

CODA-45/46/47 Gigabit Cable Modem

User's Guide

Version 1.0 - 10/2016



About This User's Guide

Intended Audience

This manual is intended for people who want to configure the CODA-45/46/47's features via its Graphical User Interface (GUI).

How to Use this User's Guide

This manual contains information on each the CODA-45/46/47's GUI screens, and describes how to use its various features.

- ▶ Use the [Introduction](#) on page [10](#) to see an overview of the topics covered in this manual.
- ▶ Use the [Table of Contents](#) (page [6](#)), [List of Figures](#) (page [8](#)) and [List of Tables](#) (page [9](#)) to quickly find information about a particular GUI screen or topic.
- ▶ Use the [Index](#) (page [42](#)) to find information on a specific keyword.
- ▶ Use the rest of this User's Guide to see in-depth descriptions of the CODA-45/46/47's features.

Related Documentation

- ▶ **Quick Installation Guide:** see this for information on getting your CODA-45/46/47 up and running right away. It includes information on system requirements, package contents, the installation procedure, and basic troubleshooting tips.

Document Conventions

This User's Guide uses various typographic conventions and styles to indicate content type:

▶ Bulleted paragraphs are used to list items, and to indicate options.

1 Numbered paragraphs indicate procedural steps.

NOTE: Notes provide additional information on a subject.



Warnings provide information about actions that could harm you or your device.

Product labels, field labels, field choices, etc. are in **bold** type. For example:

Select **UDP** to use the User Datagram Protocol.

A mouse click in the Graphical User Interface (GUI) is denoted by a right angle bracket (>). For example:

Click **Settings > Advanced Settings**.

means that you should click **Settings** in the GUI, then **Advanced settings**.

A key stroke is denoted by square brackets and uppercase text. For example:

Press [ENTER] to continue.

Customer Support

For technical assistance or other customer support issues, please consult your Hitron representative.

Accessing the Device

The CODA-45/46/47's default IP address is as follows. For more information, see [Accessing the CODA-45/46/47](#) on page 17.

Table 1: Default Credentials

IP Address	192.168.100.1
------------	---------------

NOTE: Because the CODA-45/46/47's GUI displays status information only, it has no login screen. You do not need a username or password; when you access the CODA-45/46/47 you will see the Status screen immediately.

Copyright © 2016 Hitron Technologies. All rights reserved. All trademarks and registered trademarks used are the properties of their respective owners.



DISCLAIMER: The information in this User's Guide is accurate at the time of writing. This User's Guide is provided "as is" without express or implied warranty of any kind. Neither Hitron Technologies nor its agents assume any liability for inaccuracies in this User's Guide, or losses incurred by use or misuse of the information in this User's Guide.

Table of Contents

About This User's Guide	2
Table of Contents	6
List of Figures	8
List of Tables	9
Introduction	10
1.1 CODA-45/46/47 Overview	10
1.1.1 Model Differentiation	10
1.1.2 Key Features	11
1.2 Hardware Connections	11
1.3 LEDs	13
1.4 IP Address Setup	15
1.4.1 Manual IP Address Setup	16
1.5 Accessing the CODA-45/46/47	17
1.6 GUI Overview	18
1.7 Resetting the CODA-45/46/47	19
Status	21
2.1 Status Overview	21
2.1.1 DOCSIS	21
2.1.2 IP Addresses and Subnets	22
2.1.2.1 IP Address Format	22
2.1.2.2 IP Address Assignment	22
2.1.2.3 Subnets	23
2.1.3 DHCP	24
2.1.4 DHCP Lease	25
2.1.5 MAC Addresses	25
2.1.6 Routing Mode	26

2.1.7 Configuration Files	26
2.1.8 Downstream and Upstream Transmissions	26
2.1.9 Cable Frequencies	26
2.1.10 Modulation	27
2.1.11 TDMA, FDMA and SCDMA	27
2.1.12 OFDM	28
2.1.13 FFT	28
2.2 The Status: System Information Screen	28
2.3 The Status: DOCSIS Provisioning Screen	29
2.4 The Status: DOCSIS WAN Screen	31
2.5 The Status: DOCSIS Event Screen	35
2.6 The Status: LAN Port Status Screen	37
Troubleshooting	39
Index	42

List of Figures

Figure 1: Application Overview	10
Figure 2: Hardware Connections	12
Figure 3: Power Adaptor	13
Figure 4: LEDs	14
Figure 5: Status	18
Figure 6: GUI Overview	19
Figure 7: The Status: System Information Screen	29
Figure 8: The Status: DOCSIS Provisioning Screen	30
Figure 9: The Status: DOCSIS WAN Screen	32
Figure 10: The Status: DOCSIS Event Screen	36
Figure 11: The Status: LAN Port Status Screen	37

List of Tables

Table 1: Default Credentials	4
Table 2: Hardware Connections	12
Table 3: LEDs	14
Table 4: GUI Overview	19
Table 5: Private IP Address Ranges	23
Table 6: IP Address: Decimal and Binary	23
Table 7: Subnet Mask: Decimal and Binary	24
Table 8: The Status: System Information Screen	29
Table 9: The Status: DOCSIS WAN Screen	33
Table 10: The Status: DOCSIS Event Screen	36
Table 11: The Status: LAN Port Status Screen	37

1

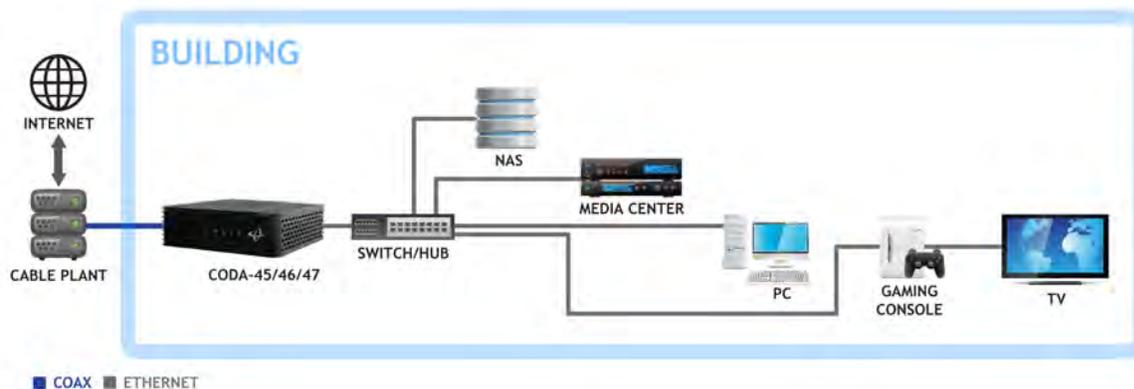
Introduction

This chapter introduces the CODA-45/46/47 and its GUI (Graphical User Interface).

1.1 CODA-45/46/47 Overview

Your CODA-45/46/47 is a DOCSIS 3.0/3.1 cable modem that allows you to connect your cabled Ethernet devices to the Internet via your building's cable connection.

