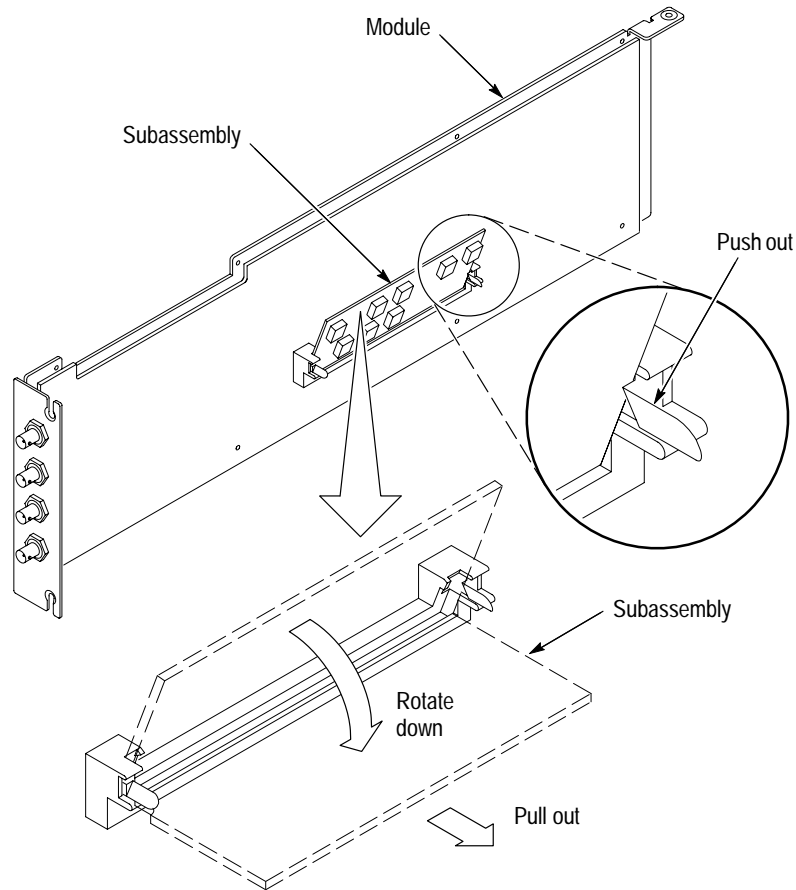


Figure 6-3: Removing a subassembly from a module

## Removing the Rear Panel

To remove the rear panel from a module, perform the following steps:

1. Perform *Instrument Backup* on page 2-8.
2. Use the *Module Removal* procedure on page 2-10 to remove the AGL1 Genlock module from the mainframe.
3. Remove the nuts and washers from each of the rear panel BNC connectors.
4. Lift the rear panel away from the module.
5. To replace the rear panel, position it on the module, install the lock washers and then the nuts.
6. Tighten the nuts.



## Replacing the Shield

It is usually not necessary to remove the shield. If you are returning the AGL1 Genlock module to Tektronix for service, do not remove the shield. Return the entire module.

If you need to replace a damaged shield, carefully follow these instructions.



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**CAUTION.** *The shield provides important support and protection for the surface-mount components. If you remove the shield, be sure not to flex the circuit board.*

---

1. Perform *Removing the Rear Panel* on page 6–8.
2. Using the T-10 Torx tip, remove the eight screws that attach the AGL1 circuit board to the shield.
3. Using great care not to bend or flex the circuit board, pull it out until the BNC connectors clear the rear portion of the shield. Remove the circuit board from the shield and place it on a static free surface.
4. Set the replacement shield assembly (which includes a metal portion and a plastic portion) on a firm, flat, static-free work surface. Carefully place the circuit board in place on the shield.
5. Install and tighten the eight screws that you removed in step 2. Check that the circuit board is flat and is not flexed.



---

**CAUTION.** *When installing the circuit board onto the shield, make sure both the shield and the circuit board are flat. If the board is flexed or warped, it may damage sensitive surface-mount components.*

---

6. Reinstall the rear panel.

## Replacing the Rear Panel Connectors

It is usually not necessary to replace the rear panel BNC connectors. However, if a connector becomes damaged, you can replace it by performing the following steps:

1. Refer to the preceding instructions, *Replacing the Shield*, to remove the shield from the AGL1 Genlock module.
2. Carefully desolder the damaged BNC connector from the back side of the board.
3. To replace the connector, reverse the procedure.



# Troubleshooting Procedures

This section contains instructions and procedures for troubleshooting the AGL1 Genlock module. These procedures will help you decide whether it is necessary to replace your module.

If the TG 2000 Platform mainframe does not boot up or if the display is not working, refer to *Troubleshooting* in the *TG 2000 Signal Generation Platform Service Manual*.

## Equipment Required

The equipment listed in Table 6–2 is required for troubleshooting.

