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CX23881/CX22702

DVB-T Receiver Card Installation

User Guide

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November 2004



Revision History

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A	November 5, 2004	Initial release.

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Introduction

1.1 About This Manual

This document describes how to install Conexant's CX23881/CX22702 DVB-Terrestrial (DVB-T) receiver card (henceforth called DVB-T card). The procedures include verifying that the DVB-T card is functioning properly. The DVB-T card, contained in the CX23881/CX22702 DVB-T Evaluation Kit (EVK), is a single-height card that plugs into an unused PCI slot in a Windows PC.

The DVB-T card must be used in conjunction with an antenna to receive digital TV broadcasts.

This document is organized as follows:

- ◆ Chapter 1: Introduction. Provides an overview of this document and direct video broadcast
- ◆ Chapter 2: Prerequisites. Lists the prerequisites for performing the remainder of this document
- ◆ Chapter 3: Installations. Describes how to install the DVB-T driver installation package, which includes the DVB-T drivers
- ◆ Chapter 4: Functional Verification. Describes how to verify that the DVB-T card works properly.

1.2 DVB-T Background

The DVB-T standard is based on Coded Orthogonal Frequency Divisional Multiplexing (COFDM) and Quadrature Phase Shift-Keying (QPSK), 16 Quadrature Amplitude Modulation (QAM), and 64 QAM modulation. It is the youngest of the three core DVB standards and also the most sophisticated and flexible digital terrestrial transmission system. The CX23881/CX22702 DVB-T card supports the following standards:

- ◆ DVB-S
- ◆ Digital Spread Spectrum (DSS)
- ◆ Binary Phase Shift-Keying (BPSK)

DVB-S broadcasting is received in all countries. However, in general, the further from the equator, the larger the dish antenna required. Another option for maximizing broadcast reception is optimizing the antenna. For example, an antenna can be optimized to reduce transmitted energy to an ocean area, while increasing transmitted energy to a land area.

1.3 DVB-T Component Overview

The CX23881/CX22702 DVB-T card contains three primary parts:

- ◆ CX23881 broadcast video decoder (also used in MPEG Personal Video Recorder and TVFM designs)
- ◆ Digital tuner
- ◆ CX22702 demodulator

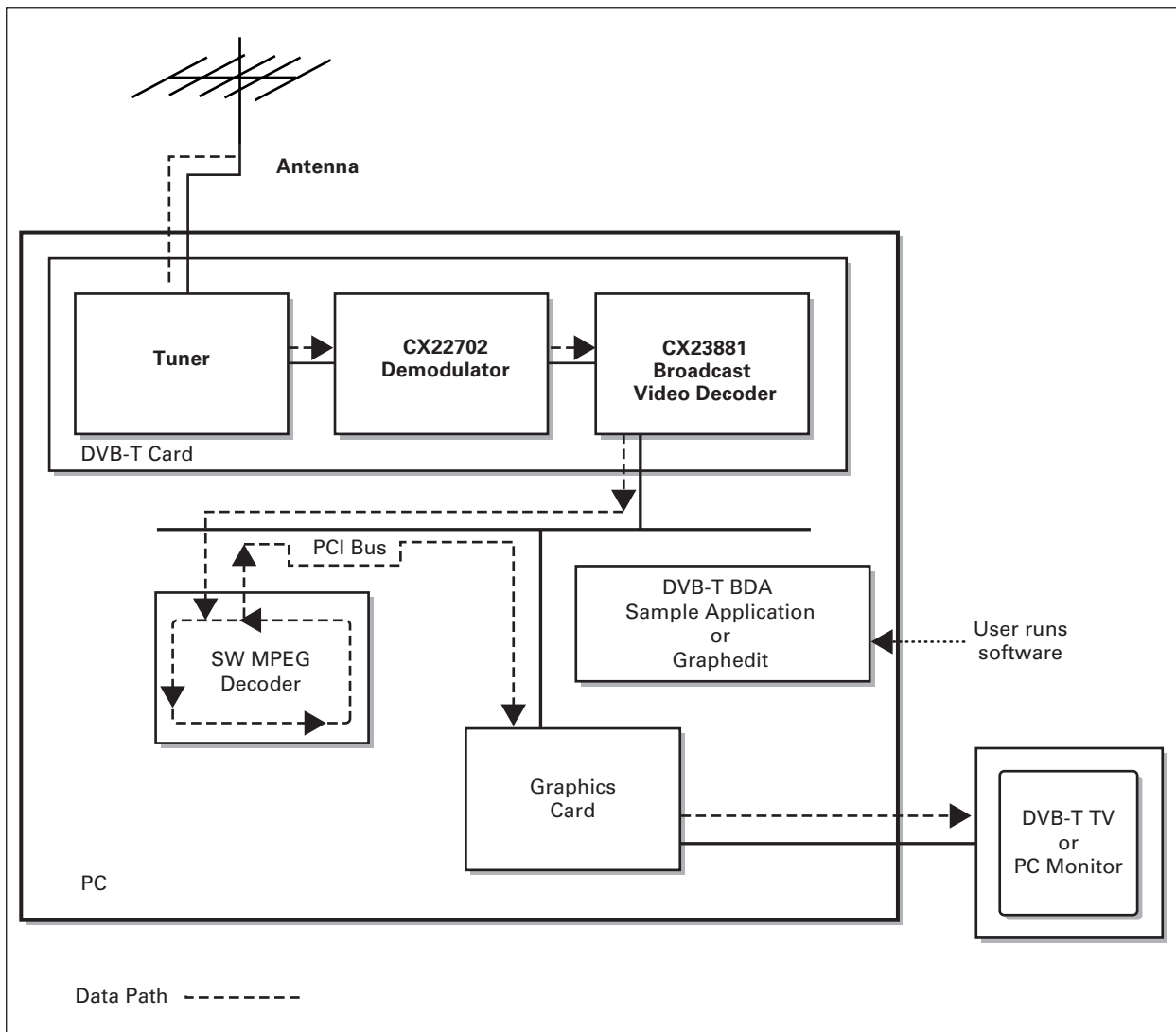
The system components required for receiving DVB-T signals, shown in [Figure 1](#), are:

- ◆ Hardware:
 - CX23881/CX22702 DVB-T card
 - DVB-T TV or PC monitor
- ◆ Software:
 - DVB-T BDA sample application or Graphedit software
 - Software MPEG decoder

The signal flow passes from the antenna to the DVB-T TV PC monitor as follows:

1. The antenna, plugged directly into the DVB-T card, transmits the DVB-T signal to the tuner.
2. The tuner passes the received signal to the CX22703 demodulator.
3. The CX22703 demodulator extracts the MPEG Transport Stream (TS).
4. The extracted MPEG TS passes to the CX23881 broadcast video decoder.
5. The CX23881 broadcast video decoder places the MPEG TS onto the PCI bus.
6. The MPEG decoder receives the MPEG TS through the PCI bus, decodes the MPEG TS, and passes the decoded data to the DVB-T TV or PC monitor.
7. A consumer runs application software DVB BDA or Graphedit (installed on the PC) to view the decoded MPEG data stream on the DVB-T TV or PC monitor through the PCI bus.

Figure 1. DVB-T System Components



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Prerequisites

This chapter describes the prerequisites for performing the remainder of this document.

2.1 System Requirements

2.1.1 Hardware

The minimum hardware requirements for running the test application used during DVB-T card functionality verification are:

- ◆ PC running Windows XP, XP Pro, or XP MediaCenter (aka XP MCE) operating system
- ◆ Minimum 1 GHz PC (robust enough for SW MPEG decoding)
- ◆ High-end graphics adapter card

2.1.2 Software

The minimum software requirements for running the test application used during DVB-T card functionality verification are as follows. To determine if the below software is present on the PC, select Start button > Settings > Control Panel > Add/Remove Programs

- ◆ Microsoft DirectX 9.0 SDK or later
If not present, install per [Section 2.1.2.1](#).
- ◆ MPEG-2 software decoder (third-party software), such as InterVideo
If using a PC running the XP Media Center operating system, an MPEG-2 software decoder was originally installed on the PC. If an MPEG-2 software decoder is no longer present on the PC, install it.
- ◆ Conexant's DVB-T drivers
If not present, copy the DVB-T driver installation package (CX23880 setup.exe file) to your hard drive.
- ◆ Optional software for debugging: MPEG-2 transport stream diagnostic filter M2Tscope.ax
If not present, install per [Section 2.1.2.2](#).

