Notice

Hewlett-Packard to Agilent Technologies Transition

This documentation supports a product that previously shipped under the Hewlett-Packard company brand name. The brand name has now been changed to Agilent Technologies. The two products are functionally identical, only our name has changed. The document still includes references to Hewlett-Packard products, some of which have been transitioned to Agilent Technologies.

Agilent Technologies

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By internet, phone, or fax, get assistance with all your test and measurement needs.

Table 1-1 Contacting Agilent

Online assistance: `www.agilent.com/find/assist`

United States	**Latin America**	**Canada**	**Europe**
(tel) 1 800 452 4844	(tel) (305) 269 7500	(tel) 1 877 894 4414	(tel) (+31) 20 547 2323
	(fax) (305) 269 7599	(fax) (905) 282-6495	(fax) (+31) 20 547 2390
New Zealand	**Japan**	**Australia**	
(tel) 0 800 738 378	(tel) (+81) 426 56 7832	(tel) 1 800 629 485	
(fax) (+64) 4 495 8950	(fax) (+81) 426 56 7840	(fax) (+61) 3 9210 5947	

Asia Call Center Numbers

Country	Phone Number	Fax Number
Singapore	1-800-375-8100	(65) 836-0252
Malaysia	1-800-828-848	1-800-801664
Philippines	(632) 8426802 1-800-16510170 (PLDT Subscriber Only)	(632) 8426809 1-800-16510288 (PLDT Subscriber Only)
Thailand	(088) 226-008 (outside Bangkok) (662) 661-3999 (within Bangkok)	(66) 1-661-3714
Hong Kong	800-930-871	(852) 2506 9233
Taiwan	0800-047-866	(886) 2 25456723
People's Republic of China	800-810-0189 (preferred) 10800-650-0021	10800-650-0121
India	1-600-11-2929	000-800-650-1101

Installation Guide

Agilent Technologies
70341A Frequency Extension Module

Agilent Technologies

Notice

The information contained in this document is subject to change without notice.

Agilent Technologies makes no warranty of any kind with regard to this material, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Safety Information

The following safety symbols are used throughout this manual. Familiarize yourself with the symbols and their meaning before operating this instrument.

WARNING   ***Warning* denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.**

CAUTION   *Caution* denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

NOTE   *Note* calls out special information for the user's attention. It provides operational information or additional instructions of which the user should be aware.

The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to the instructions in the documentation.

This symbol is used to mark the on position of the power line switch.

This symbol is used to mark the standby position of the power line switch.

This symbol indicates that the input power required is AC.

WARNING	**This is a Safety Class 1 Product (provided with a protective earth ground incorporated in the power cord). The mains plug shall be inserted only in a socket outlet provided with a protected earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.**
WARNING	**No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.**
WARNING	**If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.**
CAUTION	Always use the three-prong AC power cord supplied with this product. Failure to ensure adequate grounding may cause product damage.

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This Agilent Technologies instrument product is warranted against defects in material and workmanship for a period of three years from date of shipment. During the warranty period, Agilent Technologies will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Agilent Technologies. Buyer shall prepay shipping charges to Agilent Technologies and Agilent Technologies shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Agilent Technologies from another country.

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LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from
improper or inadequate maintenance by Buyer, Buyer-supplied
software or interfacing, unauthorized modification or misuse, operation
outside of the environmental specifications for the product, or improper
site preparation or maintenance.

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EXCLUSIVE REMEDIES. AGILENT TECHNOLOGIES SHALL NOT
BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL,
OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON
CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

The HP 70341A

The HP 70341A frequency extension module is part of the Modular
Measurement System, MMS, and is a slave module to the HP 70340A modular
signal generator. The HP 70341A and HP 70340A, together, provide carrier
frequency range of 0.01 to 20 GHz. (Without the HP 70341A, the HP 70340A
frequency range is 1 - 20 GHz.)

The *HP 70341A Installation Guide* shows you how to install the HP 70341A
into the MMS. The procedures in this book assume that you have already
installed the HP 70340A into the MMS and have verified its operation. If you
have not installed the Signal Generator, refer to the *HP 70340A/41A User's
Guide* chapter, "Installing and Verifying the Signal Generator" before using
this book.

Once the HP 70341A installation and power-on procedures are complete,
operation of the HP 70340A/41A should be verified through the procedure
"Verifying the HP 70340A/41A Functionality" in the *HP 70340A/41A
User's Guide* and/or through the incoming inspection procedure in the
HP 70340A/41A Calibration Guide. Signal generator applications and
reference material are in the *HP 70340A/41A User's Guide*. See the Learning
Products Map at the end of this book for a complete list of documentation
pertaining to the HP 70341A.

A **serial number** identification label is attached to the rear panel of this
instrument. The serial number is in the form: xxxxAyyyyy. The first four
digits, xxxx, and the letter "A" comprise the serial number prefix while the
last five digits, yyyyy, make up the suffix. The serial number prefix is the
same for identical instruments; the prefix *only* changes when a configuration
change is made to the instrument. The serial number suffix, on the other
hand, is unique to each instrument and is assigned sequentially.

For simplicity, the HP 70001A mainframe and the HP 70206A display is used for "front panel" illustration in the procedures throughout this book. Illustrations are shown with the display in full-screen mode. If you are using a display other than the HP 70206A or are not in full-screen mode, the keys and softkeys may differ.

Certain terms and conventions that are used throughout this book are explained here.

HP 70341A   refers to the HP 70341A frequency extension module

HP 70340A   refers to the HP 70340A modular signal generator

signal generator refers to the HP 70340A modular signal generator

MMS   refers to the HP 70000 Modular Measurement System

module   refers to any MMS module

mainframe   refers to your mainframe or display (HP 70001A, HP 70004A, HP 70205A, or HP 70206A)

[hard key]   refers to keys dedicated to one function as labeled

softkey   refers to keys which change function according to the label on the display screen

screen text   refers to text (other than softkey labels) that is shown on the display screen

At a Glance
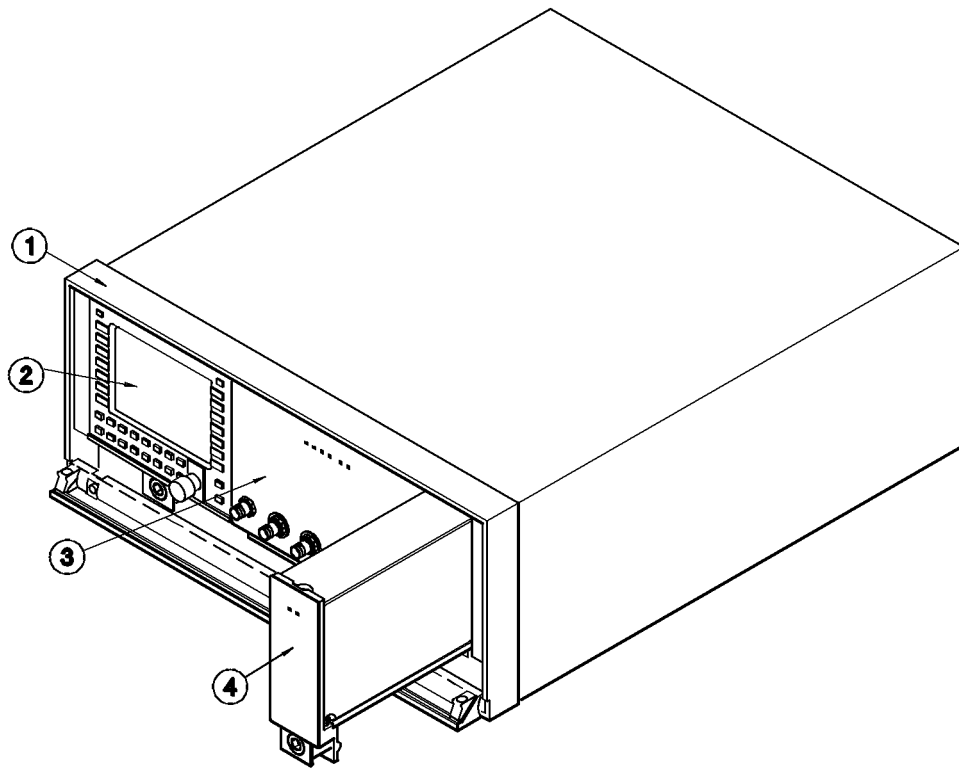
The HP 70341A, HP 70340A, and Display

The HP 70341A frequency extension module operates in the MMS with the
HP 70340A modular signal generator, a mainframe, and (for front panel
operation) a display. The HP 70341A frequency extension module is shown
being installed into the mainframe. This example MMS configuration shows
the ① HP 70001A mainframe, ② HP 70206A display module, ③ HP 70340A
signal generator, and ④ HP 70341A frequency extension module.

All connections between the HP 70340A and the HP 70341A are made from the rear panels. Refer to the procedure, "To Make Rear Panel Connections," in chapter 1 for the connections between the two modules.

In This Book

The first two chapters of this book contain step-by-step instructions for HP 70341A installation and system power-up. The last two chapters contain HP 70341A reference, legal and product warranty material.

Chapter 1, "Installing the HP 70341A," explains how to install the module into the MMS.

Chapter 2, "If You Encounter a Problem," shows you what to do in the event that you do have trouble installing the HP 70341A.

Chapter 3, "Reference," provides alphabetized entires about module features, specifications, accessories, options, etc. which pertain to the installation procedures in this book.

Chapter 4, "Legal and Regulatory Information", contains safety, RFI type acceptance, SCPI conformance, and product warranty information.

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Installing the HP 70341A

Installing the HP 70341A

This chapter provides step-by-step instructions for installation of the
HP 70341A frequency extension module into the MMS. The procedures
assume that you have already installed and verified operation of the
HP 70340A modular signal generator.

When you have completed the installation of the HP 70341A, refer to the
HP 70340A/41A Calibration Guide for performance verification or incoming
inspection procedures.

If you have difficulty running any of these procedures, the chapter, "If You
Encounter a Problem," lists commonly encountered problems and solutions
that allow you to quickly get back to work.

