CX23881/CX24109/CX24123 DVB-S Receiver Card Installation

User Guide

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CONEXANT

Revision History

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A	November 5, 2004	Initial release.

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1 Introduction

1.1 About This Manual

This document describes how to install Conexant's CX23881/CX24109/CX24123 DVB-Satellite (DVB-S) receiver card (henceforth called DVB-S card). The procedures include verifying that the DVB-S card is functioning properly. The DVB-S card, contained in the CX23881/CX24109/CX24123 DVB-S Evaluation Kit (EVK), is a single-height card that plugs into an unused PCI slot in a Windows PC.

The DVB-S card must be used in conjunction with a dish antenna, such as used to receive digital satellite programming, 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-S driver installation package, which includes the DVB-S drivers
- Chapter 4: Functionality Verification. Describes how to verify that the DVB-S card works properly.

1.2 DVB-S Background

The DVB-S satellite transmission standard was approved in 1994, and is the current world satellite transmission standard. The DVB-S standard is based on Quadrature Phase-Shift Keying (QPSK) modulation. The CX23881/CX24109/CX24123 DVB-S 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-S Component Overview

The CX23881/CX24109/CX24123 DVB-S card contains three primary parts:

- CX23881 broadcast video decoder (also used in MPEG Personal Video Recorder and TVFM designs)
- CX24109 silicon tuner, or other Conexant silicon tuner
- CX24123 QPSK (BPSK) demodulator, or other Conexant demodulator;

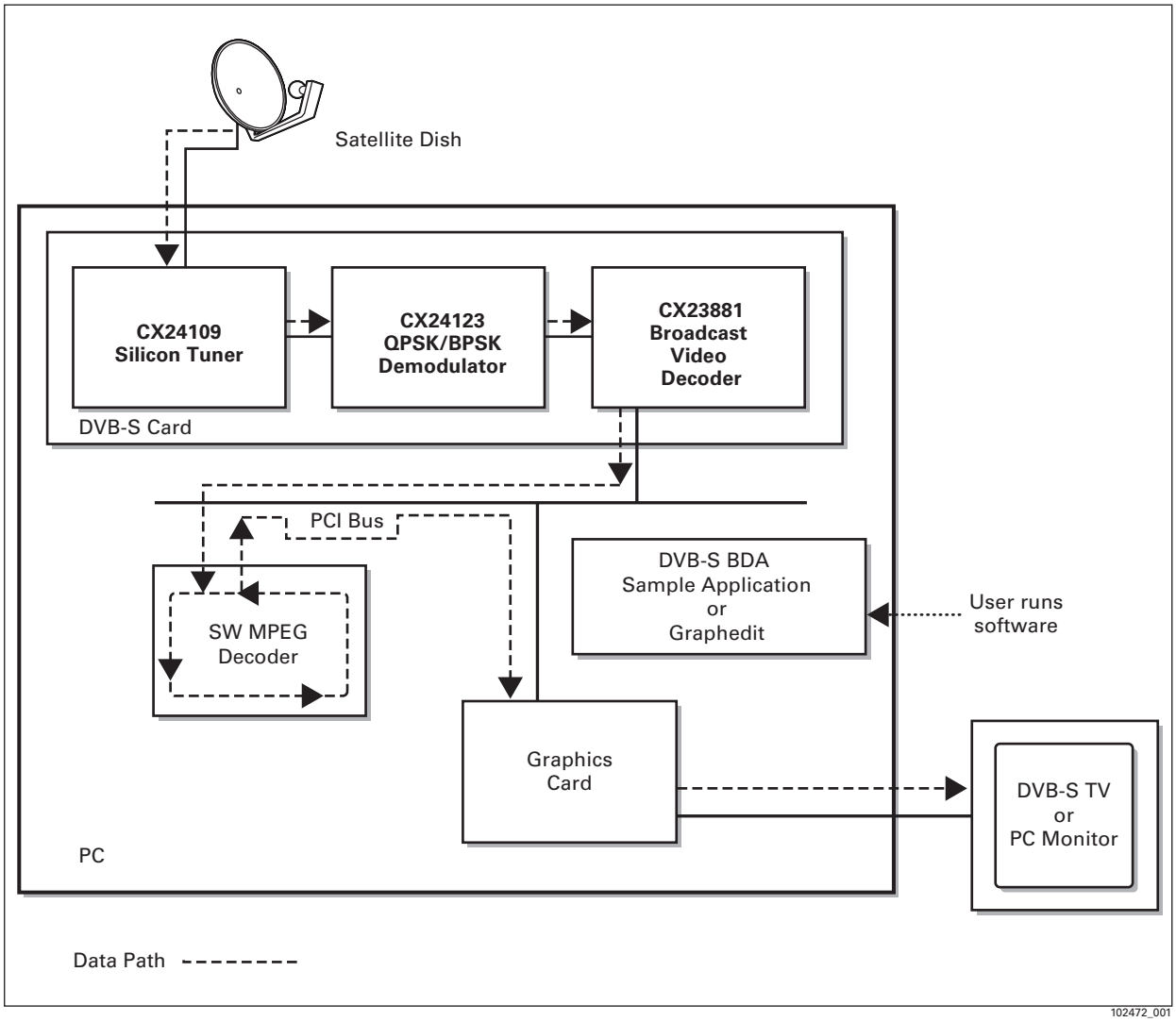
The system components required for receiving DVB-S signals, shown in Figure 1, are:

- Hardware:
  - CX23881/CX24109/CX24123 DVB-S card
  - DVB-S TV or PC monitor
- Software:
  - DVB-S BDA sample application or Graphedit software
  - Software MPEG decoder

The signal flow passes from the satellite dish to the DVB-S TV PC monitor as follows:

1. The satellite dish, plugged directly into the DVB-S card, transmits the DVB-S signal to the CX24109 silicon tuner.
2. The CX24109 silicon tuner passes the received signal to the CX24123 QPSK/BPSK demodulator.
3. The CX24123 QPSK/BPSK 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-S 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-S TV or PC monitor through the PCI bus.

Figure 1. DVB-S System Components



2 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-S 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-S 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-S drivers
  If not present, copy the DVB-S 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.

3 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-S card
- Install the copied DVB-S driver installation package

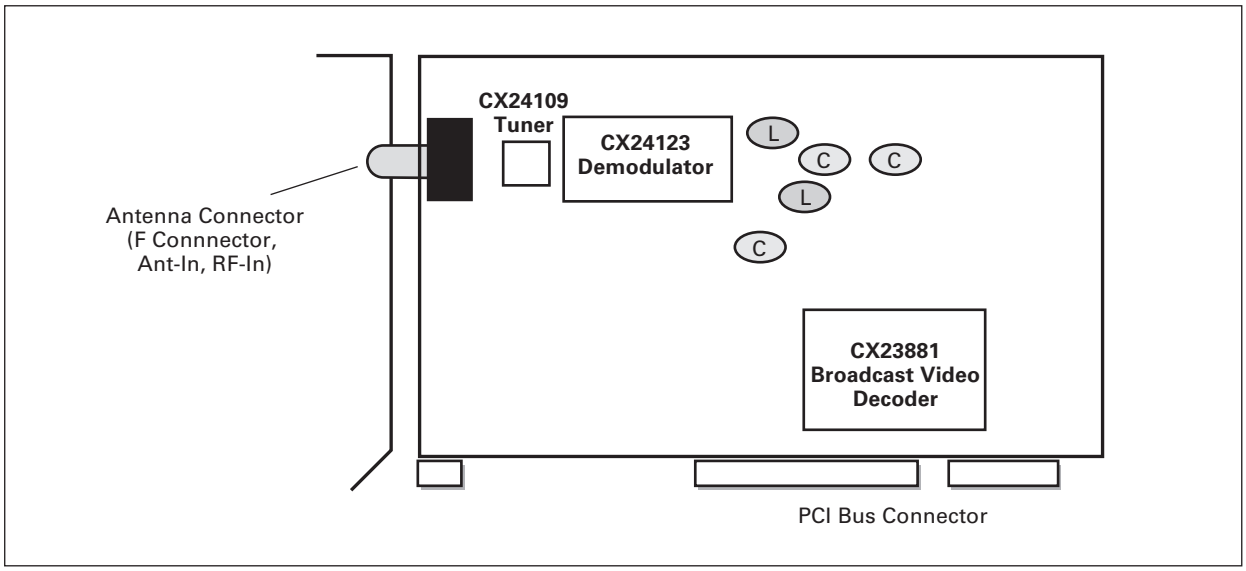
3.1 Copy the Sample Application File

Copy the Conexant sample application file, filename BDA DVBS.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.