2.1.2.1 Microsoft DirectX 9.0 SDK Installation

If DirectX 9.0 SDK or later is not installed, do one of the following:

- ◆ Download DirectX 9.0 SDK from Microsoft (www.microsoft.com) by doing a search for the SDK on the Microsoft Web sit, selecting the SDK for download, downloading it, and running the installer dx9sdk.exe or
- ◆ Install DirectX 9.0 SDK from disk by running the SDK installer dx9sdk.exe

2.1.2.2 MPEG-2 Transport Stream Diagnostic Filter Installation (Optional)

If an MPEG-2 transport stream diagnostic filter is needed for debugging, install M2Tscope.ax as follows:

1. Place a copy of M2Tscope.ax into \windows\System directory
2. Register M2Tscope.ax as follows:
 - a. Select Start > Run.
 - b. Enter `Regsvr32 \windows\system32\M2Tscope.ax`=
A message reports a successful installation

2.1.3 System Setup

The system components must be set up for functional verification.

Installations

At this point, you have performed the prerequisites, described in [Chapter 2](#).

This chapter describes how to perform the following procedures:

- ◆ Copy the sample application file
- ◆ Install the DVB-T card
- ◆ Install the copied DVB-T driver installation package

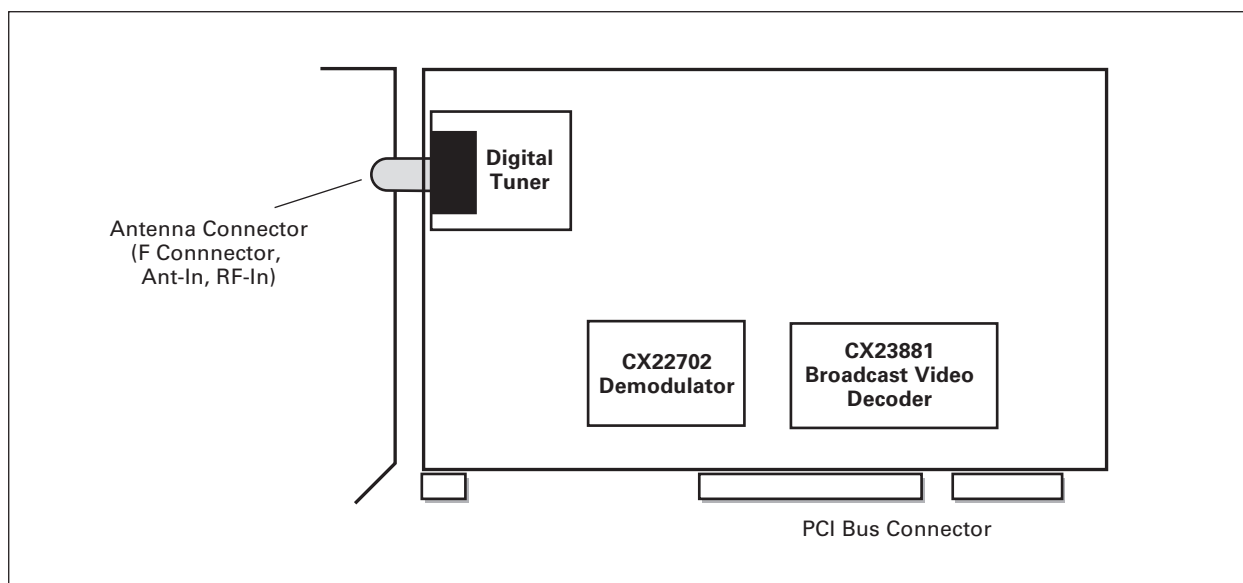
3.1 Copy the Sample Application File

Copy the Conexant sample application file, filename BDA DVBT.exe, to your PC desktop. The location of the sample application file to copy is stated in the EVK cover letter. You will execute and configure this file later, in [Chapter 4](#).

