



Installation of the Cisco DVB CAR100

This chapter describes how to install the Cisco DVB CAR100. It includes the following sections:

- Minimum Installation Requirements
- Tools for Installation
- Installing the Cisco DVB CAR100
- Configuration Overview
- Automatic Network Configuration
- Manual Network Configuration
- Cisco DVB CAR100 Startup Sequence

The following section describe the cable modem installation procedure that the subscriber typically performs. This information is included to give a comprehensive picture of the installation of the Cisco DVB CAR100 at the subscriber's premises, and the configuration program for the Cisco DVB CAR100 at the cable service provider's premises.

The Cisco DVB CAR100 package includes:

- A power supply (AC adapter)
- A country-specific power cable
- *Quick Start Guide for the Cisco DVB CAR100 Cable Access Router*

Minimum Installation Requirements

The minimum installation requirements are different for the Cisco DVB CAR100-PC and the Cisco DVB CAR100-LAN.

Cisco DVB CAR100-PC

The minimum requirements for installing the Cisco DVB CAR100-PC are a:

- Personal computer with an Ethernet 10BaseT network adapter and applicable drivers installed
- Crossover Ethernet cable
- Coaxial cable for the connection between the wall outlet and the cable modem
- HFC cable network connection
- Dedicated data wall outlet. If this is not available, a splitter with an integrated filter and a coaxial cable with F-connector (male at both ends) will be needed.

**Note**

It is the subscriber's responsibility to ensure that the PC is equipped with an Ethernet network adapter.

**Note**

The Cisco DVB CAR100 is designed for 10 Mbps and 10/100 Mbps Ethernet NICs. It does not work with 100 Mbps only (pure Fast Ethernet) NICs.

Cisco DVB CAR100-LAN

The minimum requirements for installing the Cisco DVB CAR100-LAN are:

- PCs with Ethernet connectivity
- Ethernet hub (for connecting the Cisco DVB CAR100-LAN to more than one PC)
- Straight-through Ethernet cabling
- Coaxial cable for the connection between the wall outlet and the cable modem
- HFC cable network connection
- Dedicated data wall outlet. If this is not available, a splitter with an integrated filter and a coaxial cable with F-connector (male at both ends) will be needed.

**Note**

Before upgrading the Cisco DVB CAR100-PC to the Cisco DVB CAR100-LAN, make sure you have a Cisco DVB CAR100-LAN license for each cable modem being upgraded.

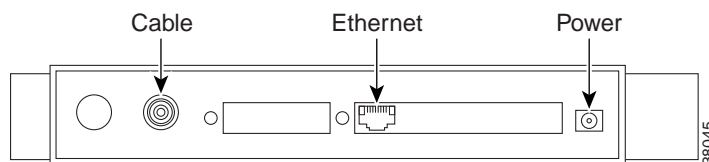
**Note**

In addition to ensuring the PCs have Ethernet connectivity, it is the subscriber's responsibility to ensure the hub is correctly connected.

Rear view

Figure 2-1 shows where to connect cables to the rear panel of the Cisco DVB CAR100.

Figure 2-1 Rear Connector Locations of the Cisco DVB CAR100



Tools for Installation

Each Cisco DVB CAR100 chassis is fully assembled at the factory, and no further assembly is required. However, the following tools and equipment are needed to install the Cisco DVB CAR100:

- High-quality coaxial cable with at least 80 percent braided with foil
- An Ethernet 10BaseT network interface card (if not already installed)

For the Cisco DVB CAR100-PC—Ethernet crossover cable with RJ-45 connectors (to connect the Cisco DVB CAR100 to a single computer).