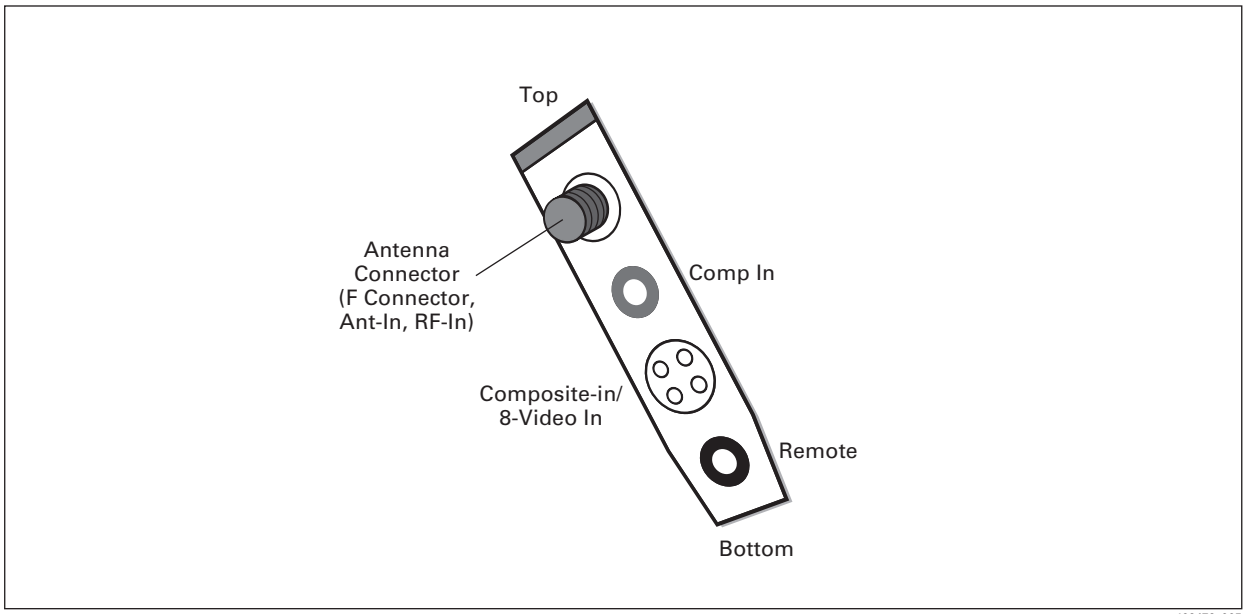
3.2 Install the DVB-S Card

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

Figure 2. DVB-S Card



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.

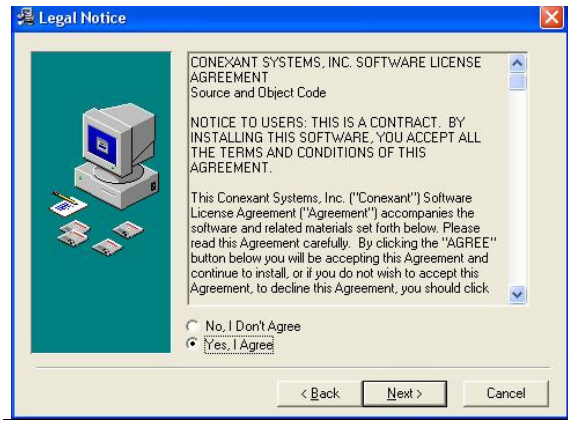
3.3 Install the Copied DVB-S Driver Setup .exe File

When you perform this step, you are executing the DVB-S 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.

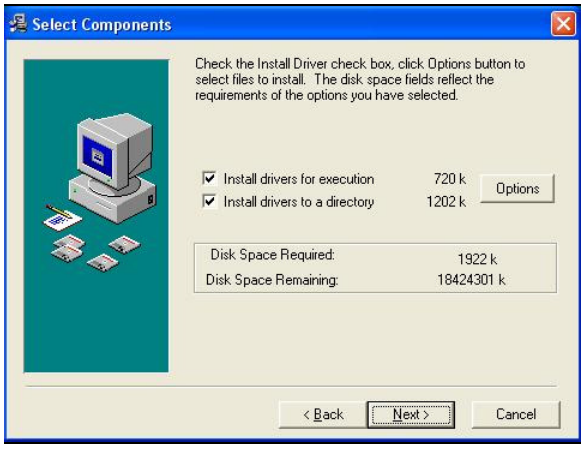
2. Terminate any running programs.
3. Click Next.
   A license agreement appears.
4. Review the license agreement.
5. Do one of the following:
   – if you accept the terms, click the Yes, I Agree radio button, then click Next to continue the installation process.
   – If you do not accept the terms, 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.

