

User Manual

Tektronix

**GP1
GPIB Interface Module**

070-9297-00

CE

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Printed in the U.S.A.

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Name	VISA or Master Card number and expiration
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

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General Safety Summary

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

Only qualified personnel should perform service procedures.

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

- | | |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Injury Precautions | Avoid Electric Overload. To avoid electric shock or fire hazard, do not apply a voltage to a terminal that is outside the range specified for that terminal. |
| Product Damage Precautions | Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel. |

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



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



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

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

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

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

CAUTION indicates a hazard to property including the product.

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



DANGER
High Voltage



Protective Ground
(Earth) Terminal



ATTENTION
Refer to Manual



Double
Insulated

**Certifications and
Compliances**

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

Service Safety Summary

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

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

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

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

To avoid electric shock, do not touch exposed connections.

Preface

This manual describes the capabilities, features, and specifications of the GP1 GPIB Interface Module. This manual also provides instructions on how to install and set up the module.

About This Manual

This manual is composed of the following sections:

- *Getting Started* provides a product description, incoming inspection procedure, and a standard and optional accessories list.
- *Operating Basics* tells how to operate the module.
- *Syntax and Commands* defines the syntax used in command descriptions, presents a list of all command subsystems, and presents detailed descriptions of all programming commands.
- *Appendices* provides additional information including the specifications and hardware installation procedures.

Related Manuals

The following documents are also available.

- The *GP1 Interface Module Service Manual* (Tektronix part number 070-9303-XX) describes how to service the GP1 Interface module. This optional manual must be ordered separately.
- The *TG 2000 Signal Generation Platform User Manual* (Tektronix part number 070-9108-XX) describes how to use the TG 2000 generator. This manual is a standard accessory for the TG 2000 Platform mainframe.
- The *TG 2000 Signal Generation Platform Service Manual* (Tektronix part number 070-9299-XX) describes how to service the mainframe to the module level. This optional manual must be ordered separately.

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>http://www.tek.com</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>



Getting Started

Getting Started

This section contains a product description, accessories list, and incoming inspection procedure.

Product Description

The GP1 GPIB Interface module provides a GPIB communication port between the TG 2000 Mainframe and external controllers. The GPIB port conforms to IEEE Std. 488.1-1987 and 488.2-1987.

Accessories

Table 1–1 lists the GP1 Interface module accessories.

Table 1–1: GP1 Interface module accessories

Accessories	Part Number
Standard	
<i>GP1 GPIB Interface Module User Manual</i>	070-9297-XX
T-10 Torx Tip	003-1604-XX
Screws (2 ea.)	211-0725-XX
Optional	
<i>GP1 GPIB Interface Module Service Manual</i>	070-9303-XX

Installation

If the GP1 Interface module was ordered with the TG 2000 Signal Generation Platform, the module comes already installed. If the module was ordered after receiving the TG 2000 Signal Generation Platform, a qualified service technician must install the module. Installation procedures are in *Appendix C: Hardware Installation*.

Incoming Inspection

Perform the following procedure to verify that the GP1 Interface module is operating correctly.

1. Install the module into the mainframe, using the installation procedures in *Appendix C: Hardware Installation*.
2. Connect the TG 2000 Platform mainframe to the appropriate AC mains power and switch on the rear panel power switch.
3. Press the **On/Standby** button on the front panel. This initiates self tests on the mainframe and all installed modules.

If the display is working and no errors appear on the display, the mainframe and its installed modules passed all self tests.

4. Push the **Remote** button. The displayed icons should include the GPIB Setup icon. This verifies that the TG 2000 Platform mainframe recognizes the GP1 module. If the GPIB Setup icon is not shown, please contact Tektronix customer support for help. Contact information is on page viii.

This concludes the incoming inspection.

Troubleshooting

If the GP1 Interface module passes self-test diagnostics but does not let remote devices communicate with the TG 2000 Platform mainframe, do the following steps:

1. Check that the GPIB cable is fully seated into the GP1 Interface module connector.
2. Check that you have assigned a unique GPIB address to the GP1 Interface module (refer to *Setting the GPIB Address* on page 2–1).
3. Check that you have set the TG 2000 Platform mainframe Remote Port to GPIB.
4. Check that the remote device is set to use the GP1 Interface module address.
5. Check that the remote device is working by having it send commands to another GPIB instrument.

