

# Keysight ESG/PSG Signal Generators

E44xxB

E44x8C

E82x7C

E82x7D

Firmware Upgrade  
Guide

# Notices

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## Firmware Upgrade Kits E4400-60230 and E4400-60597 for PSG/ESG Signal Generators

Product Affected: .....	All
Serial Numbers: .....	All
Options: .....	All except Option H98
To Be Performed By: .....	(X) Keysight Technologies Service Center (X) Personnel Qualified by Keysight Technologies (X) Customer
Estimated Installation Time: .....	75 minutes (RS-232), 30 Minutes (GPIB), 3 minutes (LAN)
Estimated Verification Time: .....	1 minute

### Introduction

The instructions in this firmware upgrade guide enable you to install the PSG/ESG Upgrade Assistant 5.12 on your computer from either the Keysight Technologies website or a CD-ROM and upgrade firmware on ESG-B signal generators with <B.03.20.

#### NOTE

**For E44xxB ESG Signal Generators Models Only**  
When upgrading E44xxB ESG signal generators from firmware versions <B.03.20, see, “[ESG-B Firmware Installation For Versions <B.03.20](#)” on [page 14](#).

To upgrade firmware on PSG/ESG signal generators, perform the following procedures:

1. Check signal generator functionality on [page 5](#).
2. Confirm required equipment on [page 6](#).
3. Connect an RS-232, GPIB, or LAN interface to a PC on [page 8](#).
4. Install PSG/ESG Upgrade Assistant 5.12 and firmware files on [page 11](#).
5. Use the PSG/ESG Upgrade Assistant 5.12 with firmware files on [page 12](#).
6. Check signal generator functionality on [page 5](#).

## Overview of Upgrade Assistant 5.12

**NOTE**

Always use the Upgrade Assistant version shown with the firmware that is to be downloaded.

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PSG/ESG Upgrade Assistant 5.12 is used for upgrading firmware on PSG/ESG signal generators:

- it is a Windows-based program
- it replaces PSG/ESG Upgrade Assistant 5.00 through 5.11 as well as ESG Upgrade Assistant 2.12, 2.22, and 3.3.
- it allows new and previous versions of firmware installations to be performed using either:
  - RS-232 or GPIB on E44xxB ESG Signal Generators
  - GPIB or LAN on E44x8C ESG Signal Generators
  - GPIB or LAN on E824xA/5xA PSG Signal Generators
  - GPIB or LAN on E82x7C/D PSG Signal Generators
- it has an associated HTML page that describes the following information for each firmware upgrade version:
  - information about new features and enhancements
  - a list of improvements and defects that have been fixed
  - hardware compatibility

## Check Signal Generator Functionality

Use the following procedure to confirm that the signal generator powers up and that the internal check identifies no errors. The internal check evaluates the operation of the signal generator and returns an error message if it detects a problem.

### NOTE

The signal generator must warm up for at least five minutes and all errors must be cleared from the error queue before a firmware upgrade can be successfully completed.

If errors exist in the error queue and a firmware upgrade is attempted, the firmware upgrade will be unsuccessful; new DSP code cannot be upgraded until the error queue has been cleared.

When signal generators with Option 1E5 are first connected to ac line power, the error message `ERROR 514, Reference Oven Cold` occurs, causing both the `OVEN COLD` annunciator and the `ERR` annunciator to turn on.

After approximately five minutes, the `OVEN COLD` annunciator automatically clears, but the `ERR` annunciator remains on until all errors are cleared from the error queue.

To check signal generator functionality

1. Turn on power to the signal generator and let it warm up for at least five minutes.
2. Cycle power on the signal generator. The green LED should light and the signal generator should perform a functionality check.
3. When the display lights, check to see if the `ERR` annunciator is on.
  - If the `ERR` annunciator is **on**, review the error messages in the error queue by pressing **Utility > Error Info > View Next Error Message**. The first error message in the error queue appears in the display text area. (Refer to the signal generator error messages list on the documentation CD for information about each error message.)
 