The tools required for installation include:

  8 mm hex ball driver, HP part number 8710-1307
  torque wrench, size 5/16 in, torque = 8 lbs-in

To Unpack the HP 70341A
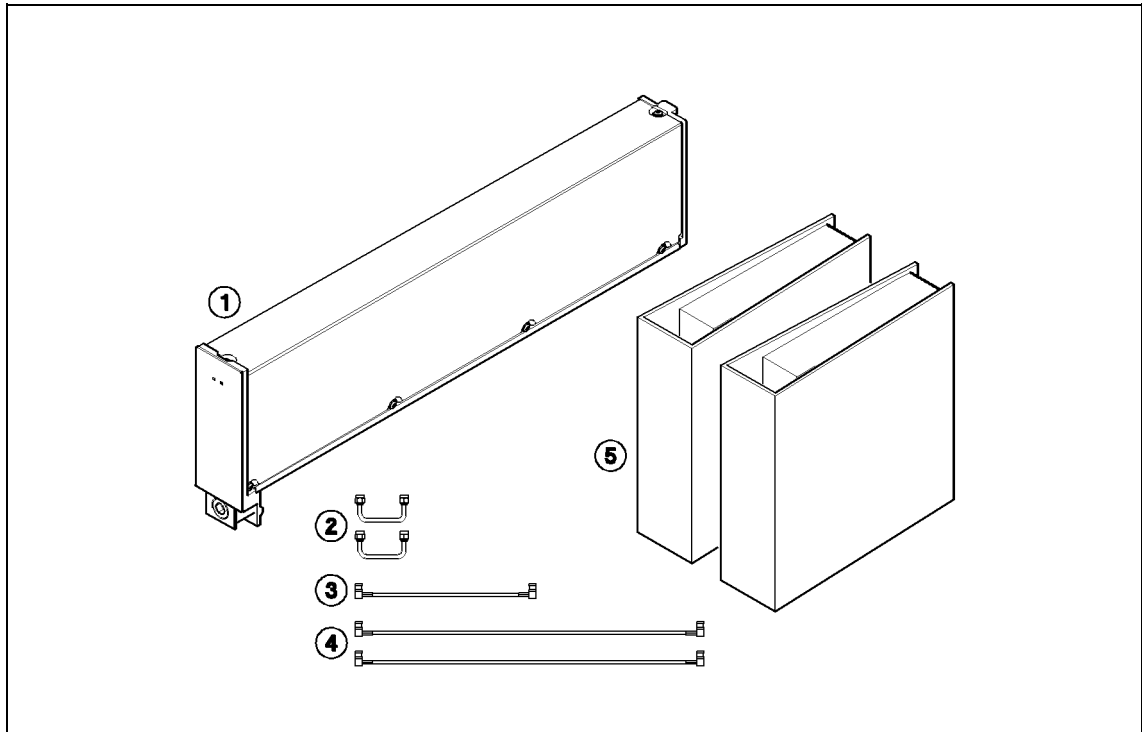
1 Unpack the shipment, inspecting the shipping container and the following contents for damage:

① HP 70341A frequency extension module
② 2 Semi-rigid Cables |HP p/n 5021-9263|
③ Flexible Cable |HP p/n 08753-60061|
④ 2 Flexible Cables |HP p/n 5061-1022|
⑤ The *HP 70341A Installation Guide* which you are reading, now.

⑤ |Options| If you ordered the option|s| below, you will also receive:
   Option 0B2- *HP 70341A Installation Guide*
   Option 0BW- *HP 70341A Service Guide*
   Option 0BV- *HP 70341A Component-Level Information Manual*

Note that a power cable is not shipped with the HP 70341A. It is supplied with your MMS mainframe or stand-alone display.

2 Keep the packaging materials and shipping container for future use.
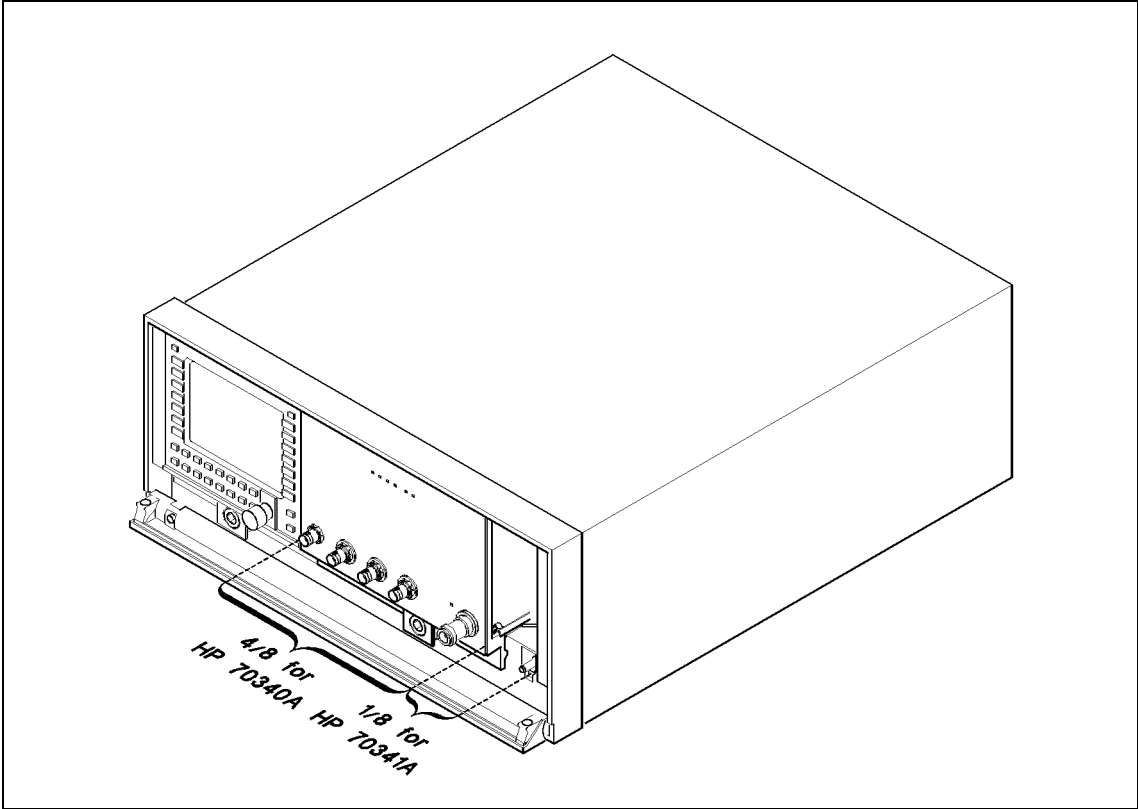
To Prepare the MMS for 70341A Installation

By following this procedure, you ensure that the MMS is ready for installation of the HP 70341A.

This procedure assumes that you have already installed the HP 70340A modular signal generator into the MMS. If you have not installed the HP 70340A, refer to the *HP 70340A/41A User's Guide* procedure, "Installing the Signal Generator."

1 Configure your MMS so that there is a 1/8 (single) slot for the HP 70341A to the right of the HP 70340A.

In the illustration, the HP 70340A is shown with the HP 70205A Display and HP 70001A Mainframe. In this configuration, the 3/8 display module, the 4/8 signal generator module, and the 1/8 frequency extension module together fill all slots in the mainframe. Other MMS configurations are possible as long as the HP 70341A is to the right of and immediately adjoining the HP 70340A.

4/8 for HP 70340A

1/8 for HP 70341A

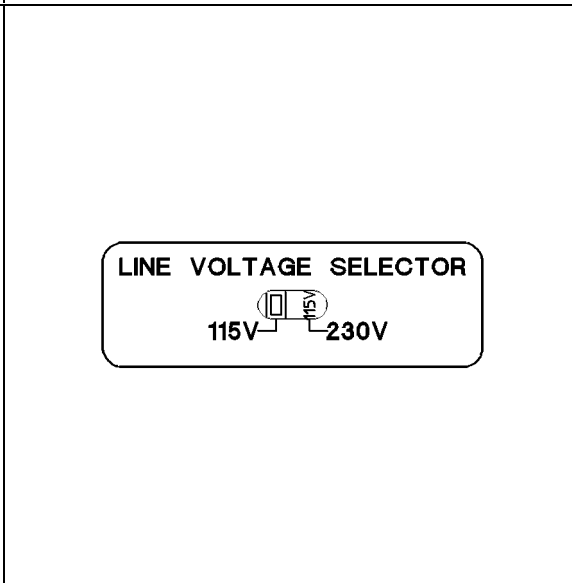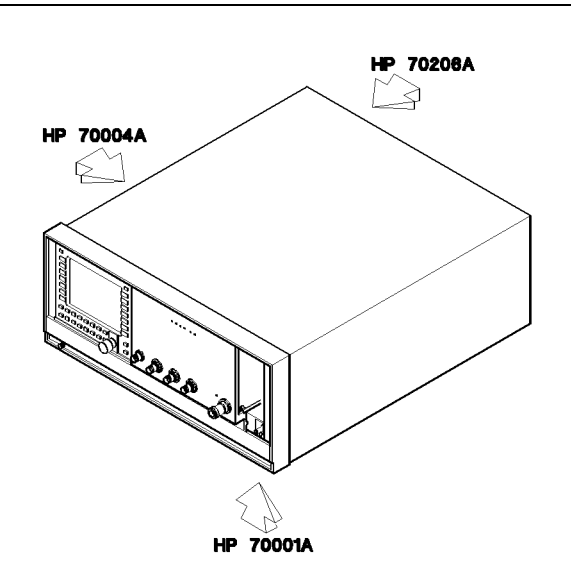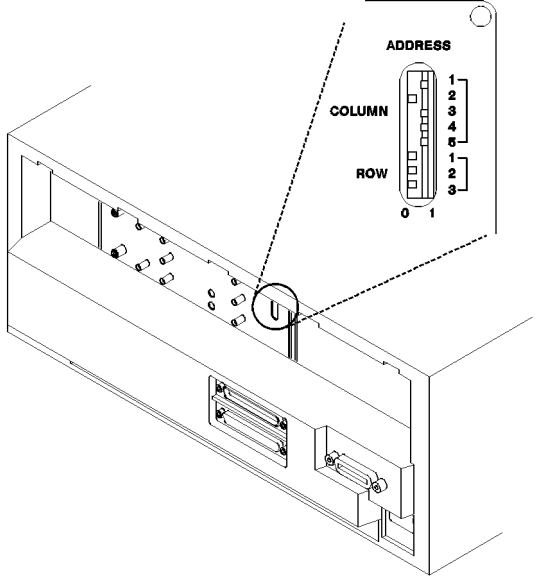| **2 Locate the LINE voltage selector on your mainframe and/or display.**	**3 Check that the LINE voltage selectors are set to the voltage of your power source.**
The location of the selector is as follows:	The selector should be set as follows:
- On the bottom of the HP 70001A Mainframe - On the left side of the HP 70004A Stand-alone Display - On the rear panel of the HP 70205A Display - On the rear panel of the HP 70206A Graphics Display	☐ **115 V** position for 90 to 132 V ac line input voltages at 50, 60, or 400 Hz ☐ **230 V** position for 198 to 264 V ac line input voltages at 50 or 60 Hz

HP 70206A

HP 70004A

HP 70001A

LINE VOLTAGE SELECTOR

115V⊐ ⊏230V

4 Locate the HP-MSIB switches on the rear panel of the HP 70340A signal generator and check that they are set to the correct address. The factory preset HP-MSIB address for the HP 70340A is 0,29 |row 0, column 29| as in the example below.

