Adrienne Electronics Corporation

"AEC-PCIe Windows Guide"

For All AEC-PCIe Family Boards

Introduction:
This document helps you install, test, and use your AEC-PCIe board in a
Microsoft "Windows" software environment. This process is not for the faint
of heart, so take it step by step. If it makes you feel any better, it is
easy to do once you have done it once already.

Preliminary Steps:
Before you proceed with Windows software, it is very important to first
install and verify the AEC-PCIe board hardware as described in the " AEC-PCIe
Board User Guide" in the "Documentation" section of this CDROM. There is no
point to proceeding with Windows setup if the Host PC and/or your AEC-PCIe
board hardware aren't working properly. Install and verify first.

Windows Software Overview:
Once you have verified that the AEC-PCIe board hardware is OK (see above), it
is time to get the board working with Windows. There are many different
versions of Windows (more than most people know), and within each version
there may be multiple "editions" (Windows 7 has six(6) different editions),
and Windows software is continually being updated. So we can only describe
here in general terms how to get your board working with Windows. If your
version, edition, or revision of Windows is a little bit different from what
we describe here, please tough it out as best you can, and send a note to
<support@adrielec.com> if you find something which should really be added to
this Windows setup document. In general, you will need to (in this order):

1) Log onto your Windows PC with "administrator" privileges. This is
   necessary so that you can install the device driver file.

2) Install the "driver software" (a ".sys" file) which allows Windows and its
   library functions and applications to access the AEC-PCIe board hardware.

3) Install the "function library" (a ".dll" file) which makes it easy for
   different AEC-PCIe board applications to access the driver software. This
   is code which could be included within each application, but for software
   maintenance reasons, it makes more sense to use the separate file. You
   will typically find dozens (if not hundreds) of DLL files on a Windows PC.

4) Launch (execute) the desired Windows "application" (a ".exe" file) which
   provides the Graphical User Interface (GUI) and functionality which
   motivated you to purchase your AEC-PCIe board in the first place.

32-bit Versus 64-bit PC Notes:
Intel has been making 32-bit "80x86" (more commonly known as "x86") CPU's since about 1985. AMD began making 64-bit CPU's which could also execute the older 32-bit code (without any changes) around 2003, and Intel soon followed AMD's lead. The 64-bit processors are commonly known as "x64" CPU's. So "x86" indicates 32-bit architecture, and "x64" indicates 64-bit architecture.

A PC which has a 32-bit CPU requires a 32-bit version of Windows.

A PC which has a 64-bit CPU almost always runs 64-bit Windows, but can instead run 32-bit Windows if needed for compatibility with older 32-bit drivers.

A PC with 32-bit Windows requires 32-bit driver software, 32-bit DLL's, and can only execute 32-bit applications.

A PC with 64-bit Windows requires 64-bit driver software (always), but can execute 32-bit applications with a 32-bit DLL, and can execute 64-bit applications with a 64-bit DLL. So you must be careful to get things right.

You will see separate directories on the AEC-PCIe CDROM for both 32-bit and 64-bit Windows files.

*** IMPORTANT NOTICE ***

Early production AEC-PCIe boards are supposed to be drop-in replacements for PCIe-TC boards. They look identical from outside the PC. They fully emulate older PCIe-TC boards, including the use of PCIe-TC Windows driver software. Do not be distressed if you see PCIe-TC Windows driver files on the AEC-PCIe CDROM. That is intentional. In theory you can (for example) remove a PCIe-LTC/RDR board from a working PC, install an AEC-PCIe-41 board in its place, power up the PC, and the PC will not know the difference. AEC-PCIe boards are successfully emulating PCIe-TC boards in both Windows and Linux environments at present. Please continue to the next page for AEC-PCIe board Windows device driver installation instructions.