If the GP1 Interface module still does not function properly after these checks, please contact Tektronix customer support for help. Contact information is on page viii.



Operating Basics

Operating Basics

This section provides operating instructions for the GP1 GPIB Interface module. If you are not familiar with the basic operation of the mainframe, read the *Operating Basics* section of the *TG 2000 Signal Generation Platform User Manual* before proceeding.

Functional Overview

The GP1 Interface module provides communication between the TG 2000 Signal Generation Platform and GPIB controllers. You can use the GP1 Interface module to remotely control the TG 2000 Signal Generation Platform and download signals from other instruments (such as the SDP 2000) into the TG 2000 Signal Generation Platform.

Operating Procedures

The following procedures describe how to set the mainframe GPIB address and how to take the GP1 Interface module off line.

Setting the GPIB Address

To set the mainframe GPIB address, do the following steps:

1. Push the **Remote** button.
2. Touch **GPIB Setup** on the display.
3. Touch **Address**.
4. Assign a GPIB address number to the mainframe. GPIB addresses are in the range of 0 to 30. You enter the address value using one of two methods:
 - Use the front-panel keypad to enter the address.
 - Use the front-panel knob to scroll through the address values.
5. Touch **Quit** to set the mainframe GPIB address and close the GPIB setup screen.

Taking the GPIB Module Off-line

To take the GPI Interface module off line, do the following steps:

1. Push the **Remote** button.
2. Touch **GPIB Setup** on the display.
3. Touch **Address**.
4. Assign GPIB address number 31 to the mainframe. You enter the address value using one of two methods:
 - Use the front-panel keypad to enter address 31.
 - Use the front-panel knob to select address 31.
5. Touch **Quit** to set the mainframe GPIB address and close the GPIB setup screen.



Syntax and Commands



Syntax

The GPIB command syntax is listed in the *TG 2000 Signal Generation Platform User Manual* and in each module's user manual. Refer to those manuals for more information.



Appendices

Appendix A: Specifications

The GPI Interface module conforms to IEEE Std. 488.1-1987 and 488.2-1987. Refer to the *TG 2000 Signal Generation Platform User Manual* for a list of mainframe environmental specifications. Table A-1 lists the EMC compliance specifications.

Table A-1: Certifications and compliances

EMC Compliance	Meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility when it is used with the TG 2000 Signal Generation Platform. 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

Appendix B: GPIB Information

This section provides GPIB bus signal information as it relates to the GP1 Interface module.

GPIB Compatibility

The GP1 Interface module conforms to IEEE Std. 488.1-1987 and 488.2-1987. Table B-1 lists the GPIB signal compatibilities.

Table B-1: GPIB compatibility

Signal	Description
SH1	Complete Source Handshake capability
AH1	Complete Acceptor Handshake capability
T6	Basic Talker Serial Poll capability No Talker Only mode Unaddress if MLA
L4	Basic Listener No Listener Only mode Unaddress if MTA
SR1	Complete Service Request capability
RL0	No Remote/Local capability
PP0	No Parallel Poll capability
DC1	Complete Device Clear capability
DT0	No Device Trigger capability
C0	No Controller capability
E2	Tristate Bus Drivers

The Status Byte Register

The Status Byte Register summarizes information from other registers. Use a serial poll or a *STB? query to read the contents of the Status Byte Register. The response is the sum of the decimal values for all bits set. When you use a serial poll, bit 6 shows Request Service information. When you use the *STB? query, bit 6, the Master Status Summary bit, indicates that bits 4 or 5 may be set. Table B-2 lists the Status Byte Register bits and corresponding functions.

Table B-2: The Status Byte Register

Bit	Decimal value	Function
0-2	–	Not used
3	8	Indicates that one or more events have occurred in the :STATus:QUEStionable registers
4	16	Indicates that data is available in the output data buffer
5	32	Indicates that one or more events have occurred in the Standard Event Status Register
6	64	Indicates that the TG 2000 Platform mainframe has requested service from the remote GPIB controller (obtained from a serial poll)
7	128	Indicates that one or more events have occurred in the :STATus:OPERation registers

WARNING

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

Appendix C: Hardware Installation

This section provides instructions for installing and removing the GPI Interface module into and from the TG 2000 Platform mainframe. A T-10 torx tip screw driver is the only tool you need to install the module. A T-10 torx tip is supplied with this module.