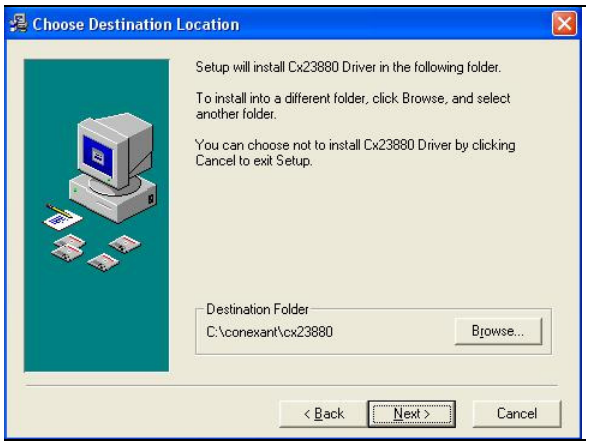
A Select Components window appears with both types of installations selected (the default):

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

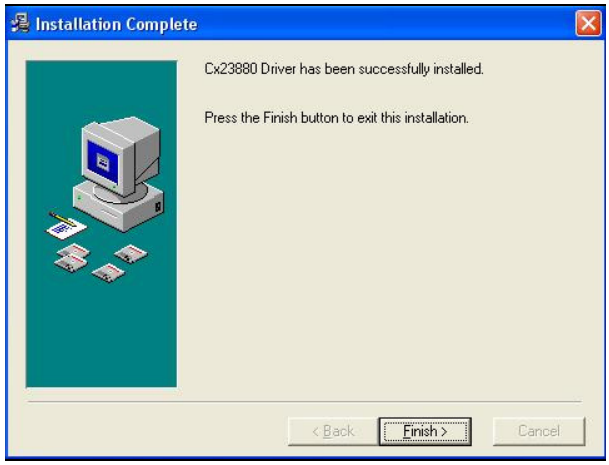


6. Keep both or only one checkmarked selection, as appropriate.
7. Make note of which selection or selections you have checkmarked; you will use this information later in this procedure.

8. In the Select Components window, click Next.
   One of the following occurs:
   – If you checkmarked Install drivers to a directoy location or both Install drivers for execution and Install drivers to a directory location in step 6, a Choose Destination window appears.

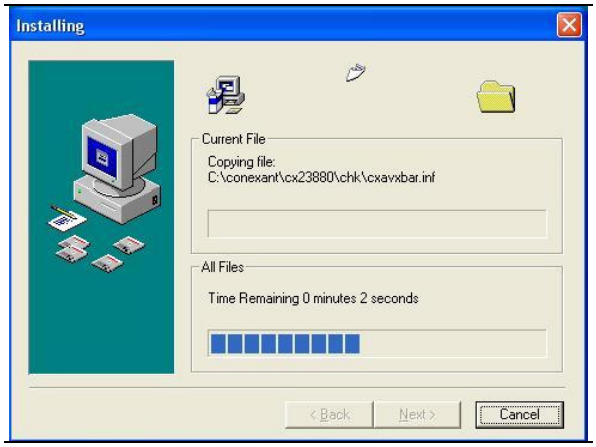


   – If you checkmarked only Install drivers for execution in step , the Installation Complete window appears

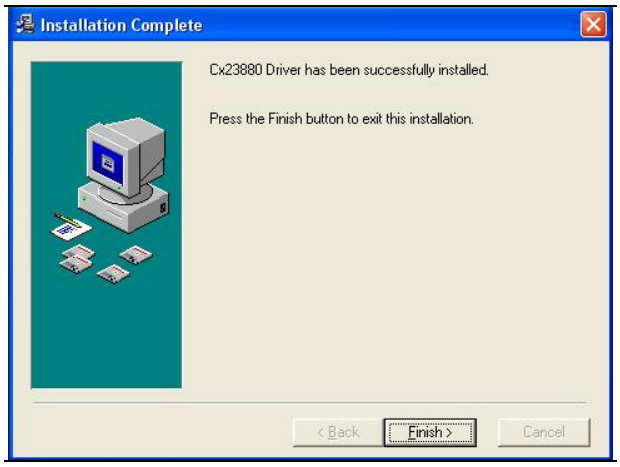


9. Do one of the following, depending on the type of window that is currently displayed:
   – If a Destination window is displayed, continue with step 10.
   – If an Instllation Complete window is displayed, skip to step 11.
10. In the Choose Destination window, do one of the following:
   – If you checkmarked *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.