Device Driver Installation (General):
AEC-PCIe boards are generic PCI devices, which means that it is easy for BIOS, our bootable test/demo software, and Windows to find the board in your system. Our bootable test/demo software knows ahead of time how to properly interface to an AEC-PCIe board, so you do not have to install any drivers for that case. In contrast, Microsoft and their Windows software have never heard of tiny Adrienne Electronics Corporation or its AEC-PCIe boards, so you must explicitly tell Windows what driver software to use in order to access an AEC-PCIe board.

In some versions of Windows, a "Found New Hardware" window or balloon will pop up, asking you what driver to use. In other versions of Windows, you have to initiate this task yourself. To make things simpler, just close down all automatic windows and balloons if they appear, then proceed as follows...

Device Driver Installation (Device Manager Startup):
Remember that you must be logged onto your Windows PC with "administrator" privileges in order to install device driver software. All versions of Windows have a "Device Manager" program which is responsible for installing and maintaining a device driver for each device which it automatically finds in the system (such as your AEC-PCIe board).

The hard part is finding Device Manager in your system. Each version of Windows does things a little bit differently. Here are some examples...

For Windows XP Device Manager, select...
        Start → Control Panel → System → Hardware (tab)
          → Device Manager

For Windows 7 Device Manager, select...
        Start → Control Panel
          → Hardware and Sound
          → Device Manager (within the Devices and Printers group)

For Windows 8 Device Manager, select (from the main tiled screen)...
        [down arrow in lower left corner] → Control Panel
          → Hardware and Sound
          → Device Manager (within the Devices and Printers group)

For Windows 10 Device Manager, select (from the main tiled screen)...
        [window frame icon in lower left corner] → Settings
          → Devices → Device Manager (may be well hidden at bottom of window)

Device Driver Installation (Device Manager Settings):

1) Install the appropriate device driver file for your AEC-PCIe board:
    a) If no driver has been installed yet, expand the "SD Host Adapters" category (if not done already). You should find one "SDA Standard Compliant SD Host Controller" entry. Right-click on that entry, select "Properties", then proceed to step "c" below.
    b) If a driver has previously been installed, expand the "AEC Time Code Device" category (if not done already). You should find one "AecPCIeTC Device" entry. Right-click on that entry, select "Properties", then continue to step "c".
    c) A "<device name> Properties" window will open.
    d) Below the "General" tab, verify that the device status field says something like "This device is working properly.".
    e) Below the "Details" tab, select the "Device Instance Path" property, then verify that there is a text string present in the "Value" display which says (in part) something like "VEN_AECB" (an AEC board). If that text string is not present, then you have accidentally selected some other (non-AEC) device, and you must select "Cancel" before you install the wrong driver for the wrong device.
    f) Below the "Driver" tab, select "Update Driver", then select "Browse my computer...", then navigate to the proper directory on the AEC-PCIe CDROM. Be very careful to select the "32-bit Win Files" directory for 32-bit Windows, and the "64-bit Win Files" directory for 64-bit Windows.
    g) If 32-bit Windows displays a message to the effect that "The best driver is already installed...", and then refuses to let you install the Adrienne Electronics driver, then refer to the "Best Driver Override" application note (PDF). Proceed as indicated in step "f" above, but after selecting "Browse my computer...", DO NOT directly select the directory which contains the driver file (that would be too easy). Instead, select "Let me pick from a list...", then select "Have disk...", then select the directory which contains the driver file.
    h) Follow the driver installation instructions now provided by Windows. It should verify that you are installing a driver written by Adrienne Electronics Corp. Device Manager will show that you now have a PCIe-TC board installed. This concludes driver installation (congratulations)!

NOTE – In the near future we intend to update, clean up, and re-issue Windows 32-bit and 64-bit drivers for all AEC products, including our AEC-PCIe boards. In the process, we plan on "signing" our 32-bit driver file set, which should eliminate the need for awkward step "g" above. Thank you for your patience.