**Table 6–2: Equipment required for troubleshooting**

Equipment description	Minimum requirements/example
Torx screwdriver handle	Accepts Torx-driver bits
T-10 Torx tip	Torx-driver bit for T-10 screw head
Blank disks	MS-DOS preformatted, 3.5 inch. For instrument backup, you will need approximately one disk for each installed generator module, and one disk for the CPU. To write the console ring file, you will need two disks.
Troubleshooting disk	Supplied with the <i>TG 2000 Signal Generation Platform Service Manual</i>
Voltmeter with probes	Accurate to two decimal places, able to measure AC voltage of 900 V <sub>RMS</sub> . For example, Tektronix DM2510 Digital Multimeter

## General Troubleshooting

This section contains general troubleshooting instructions and procedures to use when you begin to troubleshoot suspected faults with the AGL1 Genlock module.

### Instrument Backup

Before you begin any troubleshooting procedures, perform Instrument Backup on page 2–8.



---

**CAUTION.** *To prevent data loss, back up the instrument before you begin any troubleshooting procedures.*

---

### Saving the Console Ring File to Disk

The TG 2000 Platform mainframe displays module diagnostic information during instrument power up. Any error messages are written to an internal file called the console ring file. Tektronix technicians can use the information in the console ring file to help troubleshoot a malfunctioning module.

---

**NOTE.** *Write the console ring file to disk before performing troubleshooting to prevent the troubleshooting routines from overwriting the console ring file.*

---

Write the file as follows:

1. Load the Troubleshooting disk (supplied with the *TG 2000 Signal Generation Platform Service Manual*) into the floppy drive. Press the front-panel **Sequences** button.
2. Touch **File Utilities**, and then touch **Add Sequences from Disk**.
3. Select the **consbak.seq** sequence file and then touch **Start Load**.
4. Touch **OK, Quit**, and then **Quit** again.
5. Touch **Sequences** and then select the **consbak.seq** file to run (use the **Select** key).
6. Touch **Run**. Insert a blank disk when prompted, and touch **Quit**. Label this disk #1.
7. Turn the instrument off and then back on from the front panel. Wait until the instrument has completed its power up process.
8. Write the console ring file to disk again, using a different disk. Label this disk #2.

9. Read the console ring file power up messages. You can use any ASCII text editor. Look for the entries with the most recent time stamp. If there are AGL1 Genlock module errors, refer to Table 6–3 below.
10. If the TG 2000 Platform does not display any power-up confidence test messages, or the CPU module fails the confidence test, refer to *Troubleshooting* in the *TG 2000 Signal Generation Platform Service Manual*.

**Returning Modules to Tektronix**

When you return a mainframe or module to Tektronix for repair or replacement, be sure to include the following:

- The disks containing the console ring files
- Whether or not the module passed diagnostics, the highest number reached for that module, and any error messages
- Description of the problem, including which troubleshooting flow chart you used.

**Fault Symptom Table**

Use this fault symptom table after you have performed the preceding *General Troubleshooting*. Before proceeding, it is important to save the console ring file as indicated in *General Troubleshooting* on page 6–12.

Locate your fault symptom in Table 6–3 and go to the flowchart indicated.

**Table 6–3: Fault symptom table**

Symptom	Flowchart
Major difficulties with module	page 6–14
Mainframe fails to power up	page 6–17
AGL1 not locking to an external signal	page 6–18
Signals lost after power down	page 6–19

## Troubleshooting Flowcharts

The troubleshooting flowcharts provide a series of steps to help you determine whether the AGL1 Genlock module is faulty. Each chart relates to an entry in Table 6–3.

