N1010A FlexDCA Technical Note

FlexDCA Installation Troubleshooting Guide

This document provides helpful information for resolving FlexDCA installation issues

Contents

FlexDCA Versions A.06.90 (and later)

FlexDCA A.06.90 Overview

FlexDCA A.06.90 is a major software release which contains updates to multiple software components, including the Keysight IO Libraries, the Keysight Host Processor Platform, the Keysight License Manager, and the PathWave License Manager. The A.06.90 installer file size is over 2.3 GB (previous FlexDCA releases were about 750 MB), and the available hard drive space required for a complete install of all components can be as much as 16.6 GB when upgrading from FlexDCA versions older than A.06.00.

The significant number of updated components along with the larger space requirement increases the potential for issues to occur during installation. The following information is intended to help resolve installation issues. If additional support is required, please contact your local Keysight representative, www.keysight.com/find/contactus.

Install Package Contents

The A.06.90 installer package contains the following individual installers. These individual updates may be installed on your instrument or PC during the A.06.90 upgrade, depending on the versions already installed.

EEsof License Tools 2020.2.0.146

IVI.NET Shared Components v1.4.1 NEW!

Microsoft .NET Framework v4.7.2

MathWorks MATLAB Runtime v9.2 NEW!

Keysight Communications Fabric v2.2.22112.11724 NEW!

Keysight IO Libraries v18.2.26526.0 NEW!

Microsoft Visual C++ 2012

Microsoft Visual C++ 2015

Keysight Host Processing Platform v5.3.27414.10022 NEW!

Keysight License Server v2019.05.17.206

Keysight License Manager v5.4.0.509 NEW!

Keysight License Service v5.3.2.19 NEW!

Keysight FlexDCA A.06.90 NEW!

Keysight Pathwave License Manager v2.4.1.69 NEW!

Checking Installer File Integrity
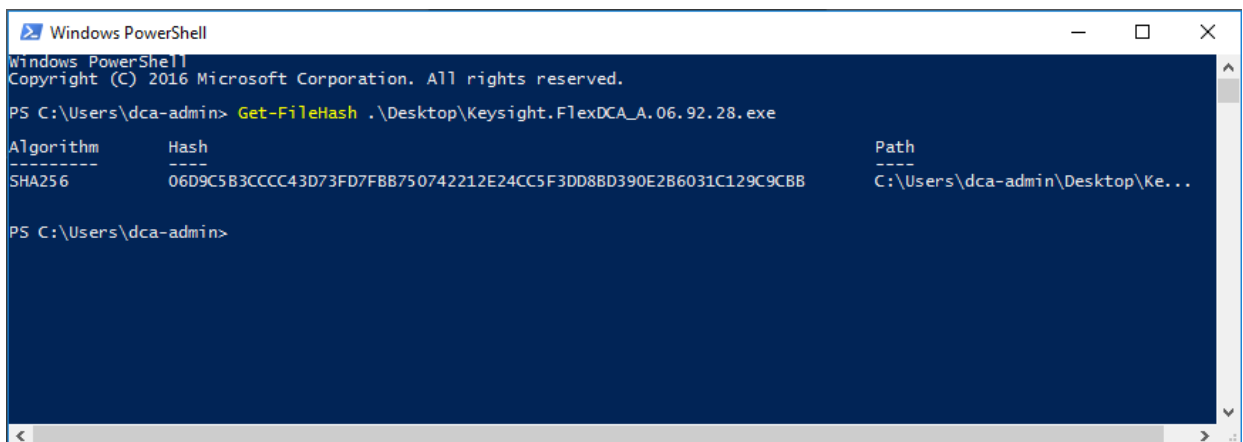
SHA256 File Checksum

The N1010A FlexDCA Software download page on Keysight.com now provides a SHA256 file checksum for verifying the integrity of the installer file. SHA256 stands for Secure Hash Algorithm which hashes the contents of a file into a 64-character hexadecimal string.

For any installation problem, it is recommended to first check the integrity of the downloaded installation file. If the SHA256 checksum is incorrect, download a new copy of the FlexDCA installation file. Then uninstall and re-install FlexDCA.

You may perform an installer file integrity check as follows:

1. Download the FlexDCA installer file and copy it to the target instrument or PC
2. Open Windows PowerShell on the instrument/PC and use one of the following commands to calculate the SHA256 of the file (not all versions of Windows will support both commands):
   a. Get-FileHash
      i. Usage: Get-FileHash <file path>
      ii. Example (shown below): Get-FileHash .\Desktop\Keysight.FlexDCA_A.06.92.28.exe
   b. Certutil
      i. Usage: certutil -hashfile <file path> SHA256
      ii. Example: certutil -hashfile .\Desktop\Keysight.FlexDCA_A.06.92.68.exe SHA256
3. Wait about 20-30 seconds for the SHA256 calculation to complete
4. Compare the calculated SHA256 to the value posted on the FlexDCA download page
5. If the SHA256 values don't match, re-download the installer file

Example (Get-FileHash):

Installation Time

Depending on the versions of the software components being upgraded, the A.06.90 installation can take upwards of twenty minutes to complete. Also note that multiple reboots are typically required, and there can be up to thirty prompts to be acknowledged during the upgrade. The following table gives typical upgrade durations for an N1000A instrument being upgraded from various prior versions:

Prompts, Reboots, and Duration for the A.06.90 Installation

N1000A starting version	# Prompts	# Reboots	Upgrade Duration
A.06.81.26	18	1	10:45
A.06.80.147	18	1	10:45
A.06.71.21	22	2	14:30
A.06.60.378	22	2	14:30
A.06.55.69	22	2	14:30
A.06.40.429	22	2	14:30
A.06.02.17	30	3	19:30
A.06.00.658	30	3	19:30

A Windows 10 PC will have similar upgrade durations, number of reboots, and number of prompts for the A.06.90 upgrade. A full install of FlexDCA A.06.90 will take about twelve minutes on a Windows 10 PC with no prior Keysight software components to uninstall.

HDD Space Requirements

Installation issues can occur if there is insufficient space available on the hard drive.