Figure 1: [Application Overview](#)



1.1.1 Model Differentiation

The models covered by this User's Guide differ in the following specifics:

- ▶ The CODA-45 operates on cable data frequencies of 5 to 85MHz.
- ▶ The CODA-46 operates on cable data frequencies of 5 to 42MHz and 5~85MHz (configurable by the operator).

- ▶ The CODA-47 operates on cable data frequencies of 5 to 85MHz, and 5 to 204MHz (configurable by the operator).

1.1.2 Key Features

The CODA-45/46/47 provides:

- ▶ DOCSIS 3.0 32x8 channel bonding / DOCSIS 3.1 2x2 multi-carrier OFDM.
- ▶ Supports Business Services over DOCSIS
- ▶ Full-featured, high-bandwidth cable modem.
- ▶ Full capture bandwidth.
- ▶ IPv4 and IPv6 support.
- ▶ Built-in MoCA immunity filter allows use with MoCA networks without interference.
- ▶ Business Services over DOCSIS (BSoD) support.
- ▶ Well-defined LEDs clearly display device and network status.

1.2 Hardware Connections

This section describes the CODA-45/46/47's physical ports and buttons.

Figure 2: Hardware Connections

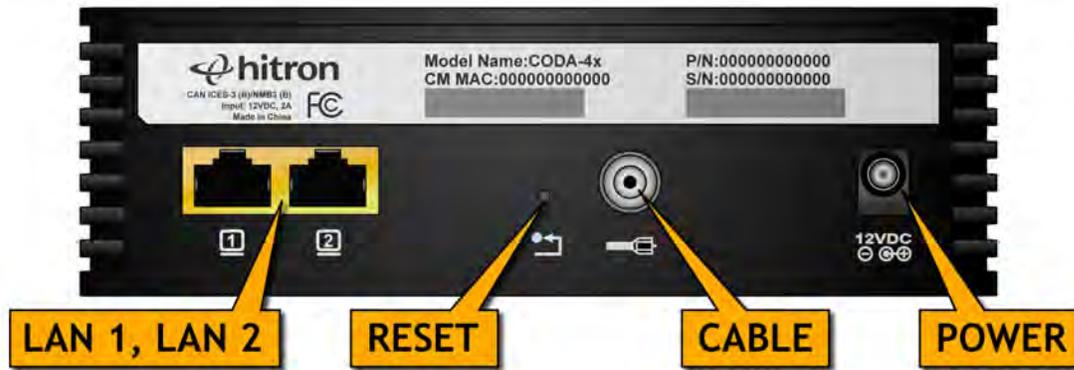


Table 2: Hardware Connections

LAN1	Use these ports to connect your computers and other network devices, using Category 5 or 6 Ethernet cables with RJ45 connectors.
LAN2	
RESET	<p>Use this button to reboot or reset your CODA-45/46/47.</p> <ul style="list-style-type: none"> ▶ Press the button and hold it for less than five seconds to reboot the CODA-45/46/47. The CODA-45/46/47 resets, using your existing settings. ▶ Press the button and hold it for more than five seconds to restart the CODA-45/46/47 using its factory default settings. See Resetting the CODA-45/46/47 on page 19 for more information. <p>NOTE: If you reboot the CODA-45/46/47, any modified settings cannot be recovered.</p>

Table 2: [Hardware Connections](#)

CABLE	Use this to connect to the Internet via an F-type RF cable.
POWER	<p>Use the POWER port to connect to the 12VDC power adapter that came with your CODA-45/46/47</p> <p>Figure 3: Power Adaptor</p> 

1.3 LEDs

This section describes the CODA-45/46/47's LEDs (lights).

Figure 4: LEDs



Table 3: LEDs

LED	STATUS	DESCRIPTION
	Off	No device is connected to either of the LAN ports.
	Green, blinking	A device is connected to one or more of the LAN ports, via a Fast Ethernet (100Mbps) link, and is transmitting or receiving data.
	Green, steady	A device is connected to one or more of the LAN ports, via a Fast Ethernet (100Mbps) link, but is not transmitting or receiving data.
	Blue, blinking	A device is connected to one or more of the LAN ports, via a Gigabit Ethernet (1000Mbps) link, and is transmitting or receiving data.
	Blue, steady	A device is connected to one or more of the LAN ports, via a Gigabit Ethernet (1000Mbps) link, but is not transmitting or receiving data.
	Green, blinking	The CODA-45/46/47's cable modem is registering with the service provider's CMTS.
	Green, steady	The CODA-45/46/47's cable modem has successfully registered with the service provider and is ready for data transfer.
	Off	The CODA-45/46/47's cable modem is offline.

Table 3: LEDs

US 	Green, blinking	The CODA-45/46/47 is searching for an upstream frequency on the CABLE connection.
	Green, steady	The CODA-45/46/47 has successfully located and locked onto a single upstream frequency on the CABLE connection.
	Blue, steady	The CODA-45/46/47 is successfully engaged in channel bonding on the upstream connection.
	Off	There is no upstream activity on the CABLE connection.
DS 	Green, blinking	The CODA-45/46/47 is searching for a downstream frequency on the CABLE connection.
	Green, steady	The CODA-45/46/47 has successfully located and locked onto a single downstream frequency on the CABLE connection.
	Blue, steady	The CODA-45/46/47 is successfully engaged in channel bonding on the downstream connection.
	Off	There is no downstream activity on the CABLE connection.
POWER 	Green, steady	The CODA-45/46/47 is receiving power.
	Off	The CODA-45/46/47 is not receiving power.

1.4 IP Address Setup

Before you log into the CODA-45/46/47's GUI, your computer's IP address must be in the same subnet as the CODA-45/46/47. This allows your computer to communicate with the CODA-45/46/47.

NOTE: [See IP Addresses and Subnets on page 22](#) for background information.

If your computer is configured to get an IP address automatically, or if you are not sure, try to log in to the CODA-45/46/47 (see [GUI Overview on page 18](#)).

- ▶ If the login screen displays, your computer is already configured correctly.

- ▶ If the login screen does not display, your computer is not configured correctly. Follow the procedure in [Manual IP Address Setup](#) on page 16 and set your computer to get an IP address automatically. Try to log in again. If you cannot log in, follow the manual IP address setup procedure again, and set a specific IP address as shown. Try to log in again.

NOTE: If you still cannot see the login screen, your CODA-45/46/47's IP settings may have been changed from their defaults. If you do not know the CODA-45/46/47's new address, you should return it to its factory defaults. See [Resetting the CODA-45/46/47](#) on page 19. Bear in mind that ALL user-configured settings are lost.

1.4.1 Manual IP Address Setup

By default, your CODA-45/46/47's local IP address is **192.168.100.1**. If your CODA-45/46/47 is using the default IP address, you should set your computer's IP address to be between **192.168.100.2** and **192.168.100.254**.