After resolving all problems causing errors, press **Clear Error Queue(s)**.
  - If the `ERR` annunciator is **off**, the signal generator functionality check has passed.

## Confirm Required Equipment

### Confirm Required Equipment

This section lists the minimum computer hardware, operating system, and software that are required to perform firmware upgrades on PSG/ESG signal generators.

Computer	IBM compatible PC with a 486 MHz processor or greater
RAM Required	64 MB or more
Hard Disk Space Required	20 MB or more  This could increase significantly if a large library of firmware upgrade files are expected to be maintained on the PC. A single firmware release consists of approximately 5 to 8 MB of data.
CD-ROM Drive or Modem	Use of a CD-ROM drive is only required when the computer being used does not have Internet access.  Use of a 56 kbps modem is only required for systems downloading firmware updated from the Internet.
RS-232, GPIB, or LAN Connection	<ul style="list-style-type: none"><li>– If you plan to perform a firmware upgrade using RS-232, refer to the “RS-232 Installation Kit (Only for use with E44xxB ESG Signal Generators)” on page 6.  While making the RS-232 connection, a 5-mm nut driver, part number 8710-1219, is used to remove the screws from the serial interface (f) to (f) adapter.</li><li>– If you plan to perform a firmware upgrade using GPIB, refer to “GPIB Interface Requirements” on page 6.</li><li>– If you plan to perform a firmware upgrade using LAN, a 10Base-T LAN interface is required. Contact your network administrator if problems are encountered.</li></ul>
Operating System	Windows XP, 2000, or Windows NT 4.0 (with Service Pack 5 or above)
Internet Browser	Use of an Internet Browser is only required for downloading firmware files from the Internet or for viewing firmware release information on your local PC or over the Internet.  Microsoft Internet Explorer 4.0 and above, or Netscape Navigator 4.0 and above  Either browser must be Java enabled with Java 1.02 or above.

RS-232 Installation Kit  
(Only for use with E44xxB ESG Signal Generators)

Quantity	Description	Part Number
1	Firmware Upgrade Guide	E4400-90549
1	PSG/ESG Firmware Upgrade CD-ROM	E4400-10501
1	RS-232 Cable Kit:	E4400-60049
	<ul style="list-style-type: none"> <li>– Serial RS-232 Cable (8120-6188)</li> <li>– RS-232 Null Modem (5181-6639)</li> <li>– Adapter, (f) to (f) (1252-7825)</li> </ul>	

### GPIB Interface Requirements

Interface Cards	Manufacturer	Driver Software	Version	Windows Version
82341C for ISA bus computers	Keysight Technologies	I/O Libraries SICL & VISA	J.01.01.00	XP/2000/NT 4.0
82350A for PCI bus computers				
PCI-GPIB	National Instruments	NI-488.2M	1.60	XP/2000/NT 4.0
PCI-GPIB+				XP/2000/NT 4.0
PCMCIA-GPIB				XP/2000/NT 4.0

Connect an RS-232, GPIB, or LAN Interface to a PC

## Connect an RS-232, GPIB, or LAN Interface to a PC

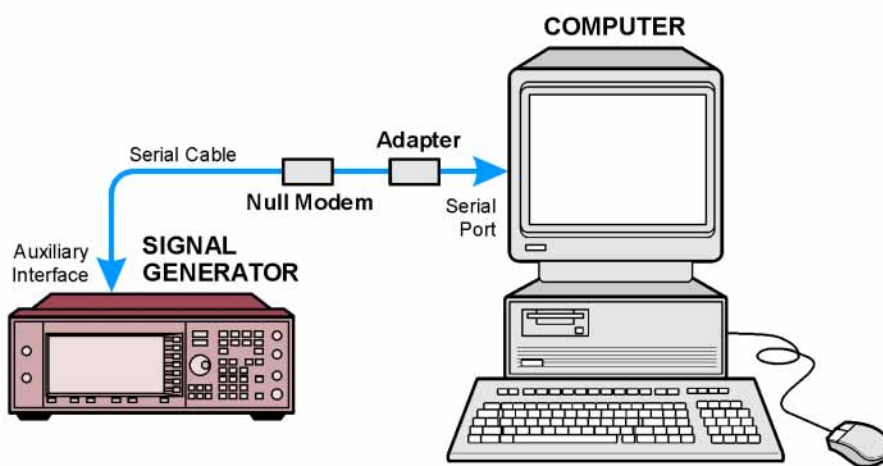
To connect the signal generator to a PC using an RS-232 interface  
(Only for use with E44xxB ESG Signal Generators)