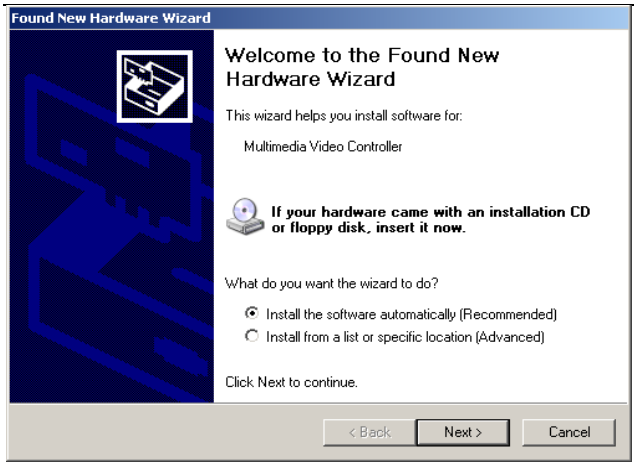


An Installation Complete window appears when the file copying is complete...

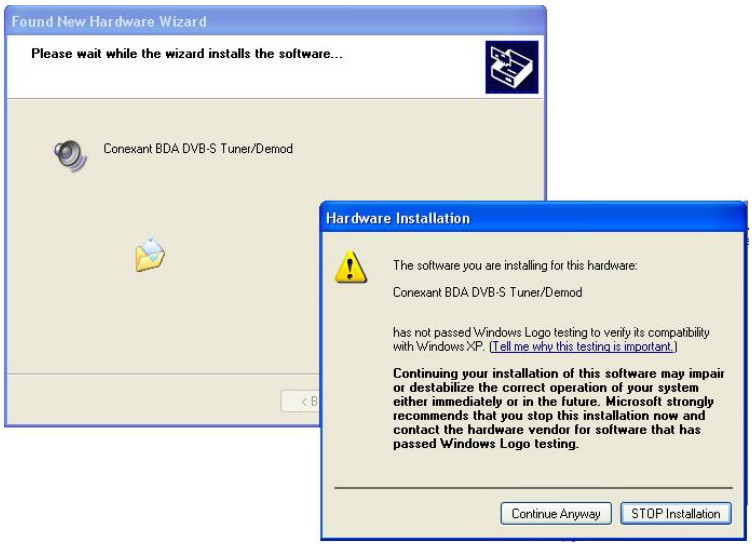


11. In the Installation Complete window, click Finish.
The Plug-and-Play Hardware Wizard scans for hardware changes.

When the Plug-and-Play Hardware Wizard finds the DVB-S 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

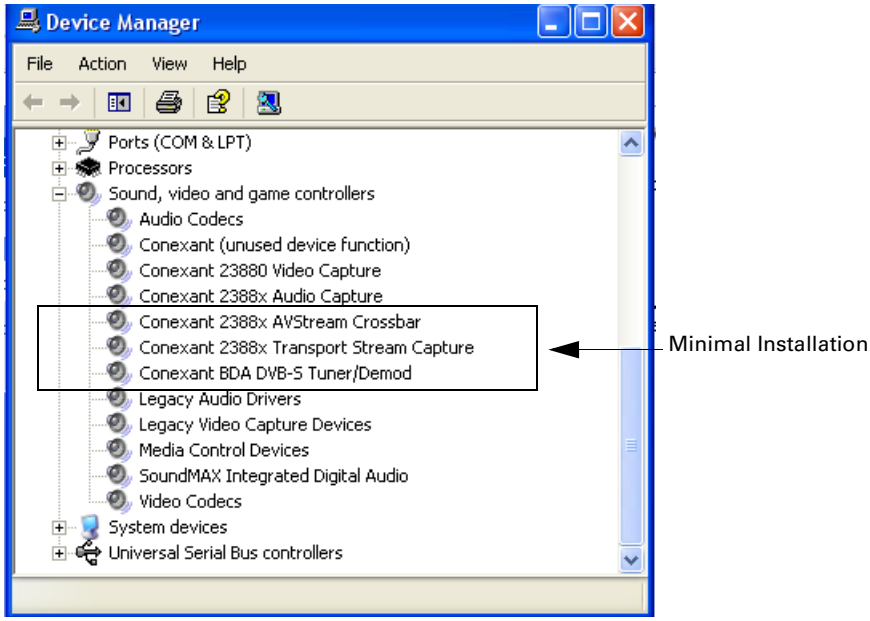


1. Select Install the software automatically (recommended).
2. Click Next.
   In the Found New Hardware window, a "Please wait...." message appears that lists the found Conexant BDA DVB-S Tuner/Demod. If the newly installed drivers do not contain certified .cat files along with the driver software, a 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-S 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-S 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.