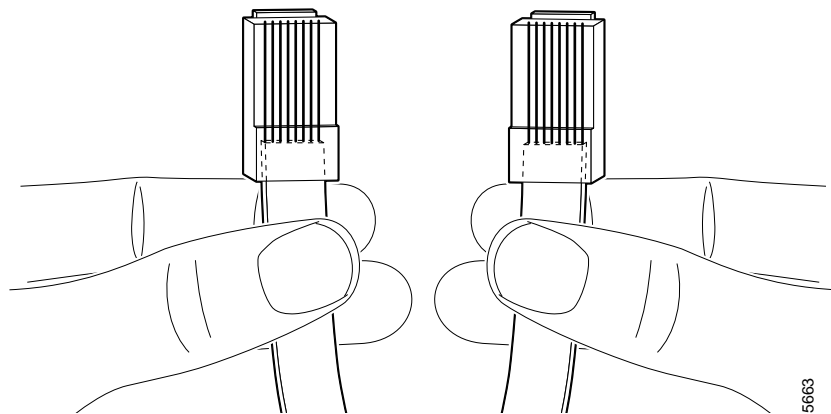
For the Cisco DVB CAR100-LAN—Ethernet straight-through cable with RJ-45 connectors (to connect the Cisco DVB CAR100 to a hub).



Tips

To distinguish a straight-through Ethernet cable from a crossover Ethernet cable, hold the two RJ-45 ends of the cable next to each other so that you can see the colored wires inside the ends, as shown in Figure 2-2.

Figure 2-2 Determining the Type of Ethernet Cable



On a straight-through cable, the colored wires are in the same sequence at both ends of the cable.

On a crossover cable, the first (far left) colored wire at one end of the cable is the third colored wire at the other end of the cable.

Installing the Cisco DVB CAR100

When installing the Cisco DVB CAR100, make sure you attach the cables in the same order described in this guide.



Warning

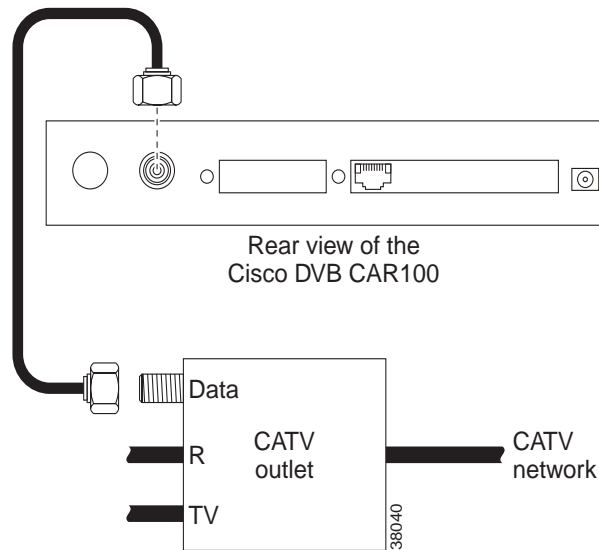
Read the installation instructions before you connect the system to its power source. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.

Connecting the HFC Coaxial Cable

Connect the HFC wall outlet to the Cisco DVB CAR100 using a shielded coaxial cable.

- Connect the HFC wall outlet to the socket labeled **Cable** on the rear of the Cisco DVB CAR100 as shown in Figure 2-3.

Figure 2-3 Connecting to a HFC Wall Outlet



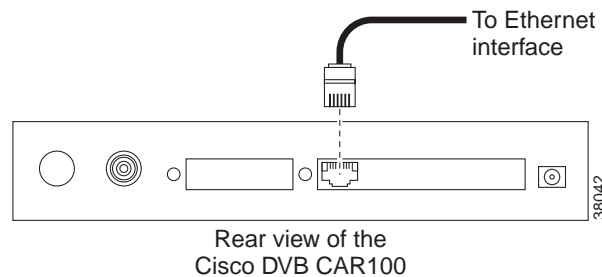
Connecting the Ethernet Cable

Connecting to a Single Computer

Connect the Cisco DVB CAR100-PC to the single computer, using a crossover Ethernet cable (Class 5, shielded, RJ-45).

- Connect the socket labeled **Ethernet** on the rear of the Cisco DVB CAR100, as shown in Figure 2-4.

Figure 2-4 Connecting the Cisco DVB CAR100 to a Single Computer



- Connect the other end of the cable to the computer's Ethernet network adapter.