Linking and Loading Notes: (optional)
Windows software is very modular, in that there are hundreds of separate
software files, each of which must interface to others in order to perform
useful work. In addition, each Dynamic Link Library (DLL) file typically
contains many separate software functions (subroutines) which may be called
and used by Windows application software. So when Windows "executes" (begins
running) a ".exe" Windows application program, it must first load said program
into memory, then link said program with all the library functions inside
other software modules so that they can all properly interact with each other.
This is a somewhat simplified account of the way things work, but at least it
gives you an idea what a DLL file is and how it is used in your system.

Library (DLL) File Installation:
You don't really have to "install" a library (".dll") file. However, Windows
does need to know where said file is located then you begin executing a
Windows application which uses one or more of the functions contained within
said library file. The easiest way to do this is simply:

1) Remember to select and use a 32-bit DLL file with a 32-bit application, and
   use a 64-bit DLL file with a 64-bit application. Navigate to the proper
   (32-bit or 64-bit) directory on the AEC-PCIe CDROM, then navigate further
   into its "DLL Files" subdirectory.

2) Copy and paste the "AEC_NTTC" (".dll") file into the same directory as the
   Windows application which you intend to use.

Alternatively, you can copy and paste the DLL file into the (typically)
"C:\Windows\System" directory. That makes the DLL available to all Windows
application programs, no matter where they are executed (launched) from.

Run the Windows Test/Demo Program:
Once you have installed the device driver file in your system, you need to
make sure that everything is installed and working properly under Windows.
The easiest way to do this is by finding and running the "AecWinDemo" (".exe")
test/demo Windows application in the "Windows Demo" directory on the CDROM.
You can double click on the file name and execute the program directly from
the CDROM. Because it is a 32-bit Windows application, we have conveniently
provided a proper size (32-bit) DLL file in the same directory. This program
should work fine on both 32-bit and 64-bit PC's. If it is running properly,
then you know that your Host PC, your AEC-PCIe board, and the Windows files
are set up properly. If you subsequently have difficulties accessing your
AEC-PCIe board with some other Windows application, then you know that said
application (not the board or the Windows files) is most likely the source of
the problem (or the proper sized DLL file is not visible).

<u>Application File Installation:</u>
You don't really have to "install" a Windows application (".exe") file
anywhere. If you want to run one of the ".exe" Windows application files
provided within the AEC-PCIe CDROM, double click on the file name to start
running it directly from the CDROM. Alternatively, you may use the Windows
"copy" and "paste" functions to copy said file (and the proper sized DLL file)
from the CDROM to a location on your PC's hard disk drive (HDD), then double
click the file name to start running it from the HDD. Be sure that the proper
sized DLL file is in the same directory as the ".exe" file, or is in a Windows
system directory which is visible to all Windows applications.

<u>Application File Problems:</u>
For some reason we frequently get technical support calls and/or e-mails from
customers who are using another company's Windows application program to
interface to our board. In most cases we have never seen or heard of said
application program, and thus cannot help you with it even if we wanted to.
Please direct such inquiries to the appropriate software or system vendor. If
your AEC-PCIe board works properly with the bootable test/demo program on the
AEC-PCIe CDROM, then all the hardware is OK. If your AEC-PCIe board works
properly with the Windows test/demo program provided on the AEC-PCIe CDROM
(see above), then the Windows setup is OK (congratulations). We have then
done all we can.

<u>Driver File Date/Time Problems:</u>
Be careful not to modify the date and/or time of any of the files within each
set of driver files. Some customers have reported accidentally doing so,
after which Windows may get confused and report security certificate or other
problems. If necessary, use the WinZip program (available for 30-day free
trial at <www.winzip.com>) to extract files from a ".zip" file downloaded from
our website. This is a good program which is easy to use.

<u>In Case of Trouble:</u>
If you have honestly tried all the above, and things aren't working right,
contact us at <support@adrielec.com>, or via the phone number found in the
"Introduction" file in the root directory of the AEC-PCIe CDROM. It is quite
possible that the Windows software has changed, or that this document needs to
be updated, or perhaps you have discovered a new software "feature" (bug). We
want you to be a happy customer who will order more boards and recommend us to
your friends, so please give us a chance to fix problems and make improvements
if and where needed.