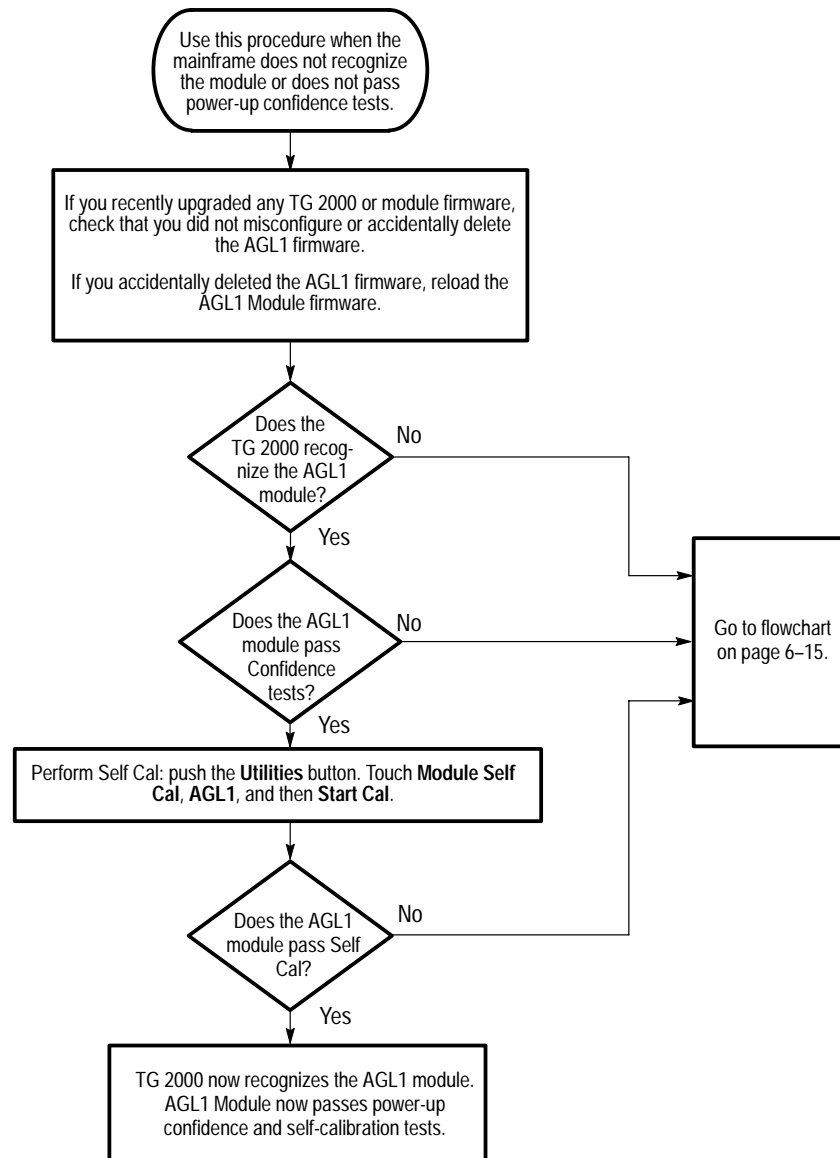


Figure 6–4: Flowchart for major difficulties with module

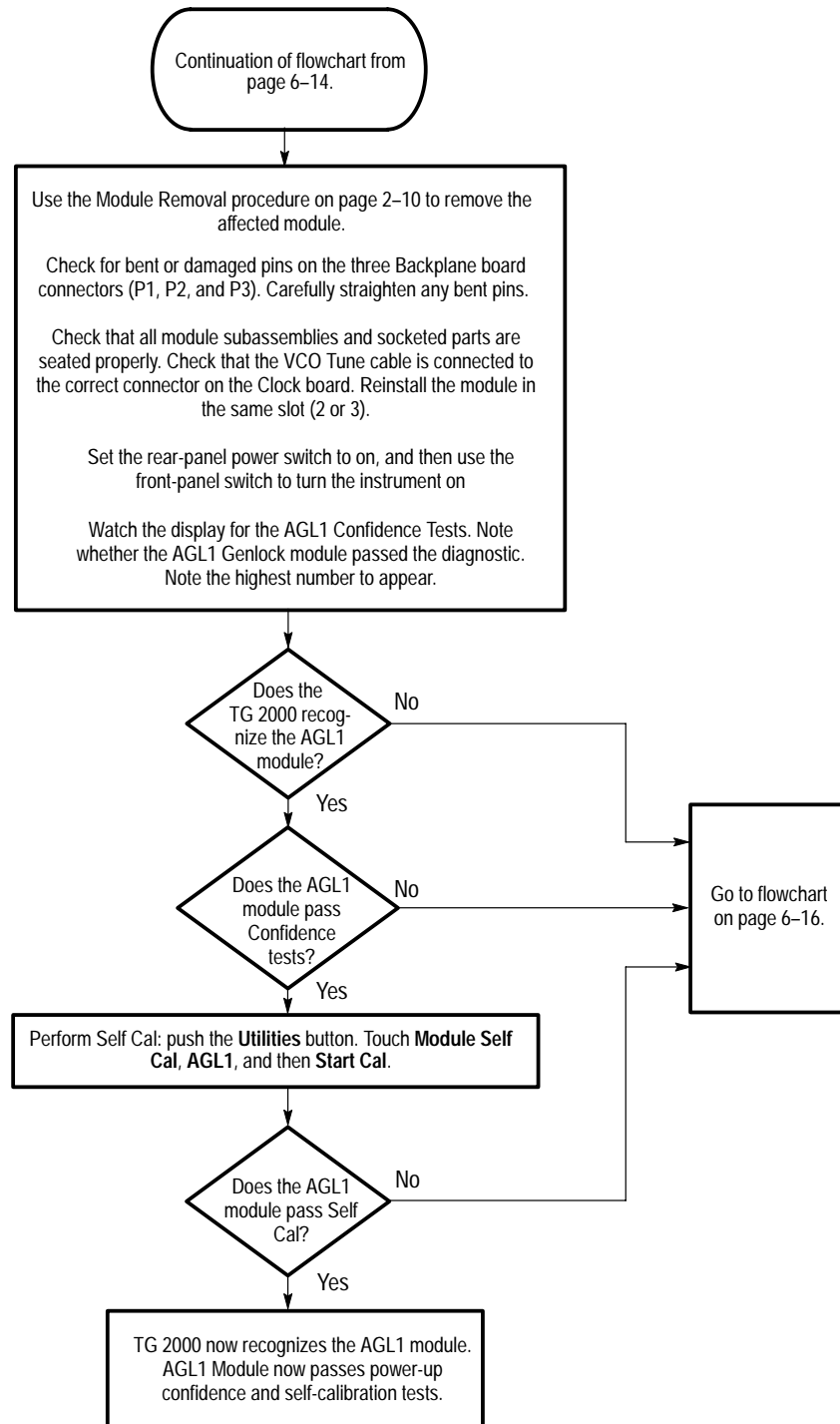


Figure 6-5: Flowchart for checking the current module installation slot