1. Connect E44xxB ESG signal generators to the PC as shown in the following diagram. Use a 5-mm nut driver to remove both standoffs (screws) from the female-female adapter.

RS-232 communications are connected to one of the COM ports on the PC using an RS-232 serial cable with a null-modem connected between the COM port and the signal generator's RS-232 connector. Refer to the "[RS-232 Installation Kit \(Only for use with E44xxB ESG Signal Generators\)](#)" on page 7 for more information.

### NOTE

Ensure that the selected COM port is not used by any other device while PSG/ESG Upgrade Assistant 5.12 is being used.



2. Set the RS-232 parameters as follows on the E44xxB ESG signal generators:
  - a. Press the following keys:

\_\_\_\_\_

**Preset (factory defined)**

\_\_\_\_\_

**Utility > GPIB/RS-232**

\_\_\_\_\_

**RS-232 Baud Rate > 19200**

\_\_\_\_\_

**RS-232 Echo > Off**

\_\_\_\_\_

**RS-232 Pace >**

\_\_\_\_\_

**Transmit Pace > None**

\_\_\_\_\_

**Receiver Pace > Xon**

\_\_\_\_\_

**RTS/CTS > RTS On**

\_\_\_\_\_

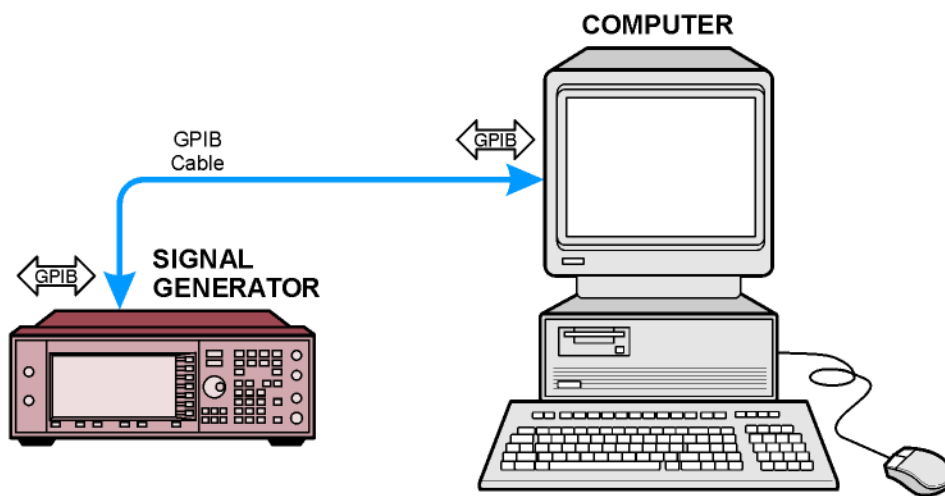


To connect the signal generator to a PC using a GPIB interface card

1. Connect the signal generator to the PC as shown in the following diagram.

GPIB communications require a GPIB interface card installed in the PC and a GPIB cable connected between the interface card and the signal generator's GPIB connector.

Two common GPIB interface cards are the National Instruments PCI-GPIB and the Keysight GPIB interface cards. (Refer to **"GPIB Interface Requirements"** on page 7 and refer to the documentation that came with the GPIB interface card for information related to installing and configuring the GPIB interface card in your computer.)