Saving Signal Sets

The installation procedure may require you to remove a generator module. Before removing a generator module you should save its signal sets to a disk. Generator modules lose their signal memory 30 seconds after removal from the TG 2000 mainframe.

To save signal sets for a generator module, perform the following procedure:

1. Insert a DOS formatted disk into the TG 2000.
2. Press the **Disk** key and select **Save Signals to Disk**.
3. Press **Select Source** and select the module you are removing. Use the cursor keys to tag the module in the signals column. Select **Quit/Save** to finish your selection.
4. Press **Select Destination** and choose **A:**. If desired, create a new directory for the signals by selecting **New Dir** and entering a DOS compatible name.
5. Create a new file by pressing **New File**.
6. Select **Quit/Save** to complete the transfer of signal sets to the disk.
7. Press **Start Save**. Saving signals to disk may take several minutes depending on the number and size of test signals.

Preventing Electrostatic Damage



CAUTION. *Electrostatic discharge (ESD) can damage components on the GP1 Interface module and the TG 2000 Platform mainframe. To prevent ESD, follow the steps below when installing, removing, or handling TG 2000 Platform mainframe 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.

Installing the GP1 Module

To install the GP1 Interface module into the TG 2000 Platform mainframe, do the following steps:

1. Turn off the TG 2000 Platform mainframe by pressing the On/Standby front panel button and switching the rear panel power switch to off.
2. Unplug the power cord.