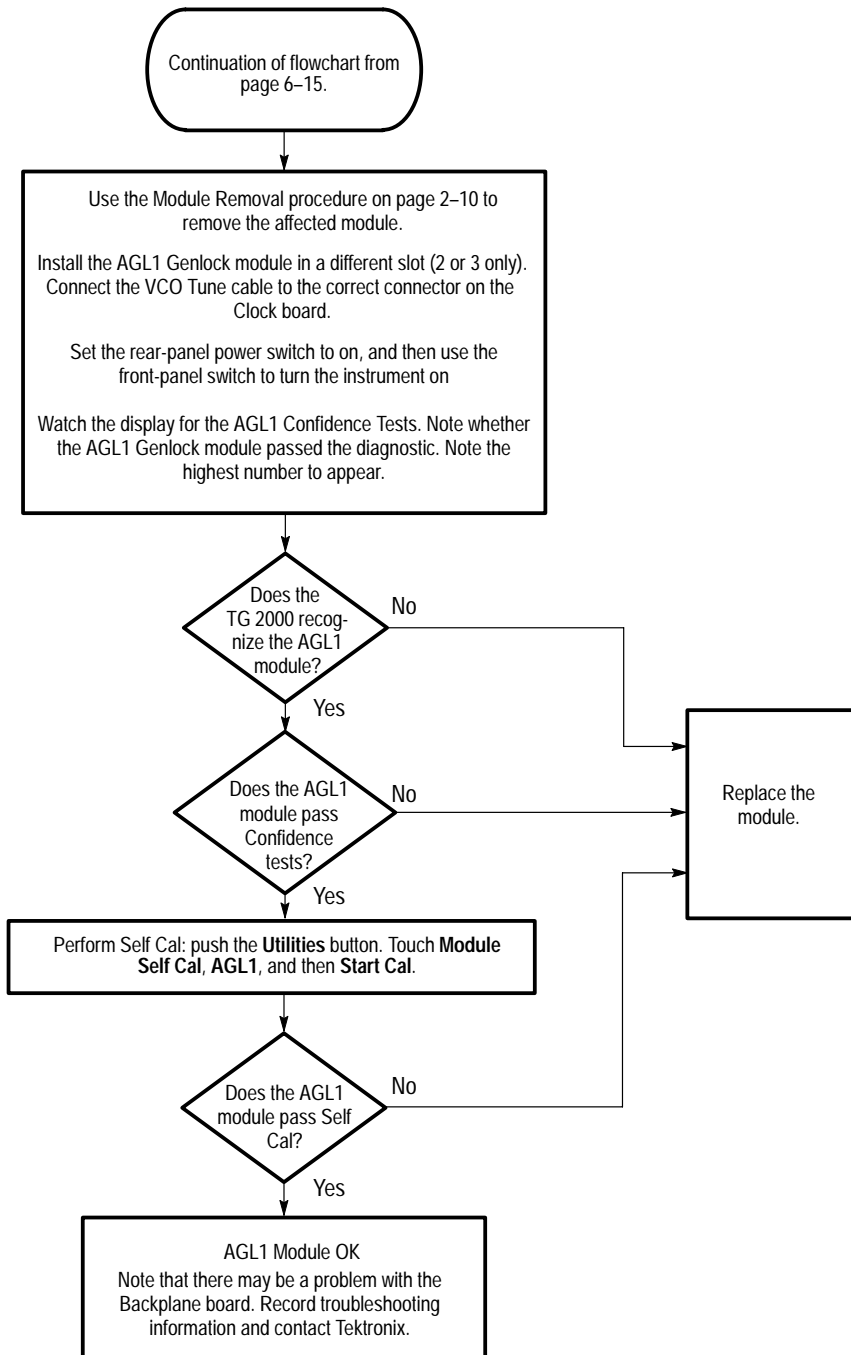


Figure 6-6: Flowchart for checking the module in a different slot



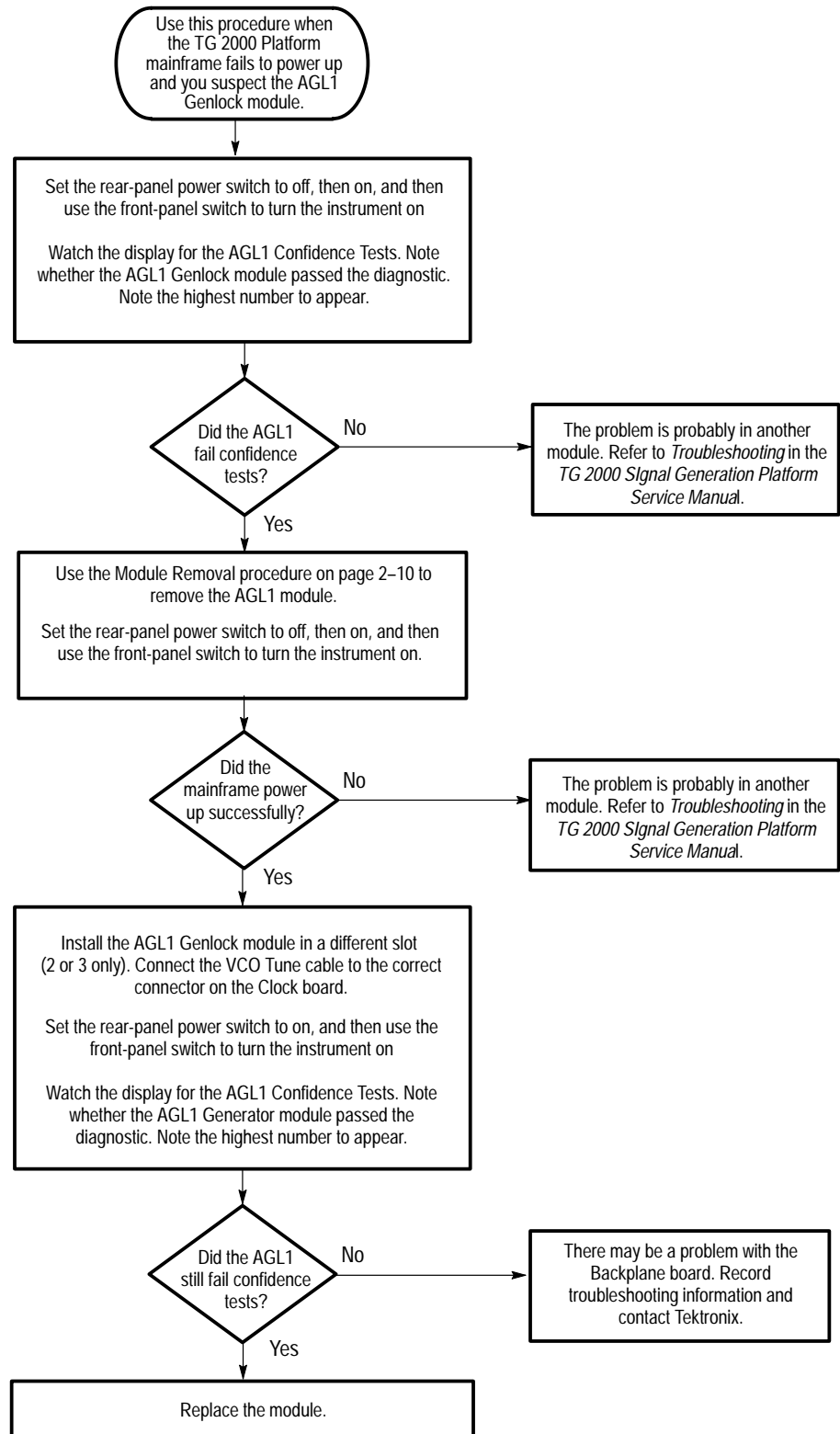


Figure 6-7: Flowchart for failure to power up