2. Set GPIB parameters as follows on PSG/ESG signal generators:

- a. Press the following keys for the model being set:

E44xxB ESG Signal Generators	E44x8C ESG Signal Generators	E82x7C/D PSG Signal Generators and E824xA/5xA PSG Signal Generators
Utility > GPIB/RS-232 > GPIB Address > 19	Utility > GPIB/RS-232/LAN > GPIB Address > 19	Utility > GPIB/RS-232/LAN > GPIB Address > 19

- b. Use the numeric keypad, the arrow keys, or rotate the front panel knob to set the desired address and press Enter.

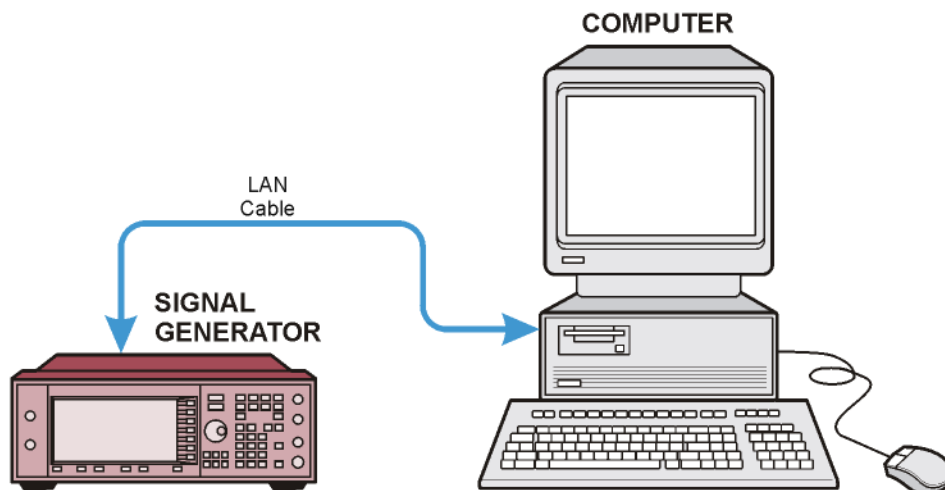
The signal generator's GPIB address is set to 19 at the factory. The acceptable range of addresses is 0 through 30. Once initialized, the state of the GPIB address is not affected by a signal generator preset or by a power cycle. Other instruments on the GPIB cannot use the same address as the signal generator.

Connect an RS-232, GPIB, or LAN Interface to a PC

To connect the signal generator to a PC using a LAN interface card

1. Connect the signal generator to the PC as shown in the following diagram.

LAN communications require a LAN interface card installed in the PC and a LAN cable connected between the interface card and the signal generator's LAN connector. LAN communications require a 10Base-T LAN interface. Contact your network administrator if problems are encountered.



2. Set LAN parameters as follows on PSG/ESG signal generators:

- a. Press the following keys for the model being set:

E44xxB ESG Signal Generators	E44x8C ESG Signal Generators	E82x7C/D PSG Signal Generators and E824xA/5xA PSG Signal Generators
LAN is not available on E44xxB ESG Signal Generators.	<b>Utility &gt; GPIB/RS-232/LAN &gt; LAN Setup &gt; Hostname &gt;</b> (enter the instrument name) or (IP address)	<b>Utility &gt; GPIB/RS-232/LAN &gt; LAN Setup &gt; Hostname &gt;</b> (enter the instrument name) or (IP address)

- b. Use the numeric keypad to set the desired address and press Enter.

The signal generator LAN address is not set at the factory. Contact your network administration to obtain an appropriate IP address.

- c. Set the Sockets SCPI parameters by pressing **Utility > GPIB/RS-232/LAN > LAN Services Setup > Sockets SCPI: On** to use the E44x8C firmware installation tool.

## Install PSG/ESG Upgrade Assistant 5.12 and Firmware Files

### NOTE

Always use the Upgrade Assistant version shown with the firmware that is to be downloaded.