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

3. Remove all top-cover screws and remove the top cover. See Figure C-1.

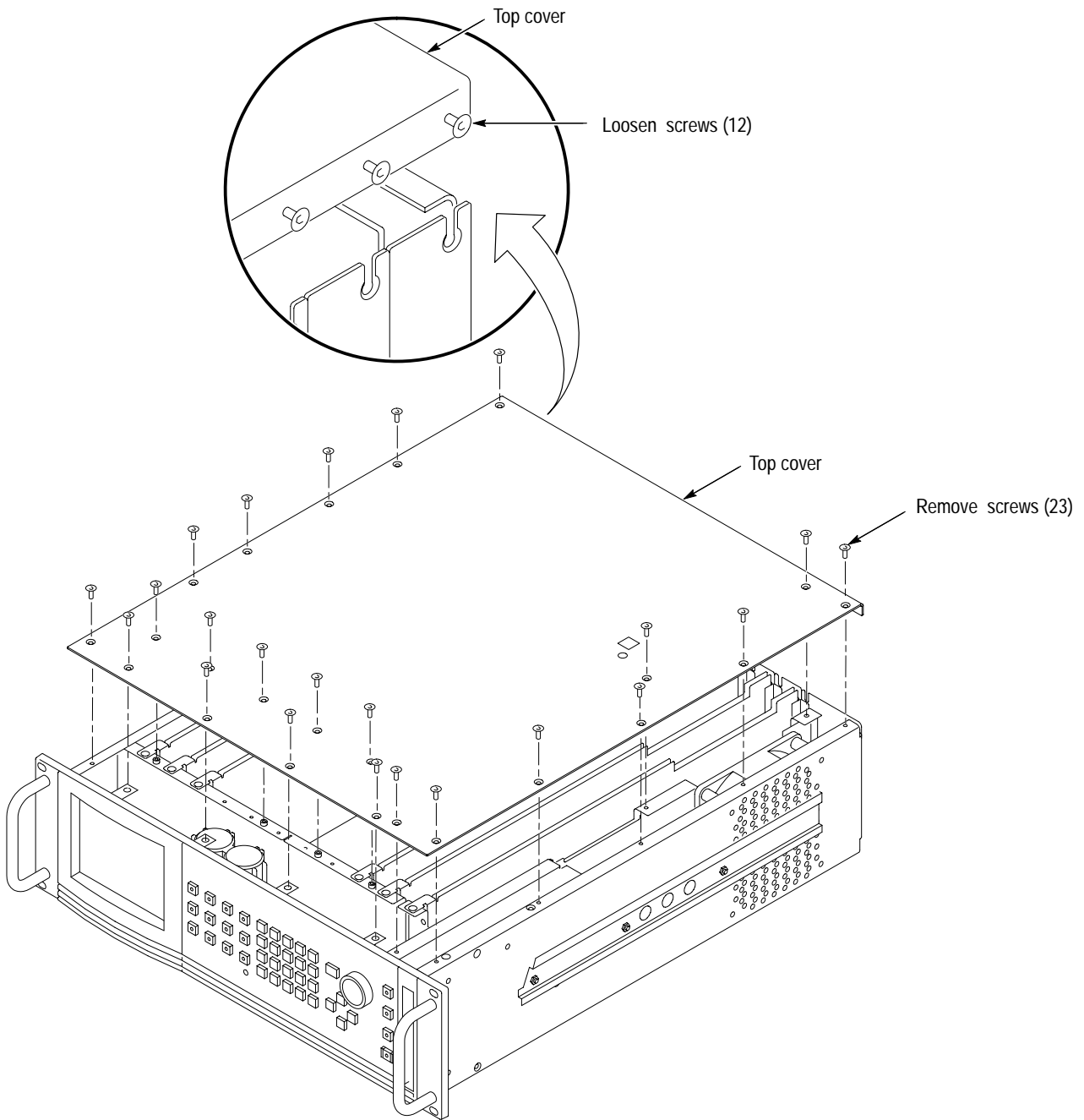


Figure C-1: Top cover removal

4. Figure C-2 shows the slot locations where special modules must be installed. The GP1 Interface module must be installed in slot 10.

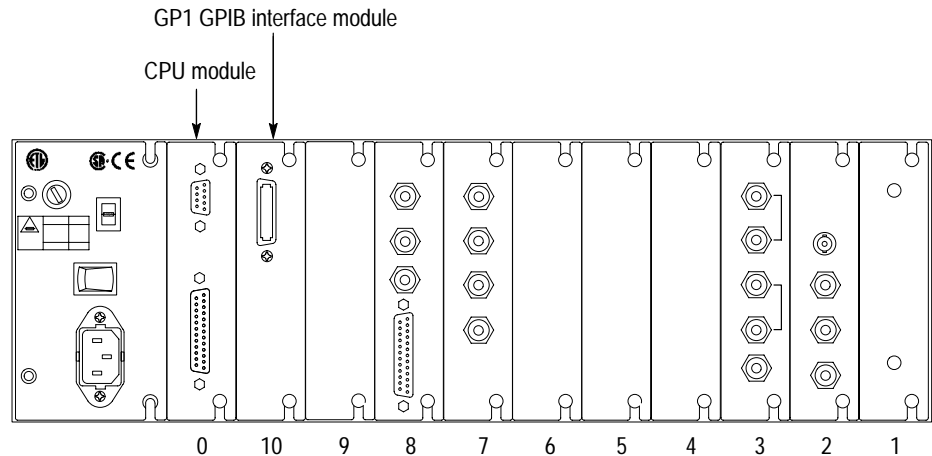


Figure C-2: TG 2000 mainframe slot numbering and GP1 Interface module location

5. Remove the rear panel covers from slots 10 and 9. Figure C-3 shows how to remove a rear panel cover. Do not remove the bottom screw, just loosen it. You will use it later to secure the module.

If there is a module installed in slot 10, remove it and install it in a different slot. If there is a module in slot 9, remove it temporarily and reinstall it after installing the GP1 Interface module. Temporarily removing a board from slot 9 makes it easier to install the GP1 Interface module.