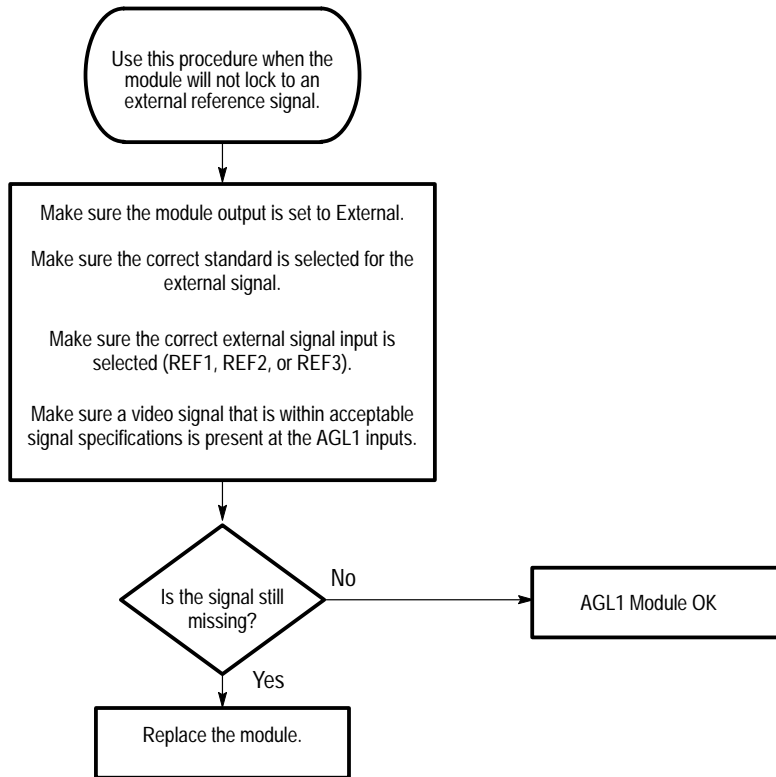


Figure 6–8: Flowchart for AGL1 not locking to an external signal

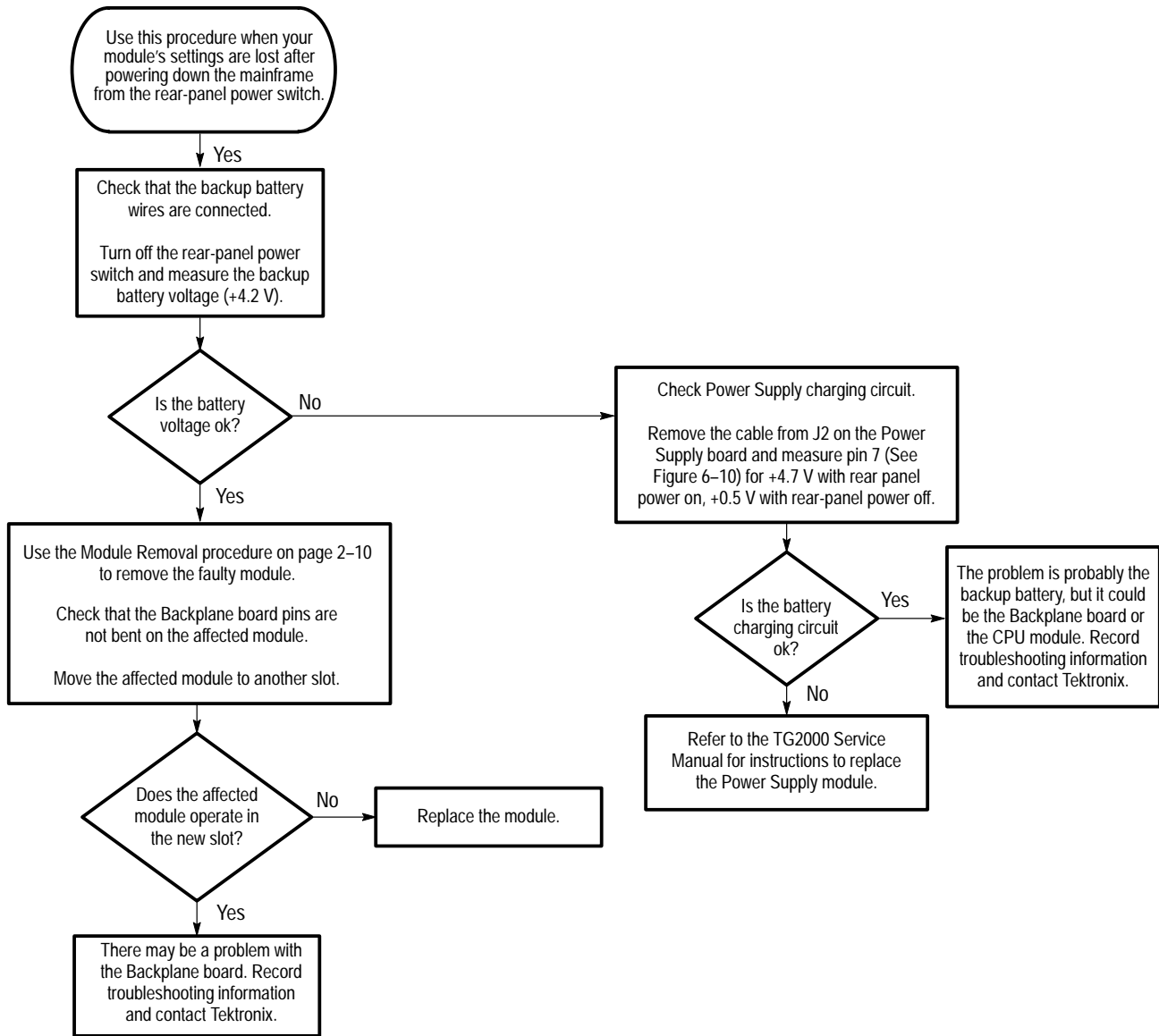


Figure 6-9: Flowchart for settings lost after power down