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PSG/ESG Upgrade Assistant 5.12 is used along with firmware files to upgrade the firmware on PSG/ESG signal generators. They are both available for download from the Keysight Technologies website or from a CD-ROM.

To install the PSG/ESG Upgrade Assistant 5.12 and firmware files from the Keysight Technologies website

1. Access the website using the following URL: <http://www.keysight.com/find/upgradeassistant> or type “upgradeassistant” in the Quick Search box from the Keysight Technologies website.
2. Download and install the PSG/ESG Upgrade Assistant 5.12 installation program onto your computer.

The installation program places the PSG/ESG Upgrade Assistant 5.12 in a default installation folder

(C:\Users\Save As from the **Save** drop-down menu shown at the bottom of the browser.

3. Download and install a version of PSG or ESG firmware files onto your computer.

The installation program places the selected firmware files in a default installation folder (C:\Users\Save As from the **Save** drop-down menu shown at the bottom of the browser.

4. After installing both the PSG/ESG Upgrade Assistant 5.12 program and the selected firmware files, proceed to “Using the PSG/ESG Upgrade Assistant 5.12 with Firmware Files” on page 11.

To install PSG/ESG Upgrade Assistant 5.12 and firmware files from CD-ROM

1. Insert the firmware upgrade CD-ROM into the computer’s CD-ROM drive.

An autostart file should run automatically.

2. Once the PSG/ESG Upgrade Assistant 5.12 starts, proceed to “Using the PSG/ESG Upgrade Assistant 5.12 with Firmware Files” on page 11.

## Use the PSG/ESG Upgrade Assistant 5.12 with Firmware Files

The PSG/ESG Upgrade Assistant 5.12 is used with firmware files to upgrade the firmware on PSG/ESG signal generators.

### NOTE

#### For E44xxB ESG Signal Generators Models Only

When upgrading E44xxB ESG signal generators from firmware versions earlier than B.03.20, the firmware must be upgraded in two steps:

- a. Upgrade from earlier firmware versions to B.03.20 using RS-232.
  - b. Upgrade from B.03.20 to any newer version (> B.03.20) using RS-232 or GPIB.
- 

1. From the program's Setup Parameters dialog box, select the Connection Type to be either LAN, GPIB, or RS-232:
  - If LAN is selected (not available with E44xxB ESG signal generators), specify the settings for LAN Setup. Enter the IP address or the instrument name (alias name) that has been assigned to the signal generator.

For example, the signal generator could be assigned an instrument name or an IP address such as 141.xxx.xxx.xxx (where each x can be any digit from 0 to 9). Each instrument name or IP address is assigned by a system administrator at your facility. (For further information, refer to the documentation that came with your LAN interface card or contact your system administrator.)

- If GPIB is selected, specify the settings for GPIB Setup. Use GPIB Port 0 and Address 19. These values should correspond with the values that are set on your signal generator.

For example, the signal generator is usually set to GPIB Port 0 and Address 19 and the GPIB interface card in the computer is usually set to GPIB Port 0 and Address 21. These values are chosen by convention, but any address in the range 0-30, inclusive, may be used. (For further information, refer to the documentation that came with your GPIB interface card.)

- If RS-232 is selected (only for use with E44xxB ESG signal generators), specify the settings for RS-232 Setup. Use either COM Port 1, 2, 3, or 4; the COM port that is selected depends on the number of serial ports that are available on the PC model be used.
  - Main firmware must be loaded at a Baud Rate of 19200, but DSP code can be loaded at Baud Rates up to 57600.

2. Under Firmware Release, click the **Browse** button.

3. From the Select Release File dialog box, double-click the folder for the version of firmware that you would like to install (for example, double-click c\_02\_52\_2002\_nov).