Refer to step 2 of the procedure, "To Check and Set the HP 70341A HP-MSIB Address" for help in determining the decimal address.

5 If any other modules are in your MMS, verify the HP-MSIB address of each.

Refer to your module user's guide, or refer to the following information when verifying addresses:

☐ Each element |module| in the MMS must have a unique HP-MSIB address.

☐ There are 255 legal addresses which consist of a row and a column address.

☐ Address 0, 31 is an illegal address. No elements should be set to this address.

☐ In order to access HP-IB and have error reporting capability, the element row address must be 0. Stand-alone instruments usually have a 0 row address.

☐ Slave elements cannot have a row address of 0.

☐ The column address of a slave element must be equal to |or greater than| its master.

To change the HP-MSIB address of a module, refer to the procedure "To Check and Set the HP 70341A HP-MSIB Address".

Note that the *Display Configuration* address switches on the back of the Graphics Display are for the display instrument only. These switches do *not* set the address of the system or any module within the system.

6 Connect the power cable(s) to the system and then to the power source.

WARNING

This is a safety Class 1 product |that is, it is provided with a protective earth terminal|. An uninterruptible safety earth ground must be provided through the power cable. Whenever it is likely that the ground is impaired, the product must be made inoperative.

7 Select the LINE (mains) switch to turn the mainframe and/or display on, and check that no error indicators are on after the power up test completes.

When you turn the MMS on, the power light comes on and the ventilation fan|s| start. |The fans are quiet, but, you can feel that the fans are on by placing your hand near the back of the mainframe.| In addition, it is normal for module LEDs |including **ERR** LEDs| to turn on and then off during a power-up test.

Note that the **ERR** LEDs should be off when the power-up test is complete.

To Check and Set the HP 70341A HP-MSIB Address

This procedure explains how to locate and determine the module address in case you want to change it. If you do change the HP-MSIB address, a nonconductive stylus such as a toothpick is useful for setting the switches.
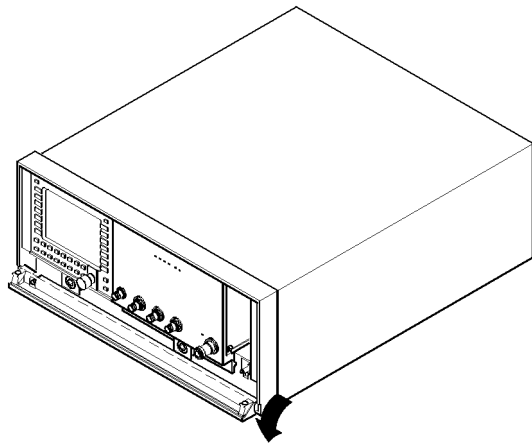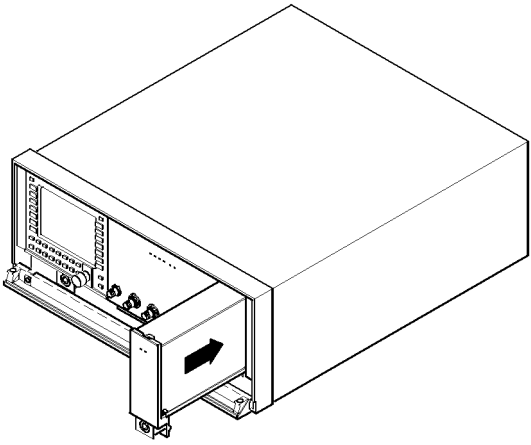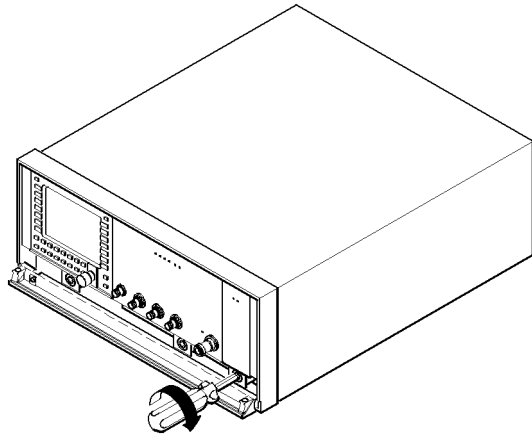
1 Locate the HP-MSIB address switches on the HP 70341A rear panel.	2 Determine the HP-MSIB address setting. The factory preset HP-MSIB address for the HP 70341A is 1,29 (row 1, column 29) as shown in the example below.

(binary)

	Binary	Decimal
Row Address:	001	1
Column Address:	11101	29

HP-MSIB Address = Row, Column
= 1,29

3 If necessary, use a nonconductive stylus to change the HP-MSIB row and column address settings of the HP 70341A as follows:

- **Set switches Row 1, Row 2, Row 3, to set the row address of the Module.** When a module (like the HP 70340A) has a row 0 address, error reporting and access to HP-IB are allowed. Because the HP 70341A is a slave to the HP 70340A, its row address cannot be 0. Legal row addresses for the HP 70341A are 1 through 8.
- **Set switches Column 1, Column 2, Column 3, Column 4, and Column 5 to the same settings as the HP 70340A switches so that the column address of the HP 70341A equals the column address of the HP 70340A.** Both the HP 70340A and the HP 70341A have the factory preset column address of 29. Legal column addresses are 0 through 31.

Each MMS module must have a unique HP-MSIB address. There are 255 legal addresses which consist of a row and a column address.

To Install the HP 70341A into the MMS

The following steps show you how to properly install the HP 70341A into your mainframe. The procedure is simple; the only tool required is an 8 mm hex-ball driver which is provided with your mainframe and/or display.

1 Before installing the HP 70341A into the mainframe or display, turn the mainframe and/or display off by setting the LINE (Mains) switches to the off position.

If the system is on when you install the module, personal injury or damage to the instrument can occur. |On some MMS mainframe models, the door will not open unless the LINE switch is off.|

2 Open the front panel mainframe or display door.

3 Slide the HP 70341A into a 1/8 (single) slot adjoining and to the right of the HP 70340A.

4 Using an 8 mm hex-ball driver, tighten the hex nut latch, and close the front panel door.

To Make Rear Panel Connections

1 Make the rear panel connections between the HP 70340A and HP 70341A, as shown, using a 5/16-in, 8.0 ± 0.5 lbs-in torque wrench for the two semi-rigid cable connectors.

Refer to the entry, "Accessories [included]," in chapter 3 for cable part numbers. Refer to the "Connectors" entry for details about working with the rear panel SMA and SMB connectors.
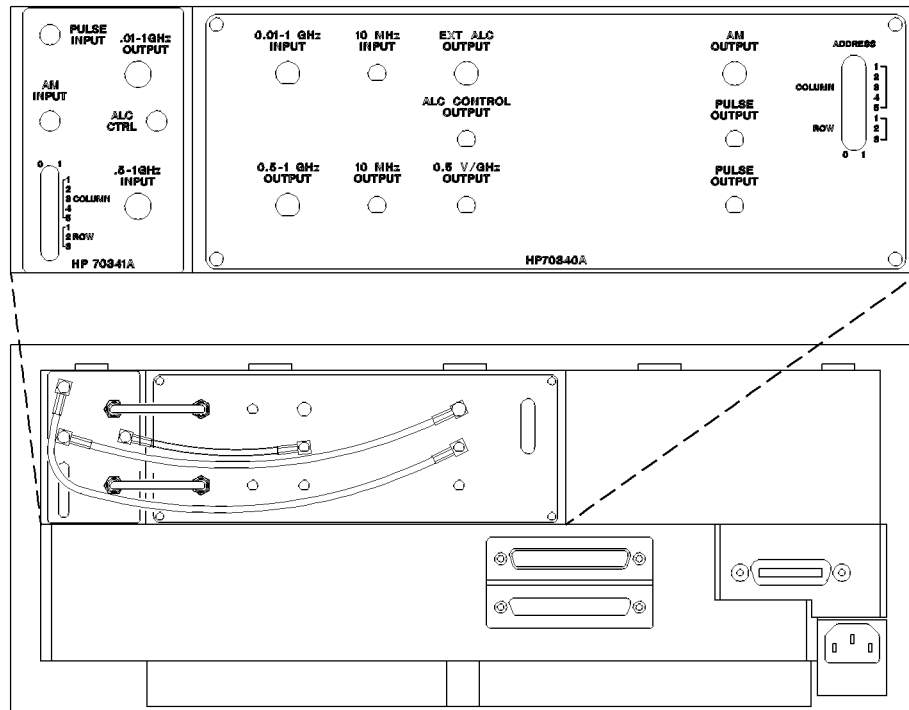
To Power-On the HP 70340A/41A System

This procedure verifies that the HP 70340A and HP 70341A are properly installed in the MMS by ensuring that the HP 70340A accepts a 500 MHz cw frequency front panel input.

This procedure requires an MMS display for front panel instrument operation. If you are not using a display, follow steps 1 through 3 of this procedure, and then, refer to the "Generating Signals" chapter in the *HP 70340A/41A User's Guide* for examples of HP-IB code for generating signals.

1 Set the mainframe LINE (Mains) switch to ON.

When you turn the MMS on, the power light comes on and the ventilation fans start. |You can feel that the fans are on by placing your hand near the back of the mainframe.| In addition, it is normal for the HP 70340A and HP 70341A LEDs |including the **ERR** LEDs| to turn on and off during a power-up test.

Note that the HP 70340A **ERR** LED may remain on after the test is complete, but, the HP 70341A **ERR** LED should be off.