4 Functional Verification

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

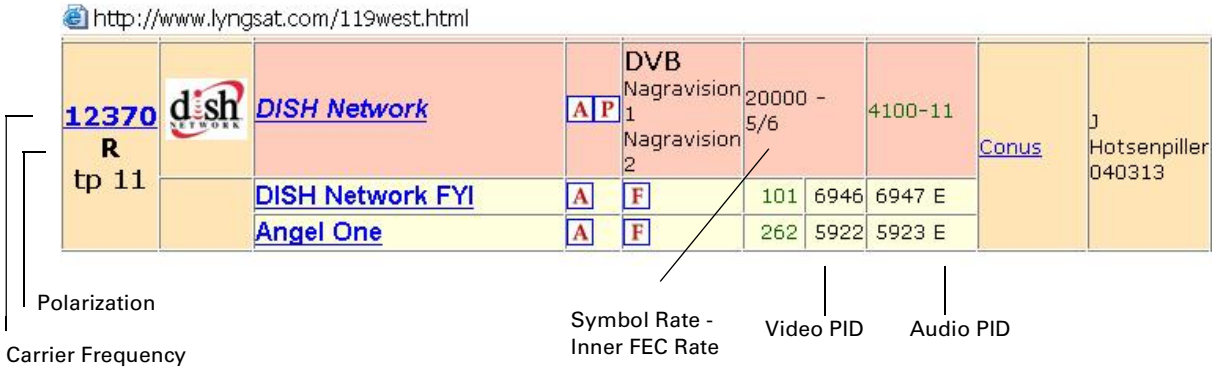
This chapter consists of the following steps:

- Obtain broadcast information
- Configure the DVB-S sample application
- Input broadcast information

4.1 Obtain Broadcast Information

Obtain the needed broadcast information for the test by doing the following steps. This information will be used later in the procedure:

1. Navigate to www.lyngsat.com.
   - Display the channel listing for the combination of longitude, satellite, and carrier frequency that you want to access during the test. A display similar to the following appears. The on-screen display lists the latest information for your selections. The following figure is a sample display. It shows a channel listing for longitude 119 degrees W, satellite EchoStar 7 transponder 11, carrier frequency 12370 MHz. The channels listed in this example are DISH Network, DISH Network FYI, and Angel One.

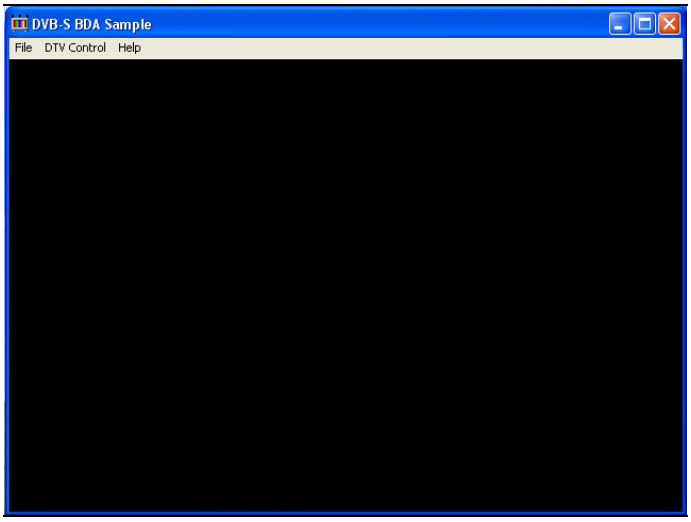


2. Write down the following broadcast information from the display:
   - Carrier Frequency Ku (KHz)—For 12370 frequency, write 12370000 MHz
   - Polarization—For "R" polarization, write "Circular Right." For "L" polarization, write "Circular Left."
   - Video PID—Write the four digits as displayed
   - Audio PID—Write the four digits as displayed

4.2 Configure the DVB-S Sample Application

Configure the DVB-S sample application by doing the following steps.