Take the following steps to manually set up your computer's IP address to connect to the CODA-45/46/47:

NOTE: This example uses Windows 7; the procedure for your operating system may be different.

- 1 Click the **Start Orb**, then click **Control Panel**.
- 2 In the window that displays, double-click **Network And Sharing Center**.
- 3 In the left-hand panel, click **Change Adapter Settings**.
- 4 Right-click your network connection (usually **Local Area Connection**) and click **Properties**.
- 5 In the **Networking** tab's **This connection uses the following items** list, scroll down and select **Internet Protocol (TCP/IPv4)**. Click **Properties**.
- 6 You can get an IP address automatically, or specify one manually:
 - ▶ If your network has an active DHCP server, select **Get an IP address automatically**.

- ▶ If your network does not have an active DHCP server, select **Use the following IP address**. In the **IP address** field, enter a value between **192.168.100.2** and **192.168.100.254** (default). In the **Subnet mask** field, enter **255.255.255.0** (default). In the **Default Gateway** field, enter **192.168.100.1** (default).

NOTE: If your CODA-45/46/47 is not using the default IP address, enter an IP address and subnet mask that places your computer in the same subnet as the CODA-45/46/47.

- 7 Click **OK**. The **Internet Protocol (TCP/IP)** window closes. In the **Local Area Connection Properties** window, click **Close**.

Your computer now obtains an IP address from the CODA-45/46/47, or uses the IP address that you specified, and can communicate with the CODA-45/46/47.

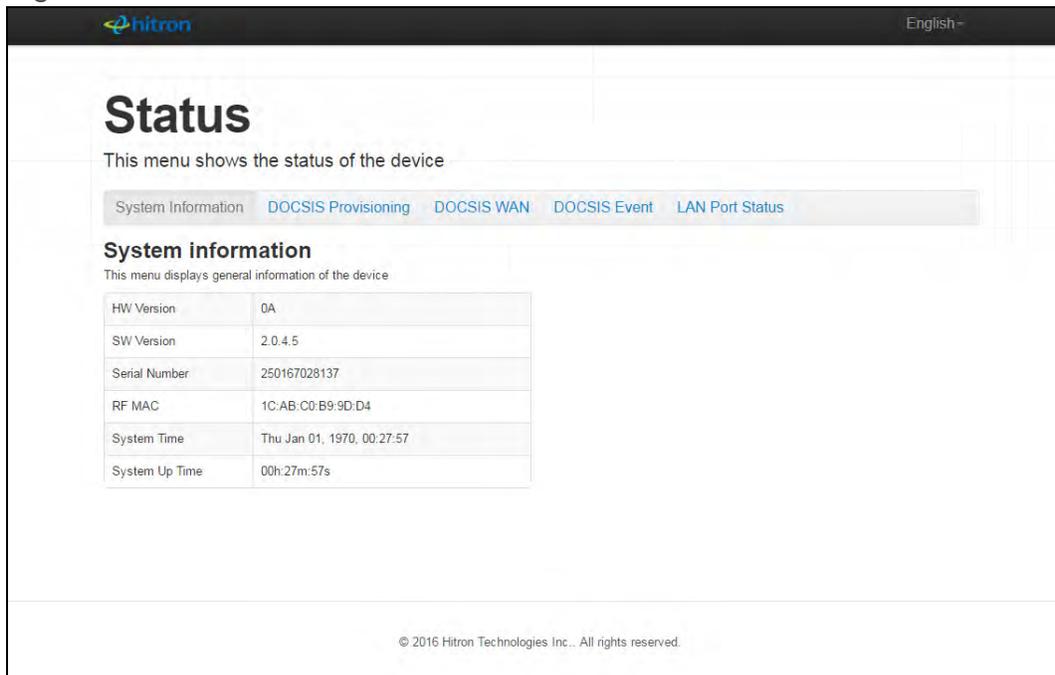
1.5 Accessing the CODA-45/46/47

Take the following steps to access the CODA-45/46/47's GUI.

NOTE: Because the CODA-45/46/47 provides only status information, its GUI does not require logging in. You do not need a username or password.

- 1 Open a browser window.
- 2 Enter the CODA-45/46/47's IP address (default **192.168.100.1**) in the URL bar. The **Status** screen displays.

Figure 5: Status



The screenshot shows the Hitron web interface. At the top left is the Hitron logo, and at the top right is the language dropdown set to "English". The main heading is "Status". Below it, a sub-heading reads "This menu shows the status of the device". A horizontal menu contains five items: "System Information", "DOCSIS Provisioning", "DOCSIS WAN", "DOCSIS Event", and "LAN Port Status". The "System Information" item is selected. Below this, another sub-heading reads "System information" with the text "This menu displays general information of the device". A table displays the following information:

HW Version	0A
SW Version	2.0.4.5
Serial Number	250167028137
RF MAC	1C:AB:C0:B9:9D:D4
System Time	Thu Jan 01, 1970, 00:27:57
System Up Time	00h:27m:57s

At the bottom of the page, a copyright notice reads: "© 2016 Hitron Technologies Inc.. All rights reserved."

- 3 Enter the **Username** and **Password**. The default login username is **cusadmin**, and the default password is **password**.

NOTE: The Username and Password are case-sensitive; "Password" is not the same as "password".

- 4 Click **Login**. The **Status Overview** screen displays (see [Status Overview](#) on page 21).

1.6 GUI Overview

This section describes the CODA-45/46/47's GUI.

Figure 6: GUI Overview

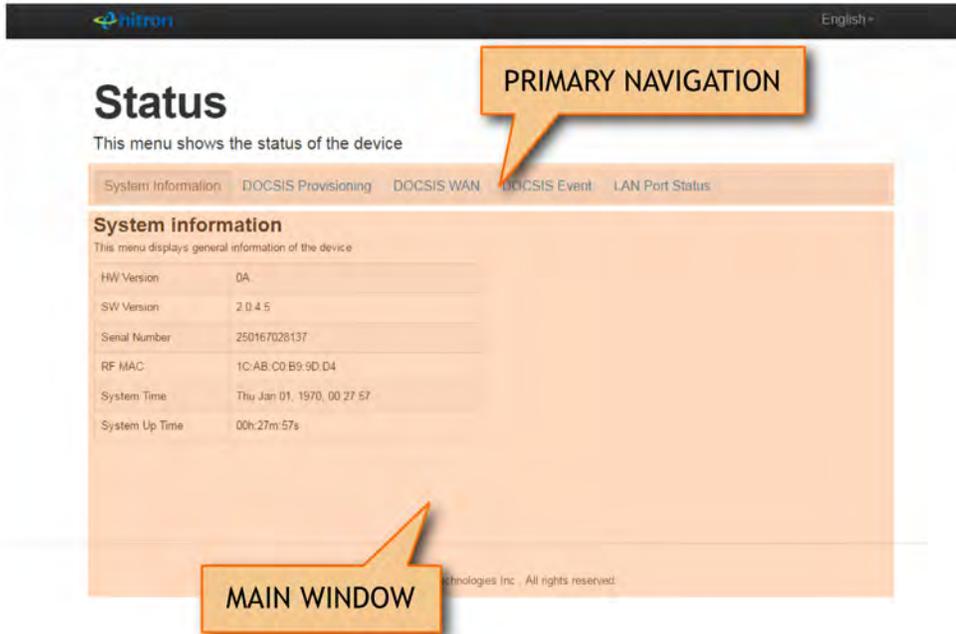


Table 4: GUI Overview

Primary Navigation	Use this section to move from one part of the GUI to another.
Main Window	Use this section to read information about your CODA-45/46/47's configuration and status.