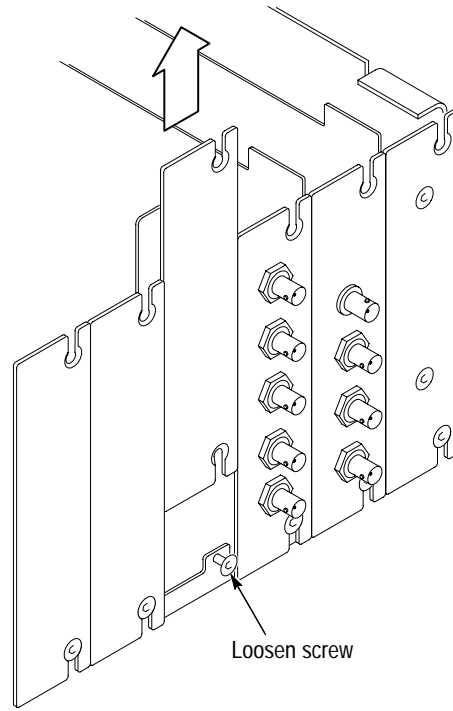


Figure C-3: Removing a rear panel cover

6. Remove the ribbon cable from its bag, slide it into the slot near J1, and plug the connector into J1. The colored wire must face the top edge of the module. See Figure C-4.

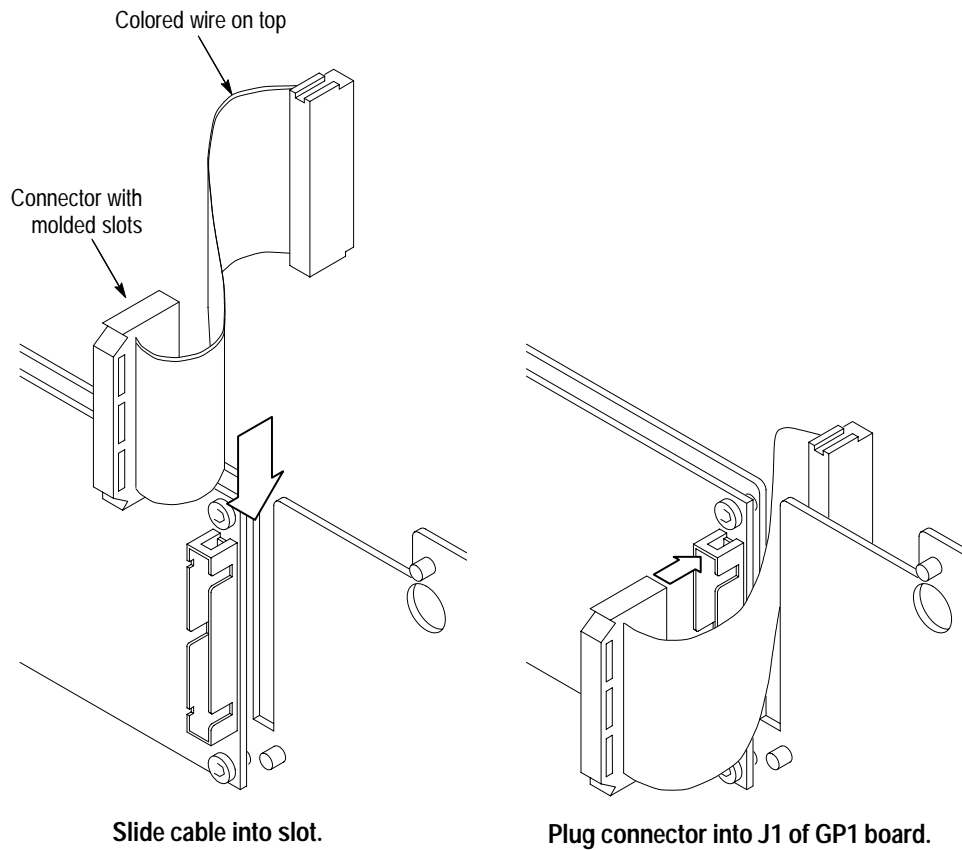


Figure C-4: Installing the CPU ribbon cable

7. Lower the GP1 Interface module into slot 10 as shown in Figure C-5. Note that the GP1 Interface module does not plug into the motherboard connector.

