SYNC n SCALE

Engineering Notes
Monday April 20, 2020

Please read these notes carefully before installing and working with the new Sync-n-Scale geolocation-aware GPS Disciplined Oscillator (GPSDO) PCIe hardware and Windows software. These in-development hardware, firmware and software are for evaluation, development and demonstration purposes only.

Frequently Asked Questions (FAQs)

♦ **How do I get the new Sync-n-Scale geolocation-aware GPSDO PCIe interface?**

Contact Sync-n-Scale. Contact information can be found at the end of this publication.

♦ **How do I get the new Sync-n-Scale Windows driver for evaluation?**

Contact Sync-n-Scale. Contact information is at the end of this publication.

♦ **Is the new Sync-n-Scale Windows driver compatible with in-production GPSDO and Expansion PCIe interfaces?**

Yes. The new Sync-n-Scale driver supports geolocation, time and frequency capabilities in the new Sync-n-Scale geolocation-aware GPSDO, and the in-production GPSDO and Expansion PCIe interfaces that are capable of time and frequency only.

♦ **What versions of Windows Desktop and Server OS releases does the new Sync-n-Scale driver support?**

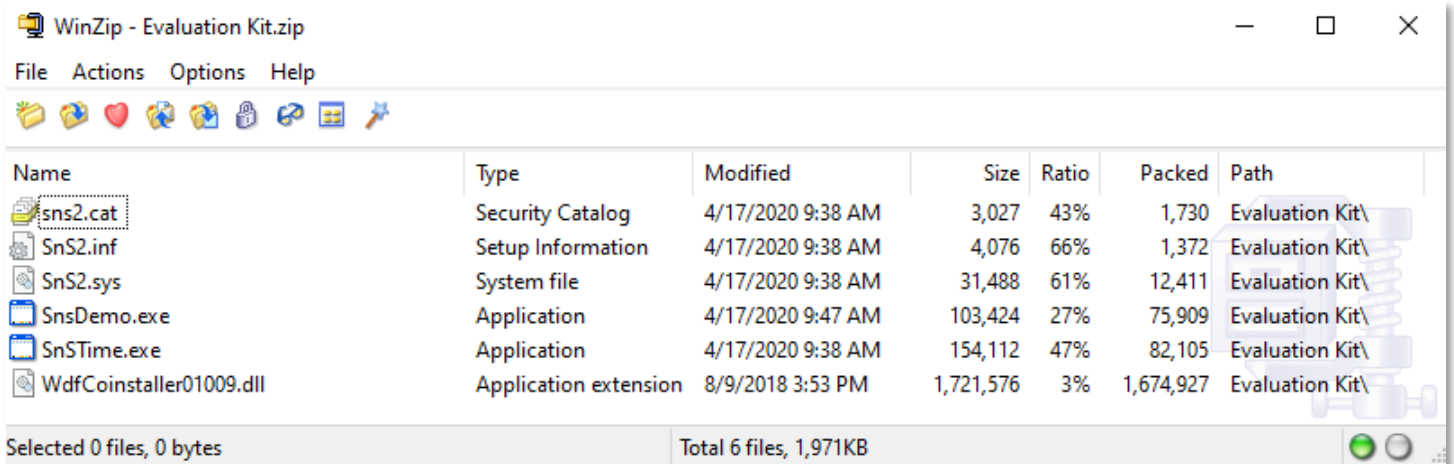64-bit versions of Windows 10 and Windows Server 2019 OS releases.

♦ **What if I am running earlier versions of Windows Desktop and Server OS releases?**

Earlier versions of Windows Desktop and Server OS releases must use the in-production Sync-n-Scale driver. It is listed in the Windows Server and Microsoft Update catalogs and installable from Windows Update services. It supports time and frequency capabilities only, and is compatible with 64-bit versions of Windows Desktop 8.1 and 10; and Windows Server 2012 R2, 2016 and 2019 OS releases.

This in-production Sync-n-Scale driver was released in 2014 and does not support the newer geolocation-aware GPSDO PCIe interface.

Evaluation Software Kit

The evaluation software kit contains a newer version of the Sync-n-Scale kernel-mode driver and a new user-mode demo tool.

The kernel-mode driver consists of the following files:

The driver software is "test-signed" due to its in-development nature. By default, Windows does not load test-signed kernel-mode drivers. To change this behavior and enable test-signed drivers to load across system reboots, you must configure the system being used for evaluation accordingly. However, this is strongly discouraged on production systems because it creates openings for attacks from outside.