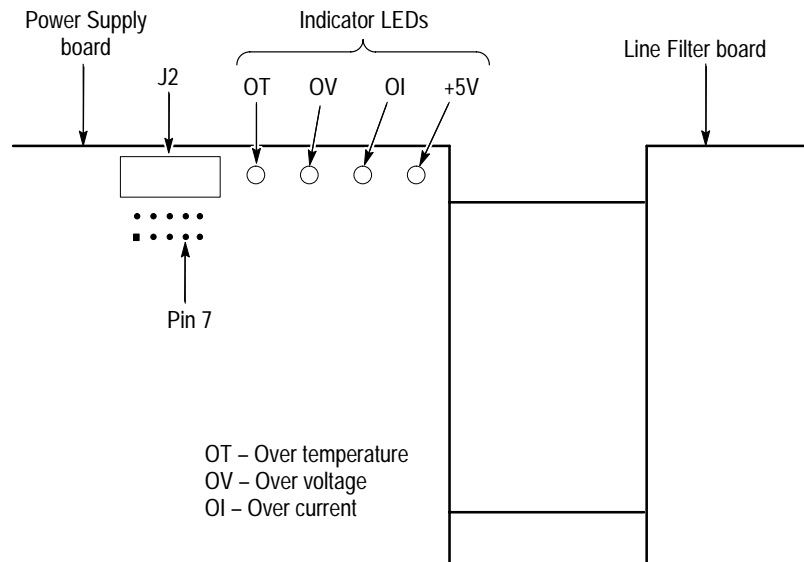


Figure 6-10: Measuring the battery charging circuit



# Options





# Options

There are no options for the AGL1 Analog Genlock Module.