Tips

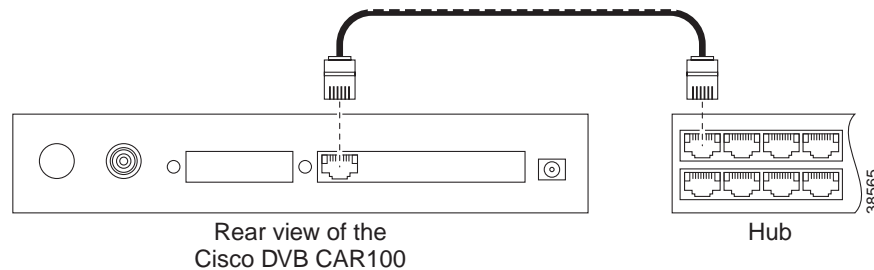
The Ethernet port is located on the back of the computer if an internal Ethernet card is installed. On a laptop computer, the Ethernet port is usually located on an adapter cable connected to a PCMCIA (PC) card installed in the computer's PCMCIA slot. If you need additional information to locate the Ethernet port on the computer, consult the user documentation for the computer.

Connecting to Multiple Computers

Connect the Cisco DVB CAR100-LAN to multiple computers, using a straight-through Ethernet cable (Class 5, shielded, RJ-45) and an Ethernet hub.

- Connect the socket labeled **Ethernet** on the rear of the Cisco DVB CAR100-LAN to the hub's Ethernet network adapter as shown in Figure 2-5.

Figure 2-5 Connecting the Cisco DVB CAR100-LAN to a Hub



Connecting the Computers to the Ethernet Hub

Connect the computers using straight-through cabling to the Ethernet hub according to the hub manufacturer's instructions. Consult the user documentation supplied with your Ethernet hub to install and configure it correctly.

Connecting the Power Supply



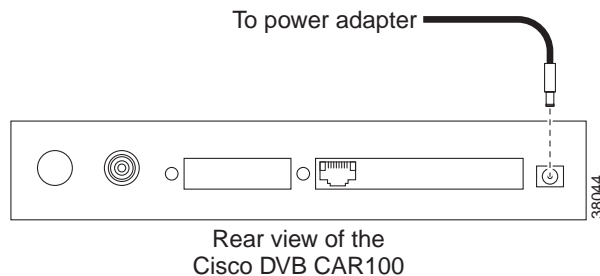
Warning

Read the installation instructions before you connect the system to its power source. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.

After connecting the HFC coaxial cable and the Ethernet cable to the Cisco DVB CAR100, connect the power supply:

- Connect the power supply unit to the socket labeled **Power** on the rear of the Cisco DVB CAR100, as shown in Figure 2-6.

Figure 2-6 Connecting the Power Supply



- Connect the other end of the power supply unit to the electrical wall socket. This completes the installation of the Cisco DVB CAR100 cable access router.

Configuration Overview

The Cisco DVB CAR100 comes preconfigured for full end-user operation. However, the connected computers need to be configured to communicate with the HFC network.

After the Cisco DVB CAR100 is installed, it is the subscriber's responsibility to configure the TCP/IP protocol and set the IP address, subnet mask, and gateway in the connected PCs, based on information supplied by the cable service provider.

You can change the default private IP address and local subnet for the Cisco DVB CAR100's Ethernet interface prior to installation.

Basic instructions for Windows 95 and Windows 98 are included in the *"Cisco DVB CAR100 Cable Access Router Hardware Installation Guide"*.

The Cisco DVB CAR100-LAN may be connected to a hub. For information on how to do this, Cisco advises subscribers to refer to the documentation supplied with that device.

It is the responsibility of the cable service provider to allocate an IP address and subnet mask on the HFC cable interface to every Cisco DVB CAR100. These communication parameters are used for all data traffic toward the HFC network.

Other specific settings, such as port-level Network Address Translation (NAPT) status and public IP addresses for a host computer, are allocated by the cable service provider. When the unit performs NAPT, all IP addresses on the connected computers are local, and cannot be seen by the outside world.



Tips

The community strings "public" and "private" are default access passwords defined in the SNMPstandard. Cisco recommends changing the default passwords to prevent the Cisco DVB CAR100 from being accidentally reconfigured. Passwords can contain up to 128 alphanumeric characters. Depending on the number of cable modems involved, you can save time by dividing them into groups with different passwords for each.