Typical Installation Sizes
Typical A.06.90 installation size requirements for various systems:

System Installed On	C:\ Drive Space Required	Installer Size	Total Space Required
Windows 10 PC with no prior Keysight software installed	11.8 GB	2.3 GB	14.1 GB
Windows 7 PC with no prior Keysight software installed	11.8 GB	2.3 GB	14.1 GB
N1000A running A.06.81	5.2 GB	2.3 GB	7.5 GB
N1000A running A.06.71	6.9 GB	2.3 GB	9.2 GB
N1000A running A.06.40	7.1 GB	2.3 GB	9.4 GB
N1000A running A.06.00	11.4 GB	2.3 GB	13.7 GB
86100D running A.06.81	5.8 GB	2.3 GB	8.1 GB
86100D running A.06.71	9.0 GB	2.3 GB	11.3 GB
86100D running A.06.40	10.6 GB	2.3 GB	12.9 GB
86100D running A.06.00	15.3 GB	2.3 GB	17.6 GB
86100D running A.05.30	19.4 GB	2.3 GB	21.7 GB

Check Available Space Before the Upgrade
Before downloading the FlexDCA installer, use File Explorer to check the free space on the C: drive of your Instrument or PC. Use the table above as a guide and allow for an additional 1 GB safety margin to prevent running out of disk space during the installation. If your instrument or PC does not have sufficient free space on the C: drive, proceed with one of the following suggestions.

Install from an Alternate Drive
If the free space on your C: drive is within 2 GB of the total space required, you may run the installer from an alternate drive, such as an external USB storage drive or the D: drive of the instrument. First confirm that the alternate drive has at least 2.3 GB of free space, then download the FlexDCA installer onto the alternate drive. Then use File Explorer to launch the installer from the alternate drive. The FlexDCA software and the library components will install onto the C: drive.

Increase Available Space on the C: Drive
- If more space on the C: drive is needed, use the Disk Cleanup utility included with Windows to delete unneeded temporary files:
  1. In the search box on the taskbar, type 'disk cleanup', and select Disk Cleanup from the list of results
  2. Select the C: drive, and then select OK

3. Wait for the free space calculation to complete
4. Select "Clean up system files"
5. Select the C: drive again, and then select OK
6. Wait for the free space calculation to complete
7. Select the checkboxes for all file categories
8. Select the More Options tab
9. Select "Clean up" for System Restore and Shadow Copies
10. Select Delete, and then select OK
11. Select Delete Files at the "Are you sure you want to permanently delete these files?" prompt
12. Note that the cleanup can take 30 minutes or more to complete
13. Restart Windows after Disk Cleanup completes

- If more space is needed, manually delete the temporary files in the %TEMP% directory:
    1. In File Explorer, type %TEMP% in the navigation bar. This will open the folder that Windows has designated as your Temp folder, typically C:\Users\[username]\AppData\Local\Temp
    2. Highlight all the files and subfolders in the Temp directory, and then press the Delete key (or right-click and select Delete)
    3. Confirm to delete any files that require admin permission to delete
    4. Windows won't let you delete any files that are currently in use. Select Skip for any of these files or folders.
    5. Right-click on the Windows Desktop Recycle Bin and select Empty Recycle Bin
    6. **Important: Do not remove the Temp directory itself**
    7. Note that on an instrument, the FlexDCA installer will clear the %TEMP% directory at the end of the installation process to remove the ~3 GB of temporary files created during the install process. On PCs the %TEMP% directory can be cleaned manually.

- If the C: drive is within 1 GB of the space needed, manually uninstall the previous versions of the following programs, using Select Settings > Apps or Control Panel > Programs > Uninstall. This will clear approximately 1.3 GB of space:
    o MATLAB Runtime 7.10
    o EESof License Tools
    o Keysight PathWave License Manager
    o Keysight FlexDCA

- If your 86100D instrument still does not have sufficient disk space for the install, there are several alternate options available:
    o Re-size the C: drive partition using the Windows Disk Management utility.
    o Upgrade to a larger hard drive. If the current replacement HDD used for repair is larger than the installed HDD, installation of a new HDD can be requested during service.
    o Upgrade the 86100D to Windows 10. This Keysight service includes a 240 GB replacement hard drive.
    o Upgrade to an N1000A DCA mainframe.

For additional assistance with these options, contact your local Keysight representative, www.keysight.com/find/contactus

Partial Installation Cleanup

If the installer runs out of disk space on the C: drive during the installation, follow these steps to remove the partial installation and install an earlier version of FlexDCA:

1. Select Settings > Apps or Control Panel > Programs > Uninstall
   a. Uninstall all of the following programs (if present):
      i. EESof License Tools
      ii. Keysight Communications Fabric
      iii. FlexDCA A.xx.xx
      iv. Keysight Host Processor Platform
      v. Keysight IO Libraries Suite
      vi. Keysight License Manager
      vii. Keysight License Server
      viii. Keysight License Service
      ix. Keysight PathWave License Manager
      x. MATLAB Runtime 9.2
2. Clear the %TEMP% directory (instructions above) and empty the Windows Recycle Bin
3. Delete the FlexDCA installer and empty the Windows Recycle Bin again
4. Restart Windows
5. Download and run the installer for a prior FlexDCA version, such as A.06.81
6. Follow suggestions listed above to ensure that sufficient space is available before attempting A.06.90 (or later) installation again.

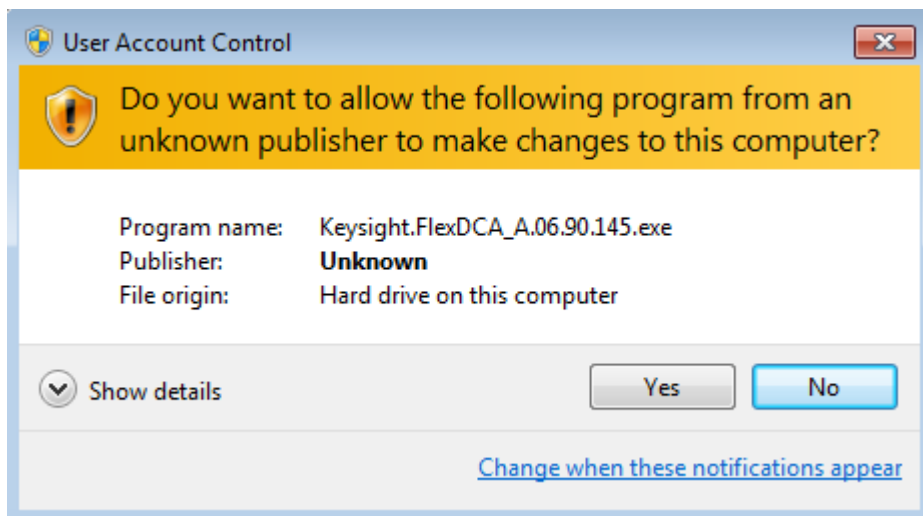## The DigiCert Certificate

Background

To ensure the integrity of the software being installed, Windows software installers, applications, and drivers are digitally signed using a Code Signing Certificate. Recent increases in cybersecurity have led to new certificate requirements for the industry. To comply with these requirements, Keysight 86100D instruments and Windows PCs running Windows 7 or Windows 8.1 need to install a new Trusted Root Certificate before installing newer versions of the N1010A FlexDCA software, starting with version A.06.90.