3.2 Install the DVB-T Card

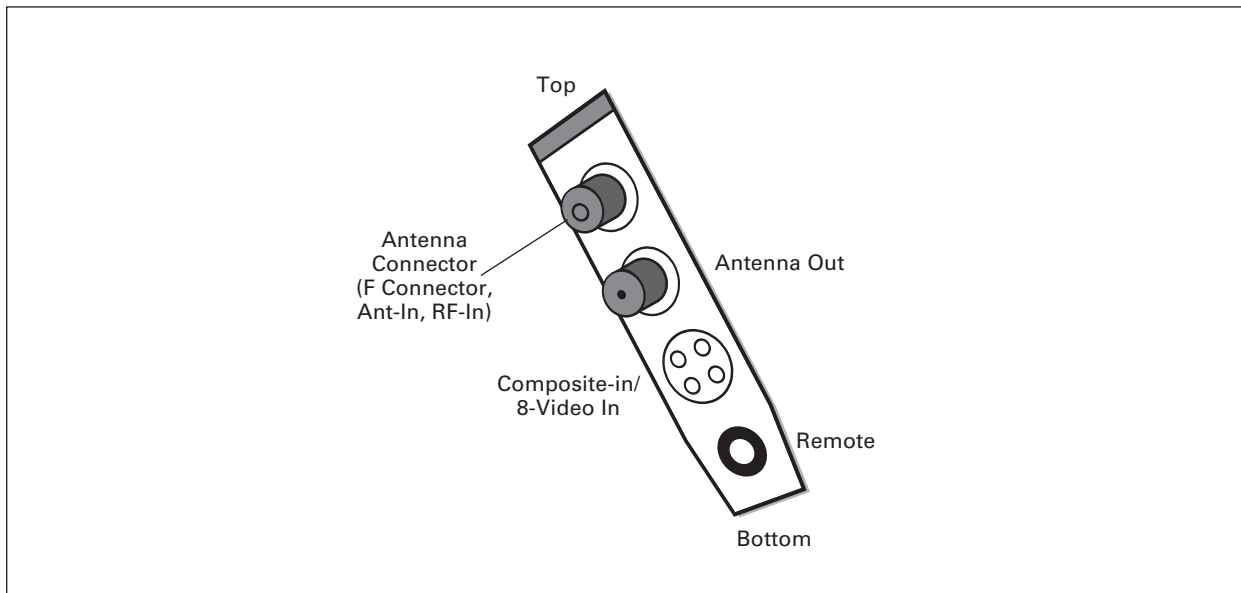
1. Power down the PC.
2. Install the Conexant DVB-T card into a PCI slot. To ensure that you are installing a Conexant DVB-T card, ensure that it contains the components specified in [Figure 2](#).

Figure 2. DVB-T Card



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3. Insert the RF connector into the "Antenna In" (F Connector, Ant-In, RF-In) connector at the top of the PCI card, as shown below.



4. Power up the PC.

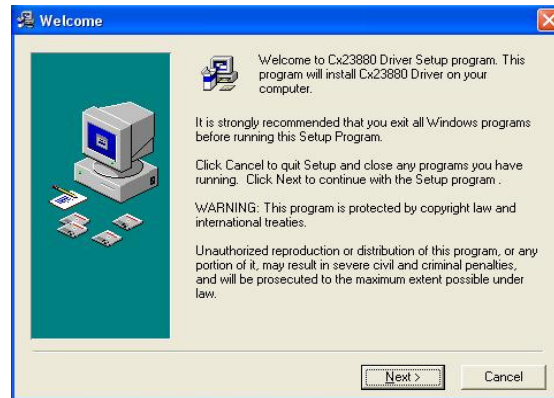
3.3 Install the Copied DVB-T Driver Setup .exe File

When you perform this step, you are executing the DVB-T driver installation package (CX23880 setup .exe file) that you copied to your hard drive as needed in [Chapter 2](#).

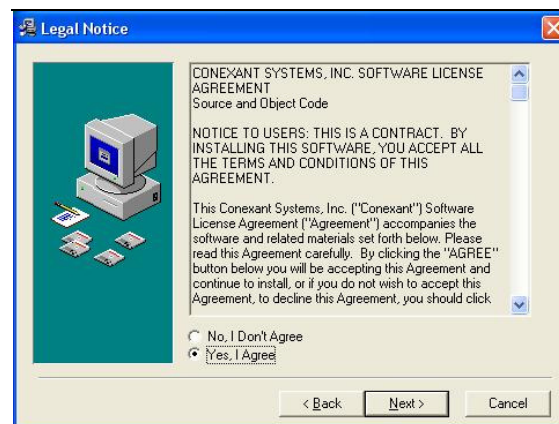
1. Run the setup .exe file by double-clicking the CX23880Setup[version number].exe icon at its installed location.
An "Initializing Wise Installation Wizard" message appears for a few seconds, indicating that the setup process has started.