2 If the display does not show the HP 70340A menu, press the following keys to call it up:

1. (DISPLAY)
2. `NEXT INSTR` or `SELECT INSTR` until the display shows:
   `HP 70340A Signal Generator`
3. (MENU)

Note that the **ACT** LEDs light when the HP 70340A and HP 70341A are accessed through HP-MSIB for front panel operation.

3 If the HP 70340A ERR LED remains on after turning the system on, read the error queue as follows in order to clear the queue.

1. Press (DISPLAY).

2. Press `REPORT ERRORS`.

   The display should show the message:
   "`HP 70340A, Signal Gen`" |along with the current HP-MSIB address.|

   The HP 70340A error message should also be displayed:
   `1803, "RAM data lost at power on;(1803)"`

3. If the display does not show the "`HP 70340A, Signal Gen`" screen, press `MORE ERRORS` until it does.

4. Press (MENU) in order to turn off the ERR LED and return to the HP 70340A front panel menus.

Note that, if you have just installed |or removed| the HP 70341A, error message 1803 does not imply a true error in instrument operation. Its purpose is to remind you that since the valid cw frequency range has changed, the instrument presets to 3 GHz, and consequently loses the cw frequency setting prior to power shutdown. In fact, all front panel settings, save/recall registers, and level correction data is lost because the instrument goes to the preset state. Refer to the *HP 70340A/41A User's Guide* "Display Menus and Functions" INSTR PRESET entry for the entire instrument preset state.

4 Enter a signal generator cw frequency of 500 MHz by selecting the following display keys/softkeys:

1. `CW FREQ`
2. (5) (0) (0)
3. `MHz`

If the HP 70340A and HP 70341A are properly installed, the data should be accepted by the signal generator as indicated by the fact that no **ERR** LEDs turn on and the display message:
`500.000000 MHz`

Refer to the *HP 70340A/41A User's Guide* for operational verification of the instruments or to the *HP 70340A/41A Calibration Guide* for full performance verification.

If You Encounter a Problem

If You Encounter a Problem

If you have a problem during installation of the HP 70341A, check the following list of commonly encountered problems and troubleshooting procedures. If the problem that you encounter is not in the following list, refer to the Troubleshooting section of the *Installation and Verification Manual* for your MMS mainframe, or contact the nearest Hewlett-Packard office for service.

The procedures in this chapter do not require either internal access to the instrument or any external test equipment. The only tool required for these procedures is an 8 mm hex ball driver.

If the HP 70341A is mechanically damaged upon receipt

1. Contact the nearest Hewlett-Packard office and the carrier.

2. Keep the shipping materials for the carrier's inspection.

3. Refer to the procedure, "If you need to return the HP 70341A for repair."

If a module appears dead

If any module or the mainframe appears to be dead after you turn the LINE switch to the ON position, follow these steps.

If the power light on the mainframe does not light

☐ Check that the power cord is connected.

☐ Check that the LINE voltage selector is set to the correct voltage (115 V or 230 V) for the power source.

The LINE voltage selector switch is located:

- on the left-hand side of the HP 70004A display
- on the bottom of the HP 70001A mainframe
- on the rear panel of the HP 70206A and HP 70205A displays

Line Voltage Selection Location
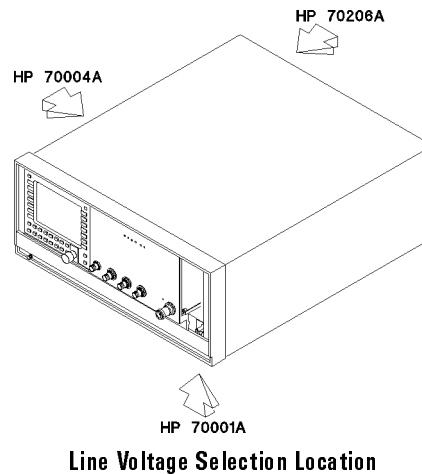
☐ Check that the mainframe fuse is good and the proper value.

The fuse is located inside of the power-cord receptacle housing on the rear of the display or mainframe. Refer to the figure below. The metric 6.3A, 250V fuse is HP part number 2110-0703.
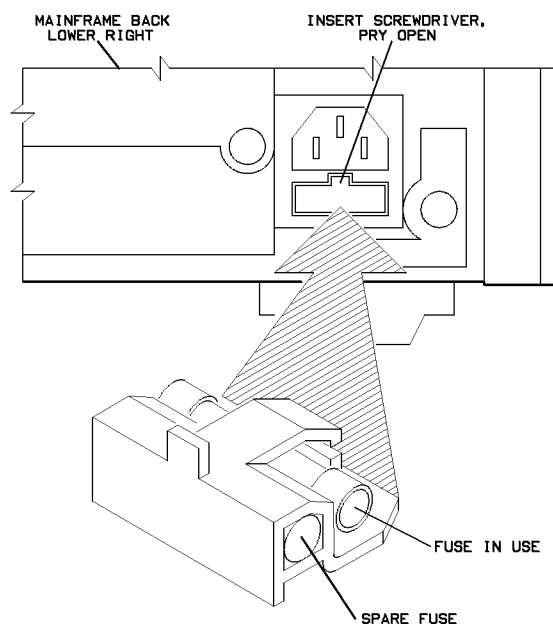

Line Fuse Removal and Replacement

You can use a continuity light or an ohmmeter to check the fuse. An ohmmeter should read very close to zero ohms if the fuse is good. Visual inspection of the fuse is not a sure check that the fuse is good.

If the fuse is bad, replace it and attempt power-up.

WARNING For continued protection against fire hazard, replace the fuse with one that is the same type and rating.

☐ Remove the HP 70341A from the MMS and attempt to power-up the mainframe, itself.

If the mainframe power light does not come on, the mainframe or another module within the mainframe is bad. If the mainframe does power-up, the fault lies with the HP 70341A.

If the module front panel LEDs do not light when the MMS is turned on

☐ Check that your display or mainframe is working properly by removing the HP 70341A and recycling power.

Refer to the display or mainframe installation manual for information regarding proper operation.

☐ Contact the nearest Hewlett-Packard office for service.

If the mainframe power light is on, but the ventilation fan does not start

☐ Set the mainframe LINE (Mains) switch to OFF.

☐ Check for blockage of the fan intakes at the bottom rear of the mainframe.

☐ Refer to your MMS mainframe manual.

N O T E

The HP 70004A Display fan is very quiet.

If the HP 70341A ERR LED remains on after the power-up test is complete

- Refer to the *HP 70341A Service Guide*, or contact your local Hewlett-Packard office for service.

If the HP 70340A ERR LED or the display E remains on after the power-up test is complete

☐ Check the error queue for error messages. To check the error queue:

1. Press (DISPLAY) and then `REPORT ERRORS`.
2. If necessary, press `NEXT INSTR` until the HP 70340A errors are displayed.
3. Check the display for the reported error(s).
4. Press (MENU) to clear the queue and return to the HP 70340A screen.
5. If the ERR LED is still on, refer to the *HP 70340A/41A User's Guide* "Error Messages" chapter or your mainframe/display user's guide for assistance in correcting the error(s).

☐ Check that the ERR LED or the display E is not flashing.

If any error indicator is flashing, this indicates that the module cannot talk over the HP-MSIB bus.

If more than one error indicator is flashing, the mainframe HP-MSIB is faulty, a module is faulty, or the HP-MSIB cables are probably faulty.

☐ Check that there are no mainframe error messages.

Mainframe error messages will appear on the display. Refer to your mainframe operating and service manuals if a mainframe error occurs.

☐ Check for proper (secure) HP-MSIB cable connections.

☐ Check that the HP-MSIB cables are connected serially to form a loop.

☐ Check that no two modules within the system have the same HP-MSIB address.

In order to change a module HP-MSIB address, refer to the procedure, "To Check and Set the HP 70341A HP-MSIB Address" in chapter 1.

If either the display HP-MSIB or mainframe I/O Check Indicator remains on

If either of these indicators is on, there is a problem with the HP-MSIB.

☐ Verify that the power to all mainframes and stand-alone displays is on.

☐ Check that the HP-MSIB cables are securely connected and connected in serial to form a loop.

☐ Check that no two modules within the system have the same HP-MSIB address.

In order to change a module HP-MSIB address, refer to the procedure, "To Check and Set the HP-MSIB Address" in chapter 1.

☐ Check for a faulty mainframe or stand-alone display by removing all of the HP-MSIB cables and noting whether or not the indicator light remains on.

If the indicator light remains on, the mainframe or display is probably faulty.

If the indicator light turns off, the problem is either with the HP-MSIB cables or with the module(s) within the system.

If the mainframe CURRENT indicator remains on

This indicator turns on when the mainframe power supply senses an overload.

☐ Check to see which module is causing the current overloading condition through the following steps:

1. Remove one module from the mainframe.
2. Cycle the power.

   If the indicator turns off, the removed module is faulty.

   If the indicator remains on, continue to remove modules until the module causing the indicator to light is identified.

   If the indicator remains on after all modules are removed, the mainframe is probably faulty.

If the display does not accept the 500 MHz cw frequency data input

☐ Check that the HP 70341A HP-MSIB row address is greater than the HP 70340A row address.

☐ Check that the HP 70341A HP-MSIB column address is equal to (or greater than) the HP 70340A column address.

Use the `DISPLAY` key, the `address map` softkey, and the Knob in order to view each module's HP-MSIB address using the front panel screen.

If the HP-MSIB address switches are not set correctly:

1. Correctly reset the HP-MSIB addresses so that the HP 70340A can address the HP 70341A.

   Refer to the procedure, "To Check and Set the HP 70341A HP-MSIB Address" for help in determining or setting the HP-MSIB addresses.

2. Cycle power.

If you need to return the HP 70341A for repair

The following procedure describes how to prepare the module for shipment:

Instrument damage can result from using packaging materials other than the original shipping materials or equivalent. Never use styrene pellets as packaging materials. They do not adequately cushion the instrument or prevent it from shifting in the carton. They cause instrument damage by generating static electricity.

1. Fill out a blue repair card (located at the end of this manual) and attach it to the instrument. If a blue repair card is not available, send the following information with the returned instrument:

   1. Type of service required.
   2. Description of the problem; state if the problem is constant or intermittent.
   3. Name and phone number of technical contact person.
   4. Return address.
   5. Model number of returned instrument.
   6. Full serial number of returned instrument.
   7. List of any accessories returned with instrument.