1.7 Resetting the CODA-45/46/47

When you reset the CODA-45/46/47 to its factory defaults the CODA-45/46/47 is returned to its initial configuration state.

To reset the CODA-45/46/47, press the RESET button on the rear of the device for more than 5 seconds (for more information, see [Hardware Connections](#) on page 11).

The CODA-45/46/47 turns off and on again, using its factory default settings.

NOTE: Depending on your CODA-45/46/47's previous configuration, you may need to re-configure your computer's IP settings; see [IP Address Setup](#) on page 15.

2

Status

This chapter describes the CODA-45/46/47's Status screens. It contains the following sections:

- ▶ [Status Overview](#) on page 21
- ▶ [The Status: System Information Screen](#) on page 28
- ▶ [The Status: DOCSIS Provisioning Screen](#) on page 29
- ▶ [The Status: DOCSIS WAN Screen](#) on page 31
- ▶ [The Status: DOCSIS Event Screen](#) on page 35
- ▶ [The Status: LAN Port Status Screen](#) on page 37

2.1 Status Overview

This section describes some of the concepts related to the Status screens.

2.1.1 DOCSIS

The Data Over Cable Service Interface Specification (DOCSIS) is a telecommunications standard that defines the provision of data services (Internet access) over a traditional cable TV (CATV) network.

Your CODA-45/46/47 supports DOCSIS version 3.0 and 3.1.

2.1.2 IP Addresses and Subnets

Every computer on the Internet must have a unique Internet Protocol (IP) address. The IP address works much like a street address, in that it identifies a specific location to which information is transmitted. No two computers on a network can have the same IP address.

2.1.2.1 IP Address Format

IP addresses consist of four octets (8-bit numerical values) and are usually represented in decimal notation, for example **192.168.0.1**. In decimal notation, this means that each octet has a minimum value of 0 and a maximum value of 255.

An IP address carries two basic pieces of information: the “network number” (the address of the network as a whole, analogous to a street name) and the “host ID” (analogous to a house number) which identifies the specific computer (or other network device).

2.1.2.2 IP Address Assignment

IP addresses can come from three places:

- ▶ The Internet Assigned Numbers Agency (IANA)
- ▶ Your Internet Service Provider
- ▶ You (or your network devices)

IANA is responsible for IP address allocation on a global scale, and your ISP assigns IP addresses to its customers. You should never attempt to define your own IP addresses on a public network, but you are free to do so on a private network.

In the case of the CODA-45/46/47:

- ▶ The public network (Wide Area Network or WAN) is the link between the cable connector and your Internet Service Provider. Your CODA-45/46/47's IP address on this network is assigned by your service provider.

- ▶ The private network is your Local Area Network (LAN) and Wireless Local Area Network (WLAN), if enabled. You are free to assign IP addresses to computers on the LAN and WLAN manually, or to allow the CODA-45/46/47 to assign them automatically via DHCP (Dynamic Host Configuration Protocol). IANA has reserved the following blocks of IP addresses to be used for private networks only:

Table 5: Private IP Address Ranges

FROM...	...TO
10.0.0.0	10.255.255.255
172.16.0.0	172.31.255.255
192.168.0.0	192.168.255.255

If you assign addresses manually, they must be within the CODA-45/46/47's LAN subnet.

2.1.2.3 Subnets

A subnet (short for sub-network) is, as the name suggests, a separate section of a network, distinct from the main network of which it is a part. A subnet may contain all of the computers at one corporate local office, for example, while the main network includes several offices.

In order to define the extent of a subnet, and to differentiate it from the main network, a subnet mask is used. This “masks” the part of the IP address that refers to the main network, leaving the part of the IP address that refers to the sub-network.

Each subnet mask has 32 bits (binary digits), as does each IP address:

- ▶ A binary value of **1** in the subnet mask indicates that the corresponding bit in the IP address is part of the main network.
- ▶ A binary value of **0** in the subnet mask indicates that the corresponding bit in the IP address is part of the sub-network.

For example, the following table shows the IP address of a computer (**192.168.0.1**) expressed in decimal and binary (each cell in the table indicates one octet):

Table 6: IP Address: Decimal and Binary

192	168	0	1
11000000	10101000	00000000	00000001

The following table shows a subnet mask that “masks” the first twenty-four bits of the IP address, in both its decimal and binary notation.

Table 7: [Subnet Mask: Decimal and Binary](#)

255	255	255	0
11111111	11111111	11111111	00000000

This shows that in this subnet, the first three octets (**192.168.0**, in the example IP address) define the main network, and the final octet (**1**, in the example IP address) defines the computer's address on the subnet.

The decimal and binary notations give us the two common ways to write a subnet mask:

- ▶ **Decimal:** the subnet mask is written in the same fashion as the IP address: **255.255.255.0**, for example.
- ▶ **Binary:** the subnet mask is indicated after the IP address (preceded by a forward slash), specifying the number of binary digits that it masks. The subnet mask **255.255.255.0** masks the first twenty-four bits of the IP address, so it would be written as follows: **192.168.0.1/24**.

2.1.3 DHCP

The Dynamic Host Configuration Protocol, or DHCP, defines the process by which IP addresses can be assigned to computers and other networking devices automatically, from another device on the network. This device is known as a DHCP server, and provides addresses to all the DHCP client devices.

In order to receive an IP address via DHCP, a computer must first request one from the DHCP server (this is a broadcast request, meaning that it is sent out to the whole network, rather than just one IP address). The DHCP server hears the requests, and responds by assigning an IP address to the computer that requested it.

If a computer is not configured to request an IP address via DHCP, you must configure an IP address manually if you want to access other computers and devices on the network. See [IP Address Setup](#) on page 15 for more information.

By default, the CODA-45/46/47 is a DHCP client on the WAN (the CATV connection). It broadcasts an IP address over the cable network, and receives one from the service provider. By default, the CODA-45/46/47 is a DHCP server on the LAN; it provides IP addresses to computers on the LAN which request them.

2.1.4 DHCP Lease

“DHCP lease” refers to the length of time for which a DHCP server allows a DHCP client to use an IP address. Usually, a DHCP client will request a DHCP lease renewal before the lease time is up, and can continue to use the IP address for an additional period. However, if the client does not request a renewal, the DHCP server stops allowing the client to use the IP address.