A warning appears, asking that you terminate any running programs.



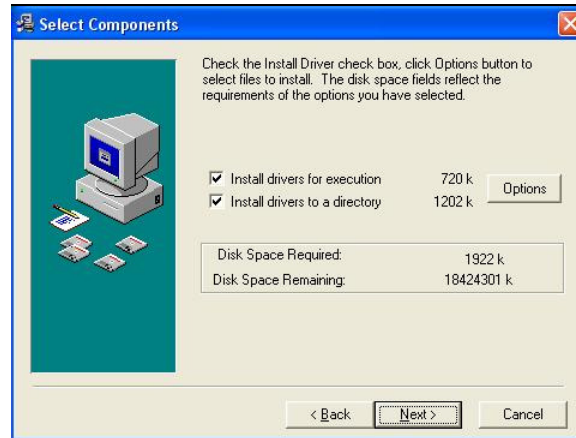
2. Terminate any running programs.
3. Click Next.
A license agreement appears.
4. Review the license agreement.
5. Do one of the following:
 - if you accept the terms, click the Yes, I Agree radio button, then click Next to continue the installation process.
 - If you do not accept the terms, click the No, I Don't Agree radio button. You will not be able to continue the installation process.



The remainder of this procedure assumes that you clicked “Yes” in step 5.

A Select Components window appears with both types of installations selected (the default):

- Install drivers for execution
- Install drivers to a directory.

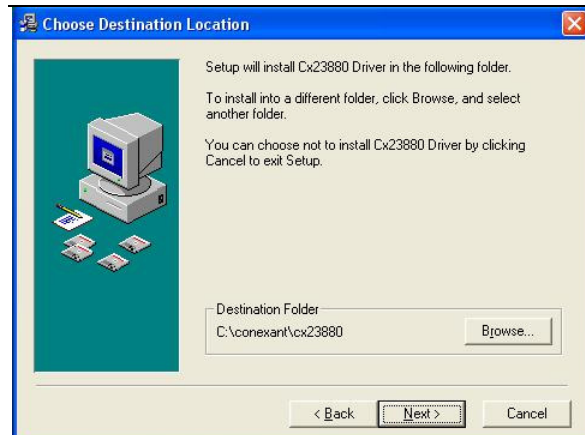


6. Keep both or only one checkmarked selection, as appropriate.
7. Make note of which selection or selections you have checkmarked; you will use this information later in this procedure.

8. In the Select Components window, click Next.

One of the following occurs:

- If you checkmarked Install drivers to a directory location or both Install drivers for execution and Install drivers to a directory location in step 6, a Choose Destination window appears.



- If you checkmarked only Install drivers for execution in step , the Installation Complete window appears



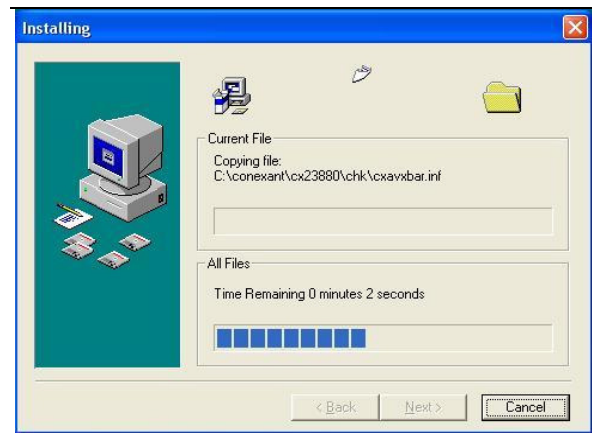
9. Do one of the following, depending on the type of window that is currently displayed:

- If a Destination window is displayed, continue with step 10.
- If an Installation Complete window is displayed, skip to step 11.

10. In the Choose Destination window, do one of the following:

- If you checkmarked *both* the Install drivers for execution selection and the Install drivers to a directory selection in the Select Components window in step 6, click Next.
- If you checkmarked only the Install drivers to a directory location in the Select Components window in step 6, click Browse or Next, as follows:
 - If you want to specify the driver directory destination, click Browse. In the resulting Select Destination Directory window, navigate to the desired location and then click OK.
 - If you want the drivers to be placed in the test application default location (C:\Conexant\CX23880), click Next.