2. Send copies of any error messages and performance data recorded for the instrument.

   Error messages are read from the MMS error queue. Performance data comes from the incoming inspection tests or performance tests in the *HP 70340A/41A Calibration Guide*.
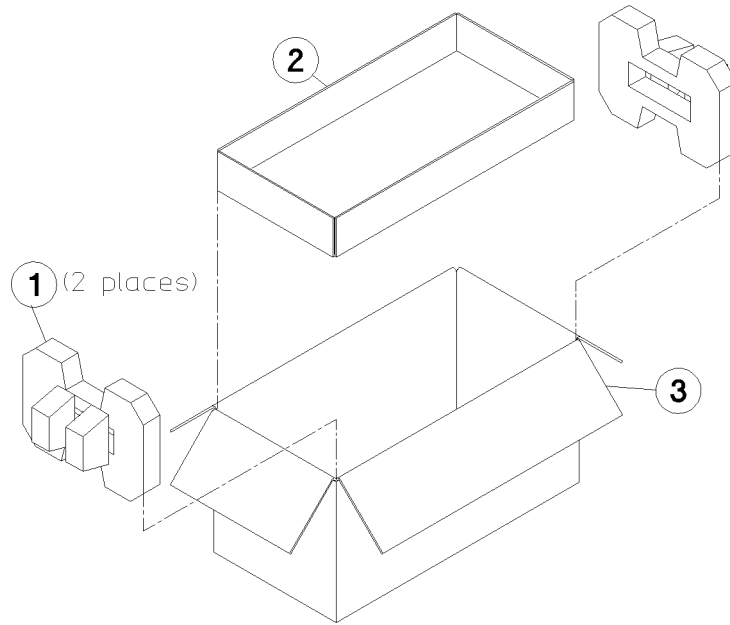
HP 70341A Packaging Materials

Item	Qty	HP Part No.	Description
1	2	70100-80008	Foam Pad
2	1	70100-80007	Corrugated Pad
3	1	70100-80006	Carton

3. Pack the instrument in the original shipping materials or the equivalent.

   Shipping materials can be ordered from any Hewlett-Packard office.

4. If the original shipping materials are not available, instruments can be repackaged for shipment using the following instructions:

   1. Wrap the instrument in antistatic plastic to reduce the possibility of ESD-caused damage.
   2. For instruments that weigh less than 54 kg (120 lb), use a double-walled, corrugated cardboard carton of 159 kg (350 lb) test

strength. The carton must be large enough and strong enough to accommodate the instrument. Allow at least 3 to 4 inches on all sides of the instrument for packing material.

3. Surround the equipment with 3 to 4 inches of packing material to protect the instrument and prevent it from moving in the carton. If packing foam is not available, the best alternative is S.D.-240 Air Cap ^{TM} from Sealed Air Corporation (Commerce, California 90001). Air Cap is a plastic sheet filled with 1-1/4 inch air bubbles. Use the pink (antistatic) Air Cap to reduce static electricity. Wrap the instrument several times in this material to protect the instrument and prevent it from moving in the carton.

5. Seal the carton with strong nylon adhesive tape.

6. Mark the carton "FRAGILE, HANDLE WITH CARE."

7. Retain copies of all shipping papers.

3

Reference

Reference

This chapter contains reference information that is useful for the Installation procedures in this book. Instrument electrical specifications for the HP 70340A and HP 70341A combination are listed here as well as other specifications and options that apply specifically to the HP 70340A.

For easy reference, all entries in this chapter are alphabetized.

Accessories (included)
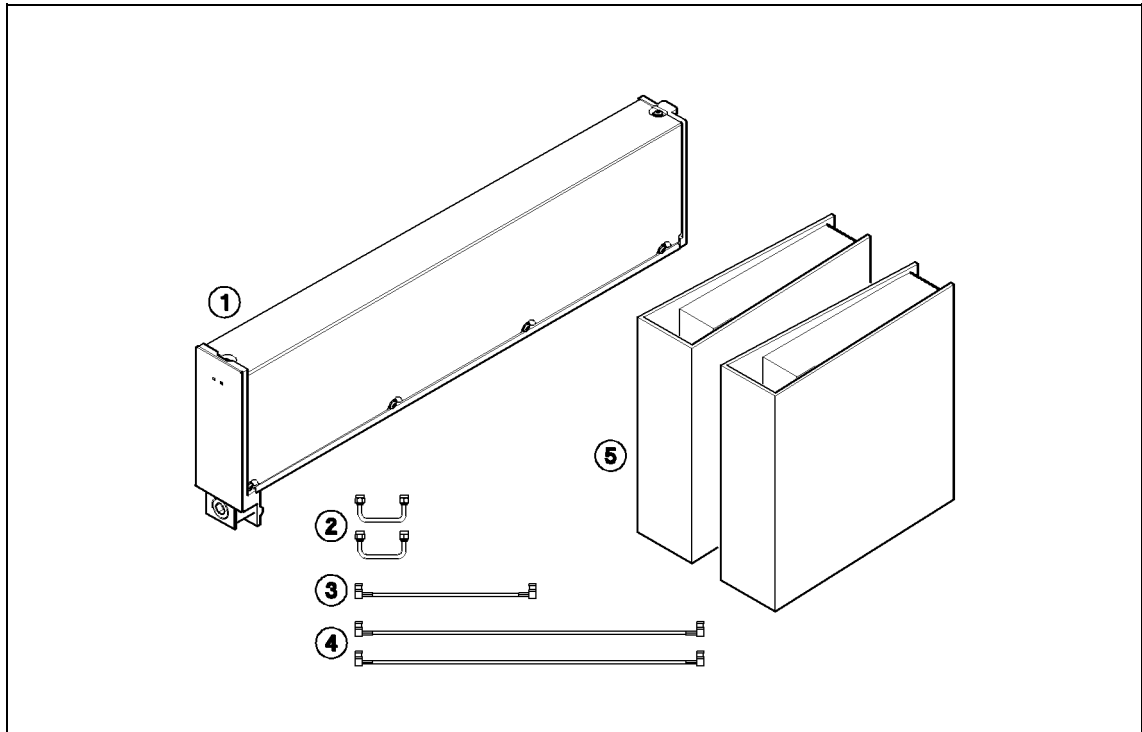
The HP 70341A Frequency Extension Module shipment includes the following:

(1) HP 70341A Frequency Extension Module
(2) 2 Semi-rigid Cables |HP p/n 5021-9263|
(3) Flexible Cable |HP p/n 08753-60061|
(4) 2 Flexible Cables |HP p/n 5061-1022|
(5) The *HP 70341A Installation Guide* which you are reading, now.

(5) options If you ordered the option|s| below, you will also receive:
   Option 0B2- *HP 70341A Installation Guide*
   Option 0BW- *HP 70341A Service Guide*
   Option 0BV- *HP 70341A Component-Level Information*

Note that a power cable is not shipped with the HP 70341A. It is
supplied with your MMS mainframe or stand-alone display.

Accessories (not included)

Several accessories (such as cables) which are not included with the Frequency Extension Module may be required for certain applications.

A list of useful cables and other accessories follows:

Accessories (not included)

Accessory	Part Number
HP-MSIB Cable- 5 meter	HP 70800A
HP-MSIB Cable- 1.0 meter	HP 70800B
HP-MSIB Cable- 2.0 meter	HP 70800C
HP-MSIB Cable- 6.0 meter	HP 70800D
HP-MSIB Cable- 30 meter	HP 70800E
SMB push-on Cable- 15 cm |rear panel connections|	08753-60061
SMB push-on Cable- 30 cm |rear panel connections|	5061-1022
SMA flex coax Cable |inter-module connections|	5061-9038
SMA flex coax Cable |mainframe connections|	5061-9039
SMB|f| to BNC|m| Cable	85680-60093
SMA|f| to SMA|m| Cable	8120-1578
8 mm hex ball Driver |module removal/installation|	8710-1307
Fuse- 6.3 A |for replacement in mainframe|	2110-0703

For cabinet interconnect and rack mounting kits, refer to your mainframe or display installation manuals.

For documentation pertaining to the HP 70340A and the HP 70341A, refer to the Learning Products Map at the end of this book.

Connectors

The HP 70341A rear panel has both threaded SMA and unthreaded SMB connectors.

SMA Connectors

Two semi-rigid coaxial cables with SMA (3.5 mm) connectors are used to carry microwave signal between the HP 70340A and the HP 70341A. Because minor mechanical imperfections in these cables and their connecting parts can produce performance degradation, it is important the cables and connectors be treated with the care afforded any microwave component:

To Connect Semi-rigid
Cables:

1. Ensure the center conductor is not bent or damaged.

2. Ensure the insulating material between the center conductor and the outer conductor is undamaged, clean, and free of contamination from metal particles.

3. If necessary, clean the cable ends using a cotton swab lightly moistened with alcohol.

4. Inspect the mating connectors and clean them if necessary.

5. Allow the alcohol to evaporate completely before assembling the connectors.

6. Retract the outer nuts away from the ends of the cable.

7. Carefully insert both ends of the cable partially into the shells of the mating connectors.

CAUTION

Do not force the cable when mating connectors. Minimal force is required to seat the center pin in the mating socket. If excessive force is used, the microwave device to which the cable is connected can be damaged.

8. Be sure the center pin of the cable is aligned with the socket of the mating connector, then gently push the cable into place. For short cables, insert both center pins simultaneously.

| **C A U T I O N** | Do not cross-thread the nut of the semi-rigid cable on the shell of the mating connector. Do not over-tighten the nut. Either of these actions can result in damage to the microwave device to which the cable is connected. |

9. Ensure the cable is seated in the mating connector at both ends, then slide the nuts along the cable to the mating connectors.

10. Start the nut on the mating connector with your fingers. If resistance is felt, back the nut away from the connector and begin again.

11. Tighten both connector nuts finger-tight.

12. Using a 5/16-inch torque wrench, tighten each connector nut to a value of 8.0 ± 1.0 lbs-in.

To Disconnect Semi-rigid Cables:

1. Disconnect 3.5 mm (SMA) connectors from the mating connector by loosening the 5/16-inch nut until it is completely free of the mating connector. Loosen the nuts at both ends of the cable before attempting to remove either end.

2. When both nuts are completely free of the mating connectors, pull the semi-rigid cable gently until the center pins disengage from the mating sockets.