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



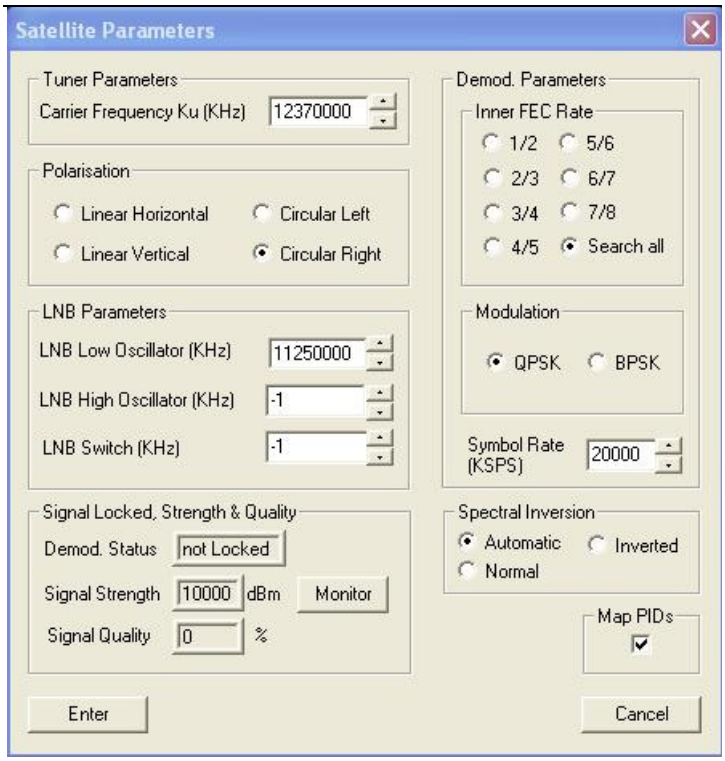
2. In the DVB-S Sample window, select DTV Control > Build Graph.
3. Wait a few seconds.
4. Select DTV Control > Run Graph.
   The sample application builds a graph without your observing it. The window remains blank.

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-S 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 Satellite Parameters window appears with the default settings for the test application, similar to the following.



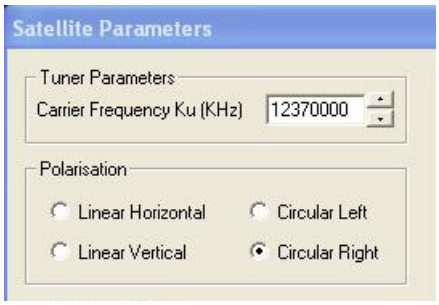
4.3 Input Broadcast Information

Input the broadcast information, obtained in Section 4.1, into the DVB-S BDA Sample Application by doing the following steps.

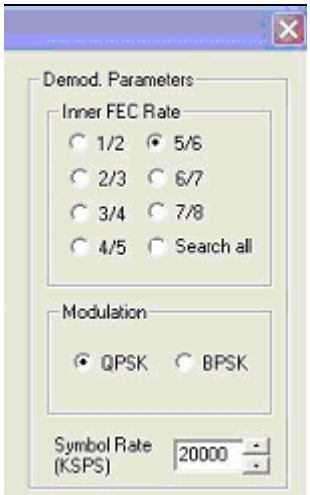
1. In the Satellite Parameters window, fill in the following fields, using the information obtained in Section 4.1:
   - Carrier Frequency Ku (KHz)
   - Polarization
   - Symbol Rate (KSPS)
   - Inner FEC Rate

   The following examples shows how you would fill in the Carrier Frequency, Polarization, Symbol Rate (KSPS), and Inner FEC Rate fields for the broadcast information obtained in Section 4.1. In these examples, your field entries are the same as the default values that appear.

   In the example shown in Section 4.1:
   - Carrier Frequency is 12370. For that example, you would type 12370000 in the Satellite Parameters window.
   - Polarization is R. For that example, you would therefore select Circular R in the Satellite Parameters window

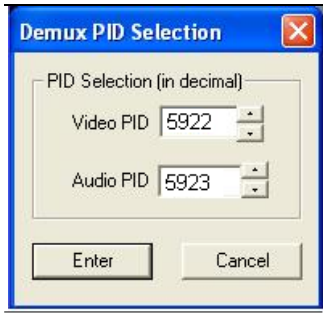


In the example shown in Section 4.1:
   - Symbol Rate (KSPS) is 5/6. For that example, you would therefore select 5/6 in the Satellite Parameters window.
   - Inner FEC Rate is 20000. For that example, you would therefore enter 20000 in the Satellite Parameters window.