An Installing window appears while the software driver files copy to the specified or default location.



An Installation Complete window appears when the file copying is complete...



11. In the Installation Complete window, click Finish.

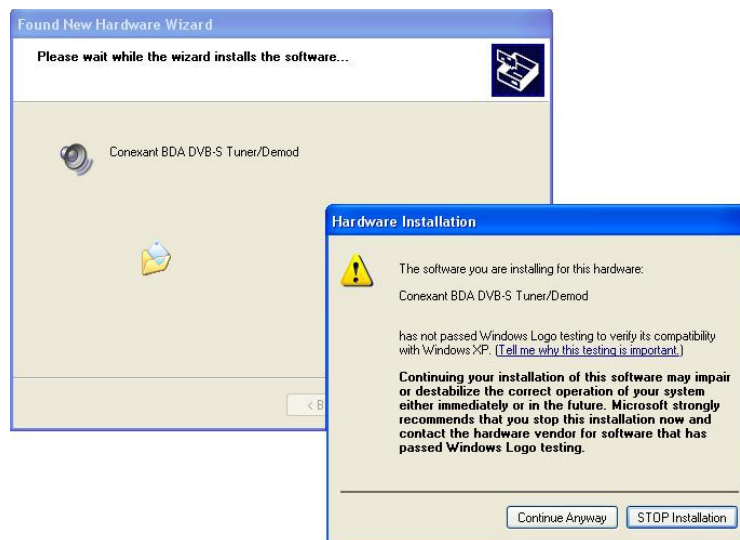
The Plug-and-Play Hardware Wizard scans for hardware changes.

When the Plug-and-Play Hardware Wizard finds the DVB-T card, a Found New Hardware Wizard "Welcome" window appears that asks what you want the wizard to do. This is asking where you want the driver files to be installed



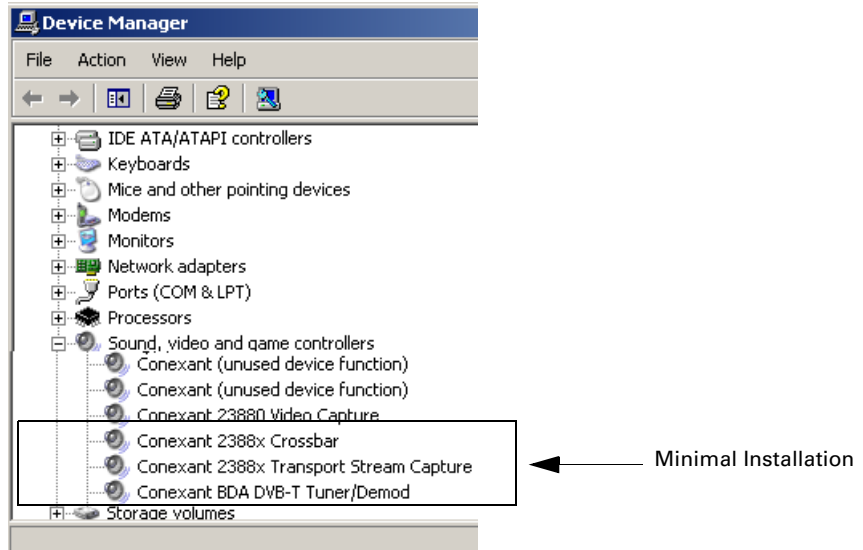
1. Select Install the software automatically (recommended).
2. Click Next.

In the Found New Hardware window, a “Please wait...” message appears that lists the found Conexant BDA DVB-T Tuner/Demod. If the newly installed drivers do not contain certified .cat files along with the driver software, a Hardware Installation window also appears. The absence of .cat files means that Microsoft has not WHQL-certified the drivers. WHQL certification is a process in which Conexant runs and Microsoft certifies test software after the test results have been verified.



3. Click Continue Anyway, allowing the software driver installation process to continue.
The Found New Hardware Wizard “Welcome” window appears for each remaining DVB-T card-related hardware device that the Plug-and-Play Hardware Wizard finds during this installation process.
4. Click Next and Continue Anyway as needed until the Welcome window no longer appears.
5. In the Device Manager window, open the Sound, video and game controllers directory to verify that the drivers have been installed. Several versions of the DVB-T card exist, and previous hardware installations may have resulted

in driver installations; the list of drivers in the Device Manager will therefore vary. Verify that at least the three drivers indicated as “Minimal Installation” below are listed.