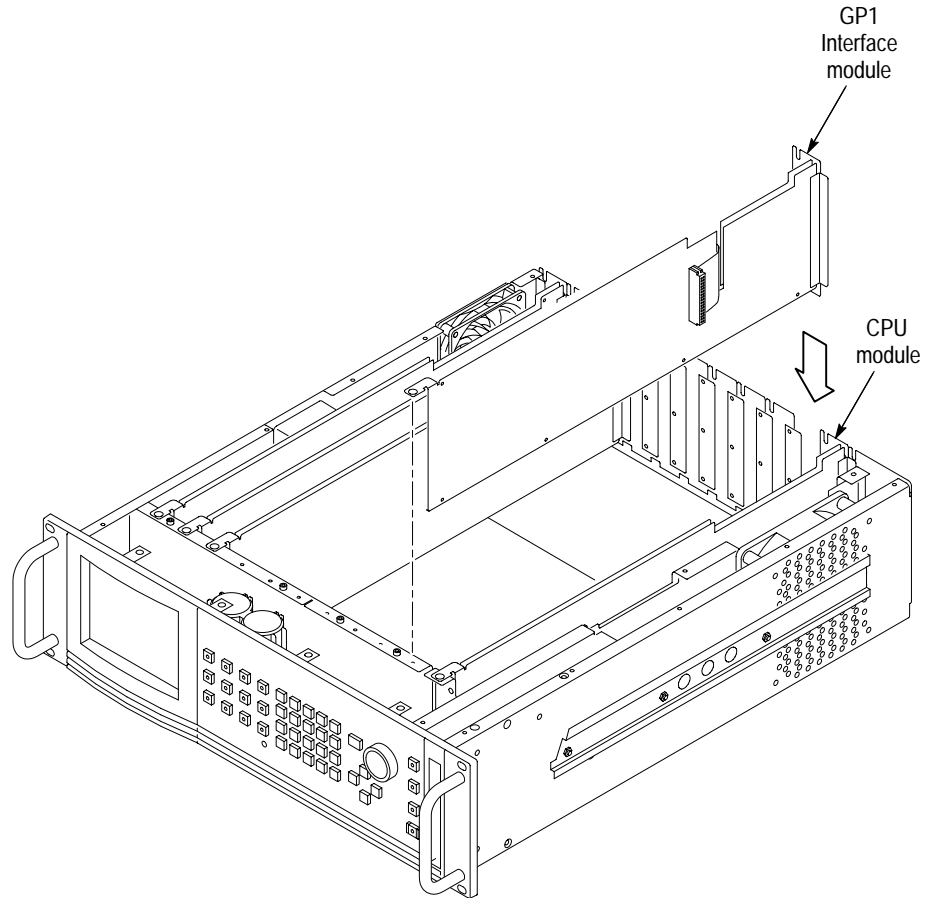


Figure C-5: Installing the GP1 module

8. Connect the ribbon cable from the GP1 Interface module to connector J20 on the CPU module, as shown in Figure C-6. You can swing the GP1 Interface module away from the CPU module to make more room to insert the cable.