Affected Devices (Win 7 & Win 8.1)

Microsoft automatically distributes Trusted Root Certificates via periodic security patches. Windows 10 PCs / Instruments typically have the necessary Trusted Root Certificate. However, if your PC / Instrument is running a version of Windows that is no longer supported by Microsoft (i.e., Windows 7 or Windows 8.1), then you must install the new Trusted Root Certificate. Windows 7 extended support ended January 2020, and Windows 8.1 mainstream support ended January 2018.

Symptoms of Missing Certificate

If you see a "Publisher: Unknown" Windows message when launching the FlexDCA software installer, this indicates that your PC or Instrument does not have the DigiCert Trusted Root G4 Certificate installed.

The FlexDCA installer also does a separate prerequisite check for the DigiCert Trusted Root G4 Certificate. If it is not found, the following messages will appear:
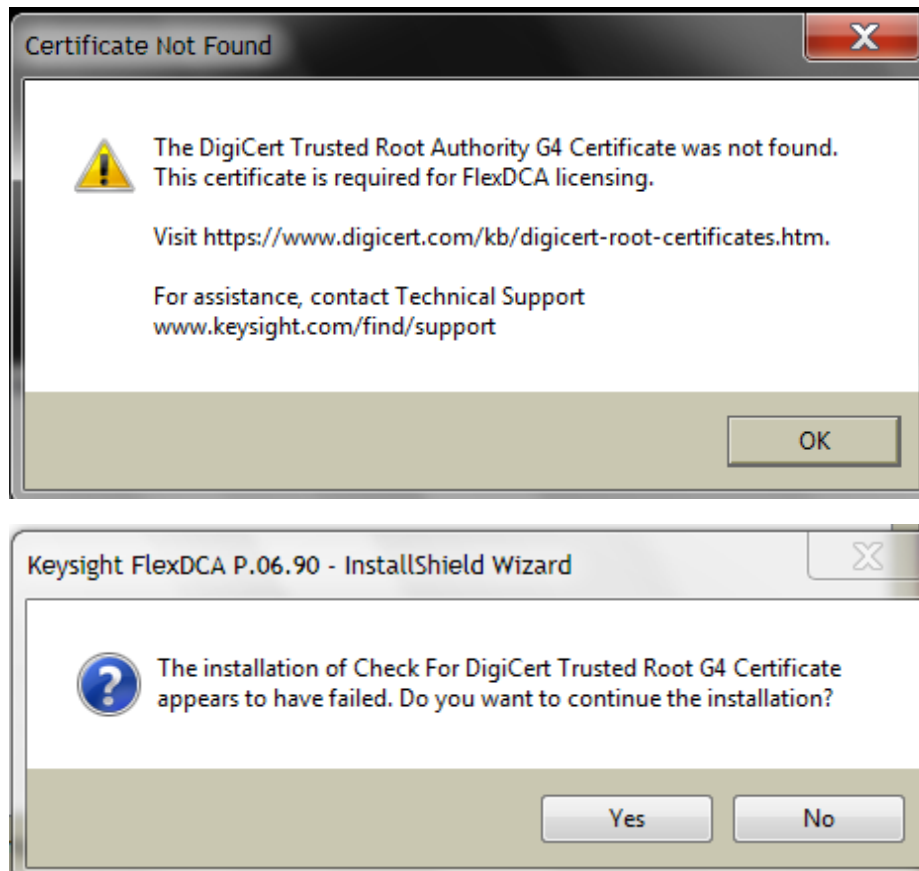

Note that the FlexDCA software will install successfully if you select "Yes" to continue, but the Keysight License Manager will no longer function correctly without the DigiCert Trusted Root G4 Certificate installed. An "Unable to connect to the License Service" warning message in FlexDCA indicates that the required certificate is not installed.

Viewing Certificates

Before viewing the certificates on your Windows PC / Instrument, first launch the FlexDCA software installer. Then select "No" at the first "User Account Control" Windows prompt to immediately exit the installer. This action will update the list of Trusted Root Certificates in the Certificate Manager.