Caution

If you change the software upgrade password from the factory default (that is, **default**) and then lose or forget the new password, there is no backdoor solution. You will have effectively rendered the Cisco DVB CAR100 unconfigurable.

Automatic Network Configuration

The following sections detail automatic network configuration in Windows 95/98 and Windows NT. If subscribers are using another operating system, advise them to consult their operating system user documentation to ensure that their computers are configured to obtain an IP address automatically from a DHCP server.

Automatic Network Configuration for Windows 95/98

- Step 1 Choose **Start>Settings>Control Panel>Network**.
- Step 2 Select the **Configuration** tab.
- Step 3 Select **TCP/IP>[your Ethernet adapter]>Properties>IP Address** tab.
- Step 4 Click **Obtain an IP address from a DHCP Server**.

Step 5 Click **OK** and reboot the PC, if necessary.



Note If you have the Cisco DVB CAR100-LAN version, repeat Steps 1 to 5 for each connected PC.

Automatic Network Configuration for Windows NT

Step 1 Choose **Start>Settings>Control Panel>Network>Protocols**.

Step 2 Select **TCP/IP Protocols>Properties>IP Address** tab.

Step 3 Click **Obtain an IP address from a DHCP Server**.

Step 4 Click **Apply**.

Step 5 Click **OK** and reboot the PC, if necessary



Note If you have the Cisco DVB CAR100-LAN version, repeat Steps 1 to 5 for each connected PC.

Manual Network Configuration



Note All operating systems: Provide subscribers with valid TCP/IP settings. If no other data is provided, subscribers are advised to use the values listed in Table 2-1 below, and to consult the operating system documentation for TCP/IP configuration procedures.

Table 2-1 TCP/IP Settings

		IP Address
Cisco DVB CAR100-PC	Single computer	192.168.128.10
Cisco DVB CAR100-LAN	Computer 1	192.168.128.10
	Computer 2	192.168.128.11
	Computer 3	192.168.128.12
	Computer 4 to ...	192.168.128.13 to ...
All versions of the Cisco DVB CAR100	Subnet Mask	Default Gateway
	255.255.255.0	192.168.128.2

Manual TCP/IP Configuration for Windows 95/98



Note To use the manual network configuration the subscriber will need to enter a valid IP address and DNS server information.

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- Step 1** Choose **Start>Settings>Control Panel>Network**.
 - Step 2** Select the **Configuration** tab.
 - Step 3** Select **TCP/IP>[your Ethernet adapter]>Properties>IP Address** tab.
 - Step 4** Click **Specify an IP address** and enter values for IP address and subnet mask from Table 2-1 above to configure the TCP/IP settings of your PC.
 - Step 5** Click the **Gateway** tab and enter values for the default gateway from Table 2-1.
 - Step 6** Select **DNS Configuration, Enable DNS** and enter the DNS server information supplied by cable service provider.
 - Step 7** Click **OK** and reboot the PC, if necessary.
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Note If you have the Cisco DVB CAR100-LAN version, repeat Steps 1 to 7 for each connected PC.

Manual TCP/IP Configuration for Windows NT



Note To use the manual network configuration the subscriber will need to enter a valid IP address and DNS server information.

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- Step 1** Choose **Start>Settings>Control Panel>Network>Protocols**.
 - Step 2** Select **TCP/IP Protocols>Properties>IP Address** tab.
 - Step 3** Click **Specify an IP Address**. If no other configuration data is provided, enter the values from Table 2-1 to configure the TCP/IP settings of the PC.
 - Step 4** Click **Apply**.
 - Step 5** Select the **DNS** tab and enter the DNS server information (supplied by cable service provider).
 - Step 6** Click **OK** and reboot the PC, if necessary.
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Note If you have the Cisco DVB CAR100-LAN version, repeat Steps 1 to 6 for each connected PC.