This is done to prevent IP addresses from being used up by computers that no longer require them, since the pool of available IP addresses is finite.

2.1.5 MAC Addresses

Every network device possesses a Media Access Control (MAC) address. This is a unique alphanumeric code, given to the device at the factory, which in most cases cannot be changed (although some devices are capable of “MAC spoofing”, where they impersonate another device’s MAC address).

MAC addresses are the most reliable way of identifying network devices, since IP addresses tend to change over time (whether manually altered, or updated via DHCP).

Each MAC address displays as six groups of two hexadecimal digits separated by colons (or, occasionally, dashes) for example **00:AA:FF:1A:B5:74**.

NOTE: Each group of two hexadecimal digits is known as an “octet”, since it represents eight bits.

Bear in mind that a MAC address does not precisely represent a computer on your network (or elsewhere), it represents a network device, which may be part of a computer (or other device). For example, if a single computer has an Ethernet card (to connect to your CODA-45/46/47 via one of the **LAN** ports) and also has a wireless card (to connect to your CODA-45/46/47 over the wireless interface) the MAC addresses of the two cards will be different. In the case of the CODA-45/46/47, each internal module (cable modem module, Ethernet module, wireless module, etc.) possesses its own MAC address.

2.1.6 Routing Mode

When your CODA-45/46/47 is in routing mode, it acts as a gateway for computers on the LAN to access the Internet. The service provider assigns an IP address to the CODA-45/46/47 on the WAN, and all traffic for LAN computers is sent to that IP address. The CODA-45/46/47 assigns private IP addresses to LAN computers (when DHCP is active), and transmits the relevant traffic to each private IP address.

NOTE: When DHCP is not active on the CODA-45/46/47 in routing mode, each computer on the LAN must be assigned an IP address in the CODA-45/46/47's subnet manually.

When the CODA-45/46/47 is not in routing mode, the service provider assigns an IP address to each computer connected to the CODA-45/46/47 directly. The CODA-45/46/47 does not perform any routing operations, and traffic flows between the computers and the service provider.

Routing mode is not user-configurable; it is specified by the service provider in the CODA-45/46/47's configuration file.

2.1.7 Configuration Files

The CODA-45/46/47's configuration (or config) file is a document that the CODA-45/46/47 obtains automatically over the Internet from the service provider's server, which specifies the settings that the CODA-45/46/47 should use. It contains a variety of settings that are not present in the user-configurable Graphical User Interface (GUI) and can be specified only by the service provider.

2.1.8 Downstream and Upstream Transmissions

The terms "downstream" and "upstream" refer to data traffic flows, and indicate the direction in which the traffic is traveling. "Downstream" refers to traffic from the service provider to the CODA-45/46/47, and "upstream" refers to traffic from the CODA-45/46/47 to the service provider.

2.1.9 Cable Frequencies

Just like radio transmissions, data transmissions over the cable network must exist on different frequencies in order to avoid interference between signals.

The data traffic band is separate from the TV band, and each data channel is separate from other data channels.

2.1.10 Modulation

Transmissions over the cable network are based on a strong, high frequency periodic waveform known as the “carrier wave.” This carrier wave is so called because it “carries” the data signal. The data signal itself is defined by variations in the carrier wave. The process of varying the carrier wave (in order to carry data signal information) is known as “modulation.” The data signal is thus known as the “modulating signal.”

Cable transmissions use a variety of methods to perform modulation (and the “decoding” of the received signal, or “demodulation”). The modulation methods defined in DOCSIS 3 are as follows:

- ▶ **QPSK:** Quadrature Phase-Shift Keying
- ▶ **QAM:** Quadrature Amplitude Modulation
- ▶ **QAM TCM:** Trellis modulated Quadrature Amplitude Modulation

In many cases, a number precedes the modulation type (for example **16 QAM**). This number refers to the complexity of modulation. The higher the number, the more data can be encoded in each symbol.

NOTE: [In modulated signals, each distinct modulated character \(for example, each audible tone produced by a modem for transmission over telephone lines\) is known as a symbol.](#)

Since more information can be represented by a single character, a higher number indicates a higher data transfer rate.

2.1.11 TDMA, FDMA and SCDDMA

Time Division Multiple Access (TDMA), Frequency Division Multiple Access (FDMA) and Synchronous Code Division Multiple Access (SCDDMA) are channel access methods that allow multiple users to share the same frequency channel.

- ▶ TDMA allows multiple users to share the same frequency channel by splitting transmissions by time. Each user is allocated a number of time slots, and transmits during those time slots.

- ▶ FDMA allows multiple users to share the same frequency channel by assigning a frequency band within the existing channel to each user.
- ▶ SC-DMA allows multiple users to share the same frequency channel by assigning a unique orthogonal code to each user.

2.1.12 OFDM

Orthogonal Frequency-Division Multiplexing (OFDM) is a physical-layer data encoding method for transmitting and receiving data on Radio Frequency (RF) media, such as the CODA-45/46/47's cable connection.

OFDM takes a single wide-band signal and separates it into multiple simultaneous subcarriers across the available RF spectrum, separated by the minimum frequency necessary to ensure non-interference among sub-carriers. "Orthogonal", in this usage, refers to this non-interfering quality of the technique.

The primary advantage of OFDM is that a signal encoded using the method can withstand suboptimal conditions on the RF medium. Depending on its implementation, OFDM can also enable faster signal throughput.

2.1.13 FFT

The Fast Fourier Transform (FFT) is an algorithm for rapidly implementing Fourier analysis of a data stream, used by modulation methods such as OFDM. Fourier analysis is a mathematical technique that enables the representation of data using simpler trigonometric functions.

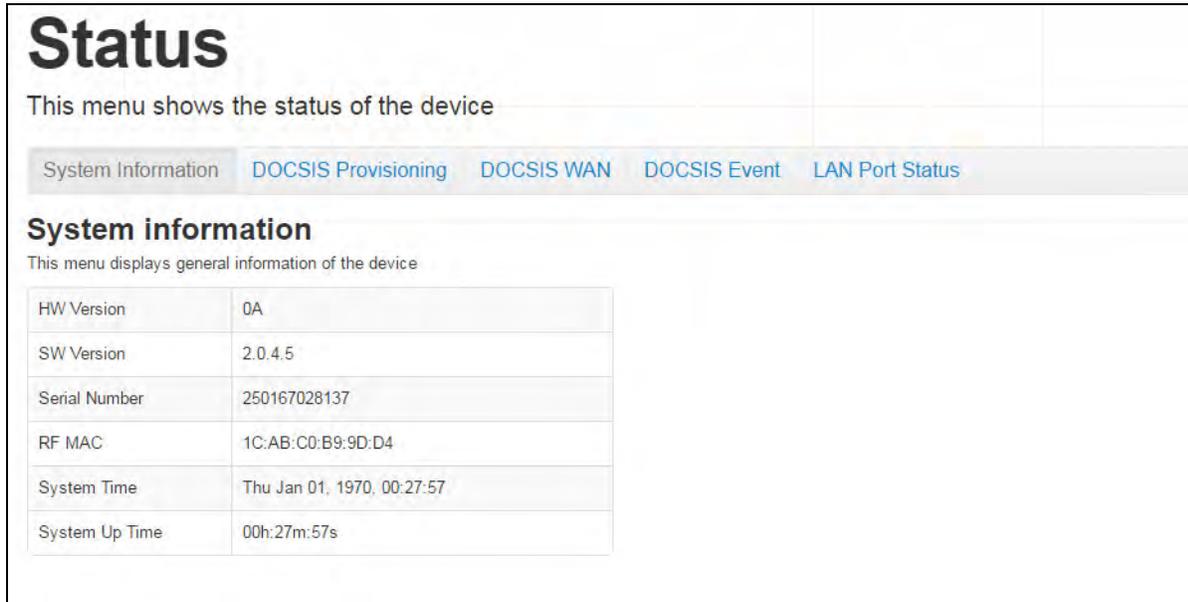
In this implementation, Fourier analysis is used to construct the frequency data for transmission, and to deconstruct received frequency data.