To view the Trusted Root Certificates on your Windows PC / Instrument, type **certmgr.msc** in the Windows start menu search field or in the Windows Run menu (Windows-R keys). In the Certificate Manager select the Trusted Root Certificate Authorities > Certificates folder and look for "**DigiCert Trusted Root G4**."
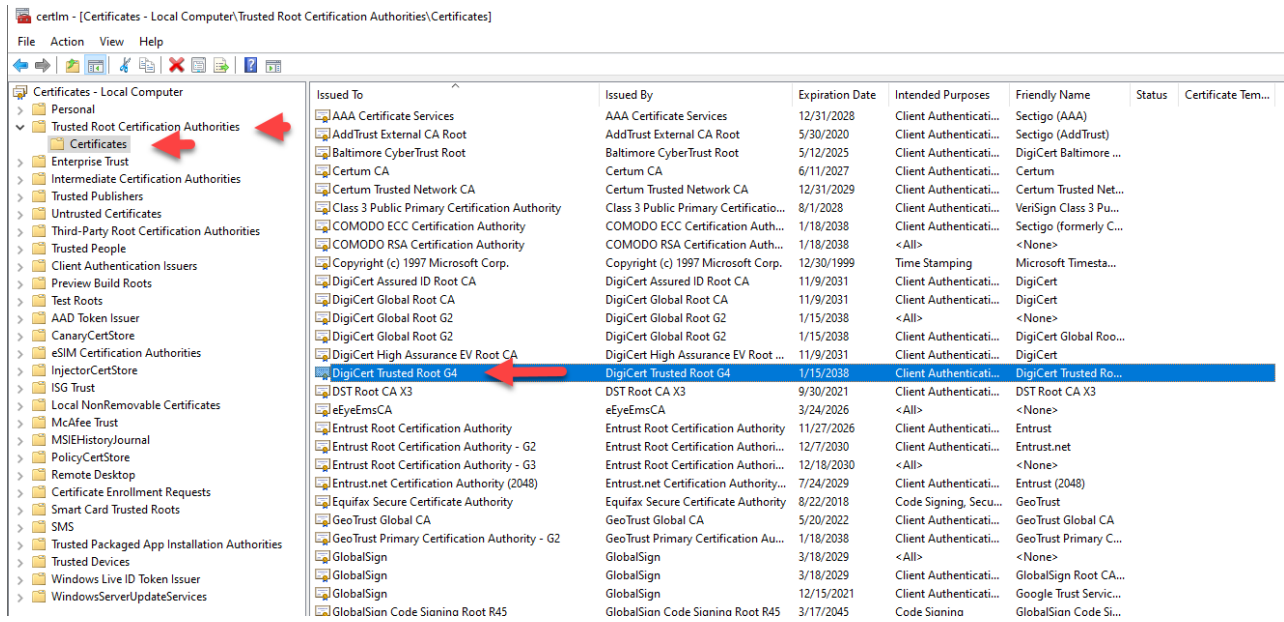
On some Instruments / PCs, the DigiCert Trusted Root G4 certificate may be stored under "Third-Party Root Certification Authorities" or "Intermediate Certificate Authorities". Use the Action > Find Certificates search feature to search for the certificate, if necessary.
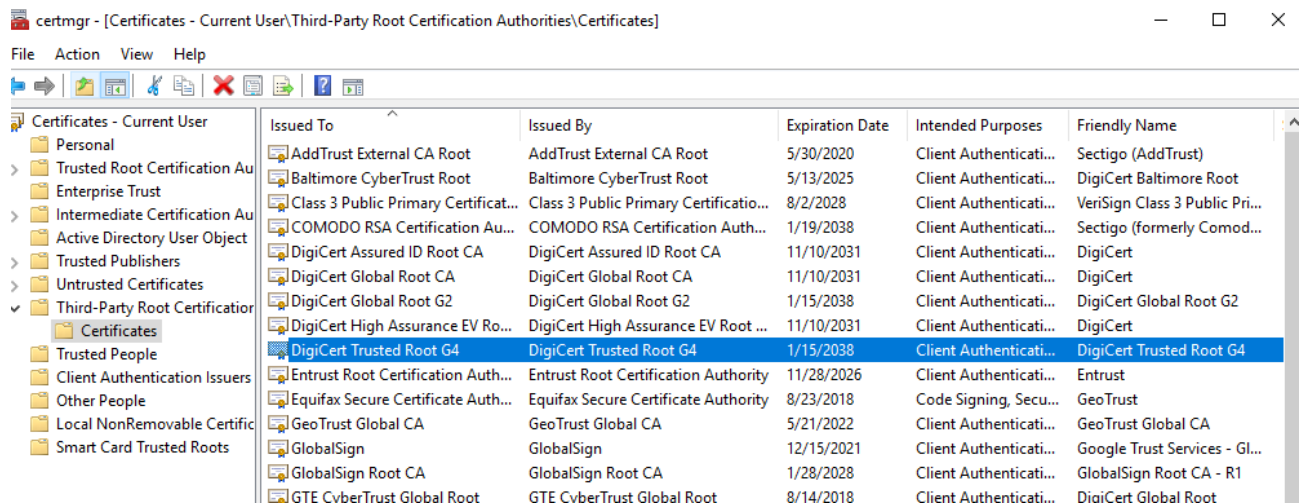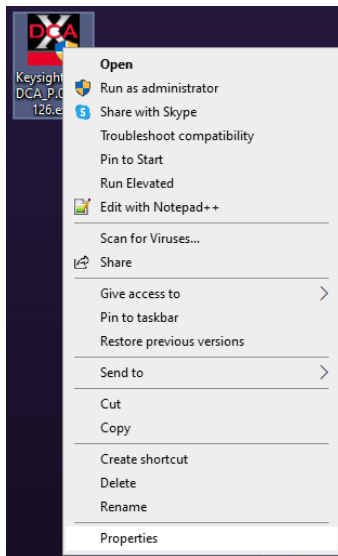

Certificate Installation

If your PC / Instrument has an internet connection, follow the Automatic Installation instructions below. The Manual Installation instructions can be used to install the certificate without an internet connection.

Automatic Certificate Installation (Internet Connection Required)

For PCs and Instruments that have an Internet connection, follow these steps to automatically install the DigiCert Trusted Root G4 certificate:

1. Right-click on the FlexDCA installer, and select **Properties**

2. The Properties dialog box will appear. Select the **Digital Signatures** tab
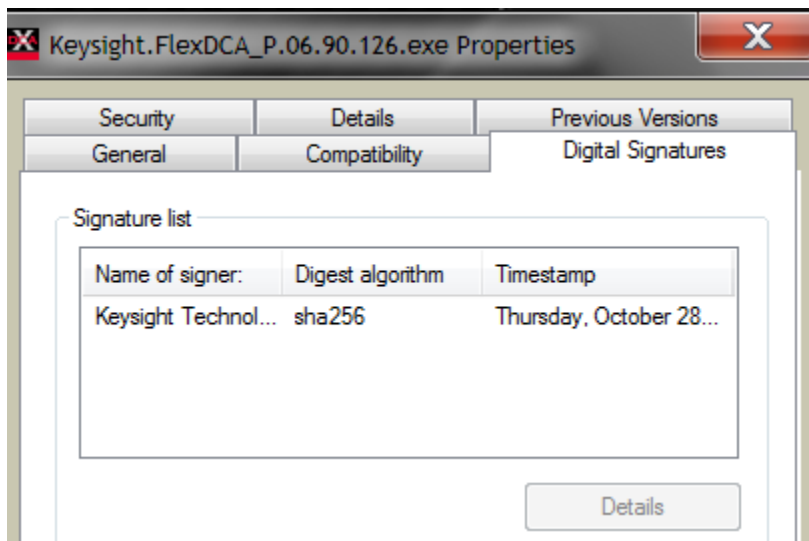
3. **Select** the **Keysight Technologies Signature** and press the **Details** button. This will cause Windows to retrieve and install the DigiCert Trusted Root G4 certificate from the trusted Certificate Authority (CA).
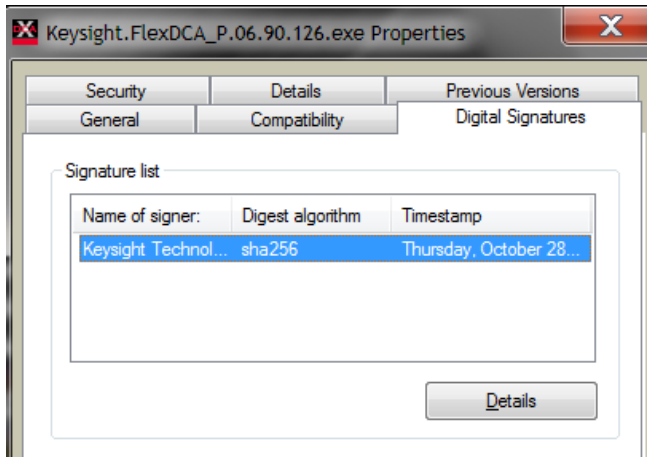
4. After 15 to 30 seconds, the Digital Signature Details dialog will appear, and should say "**This digital signature is OK**." Press OK to exit the details dialog and press OK again to exit the properties dialog.
   You may also confirm that the DigiCert Trusted Root G4 certificate is now present in the Certificate Manager by selecting Action > Refresh to refresh the list.
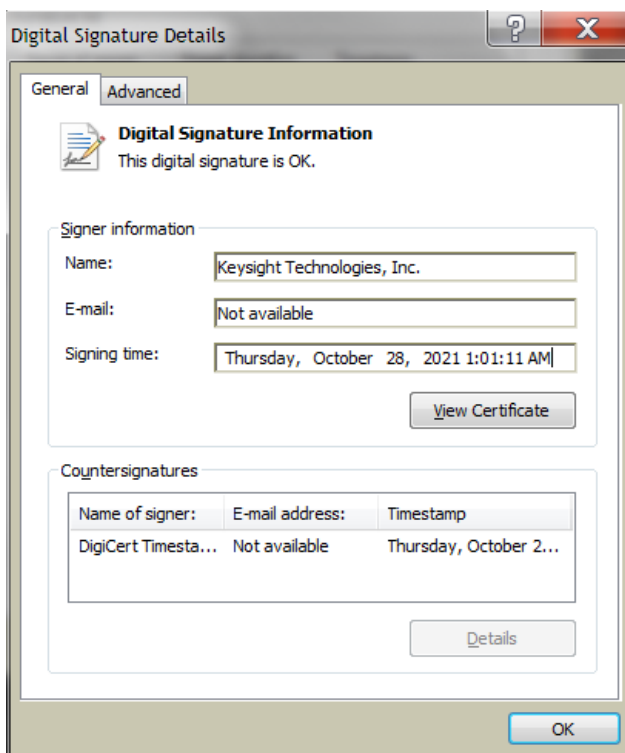
If the Digital Signature Details dialog instead says "The certificate in the signature cannot be verified" then you must follow the Manual Certificate Installation instructions below.

For PCs and Instruments that do not have an Internet connection, follow these steps to manually install the DigiCert Trusted Root G4 certificate:

1. On another PC with Internet access, obtain the Trusted Root Certificate from the DigiCert website:
   a. Navigate to https://www.digicert.com/kb/digicert-root-certificates.htm
   b. Find "**DigiCert Trusted Root G4**"
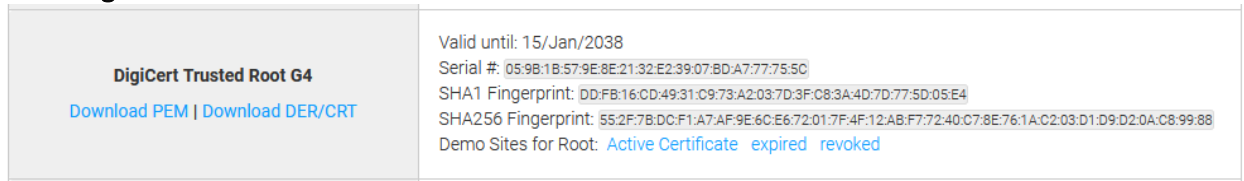
   c. Click **Download DER/CRT**
   d. Save File

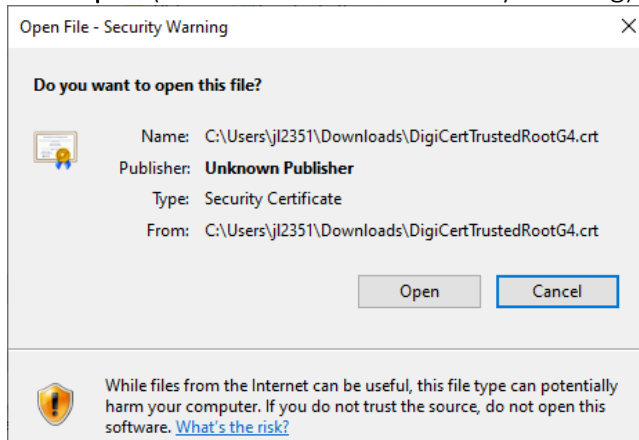2. Transfer the Certificate file to the target PC / Instrument:
   a. If the PC / Instrument does not have an LAN connection, then a USB Storage Flash Drive is typically used to transfer the file

3. Install the Certificate:
   a. Right-click the file and select **Install Certificate**
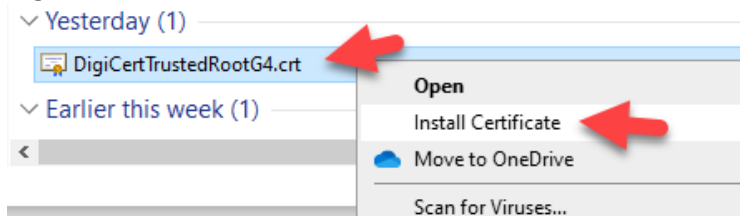
   b. Click **Open** (note that there is a security warning)