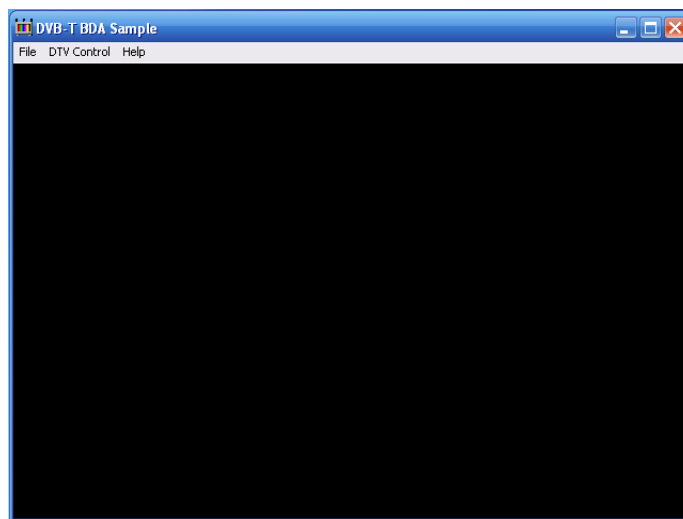


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Functional Verification

This chapter describes how to verify that the DVB-T card is working properly. The test uses a small, Conexant-designed TV software application, the installed DVB-T drivers, and a selected antenna to test the DVB-T card.

1. Do one of the following:
 - From the command line, enter "BdaDVBT.exe" or
 - Double-click the BdaDVBT.exe icon, on your desktop (copied there while performing the steps in [Chapter 3](#)).The DVB-T BDA Sample window appears.



2. In the DVB-T Sample window, select DTV Control > Build Graph.
3. Wait a few seconds.

4. Select DTV Control > Run Graph.
The sample application builds a graph without your observing it. The window remains blank.

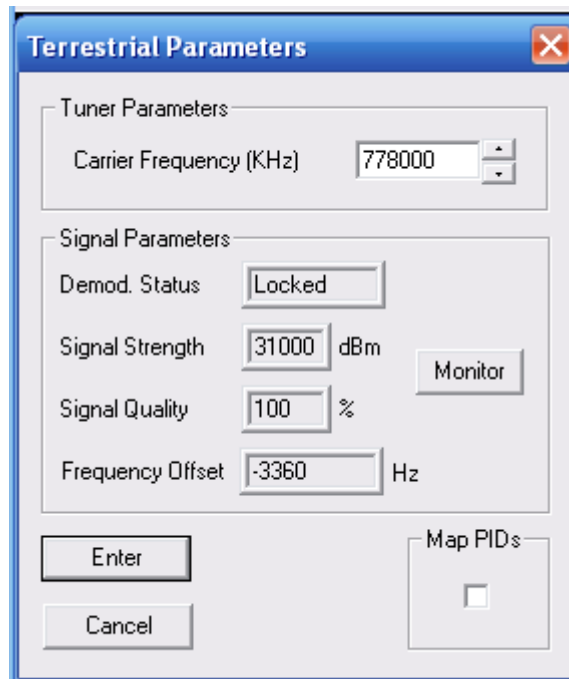
NOTE:

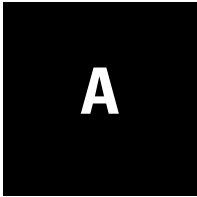
If the sample application is not able to build a graph, an error message appears, as follows:

If your PC is running the Microsoft XP or XP Pro operating system, two possible causes of an error message are: (1) missing or corrupt software MPEG decoder or (2) incorrect Conexant DVB-T card installed. For causes other than these, contact a Conexant FAE to help resolve.

If your PC is running the Microsoft MediaCenter operating system, two possible causes of the error message are: (1) a software MPEG-2 decoder is not currently present on the PC or (2) the installed graphics card is too old to be compatible with the MediaCenter operating system, requiring that it be replaced with a newer graphics card.

5. Select DTV Control > Select Channel.
A tuning window appears with the default settings for the test application.
6. Select DTV Control > Select Channel.
A Terrestrial Parameters window appears with the default settings for the test application, similar to the following.