2.2 The Status: System Information Screen

Use this screen to see general information about your CODA-45/46/47's hardware, its software, and its connection to the Internet.

Click the **System Information** tab. The following screen displays.

Figure 7: The Status: System Information Screen



The following table describes the labels in this screen.

Table 8: The Status: System Information Screen

HW Version	This displays the version number of the CODA-45/46/47's physical hardware.
SW Version	This displays the version number of the software that controls the CODA-45/46/47.
Serial Number	This displays a number that uniquely identifies the device.
RF MAC	This displays the Media Access Control (MAC) address of the CODA-45/46/47's Radio Frequency (RF) module. This is the module that connects to the Internet through the Cable connection.
System Time	This displays the current date and time configured on the device.
System Up Time	This displays the amount of time that has elapsed since the CODA-45/46/47 was last restarted.

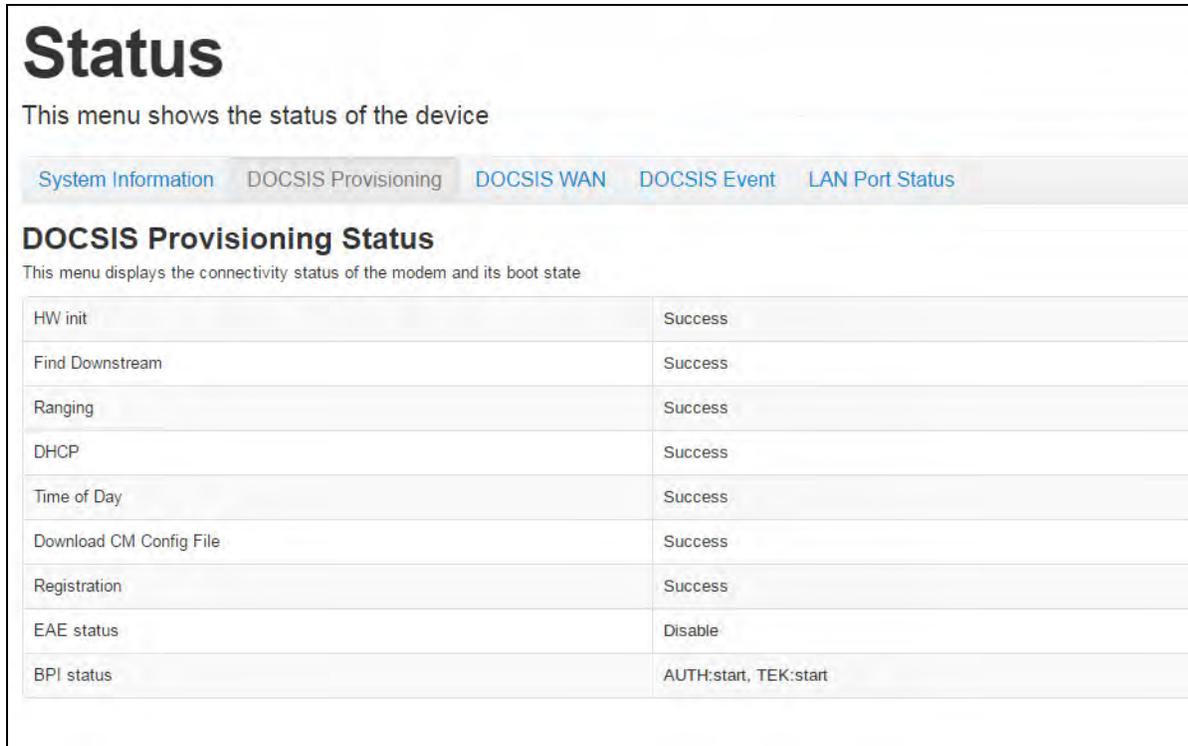
2.3 The Status: DOCSIS Provisioning Screen

This screen displays the steps successfully taken to connect to the Internet over the **Cable** connection.

Use this screen for troubleshooting purposes to ensure that the CODA-45/46/47 has successfully connected to the Internet; if an error has occurred you can identify the stage at which the failure occurred.

Click the **DOCSIS Provisioning** tab. The following screen displays.

Figure 8: [The Status: DOCSIS Provisioning Screen](#)



DOCSIS Provisioning Status	
This menu displays the connectivity status of the modem and its boot state	
HW init	Success
Find Downstream	Success
Ranging	Success
DHCP	Success
Time of Day	Success
Download CM Config File	Success
Registration	Success
EAE status	Disable
BPI status	AUTH:start, TEK:start

For each step, with the exception of **BPI Status**:

- ▶ **Process** displays when the CODA-45/46/47 is attempting to complete a connection step.
- ▶ **Success** displays when the CODA-45/46/47 has completed a connection step.
- ▶ **Disable** displays when the relevant feature has been turned off.

The **BPI Status** step refers to DOCSIS Baseline Privacy Interface (BPI), which provides data security on the cable connection:

- ▶ **Auth** displays information about BPI authorization, which allows the CODA-45/46/47 to identify a Cable Modem Termination System (CMTS) with which it is authorized to communicate. When **AUTH:start** displays, this process is running.

- ▶ **TEK** displays information about BPI Transport Encryption Keys. Your CODA-45/46/47 uses these keys to decrypt data from the CMTS and encrypt data to the CMTS. When **TEK:start** displays, this process is running.

2.4 The Status: DOCSIS WAN Screen

Use this screen to discover information about:

- ▶ The nature of the upstream and downstream connection between the CODA-45/46/47 and the device to which it is connected through the **Cable** interface.
- ▶ IP details of the CODA-45/46/47's WAN connection.

Click the **DOCSIS WAN** tab. The following screen displays.