4. When the folder opens, double-click the filename for the version of firmware that you would like to install (for example, c\_02\_52\_e443xc.esg).
  - a. Click the View Release Information button and review all firmware release information before downloading to the signal generator.
  - b. From the program's Setup Parameters dialog box, under Special Cases, select any items that may apply to the upgrade:
    - Select the Added New Hardware checkbox if new hardware has been added to the signal generator.
    - Select the Recover Failed Upgrade checkbox if a previous firmware upgrade had been aborted or failed and a recovery is required.
  - c. Click the Next button to proceed.
5. From the program's Select Components dialog box:
  - a. Under Selected Release, verify that the correct firmware version has been selected.
    - If the firmware version needs to be changed, use the Back button and return to step 3 of this procedure.
  - b. Under Firmware Revision, verify that the version of the firmware designated as Installed is to be replaced by the version designated as New.
    - If an old version of firmware is to be installed, select the Allow Old Revisions checkbox. Note that installing old versions of firmware with new hardware may generate errors.
  - c. Under Upgrade Selection, verify that all firmware components are to be upgraded.

By default, all upgrade components are selected:

    - If you want to perform a partial upgrade and do not **already** know the requirements for each upgrade component, use the Back button and return to step 4 of this procedure.
    - If all components are not to be upgraded:
      1. Click the Options button and review the cards installed in the signal generator along with their corresponding options.
      2. Click the OK button when done reviewing available options.
      3. Click the components to be upgraded.
  - d. Click the **Next** button when all upgrade selections have been made.
6. From the program's Confirm Upgrade dialog box, click the **Next** button to begin the firmware upgrade.

Note that once an upgrade is started, it should not be aborted and must be completed; failing to complete an upgrade may leave the signal generator in a non-operational state.

The Upgrade in Progress area is displayed, indicating the estimated time remaining to complete the upgrade process.
7. When the download is completed, perform the **“Check Signal Generator Functionality”** procedure on [page 5](#).

## ESG-B Firmware Installation For Versions <B.03.20

### Introduction

The following procedure describes how to install firmware revisions into ESG-B RF Signal Generators with existing firmware revisions <B.03.20. These instructions assume you are using Microsoft Windows and that you are familiar with basic file management within Windows.

### Required Equipment

- PC
- 9-pin null modem cable, with female connectors on both ends.

The 9-pin null modem cable can be made from a standard female-female 9-pin serial cable and a correctly-gendered null modem adapter, or it can be assembled from the following parts:

Item	Quantity	Description	Part Number
1	1	9-pin Serial RS-232 cable (male-female)	8120-6188
2	1	9-pin Null Modem Adapter (male-male)	5181-6639
3	1	9-pin gender changer (female-female)	1252-7825

## Safety Considerations

### CAUTION

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation.

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## Check Signal Generator Functionality

Use the following procedure to confirm that the signal generator powers up and that the internal check identifies no errors. The internal check evaluates the operation of the signal generator and returns an error message if it detects a problem.

### NOTE

The signal generator must warm up for at least five minutes and all errors must be cleared from the error queue before a firmware upgrade can be successfully completed.

If errors exist in the error queue and a firmware upgrade is attempted, the firmware upgrade will be unsuccessful; new DSP code cannot be upgraded until the error queue has been cleared.

When signal generators with Option 1E5 are first connected to ac line power, the error message `ERROR 514, Reference Oven Cold` occurs, causing both the `OVEN COLD` annunciator and the `ERR` annunciator to turn on.

After approximately five minutes, the `OVEN COLD` annunciator automatically clears, but the `ERR` annunciator remains on until all errors are cleared from the error queue.

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To check signal generator functionality

1. Turn on power to the signal generator and let it warm up for at least five minutes.
2. Cycle power on the signal generator. The green LED should light and the signal generator should perform a functionality check.
3. When the display lights, check to see if the `ERR` annunciator is on.
  - If the `ERR` annunciator is **on**, review the error messages in the error queue by pressing **Utility > Error Info > View Next Error Message**. The first error message in the error queue appears in the display text area. (Refer to the signal generator error messages list on the documentation CD for information about each error message.)
  - After resolving all problems causing errors, press **Clear Error Queue(s)**.
  - If the `ERR` annunciator is **off**, the signal generator functionality check has passed.