   c. This will open the Certificate Import Wizard

d. Select **Local Machine**, then click **Next**

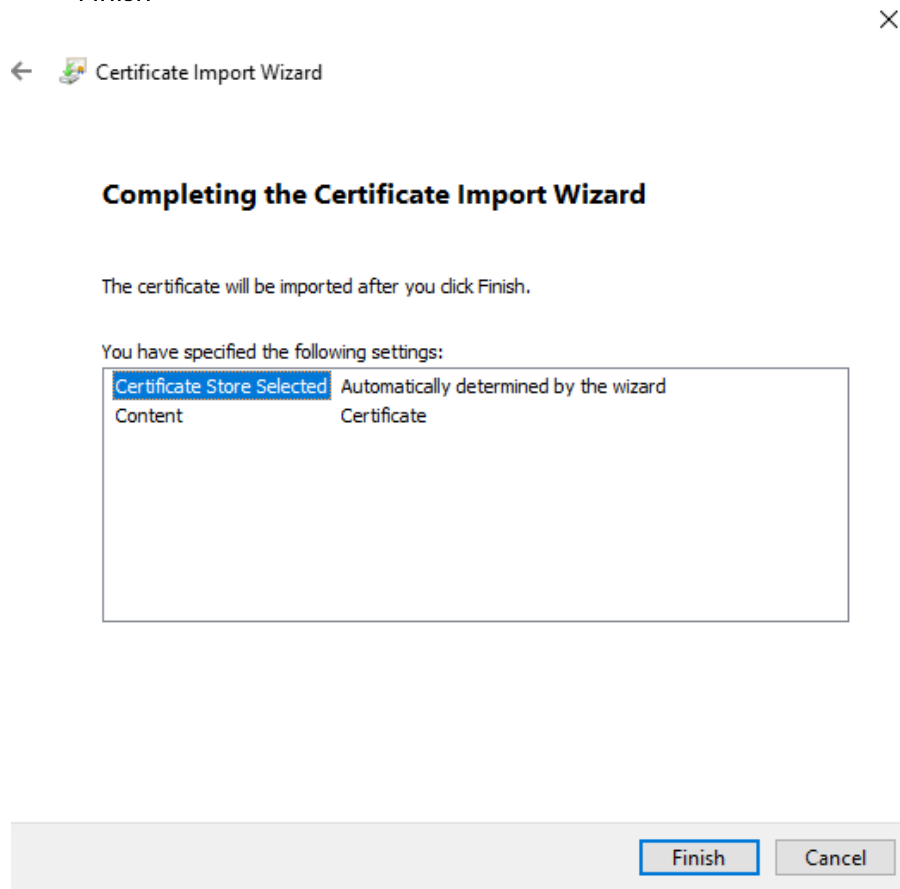e. Select "**Automatically select the certificate store based on the type of certificate**", and then click **Next**

f. Click **Finish**

g. You will see a success message, then click **OK**.
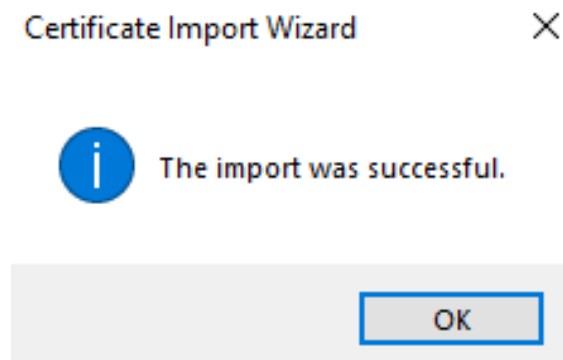
h. In Certificate Manager select Action > Refresh to refresh the list. Confirm that the DigiCert Trusted Root G4 certificate is now present.

Post Certificate Installation
Once the DigiCert Trusted Root G4 certificate is present on your instrument or PC, subsequent FlexDCA software installs will show "Verified publisher" at the initial "User Account Control" installer prompt, and Keysight License Manager will function correctly.
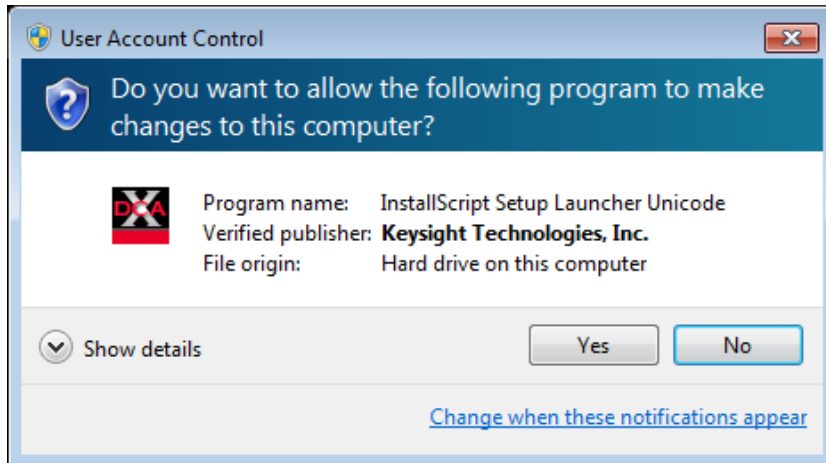
Sectigo Intermediate Certificate

Beginning with FlexDCA A.07.00, both the DigiCert trusted root G4 certificate (discussed above) and the Sectigo USERTrust intermediate certificate are required. For instruments connected to the internet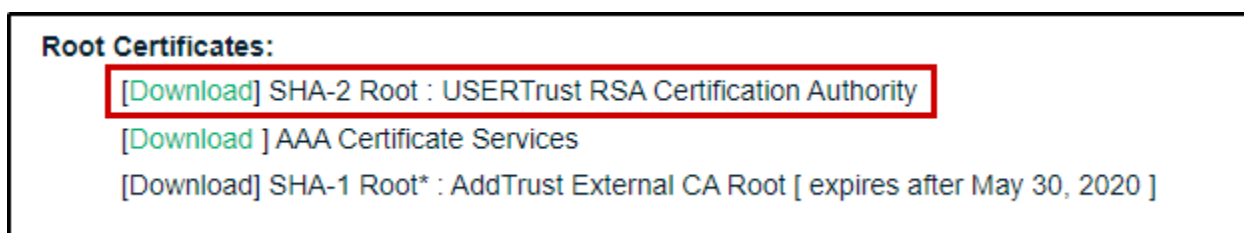 during installation, both certificates are added automatically when the Digital Signature for the A.07.00 FlexDCA installer is viewed. For 86100D Win7 instruments not on a LAN, both the DigiCert trusted root G4 certificate and the Sectigo USERTrust intermediate certificate must be added manually.