Figure 9: The Status: DOCSIS WAN Screen

Status

This menu shows the status of the device

System Information DOCSIS Provisioning DOCSIS WAN DOCSIS Event LAN Port Status

DOCSIS WAN

This menu displays both upstream and downstream signal parameters

DOCSIS Overview	
Network Access	Permitted
IP Address	192.168.50.42
Subnet Mask	255.255.255.0
Gateway IP	192.168.50.254
DHCP Lease Time	D: 00 H: 02 M: 00 S: 00

Downstream Overview								
Port ID	Frequency (Hz)	Modulation	Signal strength (dBmV)	Signal noise ratio (dB)	Octets	Correcteds	Uncorrectables	Channel ID
1	501000000	256QAM	5.200	44.626	486891435	0	0	38
2	465000000	256QAM	-2.600	43.377	482849712	12	0	32
3	471000000	256QAM	-2.000	40.946	482850727	0	0	33
4	477000000	256QAM	-1.500	43.377	482850381	0	0	34
5	483000000	256QAM	-0.600	43.377	482850436	0	0	35
6	489000000	256QAM	3.500	43.377	482848995	12	0	36
7	495000000	256QAM	4.700	43.377	482851422	0	0	37
8	507000000	256QAM	4.800	43.377	482851127	0	0	39

[Reset FEC Counters](#)

OFDM Downstream Overview						
Receiver	FFT type	Subcarrier Frequency (Hz)	PLC locked	NCP locked	MDC1 locked	PLC power(dBmV)
0	NA	NA	NO	NO	NO	NA
1	4K	593800000	YES	YES	YES	5.699997

Upstream Overview						
Port ID	Frequency (Hz)	Bandwidth (Hz)	Modulation Type	DOCSIS Mode	Signal Strength (dBmV)	Channel ID
1	40200000	1600000	ATDMA - 64QAM		5.200	4
2	38500000	1600000	ATDMA - 64QAM		3.500	3
3	36800000	1600000	ATDMA - 64QAM		4.800	2
4	35100000	1600000	ATDMA - 64QAM		4.700	1

The following table describes the labels in this screen.

Table 9: [The Status: DOCSIS WAN Screen](#)

DOCSIS Overview	
Network Access	<p>This displays whether or not your service provider allows you to access the Internet over the Cable connection.</p> <ul style="list-style-type: none"> ▶ Permitted displays if you can access the Internet. ▶ Denied displays if you cannot access the Internet.
IP Address	This displays the CODA-45/46/47's WAN IP address. This IP address is automatically assigned to the CODA-45/46/47
Subnet Mask	This displays the CODA-45/46/47's WAN subnet mask.
Gateway IP	This displays the IP address of the device to which the CODA-45/46/47 is connected on the WAN.
DHCP Lease Time	This displays the time that elapses before your device's IP address lease expires, and a new IP address is assigned to it by the DHCP server.
Downstream Overview	
NOTE: The downstream signal is the signal transmitted to the CODA-45/46/47.	
Port ID	This displays the ID number of the downstream connection's port.
Frequency (Hz)	This displays the actual frequency in Hertz (Hz) of each downstream data channel to which the CODA-45/46/47 is connected.
Modulation	This displays the type of modulation that each downstream channel uses.
Signal Strength (dBmV)	This displays the power of the signal of each downstream data channel to which the CODA-45/46/47 is connected, in dBmV (decibels above/below 1 millivolt).
Signal Noise Ratio (dB)	This displays the Signal to Noise Ratio (SNR) of each downstream data channel to which the CODA-45/46/47 is connected, in dB (decibels).
Octets	This displays the total number of octets received.
Correcteds	This displays the number of blocks received that required correction due to corruption, and were successfully corrected.

Table 9: [The Status: DOCSIS WAN Screen \(continued\)](#)

Uncorrectables	This displays the number of blocks received that required correction due to corruption, but were unable to be corrected.
Channel ID	This displays the ID number of each channel on which the downstream signal is transmitted.
Reset FEC Counters	Click this to delete data in the Forward Error Connection (FEC) columns (Correcteds and Uncorrectables) and start collecting data anew.
OFDM Downstream Overview	
Receiver	This displays the index number of the OFDM receiver (see OFDM on page 28).
FFT Type	This displays the type of Fast Fourier Transform in use on the relevant OFDM receiver (see FFT on page 28).
Subcarr 0 Frequency (Hz)	Each OFDM signal consists of multiple subcarriers. This displays the frequency, in Hertz, of the first OFDM subcarrier on the relevant receiver.
PLC Locked	This displays whether or not the relevant OFDM connection's physical link channel (PLC) data is locked. The PLC tells the CODA-45/46/47 how to decode the OFDM signal, and what power level to use. Once the CODA-45/46/47 receives a PLC without uncorrectable errors, the PLC is locked and subsequent communication can continue.
NCP Locked	This displays whether or not the relevant OFDM connection's next codeword pointer (NCP) data is locked. The NCP tells the CODA-45/46/47 which codewords are to be used for OFDM communication, and which profile to use for each codeword. Once the CODA-45/46/47 receives an NCP without uncorrectable errors, the NCP is locked and subsequent communication can continue.
MDC1 Locked	This displays whether or not the relevant OFDM connection's Multipath Delay Commutator (MDC) data is locked. This provides information about the method of Fast Fourier Transform (FFT) to be used on the OFDM connection. Once the CODA-45/46/47 receives an MDC1 without errors, the MDC1 is locked and subsequent communication can continue.

Table 9: [The Status: DOCSIS WAN Screen \(continued\)](#)