## Installation Procedure

### NOTE

For firmware revisions B.02.42 and above, the download procedure has changed. It is no longer necessary to synchronize the powering up of the ESG with the program. Simply turn the signal generator on and run the program. In addition, the program will ask you for the COM port, so only one program will need to be run (`DLSERIAL.BAT`).

If the ESG will not power up correctly (possibly because of a previously failed attempt at a firmware download) you can still use the older method of firmware installation with the ESG initially turned off. To do this, open a DOS window, navigate to the appropriate directory and enter the following command: `DLESERIAL ESG_OFF`. This method will download firmware using the powered-off method.

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### NOTE

It is highly recommended that all non-essential computer programs be terminated before upgrading the firmware. RS-232 overruns could occur if other programs interrupt the download process.

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1. Navigate to the PSG/ESG Firmware Upgrade Assistant page, [www.keysight.com/find/upgradeassistant](http://www.keysight.com/find/upgradeassistant).
2. Select “OLD Firmware Versions” and then select “E44xxB ESG, OLD Firmware Versions”.
3. Select the firmware version you wish to use to upgrade your ESG-B.
4. Repeat the previous step.

### NOTE

If your signal generator currently has a firmware revision <B.03.02, and you want to upgrade to a firmware version >B.03.02, you will need to upgrade to B.03.02 using the DOS method, then upgrade to the latest firmware version using the Firmware Upgrade Assistant.

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5. Save to any convenient directory. Make note of the filename and directory where you saved the file; you will need to retrieve it in the next step.
6. Once the file has been downloaded, locate the file using File Manager/Explorer.
7. Double click the file. This will trigger the file to extract into a number of smaller files. The extraction process will automatically place the smaller files in `C:\ESG_FW`. If you wish to have the files extracted to a different directory, change the location.
8. For revision B.02.42 or later, open `DLSERIAL.BAT`. For revisions earlier than B.02.42, choose `dl_com1.bat` if you are using the COM1 port or `dl_com2.bat` if you are using the COM2 port.
9. Follow the download instructions as they appear on your screen. The download could take up to one hour to complete. When complete, the DOS window will close. For help following the download instructions, see [“Helpful Notes for Using this Procedure” on page 17](#).
10. Once the firmware download is successful, disconnect the RS-232 cable.
11. The files and directories that were created in the earlier steps can now be removed from your computer.



## Helpful Notes for Using this Procedure

- When you are prompted with, “Turn ON the instrument NOW”, you must respond within 5 seconds to avoid a synchronization problem.
- When you are instructed to press Return, this refers to the PC keyboard Enter key, not the Return key on the signal generator.
- When you are prompted with a Yes/No question, press the computer keyboard Y or N key and then the Return key. This is not case sensitive.
- Once the download starts, it will take 30-60 minutes to finish. No further interaction is required. While the download is in process, the DOS window will show the communication that is taking place with the signal generator. Several (non-highlighted) prompts will appear on the display. These will be automatically answered by the download program.
- When you are prompted with, “Be sure the instrument RS-232 settings under the front panel keys [Utility] [HP-IB/RS-232] are set as follows...”, turn the signal generator on and verify the RS-232 settings as shown, then turn the signal generator off.
- When you are prompted with, “Do you have Option UND, UN5, and/or H97? [(Y/N) Return]” answering Yes will download the ESG firmware and Option UND, UN5, and/or H97 firmware. Answering No, will download the ESG firmware only.
- If the signal generator is in the wrong mode, (e.g. bootrom mode) the download program will not detect this condition. If this occurs, close the DOS window and repeat from step 7.
- If the procedure fails, due to loss of synchronization, accidental loss of power, etc., repeat the installation procedure, starting with step 7.
- After the firmware download is complete, the signal generator will automatically reboot.
- To verify the new firmware has been downloaded into the signal generator, press **Utility** > **Instrument Info/Help Mode** > **Diagnostic Info**. The new firmware revision and firmware date should be displayed under “Instrument Information”.



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