The Sectigo USERTrust intermediate certificate may be downloaded from:

https://sectigo.com/knowledge-base/detail/Sectigo-Intermediate-Certificates/kA01N000000rfBO

(Root Certificates > SHA-2 Root : USERTrust RSA Certification Authority)

SHA-2 Certificate Support

86100D frames running legacy OS version Windows 7 SP1 that are not up to date with Microsoft Windows Updates may see the following "Windows requires a digitally signed driver" error message during installation of FlexDCA A.06.90 and later software versions:
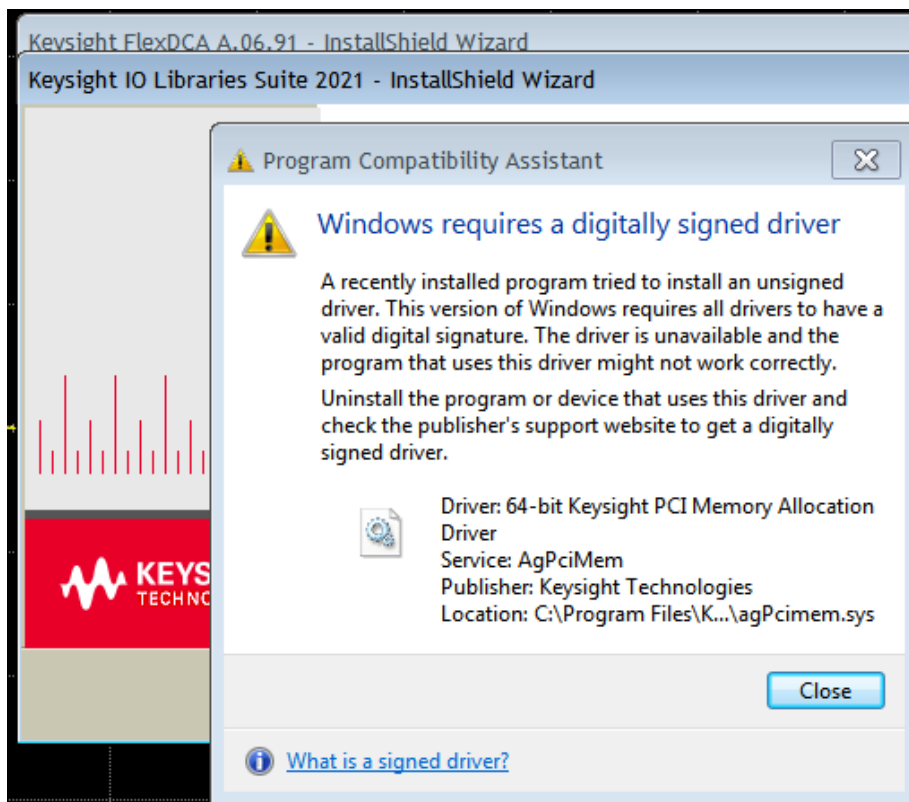
This error message is given because the new Keysight IO Libraries Suite 2021 driver is signed with a SHA-2 certificate to meet current requirements. However, legacy Windows 7 versions only supported SHA1 driver certificates. This affects 86100D mainframes manufactured prior to January 2016 that are not up to date with Microsoft Windows Updates. To update your legacy 86100D Windows 7 SP1 to support SHA-2 certificates, the following two stand-alone updates are required to be installed prior to installing FlexDCA A.06.90, or later:

KB4474419 - Security Update for Windows Embedded Standard 7 for x64-based Systems

KB4490628 - Servicing Stack Update for Windows Embedded Standard 7 for x64-based Systems

These can be downloaded and installed directly from the Microsoft Update Catalog: https://www.catalog.update.microsoft.com/

For more information about the SHA-2 certificate support requirement for Windows 7, please see this support article from Microsoft, *2019 SHA-2 Code Signing Support requirement for Windows and WSUS*

Disk and File Corruption

The most common cause of the "FlexDCA cannot connect to the license service" error message is the DigiCert and Sectigo certificates not being installed, as discussed above. If this error message persists after all previous recommendations have been followed, run the following checks from a command prompt and allow the system to fix any problems it finds.

- Run check disk, "chkdsk", to scan for any system structure problems
- Run system file checker, "sfc /scannow", to check for problems with operating system files

Installer Caveats

Note that the following known caveats may impact the FlexDCA installation:

- After a Windows re-start, FlexDCA may start and the FlexDCA window can hide the installer window. Minimize or close the FlexDCA window and continue the installation.
- The Installer may not automatically re-start after a reboot during the installation. This can happen when running the installer from an alternate drive (other than the C: drive). If this happens, wait a minute after rebooting, then double-click on the installer icon to continue the installation process.
- The FlexDCA 6.90 installation is not complete until the PathWave installation is complete. PathWave is installed as a post-requisite and it may be necessary to wait for several moments after the FlexDCA installer closes to allow the PathWave installation to begin.
- A Legacy UI icon may briefly appear on the Desktop during installation on the N1000A. Note that the icon will disappear on its own and that the Legacy UI is not installed on N1000A mainframes.
- If a "1394_OHCI_LegacyDriver.msi" error message appears during the IO Libraries install on an N1000A running A.06.00.658, select Cancel and continue the installation. This file is not needed on the N1000A.
- If the message "Cannot create a file when it already exists" appears for the C:\Program Files\Keysight\FlexDCA\Scope.ico file, select Retry to proceed.
- After the installation completes, Keysight IO Libraries Suite 2019 may still be listed in the Programs and Features control panel, even though it was successfully removed and upgraded to IO Libraries Suite 2021. To check if the 2021 Suite installation was successful, launch Connection Expert and confirm that the About dialog lists "Connection Expert 2021". The IO Libraries Suite 2019 listing in Programs and Features can be ignored.
- After the installation completes on a PC, clear the %TEMP% directory manually, as needed. The installation will leave several GB of temporary files in this directory. When installed on an instrument, the temp files are automatically deleted after installation. On a PC, the files must be manually deleted, if additional disk space is desired.

FlexDCA Versions A.05.80 – A.06.81

.NET 4.7.1 Installation Failure

Installation of FlexDCA versions prior to A.06.90 may fail during the .NET 4.7.1 Framework installation step in some cases and is most often caused by either low disk space on the target drive or an invalid / out of date certificate.