The user-mode demo tool is a Windows desktop app. It allows you to assess the Sync-n-Scale enablement on a system.

Configure System for "Test-Signed" Driver

After installing the Sync-n-Scale geolocation-aware GPSDO PCIe interface for evaluation and rebooting the system, you must configure its boot option to allow "test-signed" drivers to be installed. Perform this task once from an Administrator Command window (right-click on the Command Prompt icon in the Start menu and follow its options to start a window).

Next, perform the following steps the Administrator Command Prompt window:

1. Enter the command

    bcdedit /set TESTSIGNING ON

    to allow "test-signed" drivers to be installed.

2. Enter the command

    bcdedit

    to confirm the Windows Boot Loader option **testsigning** is **Yes**.

2. Enter the command

    shutdown -t 0 -r

    to immediately reboot the system.

The Administrator Command Prompt window should look like the example on the right. After rebooting, the system is ready for driver installation.

Install Driver

The Sync-n-Scale geolocation-aware GPSDO PCIe shows up in the Device Manager as **PCI Input Device**. This is due to the in-development nature of its driver which is not yet available for automatic installation from Microsoft Windows Update services. The device can be positively identified by Its PCI Vendor ID 0x**1CA1** and Device ID 0x**010F**.

Click **Update Driver...** button to install the newer Sync-n-Scale driver.
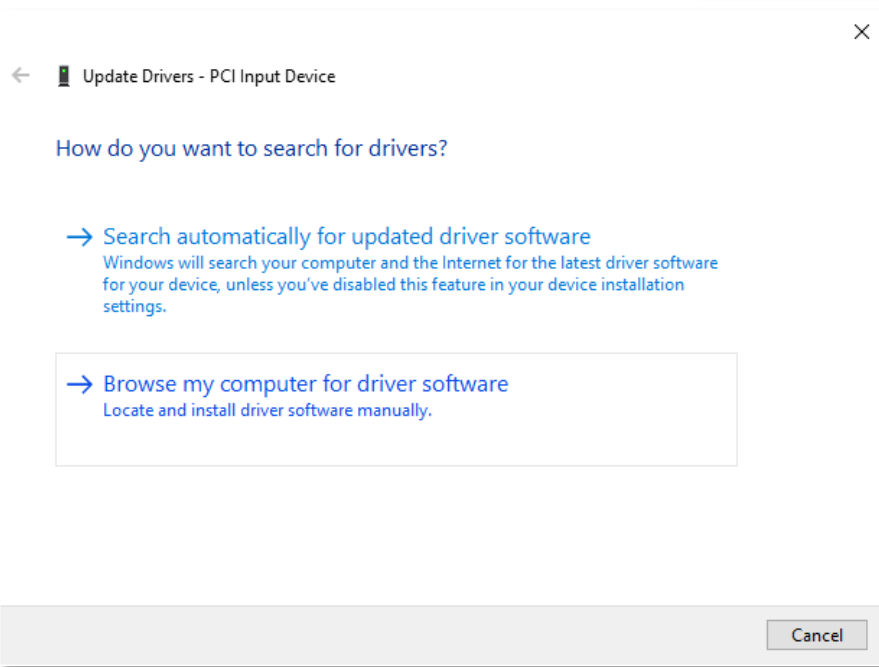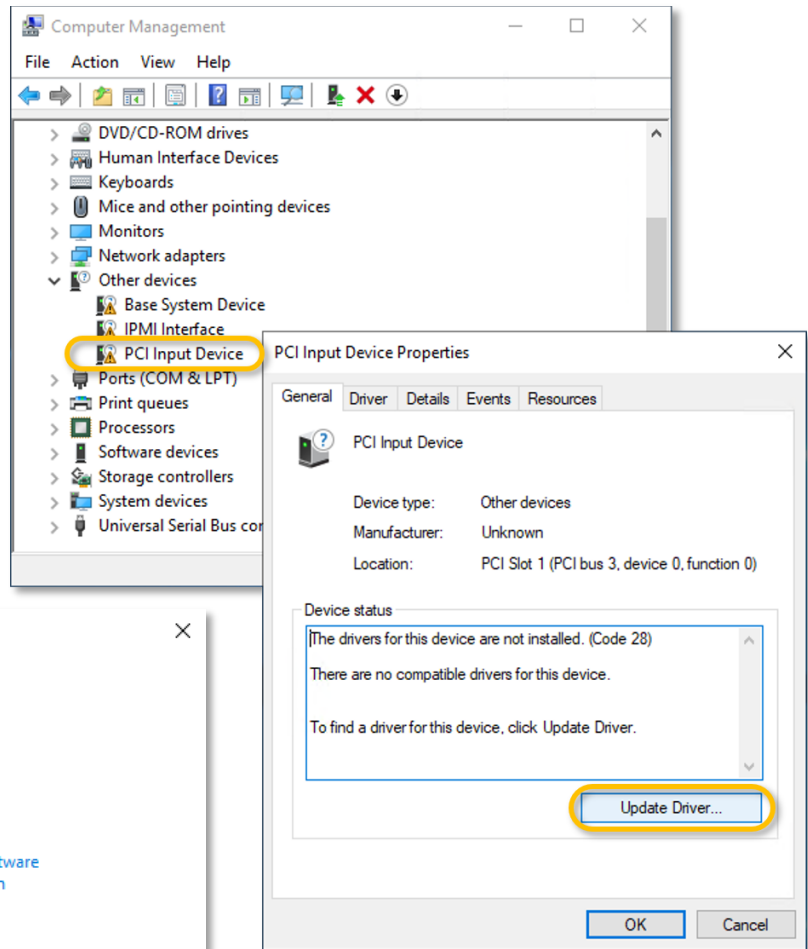
When prompted **How do you want to search for drivers?** select **Browse my computer for driver software**. Navigate to the file folder where the Sync-n-Scale Evaluation Software Kit resides and select it to start installation.

