

Adrienne Electronics Corporation

“WINDOWS CODE 10 ERROR”

FIELD APPLICATION NOTE

Introduction:

We have discovered that if our USB-TC (including USB-IRIG) products are plugged into a USB 2.0 or USB 3.0 port on a modern (fast) Windows PC, then Windows will sometimes report a “Code 10” error. This is a generic Windows error code which provides no useful information.

Recommended Solution:

You will need to update the USB-TC device firmware, and will also need to update the USB-TC Windows device driver software, via the following steps...

- 1) Obtain the most recent USB-TC CDROM files at <www.adrielec.com/downloads>, then “unzip” the files so that they can be used in the following steps. If necessary, use the WinZip program (available for 30-day free trial at <www.winzip.com>) to extract the files. This is a good program which is easy to use.
- 2) Connect your USB-TC device to a USB 2.0 port (ideally) on a Windows 7 or later PC. If only USB 3.0 ports are available, you may need to temporarily install a USB 2.0 hub in between the USB 3.0 port and your USB-TC device. Once the new USB-TC Windows device driver software is installed, your USB-TC device should work fine on USB 3.0 ports, but you have to get the device connected and the driver updated first.
- 3) Install new USB-TC Windows device driver software dated 2016 or later, and copy DLL files as needed, using the instructions in the “USB-TC Windows Guide” (PDF) document which can be found in the USB-TC CDROM “Documentation” subdirectory. This new device driver software is required for use with USB 3.0 ports, and is also required for USB-TC firmware updating purposes.
- 4) Follow the “USB-TC Firmware Update Guide” (PDF) document which can be found in the USB-TC CDROM “Firmware Updating” subdirectory. Once your USB-TC device firmware has been updated, and the USB-TC Windows device driver software has been updated, the Windows “Code 10” errors should go away.
- 5) Read historical notes on next page if you care to do so (optional).

Background Information:

At present all AEC USB devices remain 12Mbps USB 1.1 devices, because the required data rates for our devices are very low, and because this provides a very economical hardware solution. That is a big reason why the various USB standards have been so successful for so many years, which is unusual in personal computer history. When 480Mbps USB 2.0 was first introduced in April 2000, all existing USB devices were USB 1.1 compatible, so for practical reasons USB 2.0 had to be 100% backwards compatible with USB 1.1 devices. When 5Gbps USB 3.0 was introduced in November 2008, there were already millions of USB 2.0 devices on the market and in-use, so the requirement to maintain USB 1.1 device compatibility was deliberately left out of the USB 3.0 standard. That said, it is still in the best interest of USB 3.0 (and USB 3.1) hardware and software vendors to maintain backwards compatibility with USB 1.1 devices.

In 2015 we started getting reports that our existing USB-TC devices, dating back to 2003, were not working properly with some USB 3.0 ports, and Windows was reporting a "Code 10" error. We recommended that customers use a USB 2.0 hub in between the USB 3.0 port and our USB 1.1 device, and that fixed the problem in many cases (a temporary fix). In October 2015 we released all-new Windows driver software which fixed the USB 3.0 problem (and Code 10 errors) on our test PC's. So we had good reason to believe that we had found and fixed the problem.

However, after October 2015, we continued to receive reports that some Code 10 errors persisted, even with the all-new USB-TC Windows driver software installed. Further investigation revealed a small intermittent software timing bug in the USB-TC firmware, which has been there since the products were first introduced in 2003. Only recently has this bug become evident, due to an unlucky combination of:

- 1) Recent Windows software changes which send a "nonsense" device setup packet which is usually harmless, but which triggered our firmware bug.
- 2) Modern faster PC's, especially high-end workstation PC's, which pack USB packets as close together as possible, therefore not giving our USB-TC firmware time to correct the bug (as it had done previously).
- 3) Our USB-TC device would return a "STALL" (error) packet in response to the combination of #1 and #2 above.
- 4) Many modern Windows and/or USB Host Controller driver software combinations would ignore the STALL packet and continue with normal setup and operation. However on some hardware platforms, the error would not be ignored, and would trigger a Windows "Code 10" error, which explains in part why this bug was evident only on some modern hardware platforms.

We apologize for this USB-TC firmware bug dating back to 2003, and recommend that all USB-TC devices (including USB-IRIG devices) receive a free in-circuit firmware update to revision "C1" or later, as described on the previous page. This update only takes a few minutes, can usually be performed without having to disconnect the USB-TC device from its host PC, and guarantees that the USB-TC device will connect properly if attached to faster PC's in the future. This bug only affects USB-TC device startup operations under Windows. Normal time code reading operations are not affected (once started OK under Windows).