# Electrical Parts List





## Electrical Parts List

The module-level replaceable electrical parts are included in the *Replaceable Mechanical Parts* list. Since component-level repair is not supported, individual electrical components are not listed.





# Diagrams



# Diagrams

The diagram in this section shows the AGL1 Analog Genlock module outputs and connections. Refer to the *Theory of Operation* section for further information and block diagrams.

## Interconnect Diagram

Figure 9–1 shows the AGL1 Analog Genlock module outputs and connections.

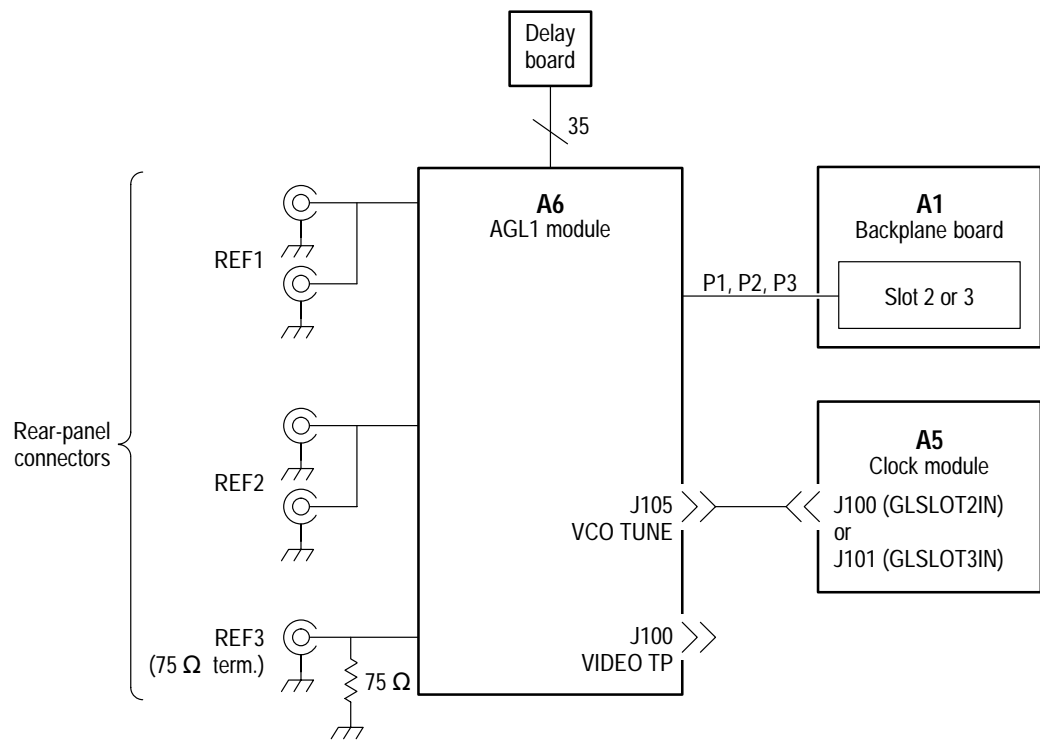


Figure 9–1: AGL1 module connections







# Mechanical Parts List



# Mechanical Parts List

This section contains a list of the replaceable modules for the AGL1 Analog Genlock module. 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 products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order.

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable
- Software version number (in Utils menu)
- Hardware version number (in Utils menu)

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

### Module Servicing

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

**Module Exchange.** In some cases you may exchange your module for a remanufactured module. These modules cost significantly less than new modules and meet the same factory specifications. For more information about the module exchange program, call 1-800-TEK-WIDE.

**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

The following table describes each column in the parts list.

### Parts List Column Descriptions

Column	Column name	Description
1	Figure & Index Number	Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow.
2	Tektronix Part Number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial Number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No 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.
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 table titled *Manufacturers Cross Index* shows 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
01536	TEXTRON INC	1818 CHRISTINA ST	ROCKFORD, IL 61108
0GZV8	HUBER & SUHNER INC	ONE ALLEN MARTIN DRIVE	ESSEX, VT 05451
OKB01	STAUFFER SUPPLY CO	810 SE SHERMAN	PORTLAND, OR 97214-4657
00779	AMP INC.	CUSTOMER SERVICE DEPT PO BOX 3608	HARRISBURG, PA 17105-3608
73743	FISCHER SPECIAL MFG CO	111 INDUSTRIAL RD PO BOX 76500	COLD SPRINGS, KY 41076
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077-0001