3. Place protective caps on semi-rigid cable connectors, and store cables to prevent damage to the center pins or accidental bending.

SMB Connectors

Three flexible coaxial cables with SMB (push-on) connectors carry signals between the HP 70340A and the HP 70341A.

To Disconnect Flexible
Coaxial Cables:

1. Grasp the connector body and pull steadily until the connector separates from its mate. If the connectors will not separate easily, rock the connector body **very** slightly side-to-side while exerting a steady pull.

2. If the connectors still will not separate, place the jaws of a pair of long-nose pliers under the connector body. Use the jaws as a fulcrum to lift the connector away from the rear panel. Use a piece of tape or other material under the pliers to avoid scratching the surface to which the connector is mounted.

C A U T I O N

Exert force only on the body of the connector. Do not pull on the cable. These connectors are easily damaged.

Electrostatic Discharge Information

Electrostatic discharge (ESD) can damage or destroy electronic components. Therefore, all work performed on assemblies consisting of electronic components should be done at a static-safe workstation.

The following figure shows an example of a static-safe workstation using two types of ESD protection: 1) conductive table mat and wrist strap combination, and 2) conductive floor mat and heel strap combination. These methods may be used together or separately. (A list of static-safe accessories and their part numbers is given on the following pages.)
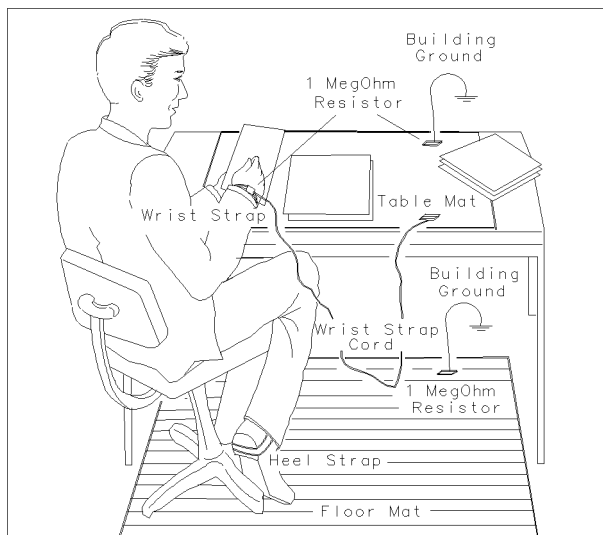
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Static-Safe Workstation

Reducing Damage Caused By ESD

Below are suggestions that may help reduce ESD damage that occurs during testing and servicing instruments.

PC Board Assemblies and Electronic Components

Handle these items at a static-safe workstation.

Store or transport these items in static-shielding containers.

C A U T I O N

Do not use erasers to clean the edge connector contacts. Erasers generate static electricity and remove the thin gold plating, which degrades the electrical quality of the contacts.

Do not use paper of any kind to clean the edge connector contacts. Paper or lint particles left on the contact surface can cause intermittent electrical connections.

Do not touch the edge connector contacts or trace surfaces with bare hands. Always handle board assemblies by the edges.

PC board assembly edge connector contacts may be cleaned by using a lint-free cloth with a solution of 80% electronics-grade isopropyl alcohol and 20% deionized water. This procedure should be performed at a static-safe workstation.

Test Equipment

Before connecting any coaxial cable to an instrument connector for the first time each day, momentarily ground the center and outer conductors of the cable.

Personnel should be grounded with a resistor-isolated wrist strap before touching the center pin of any connector and before removing any assembly from the instrument.

Be sure that all instruments are properly earth-grounded to prevent buildup of static charge.

Static-Safe Accessories

The following is a list of static-safe accessories that may be obtained from any Hewlett-Packard office by using the HP part numbers listed.

HP Part Number 9300-0797
  Includes: 3M static control mat .6m x 1.2m (2 ft. x 4 ft.)
            4.6m (15 ft.) ground wire
            wrist strap and attachment cord

HP Part Number 9300-0980
  Wrist strap cord 1.5m (5 ft.)

HP Part Number 9300-0985
  Wrist strap (large)

HP Part Number 9300-0986
  Wrist strap (small)

HP Part Number 9300-1169
  ESD heel strap (reusable 6 to 12 months)

HP Part Number 9300-0793
  Shoe ground strap (one-time use only)

Options

The following paragraphs explain the different warranty and documentation options available for the Frequency Extension Module.

Warranty Options

Option W30 - Two Years Additional Return to HP Service

Consult your HP sales representative for details on this option.

Option W32 - Three Years Return to HP Calibration Service

Consult your HP sales representative for details on this option.

Option W34 - Three Year Mil-std Calibration Service

Consult your HP sales representative for details on this option.

Longer term warranty and calibration services are available. Please consult your HP sales representative for details.

Documentation Options

The documentation options: 0B2, 0BW, and 0BV that follow are available when the Frequency Extension Module is ordered and are received with the shipment of the module. If the documentation is not ordered with the original shipment but is desired at a later date, it can be ordered from the nearest Hewlett-Packard office using the book titles included in each of the following paragraphs.

Option 0B2 - Extra User Documentation

If option 0B2 is ordered, the shipment includes an extra copy of the *HP 70341A Installation Guide*.

Option 0BW - Add Assembly-level Service Documentation

If option 0BW is ordered, the shipment contains a set of service documentation. This includes the *HP 70341A Service Guide*, the *HP 70340A/41A Calibration Guide*, and the Calibration Software. Note that the calibration and service documentation is not shipped with the Frequency Extension Module if option 0BW is not ordered.

Option 0BV - Add Component-level Service Documentation

If option 0BV is ordered, the shipment contains the *HP 70341A Modular Signal Generator Component-level Information*. Note that the *CLIM* is not shipped with the Frequency Extension Module if option 0BV is not ordered.

Specifications- HP 70340A/41A

This section contains the specifications, supplemental characteristics, and electrical options for both the HP 70340A and the HP 70340A/41A . Refer to the *HP 70340A/41A User's Guide* for mechanical, documentation, and warranty options for the HP 70340A. Refer to the "Options" entry in this chapter for mechanical, documentation, and warranty options for the HP 70341A.

Specifications describe the instruments warranted performance over the 0° to 55° temperature range unless otherwise noted. Supplemental characteristics, *indicated by italics,* are intended to provide information useful in estimating instrument capability in your application by describing typical, but not warranted, performance.

Frequency

Range: HP 70340A Modular Signal Generator, 1.0 to 20.0 GHz
HP 70341A Frequency Extension Module, 10 MHz to 1 GHz
HP 70341A can only be used in combination with the HP 70340A.
Resolution: 1 kHz (1 Hz with Option 1E8)
Stability (with external high stability timebase):

> **Aging Rate:** same as external reference.
> **Temperature Effects:** same as external reference.

Stability (without external high stability timebase):

> *Aging Rate: $<1.0\times10^{-8}$/day after 72-hours at $25°C\pm10°C$*
> *Temperature Effects: $<5\times10^{-6}$ over 0 to 55°C, referenced to 25°C*
> *Frequency Switching Time: <50 ms to within 1 kHz, 1 - 20 GHz.*
> *<100 ms to within 1 kHz, 10 MHz - 1 GHz.*

RF Output

Maximum Leveled Output Power:

Frequency	Standard	with Option 1E1
0.01—1 GHz	+ 13 dBm	+ 13 dBm
1—18 GHz	+ 11 dBm	+ 10 dBm
18—20 GHz	+ 10 dBm	+ 8 dBm

Typical maximum available output power from 1 to 20 GHz, at 25°C with output step attenuator (Option 1E1) installed.

Typical maximum available output power from 0.01 to 1 GHz at 25°C.

Display Resolution: 0.01 dB

Minimum Leveled Output Power (without Option 1E1): −4 dBm
Minimum Leveled Output Power (with Option 1E1): −90 dBm

Accuracy: (−4 dBm to specified maximum leveled output power)

   10 MHz to 50 MHz: ±1.3 dB
   50 MHz to 20 GHz ±1.0 dB

Accuracy: (over all specified temperatures and power levels)

   10 MHz to 50 MHz: ±2.3 dB
   50 MHz to 20 GHz: ±2.0 dB

The use of Type-N RF connectors above 18.0 GHz degrades specification
typically by 0.2 dB.

Flatness: ±0.5 dB. The use of Type-N RF connectors above 18.0 GHz
degrades specification typically by 0.2 dB.

*Level Switching Time: <15 ms (without step attenuator range change.
Attenuator range changes occur at −4 dBm, −14 dBm, −24 dBm, etc.)
Output SWR: <2.0 : 1 nominal*
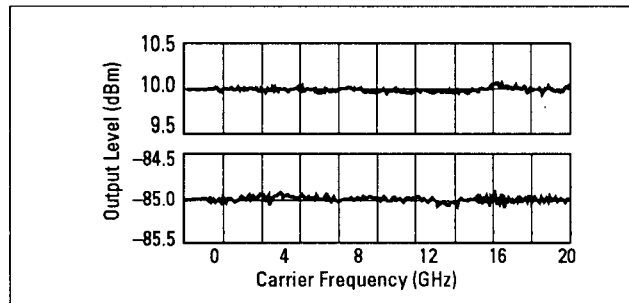
Typical output level accuracy and flatness at +10 and −85 dBm

Spectral Purity

SSB Phase Noise (dBc/Hz):

Offsets

Carrier Freq.	100 Hz	1 kHz	10 kHz	100 kHz
500 MHz	−70	−86	−103	−119
2 GHz	−66	−74	−91	−107
10 GHz	−69	−75	−79	−101
18 GHz	−63	−70	−73	−99

Phase noise decreases 6 dB/octave below 500 MHz and reaches a floor of
$<−140$ dBc/Hz.
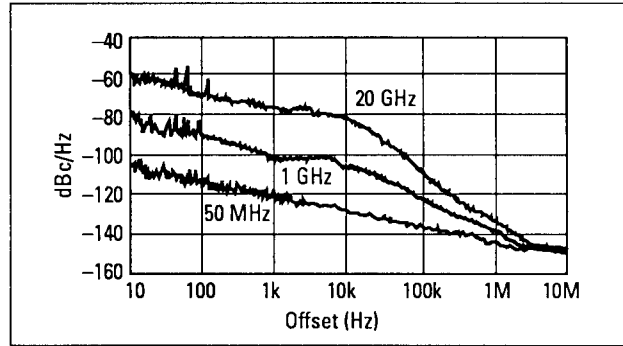
Typical single-sideband phase noise at 50 MHz, 1 GHz and 20 GHz, 25°C, CW mode. Offsets less than 100 Hz require use of external high stability timebase.