2. Select the Map PIDs checkbox at the bottom right of the window.

3. Click Enter.
   The Demux PID Selection window appears.
4. In the Demux PID Selection window, fill in the following fields, using the information obtained in Section 4.1:
   – Video PID (in decimal)
   – Audio PID (in decimall)
     In the example shown in Section 4.1:
     • Video PID is 5922. For that example, you would therefore type 5922 in the Demux PID Selection window.
     • Audio PID is 5923. For that example, you would therefore type 5923 in the Demux PID Selection window.



5. Click Enter.
   Streaming video and audio appears in the DVB-S BDA Sample window.
   – If streaming video and audio does not appear, verify that you have correctly entered the PIDs that are currently displayed at www.lyngsat.com.

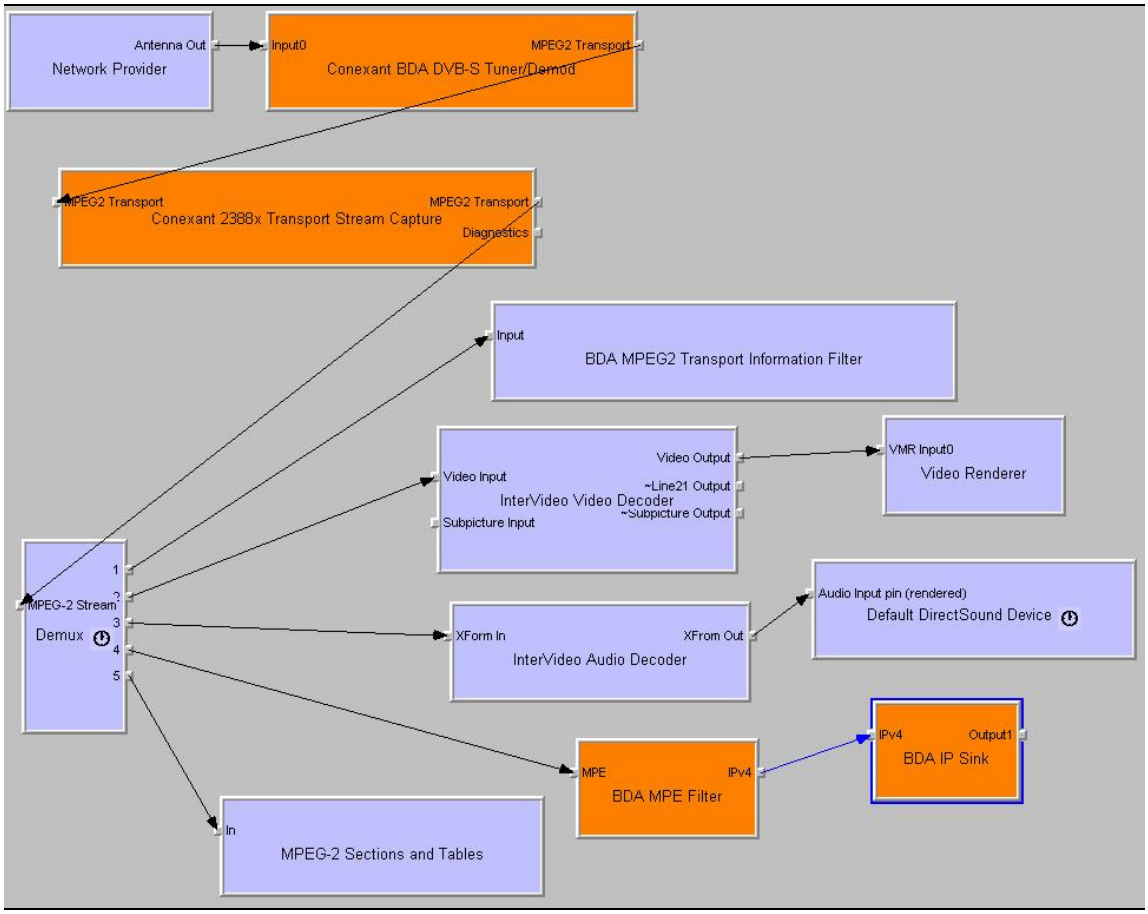
A

Graphedit Sample Graph

This appendix provides an example of a graph built by the DVB-S 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 a sample graph from Graphedit.

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



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