Low Disk Space

The .NET 4.7.1 installation requires 1.4 GB of free disk space and may fail if insufficient disk space is available. When this happens, the installer will give the following error message:
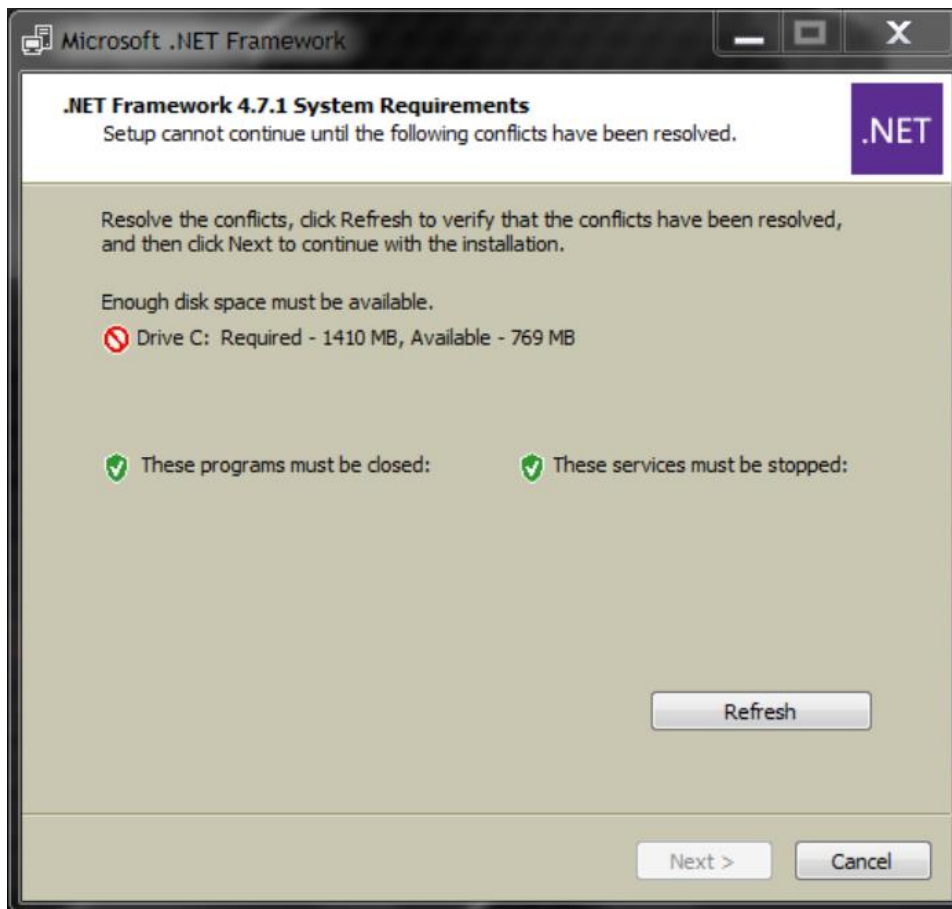
See recommendations in Increase Available Space on the C: Drive, above.

The .NET 4.7.1 installation requires a valid certificate from Microsoft. This is typically only a problem for 86100D mainframes shipped prior to 2015, which have not been getting regular Windows Updates. When the .NET 4.7.1 installation fails due to a missing certificate, the installer will give the following error message:
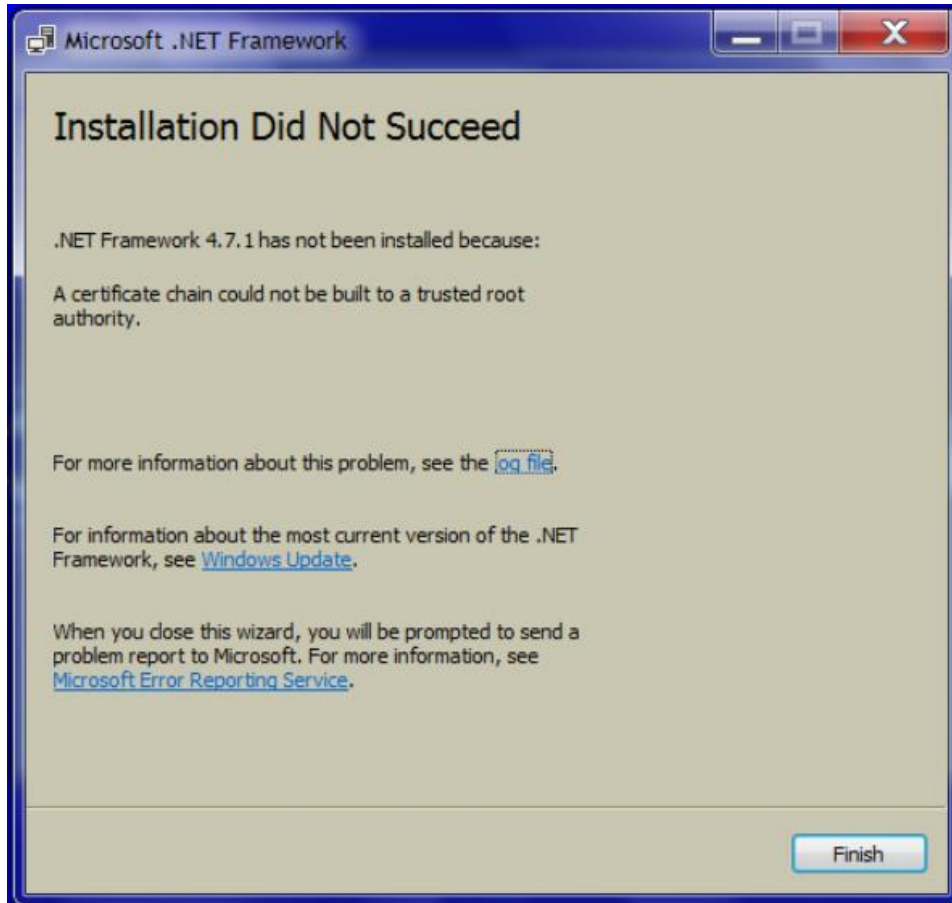
Try the following possible solutions:

- Connect the DCA to the LAN/Internet. Typically, this allows the .NET installer to retrieve a valid certificate during the installation.
- Check for and install all Windows Updates. This should also update the certificate, allowing the .NET 4.7.1 installation to succeed.
- If the instrument cannot be connected to the internet, see Manual Certificate Installation instructions, above. The certificate required for .NET 4.7.1 can be downloaded from Microsoft: http://www.microsoft.com/pki/certs/MicRooCerAut2011_2011_03_22.crt

Upgrading 86100D Instruments from FlexDCA A.05.51 or Earlier

For 86100D instruments running versions of FlexDCA prior to A.05.51 (released October 28, 2016), it is recommended to run the A.05.51 installer first, before upgrading to a later FlexDCA version. The FlexDCA A.05.51 installer is available at https://www.keysight.com/find/flexdca_download under the Previous Versions tab.

1. Download the A.05.51 installer to the 86100D mainframe
2. Complete the installation of FlexDCA A.05.51
3. Confirm that the 86100D instrument has the necessary available space on the C: drive, per the above section, HDD Space Requirements
4. Download and install the latest version of FlexDCA from https://www.keysight.com/find/flexdca_download