## Replaceable Parts List

Fig. & index number	Tektronix part number	Serial no. effective	Serial no. discont'd	Qty	Name & description	Mfr. code	Mfr. part number
10-1-1	211-0408-00			8	SCR,ASSEM WSHR:4-40 X 0.250,PNH,STL,ZINC,T-10 TORX	OKB01	211-0408-00
10-1-2	211-0725-00			2	SCREW,MACHINE:6-32 X 0.375,FLH TORX	01536	ORDER BY DESCR
10-1-3	671-2875-00	B010100	B010730	1	CIRCUIT BD ASSY:GENLOCK	80009	671-2875-00
	671-2875-01	B010731		1	CIRCUIT BD ASSY:GENLOCK	80009	671-2875-01
10-1-4	671-3104-00	B010100	B010730	1	CIRCUIT BD ASSY:DELAY	80009	671-3104-00
	671-3104-01	B010731		1	CIRCUIT BD ASSY:DELAY	80009	671-3104-01
10-1-5	337-4063-01			1	SHIELD:ALUM	80009	337-4063-01
10-1-6	131-3378-00			5	CONN,RF JACK:BNC,50 OHM	00779	227677-1
10-1-7	333-4105-00			1	PANEL,REAR:ALUMINUM,AGL1,TG2000	80009	333-4105-00
10-1-8	210-1039-00			5	WASHER,LOCK:0.521 ID,INT,0.025 THK,SST	OKB01	1224-02-00-0541C
10-1-9	220-0497-00			5	NUT,PLAIN,HEX:0.5-28 X 0.562 HEX,BRS CD PL	73743	ORDER BY DESCR
					<b>STANDARD ACCESSORIES</b>		
	070-9050-XX			1	MANUAL,TECH:USER,AGL1	80009	070-9050-XX
					<b>OPTIONAL ACCESSORIES</b>		
	070-9301-XX			1	MANUAL,TECH:SERVICE,AGL1	80009	070-9301-XX
	063-2958-XX			1	SERVICE DISK,AGL1	80009	063-2958-XX

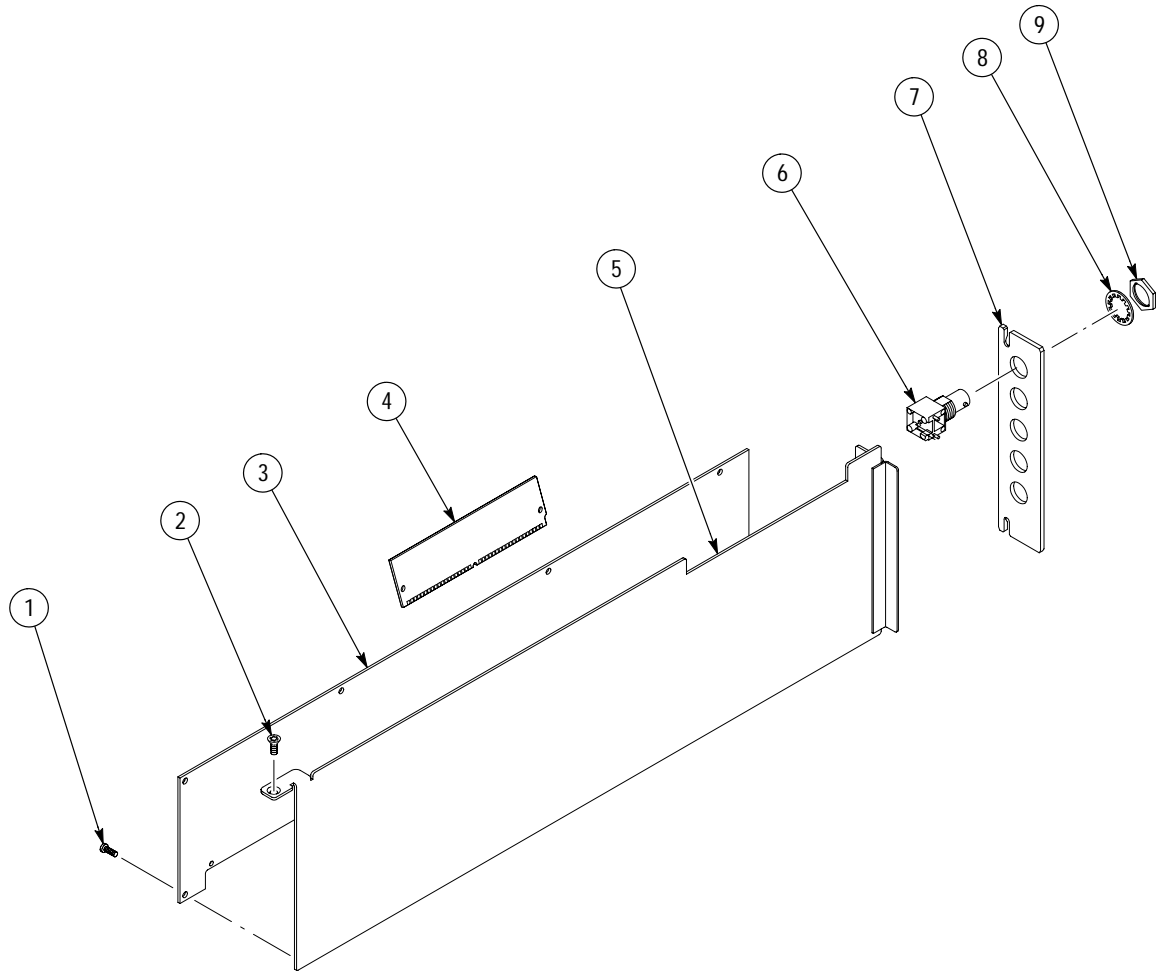


Figure 10-1: Exploded view