Turning on the Cisco DVB CAR100

Having configured the computers attached to the Cisco DVB CAR100, the Cisco DVB CAR100 can be started. If it is running in the default DHCP Server mode:

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- Step 1** Turn on the modem.
Step 2 Then turn on the PC.
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The Cisco DVB CAR100 will connect to the HFC network, and be able to access the Internet. This procedure is described in the next section.



Note Cisco advises subscribers to leave the Cisco DVB CAR100 switched on at all times to enable automatic software updates to be performed.

Cisco DVB CAR100 Startup Sequence

When you have connected and powered up the Cisco DVB CAR100 according to the instructions above, it will automatically initiate the sign-on procedure. After it has successfully signed on, it will stay on-line until the power supply is turned off.

Here is an overview of the startup sequence initiated when the Cisco DVB CAR100 connects to the HFC network.

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- Step 1** The Cisco DVB CAR100 performs a frequency scan to find a frequency with a “valid” DVB cable modem signal. By “valid” we mean a valid MPEG2 signal as well as a valid DVB cable headend. From the headend we also learn a valid upstream frequency for a DVB MAC level sign on. For further information see “Setting Downstream Channel Frequencies” section on page 4-8.
- Step 2** The Cisco DVB CAR100 signs on to the headend using its factory built-in Ethernet MAC address to identify itself. This sign on establishes a two-way (MAC layer) connection between the DVB CAR100 and the headend.
- Step 3** The Cisco DVB CAR100 HFC cable interface is IP-configured dynamically using BOOTP, via a BOOTP server on the cable side internet. The IP configuration includes an IP address, an IP subnet mask and eventually a DNS server name to be applied for the Cisco DVB CAR100’s built-in DHCP server.



Note For testing purposes the Cisco DVB CAR100 HFC interface may also be statically configured (i.e. without BOOTP). In certain configurations, the Cisco DVB CAR100 Ethernet interface may also be dynamically BOOTP configured.

- Step 4** The Cisco DVB CAR100 internal time is then aligned with an SNTP (Simple Network Time Protocol) server. This is not the default configuration and therefore an SNTP server address needs to be entered. See the **rcm SNTPServer** MIB in the “System” section on page 5-3.
- Step 5** The Cisco DVB CAR100 is now ready, and the main LED should light constant green.
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**Tips**

The first sign-on procedure might take up to 20 minutes or in some instances even longer because the Cisco DVB CAR100 has to find a valid downstream channel frequency. After this frequency is found, it is written in the memory of the unit and is available for the next sign-on procedure, which will typically take no longer than a few minutes at most. For more information, see the “Setting Downstream Channel Frequencies” section on page 4-8.

Startup Default Settings

These are the default settings when the Cisco DVB CAR100 first starts up:

- The HFC IP interface is dynamically configured using BOOTP.
- The Ethernet IP interface is statically configured.
- The default IP address is 192.168.128.2, while the IP subnet mask is 255.255.255.
- The Cisco DVB CAR100’s built-in DHCP server is enabled and the addresses assigned to hosts or PCs by this DHCP server are all the addresses defined by the Cisco DVB CAR100 side’s Ethernet subnet.
- NAPT is turned on.
- Downstream IP multicasting is enabled.
- Upstream IP multicasting is disabled.

The default settings for the startup sequence can be changed using SNMP and a MIB browser. For more information, see “Changing Cisco DVB CAR100 Settings” section on page 3-5.

**Note**

The Cisco DVB CAR100 uses the last saved settings each time it powers up—it does not revert to the factory defaults. This means that if NAPT was turned off last time the cable modem was shut down, it will still be off the next time the device signs on.

**Tips**

To verify if the sign-on has been successful, check if the Master LED on top of the Cisco DVB CAR100 has turned green.

If the LED on top of the cable modem does not turn green, check that the coaxial cable is correctly connected to the wall outlet.

If the Master LED still does not turn green, refer to the “LED Patterns” section on page 6-2.

Cisco also offers a free application designed to monitor the performance and status of the Cisco DVB CAR100. It can be found at <http://www.cisco.com/cgi-bin/tablebuild.pl/car100>. For more information, see “Useful Support Applications” section on page 6-4.