Because this is a "test-signed" driver, the system raises a warning before allowing you to proceed. Select Install this driver software anyway to proceed.

When driver installation completes, reboot the system.

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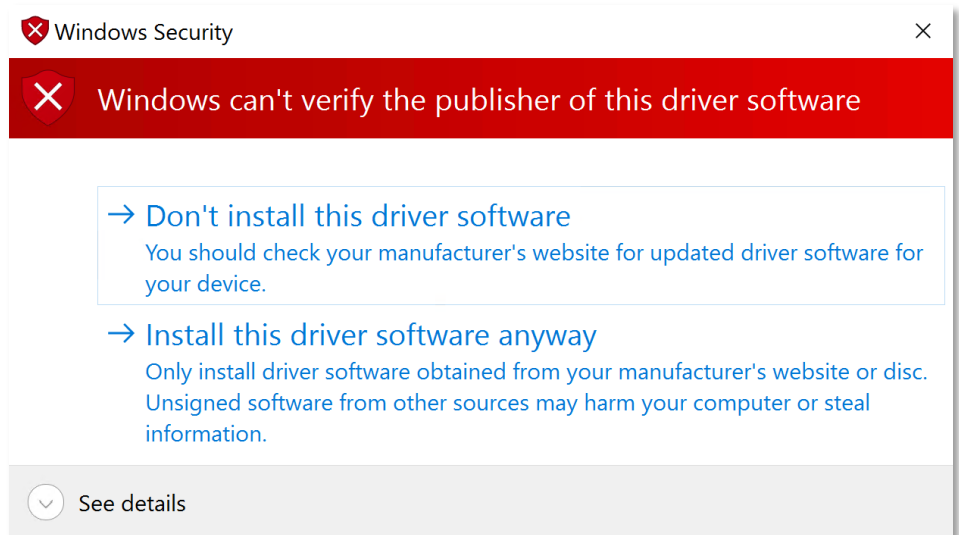
Demonstrate Sync-n-Scale Capabilities

The Windows desktop demo tool (SnsDemo.exe) allows you to assess the Sync-n-Scale capabilities and how they affect system clock UTC-accuracy and time zone information. Its assessment result is displayed in the window title bar. There are three Sync-n-Scale enablement scenarios:

1. **Microsoft Windows Time Service (W32Time) Maintained UTC Accuracy**; *i.e.* no Sync-n-Scale enablement. So *"Do what you can, with what you have, where you are."* Theodore Roosevelt, Jr. — 26th President of the United States.

2. **Sync-n-Scale Enabled UTC Accuracy**; *i.e.* system is maintaining persistent no-drift UTC-accuracy in double-digit microsecond precision range.

3. **Sync-n-Scale Enabled Geolocation Awareness and UTC Accuracy**; *i.e.* system is tracking its second-by-second geolocation coordinates, and maintaining persistent no-drift UTC-accuracy in double-digit microsecond precision range.

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www.sync-n-scale.com