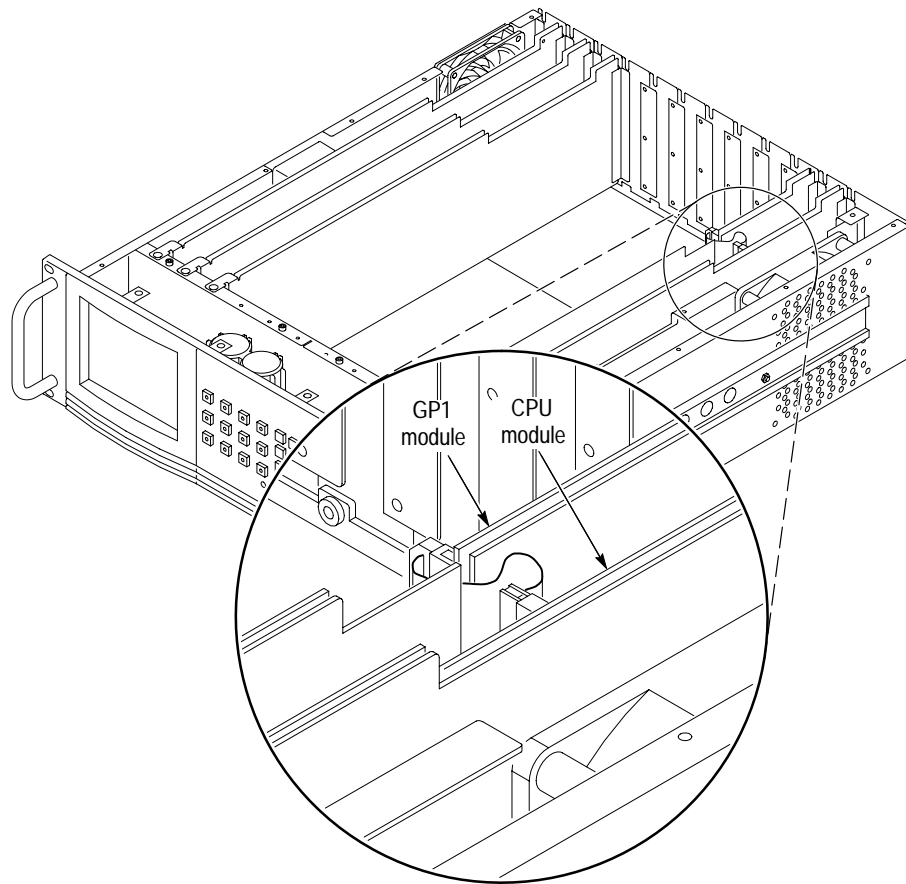


Figure C-6: Attaching the cable from the GP1 Interface module to the CPU board

9. Check that the flange on the GPI Interface module is correctly aligned. Figure C-7 shows how a flange is aligned.

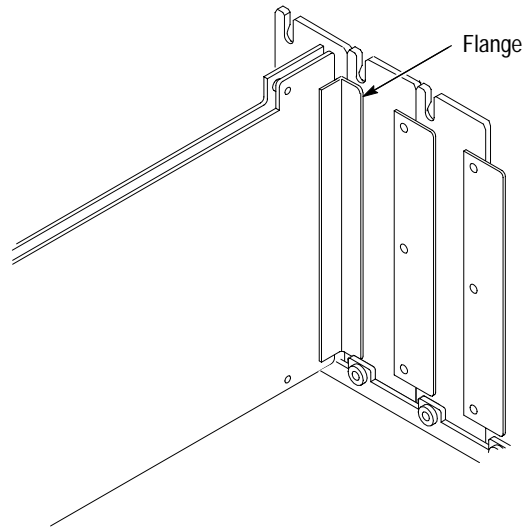


Figure C-7: Module flange alignment

10. Refer to Figure C-8 and insert and tighten the top screw, which comes with your module.

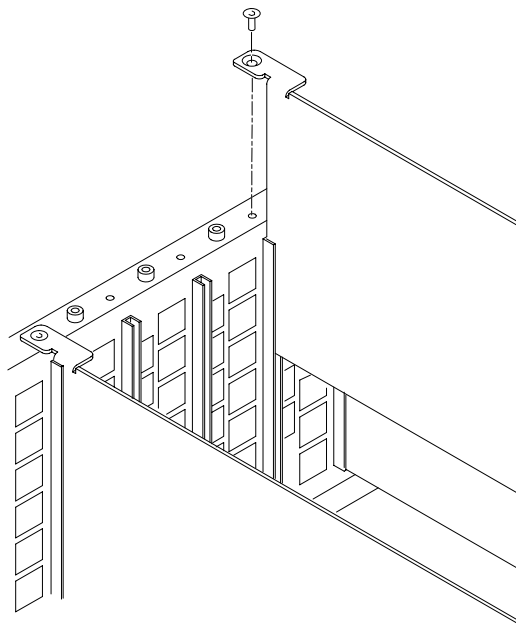


Figure C-8: Module top screw

11. Tighten the rear panel screw on the GPI Interface module.
12. If you removed a module from slot 9, reinstall it now.
13. Reinstall the top cover and insert and tighten all top cover screws.
14. Plug in the instrument power cord.

This completes the module installation procedure. Go to *Incoming Inspection* on page 1–2 to verify that the GPI Interface module is operating correctly.

Removing the GPI Interface module

To remove the GPI Interface module, first power off and unplug the instrument. Then refer to the previous procedure, *Installing the GPI Module*, and perform the installation steps in the reverse order. If you want to save your current signal settings, refer to *Saving Signal Sets* on page C–1.

To ensure proper cooling and adherence to EMI shielding requirements, use 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.

This completes the module removal procedure.