Harmonics: <-55 dBc at output levels $<+6$ dBm, 0.01 to 20 GHz
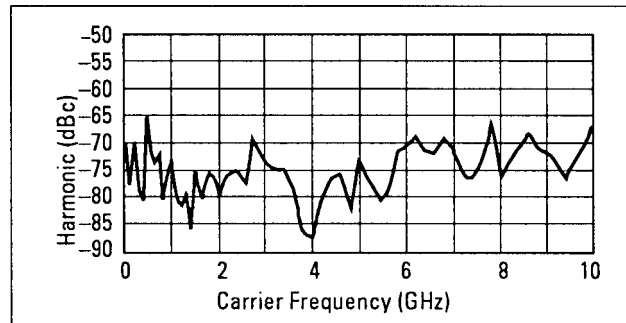
Typical 2nd harmonic levels measured at output power of +6 dBm

Non-Harmonic Spurious ($\geq$3 kHz): <-60 dBc (includes power supply and frequency synthesis spurious).
Non-Harmonic Spurious (<3 kHz): < -50 dBc
Sub-Harmonics: None

Residual FM:
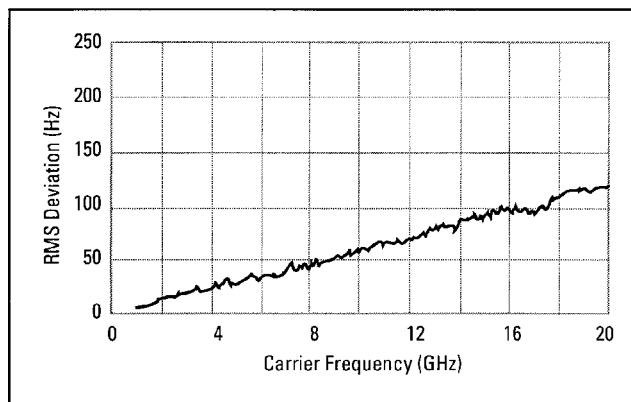
Typical residual FM measured in 50 Hz · 15 kHz bandwidth, CW mode.

At 1 GHz, <15 Hz in 50 Hz - 15 kHz bandwidth.
Residual FM decreases 6 dB per octave below 1 GHz.

AM Noise Floor: (at 0 dBm and offsets greater than 5 MHz from carrier)
<−150 dBm/Hz, 1 - 20 GHz.
<−140 dBm/Hz, 0.01 - 1 GHz.

Modulation

CARRIER FREQUENCY	<25 MHz	25 - <64 MHz	64 - <128 MHz	128 - <500 MHz	500 - <1000 MHz	1 - 20 GHz
Minimum Pulse Width	<1µs		<100 ns		<25 ns Typically <10 ns	
Rise/Fall Time	<500 ns	<350 ns	<50 ns	<35 ns	<20 ns	<10 ns
Video Feedthrough	<2 mV peak-to-peak at 0 dBm					<20 mV peak-to-peak at 0 dBm
Pulse Width Compression	±150 ns		±15 ns		±5 ns	
Pulse Delay (Video out to RF out)	<1µs		<200 ns		<125 ns	<100 ns

Pulse Modulation

On/Off Ratio: > 80 dB
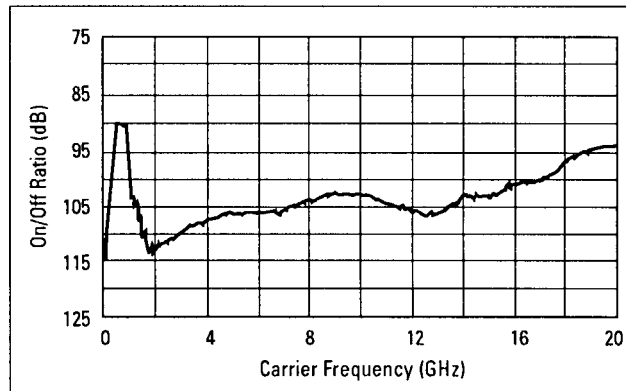
Typical pulse modulation on/off ratio at +8 dBm

Maximum Pulse Repetition Frequency: > 3 MHz
Minimum Pulse Duty Cycle: No restrictions on duty cycle.
Pulse Level Accuracy (relative to CW): ±1.0 dB
Pulse Overshoot: < 10%
Input Impedance: 50Ω nominal; TTL drive levels

Maximum Leveled Output Power in Pulse Mode (relative to CW):
−0.5 dB

Timebase = 10.0 ns/div   Risetime = 4.9 ns
Carrier Frequency = 10.0 GHz   Falltime = 2.05 ns
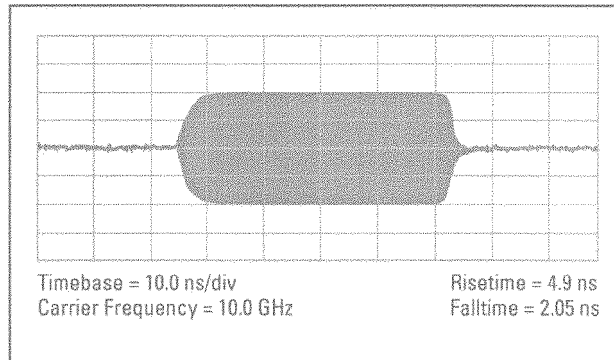
**Typical pulse modulation envelope illustrates the fast rise and fall times, excellent flatness and
pulse fidelity of the HP 70340A**

Internal Pulse Source (Option 1E2)

> **Pulse Source Modes:** Free-run, triggered with delay, doublet and gated.
> Triggered with delay, doublet and gated require external trigger source.
> **Pulse Repetition Frequency:** 3 Hz to >3 MHz
> **Pulse Repetition Interval (PRI):** 300 ns to 419 ms
> **Pulse Width (T_w):** 25 ns to 419 ms
> **Variable Pulse Delay (free-run mode, T_d):** ±419 ms from sync pulse to
> video modulation
> **Variable Pulse Delay (triggered with delay & doublet modes, T_d):**
> 225 ns to 419 ms with ±25 ns jitter
> **Pulse Width/Delay/PRI Resolution:** 25 ns
> *Pulse Delay (Video to RF, T_m):* Nominally, <20 ns, 1 to 20 GHz

All pulse modulation specifications and supplemental characteristics apply
during use of internal pulse source.

Td Video Delay (Variable)   Tr RF Pulse Rise Time
Tw Video Pulse Width (Variable) Tf RF Pulse Fall Time
Tp Pulse Period (Variable)   Vor Overshoot and Ringing
Tm RF Delay   Vf Video Feethrough
Trf RF Pulse Width
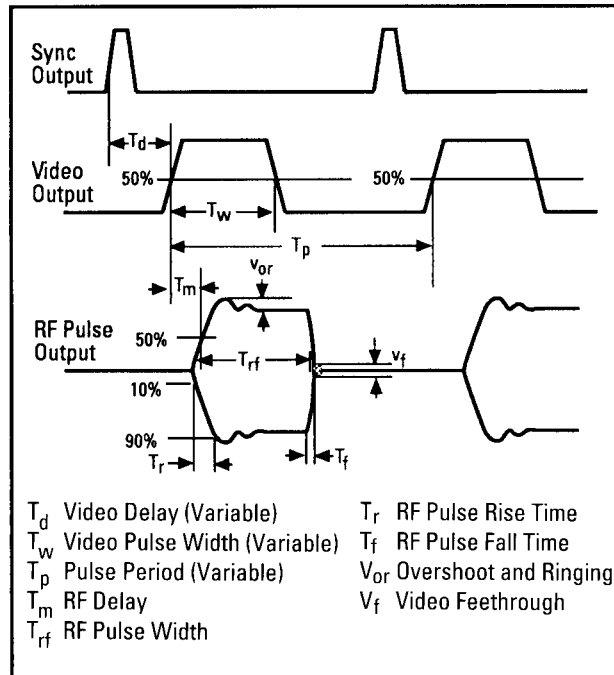
Frequency Modulation

Rates: 1 kHz to 1 MHz
Flatness: ±2 dB

CARRIER FREQUENCY		256 - <500 MHz	500 MHz - <1 GHz	1 - 2 GHz	2 - 20 GHz
Maximum Deviation[1]		1.25 MHz peak	2.5 MHz peak	5 MHz peak	10 MHz peak
Modulation Index		>37	>75	>150	>300
CARRIER FREQUENCY	10 - 16 MHz	16 - 64 MHz	64 MHz - 256 MHz	256 MHz - 1 GHz	1 - 20 GHz
FM Sensitivity	40 kHz/V	80 kHz/V	320 kHz/V	1.25 kHz/V	5 MHz/V
FM Sensitivity Accuracy	±25% at 100 kHz.				
Incidental AM	<5%				
FM Input Impedence	600Ω nominal				
Harmonic Distortion	<1% (1 MHz peak deviation @ 100 kHz rate)				

1 Maximum deviation decreases by a factor of 2 for each octave below 256 MHz

Logarithmic Amplitude Modulation (Scan Modulation)

Maximum Depth: > 60 dB
Sensitivity: −10 dB/V; (0 to +6V for 0 to −60 dBc)
Step Response (50 dB change in level):

	< 1 GHz	1 - 20 GHz
rise time	<10 μs	<5 μs
fall time	<20 μs	<5 μs

Input Impedance: 5000Ω nominal
Maximum Leveled Output Power in Log AM Mode (relative to CW):

< 1 GHz	1 - 4 GHz	>4 GHz
+0 dB	−4.5 dB	−1.0 dB
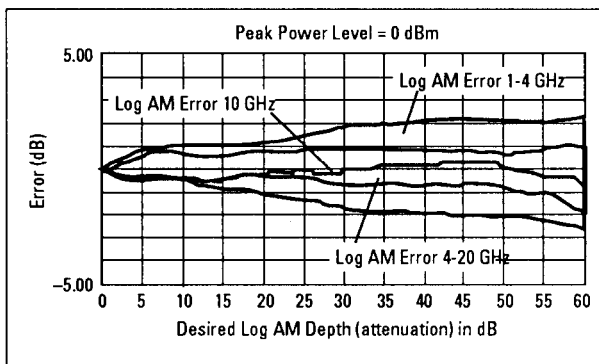
Typical log AM error (deviation from desired depth) at 25° C for carrier frequencies between 1.0 and 20 GHz

Simultaneous Modulations

Full AM bandwidth and depth is available at any pulse rate or width. FM is
completely independent of AM and pulse modulation.