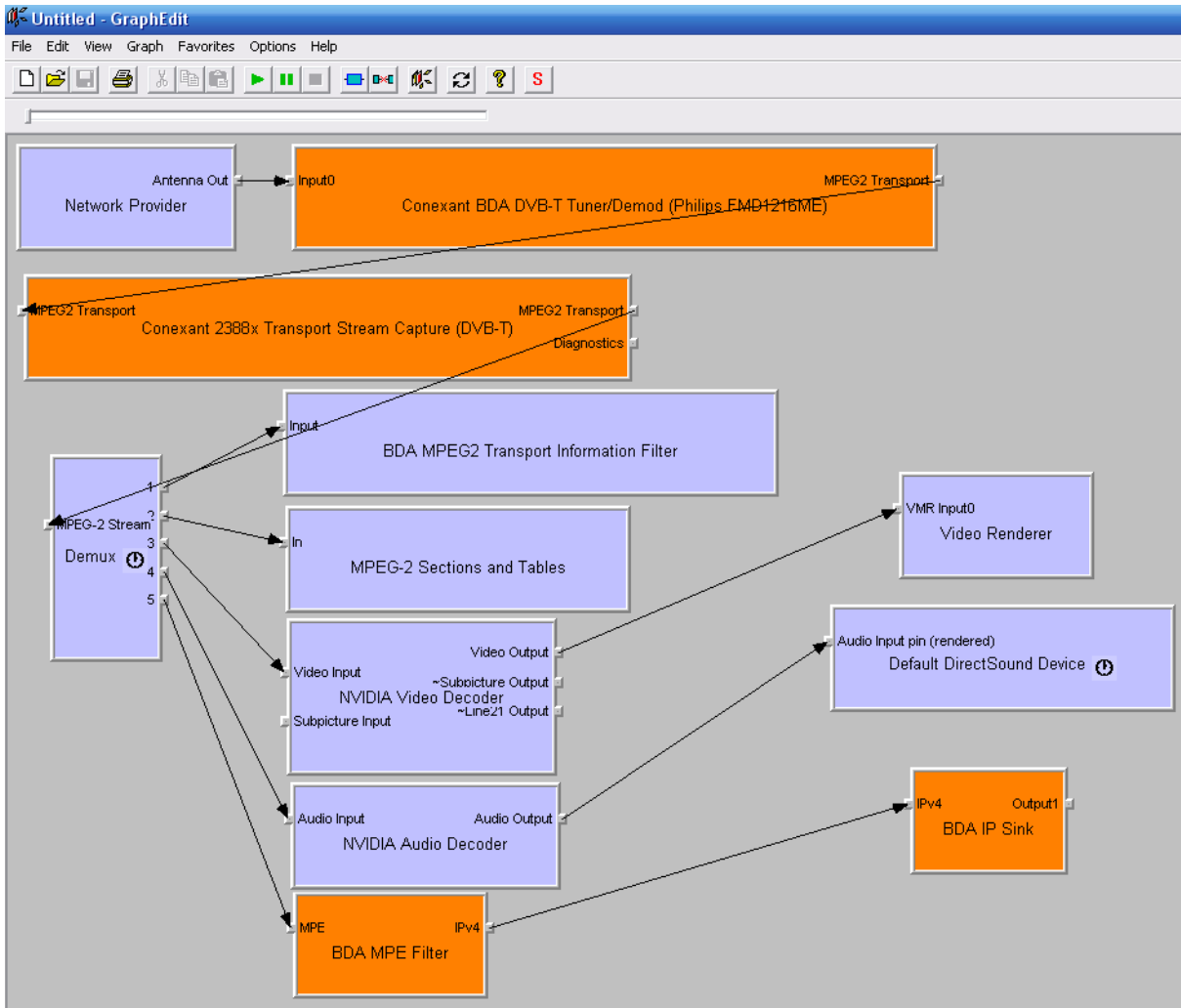


Graphedit Sample Graph

This appendix provides an example of a graph built by the DVB-T Sample Application and then copied using the Graphedit application. In this example, an InterVideo software MPEG decoder was installed on the PC.

Figure 3 shows the sample graph.

Figure 3. DVB-T BDA Sample Application Graph from Graphedit



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