General

Programming

The HP 70340A and HP 70341A are fully compatible with the Standard
Commands for Programmable Instruments (SCPI). SCPI programming
complies with IEEE 488.2-1987. Optional CIIL programming compatibility is
available. Please consult your HP sales representative for details.

Environmental

Operating Temperature Range: 0° to 55°C
EMC: Meets or exceeds EN 55011/CISPR 11/1990, Class A and Mil-Std-461C
Part 2 RE02, CE03, CS02, RS03.

Physical Dimensions

Net Weight: HP 70340A, < 9 kg (20 lb).
HP 70341A, < 2.5 kg (5 lbs).
Shipping: HP 70340A, < 15 kg (30 lb)
HP 70341A, < 6 kg (12 lbs).
Size: HP 70340A, 4/8 MMS module width.
148.5 mm H × 192.8 mm W × 477.5 mm D.
HP 70341A, 1/8 MMS module width.
148 mm H × 48.2 mm W × 477.5 mm D.
Power Consumption: HP 70340A, < 80 Watts.
HP 70341A, <30 Watts.
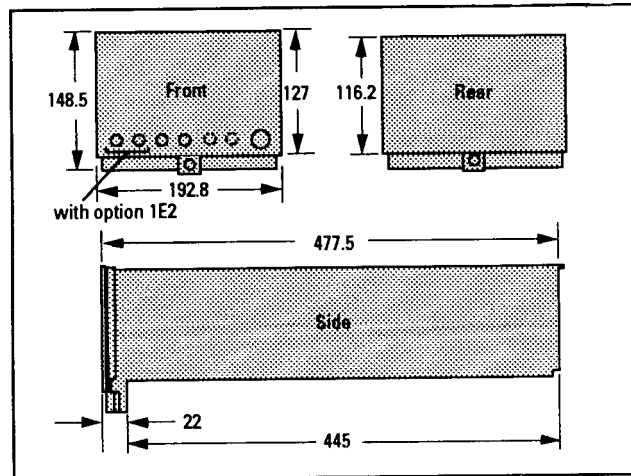
HP 70340A Dimensions
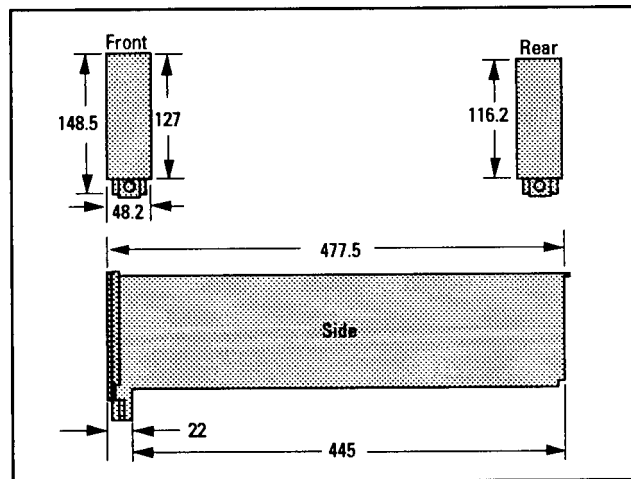
HP 70341A Dimensions

Rear Panel Connectors

HP 70340A

0.5-1 GHz OUTPUT:
SMA connector outputs a 0.5 to 1.0 GHz signal for driving the HP 70341A
Frequency Extension module. The HP 70341A combined with the HP 70340A
extends the Signal Generator RF Output frequency range down to 0.01 GHz.

0.01-1 GHz INPUT:
SMA connecotr accepts the HP 70341A 0.01-1 GHz output signal. The HP
70341A signal is output step attenuated in the HP 70340A with the 0.01 to
1.0 GHz output available at the front panel RF Output connector of the HP
70340A.

10 MHz INPUT:
SMB connector accepts a 10 MHz ± 100 Hz, 0 to +10 dBm, external reference
signal for operation from an external high stability timebase. Nominal input
impedance is 50Ω.

10 MHz OUTPUT:
SMB connector outputs the 10 MHz external reference signal, nominally
+3 dBm, for use as an external reference signal.

EXTERNAL ALC OUTPUT:
SMB connector outputs external ALC drive signal (from the front panel EXT
ALC input connector) to the frequency extension module.

ALC CONTROL OUTPUT:
SMB connector supplies a −10 to +10 V signal as a reference for leveling the
.01 to 1.0 GHz output signal of the HP 70341A.

0.5V/GHz OUTPUT:
SMB connector supplies a voltage proportional to output frequency for use
with mm-wave frequency multipliers, including the HP 835XX Series.

AM OUTPUT:
SMB connector outputs AM drive signals (from the front panel EXT PULSE
input connector) to the frequency extension module.

PULSE OUTPUT:
2 SMB connectors output pulse modulation drive signals (from the front panel
EXT PULSE input connector) to the frequency extension modules.

HP 70341A

0.5-1 GHz INPUT:
SMA connector accepts a 0.5 to 1.0 GHz signal from the HP 70340A that
drives the HP 70341A Frequency Extension module.

0.01-1 GHz OUTPUT:
SMA connector outputs a 0.01-1 GHz signal which extends the HP 70340A
frequency range down to 0.01 GHz. The HP 70341A signal is output step
attenuated in the HP 70340A with the 0.01 to 1.0 GHz output available at the
front panel RF Output connector of the HP 70340A.

ALC CTRL:
SMB connector accepts a −10 to +10 V signal as a reference for leveling the
.01 to 1.0 GHz output signal.

AM INPUT:
SMB connector accepts AM drive signals from the HP 70340A rear panel AM
OUTPUT connector.

PULSE INPUT:
SMB connector accepts pulse modulation drive signal from the HP 70340A
rear panel PULSE OUTPUT connector).

Options

There are several electrical, mechanical, warranty, and documentation
options available for the HP 70340A.

Electrical Options: There are three electrical options available for the Signal
Generator. These options are as follows:

Option 1E1 - Add Output Step Attenuator

If option 1E1 is ordered, an internal step attenuator is included before the
RF OUTPUT connector. The step attenuator has a range of 0 to 90 dB in
10 dB steps. The correct amount of attenuation is selected automatically by
the Signal Generator dependent on the output power level selected. If this
option is installed, you can select whether or not the step attenuator will

automatically switch. This function is useful during certain applications, such as when external automatic level control is used.

Option 1E2 - Internal Pulse Modulation Generator

If Option 1E2 is installed, the instrument includes as internal pulse source with four different pulse modes. With Option 1E2, the six pulse modulation modes available are: external, inverted external, free-run internal, gated, triggered with delay, and pulse doublet. Pulse rise and fall times are typically < 5 ns, minimum leveled pulse width is < 25 ns, and on/off ration is > 80 dB.

Option 1E8 - 1 Hz Frequency Resolution

Consult your HP sales representative for details on availability and retrofit information.

Option 1E9 - 3.5 mm RF Output Connector

If option 1E9 is ordered, the **RF OUTPUT** connector is a male APC-3.5 precision connector in place of the standard female type-N connector.

4

Legal and Regulatory Information

Legal and Regulatory Information

This chapter contains information pertaining to safety, SCPI conformance, and the warranty.

Safety Considerations

This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

This product is a Safety Class I system (provided with a protective earth terminal).

Before Applying Power

Verify that the product is set to match the available line voltage and the correct fuses are installed.

Safety Earth Ground

An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cable, or supplied power cable set.

WARNING

Any interruption of the protective (grounding) conductor (inside or outside the system) or disconnecting the protective earth terminal will cause a potential shock hazard that could result in personal injury. (Grounding one conductor of a two conductor outlet is not sufficient protection.) In addition, verify that a common ground exists between the unit under test and the system prior to energizing either unit.

Whenever it is likely that the protection has been impaired, the system must be made inoperative and be secured against any unintended operation.

If this system is to be energized via an autotransformer (for voltage reduction) make sure the common terminal is connected to neutral (that is, the grounded side of the mains supply.)

Servicing instructions are for use by service-trained personnel only. To avoid dangerous electric shock, do not perform any servicing unless qualified to do so.

Adjustments described in the manual are performed with power supplied to the system's instruments while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.

Capacitors inside the system's instruments might still be charged even if the system has been disconnected from its source of supply.

For continued protection against fire hazard, replace the line fuses only with 250 V fuses of the same current rating and type (for example, normal blow, time delay, etc.). Do not use repaired fuses or short circuited fuse holders.

Safety Symbols

⚠ Instruction manual symbol: The product will be marked with this symbol when it is necessary for the user to refer to the instruction manual (see Table of Contents for page references).

⚡ Indicates hazardous voltages.

Indicates earth (ground) terminal.

WARNING The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

CAUTION The CAUTION sign denotes a hazard. It calls attention to a procedure, practice, or the like which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

SCPI Conformance

The HP 70341A is a slave module to the HP 70340A and, therefore, can only be addressed via HP-IB through the HP 70340A. The Signal Generator uses the SCPI (Standard Commands for Programmable Instruments) language for HP-IB communication. The SCPI commands and queries that the Signal Generator understands are listed and described individually in Chapter 7, "Programming Commands" of the *HP 70340A/41A User's Guide*.

The table in Chapter 10 of the *HP 70340A/41A User's Guide* lists all of the commands and queries that the Signal Generator understands and whether they are SCPI approved, SCPI confirmed, or non-SCPI. The commands and queries that are labeled "IEEE 488.2 Required" and "IEEE 488.2 Optional" are always non-SCPI.

If you need more information about SCPI, refer to the *Beginner's Guide to SCPI* (HP part number H2325-90001).

Warranty

CERTIFICATION

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, (NIST), to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

WARRANTY

This Hewlett-Packard instrument product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by HP. Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instructions when properly installed on that instrument. HP does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. HP SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCLUSIVE REMEDIES

THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE
REMEDIES. HP SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT,
SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED
ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

ASSISTANCE

Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products.

For any assistance, contact your nearest Hewlett-Packard Sales and Service Office.

Hewlett-Packard Sales and Service Offices

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