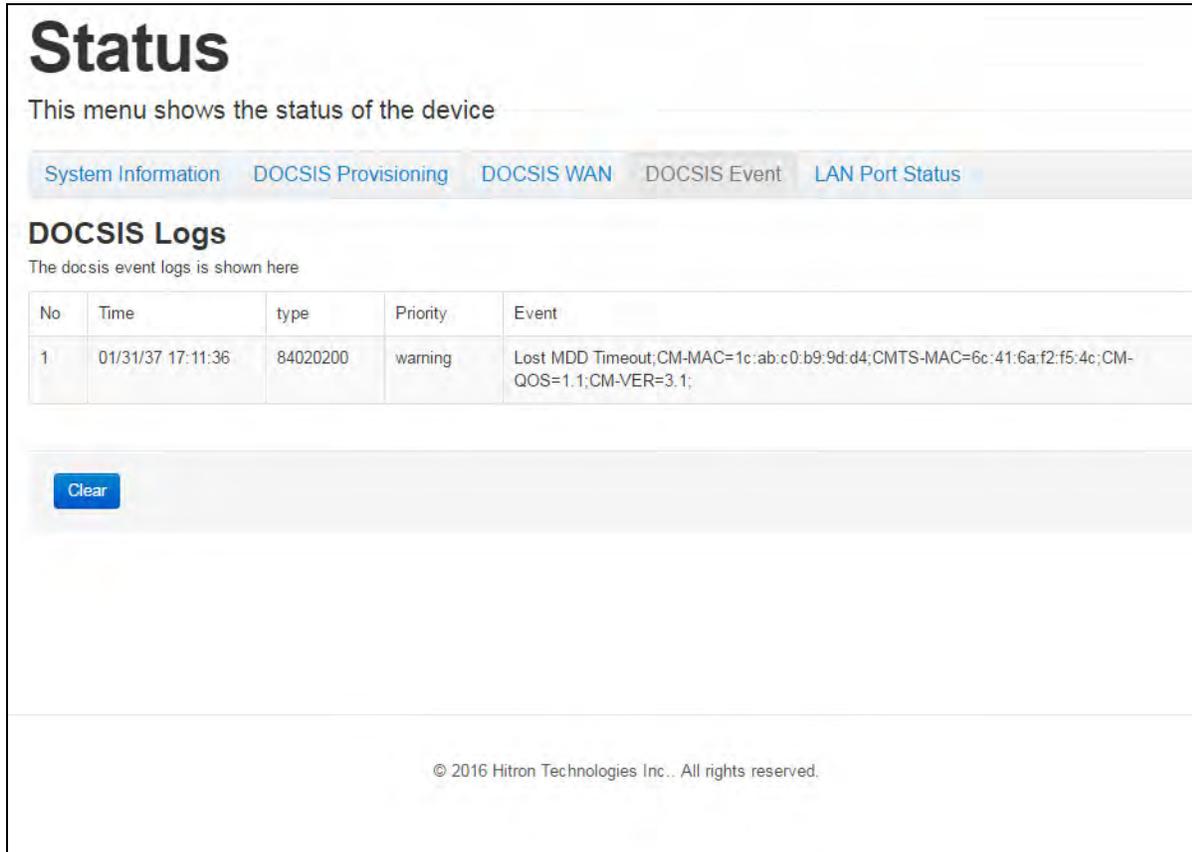
PLC Power (dBmV)	This displays the power level the CODA-45/46/47 has been instructed to use on the relevant OFDM connection by the physical link channel (PLC) data, in dBmV (decibels above/below 1 millivolt).
Upstream Overview	
NOTE: The upstream signal is the signal transmitted from the CODA-45/46/47.	
Port ID	This displays the ID number of the upstream connection's port.
Frequency (Hz)	This displays the actual frequency in Hertz (Hz) of each upstream data channel to which the CODA-45/46/47 is connected.
Bandwidth (Hz)	This displays the maximum available bandwidth on the relevant channel, in Hertz (Hz).
Modulation Type	This displays the type of modulation that each upstream channel uses.
DOCSIS Mode	This displays the version number of the DOCSIS mode that each upstream channel uses.
SNR (dB)	This displays the Signal to Noise Ratio (SNR) of each upstream data channel to which the CODA-45/46/47 is connected, in dB (decibels).
Signal Strength (dBmV)	This displays the power of the signal of each upstream data channel to which the CODA-45/46/47 is connected, in dBmV (decibels above/below 1 millivolt).
Channel ID	This displays the ID number of each channel on which the upstream signal is transmitted.

2.5 The Status: DOCSIS Event Screen

Use this screen to view information about local WAN activity events.

Click the **DOCSIS Event** tab. The following screen displays.

Figure 10: The Status: DOCSIS Event Screen



The following table describes the labels in this screen.

Table 10: The Status: DOCSIS Event Screen

No	This displays the arbitrary, incremental index number assigned to the event.
Time	This displays the date and time at which the event occurred.
Type	This displays the nature of the event.
Priority	This displays the severity of the event.
Event	This displays a description of the event.
Clear	Click this to remove all DOCSIS event logs from the system.

2.6 The Status: LAN Port Status Screen

Use this screen to view information about data rate and flow for each of the CODA-45/46/47's Local Area Network (LAN) ports, to which you connect your computers.

Click the **LAN Port Status** tab. The following screen displays.

Figure 11: The Status: LAN Port Status Screen



Status

This menu shows the status of the device

System Information DOCSIS Provisioning DOCSIS WAN DOCSIS Event LAN Port Status

LAN Port Status

This menu displays the link status of the LAN port

Port	Status	Speed	Duplex
1	Up	1000Mbps	Full
2	Down	-	-

The following table describes the labels in this screen.

Table 11: The Status: LAN Port Status Screen

Port	This displays the index number of the LAN port.
Status	<p>This displays whether or not there is a device connected to the LAN port.</p> <ul style="list-style-type: none"> ▶ Up displays when there is a device connected to the port. ▶ Down displays when there is no device connected to the port.

Table 11: The Status: LAN Port Status Screen (continued)

Speed	This displays the maximum achievable data speed of the connection between the CODA-45/46/47 and the connected device, in megabits per second (Mbps). The CODA-45/46/47 supports LAN connections at 10, 100, and 1000 Mbps.
Duplex	<p>This displays information about whether data can flow in both directions between the CODA-45/46/47 and the connected device simultaneously (duplex) or in only one direction at a time (half-duplex).</p> <ul style="list-style-type: none">▶ Full displays when data can flow between the CODA-45/46/47 and the connected device in both directions simultaneously.▶ Half displays when data can flow between the CODA-45/46/47 and the connected device in only one direction at a time. <p>NOTE: The terms “duplex” and “full duplex” are interchangeable.</p>

3

Troubleshooting

Use this section to solve common problems with the CODA-45/46/47 and your network. It contains the following sections:

- ▶ [None of the LEDs Turn On](#) on page 39
- ▶ [One of the LEDs does not Display as Expected](#) on page 40
- ▶ [I Forgot the CODA-45/46/47's IP Address](#) on page 40
- ▶ [I Forgot the CODA-45/46/47's Admin Username or Password](#) on page 40
- ▶ [I Cannot Access the CODA-45/46/47 or the Internet](#) on page 40

Problem: [None of the LEDs Turn On](#)

The CODA-45/46/47 is not receiving power, or there is a fault with the device.

1 Ensure that you are using the correct power cable.

 **Using a power source other than the one that came with your CODA-45/46/47 can damage the CODA-45/46/47.**

2 Ensure that the power cable is connected to the CODA-45/46/47 and the wall socket (or other power source) correctly.

3 Ensure that the power source is functioning correctly. Replace any broken fuses or reset any tripped circuit breakers.

4 Disconnect and re-connect the power cable to the power source and the CODA-45/46/47.

5 If none of the above steps solve the problem, consult your vendor.

Problem: One of the LEDs does not Display as Expected

- 1 Ensure that you understand the LED's normal behavior (see [LEDs](#) on page 13).
- 2 Ensure that the CODA-45/46/47's hardware is connected correctly; see the Quick Installation Guide.
- 3 Disconnect and re-connect the power cable to the CODA-45/46/47.
- 4 If none of the above steps solve the problem, consult your vendor.

Problem: I Forgot the CODA-45/46/47's IP Address

- 1 The CODA-45/46/47's default LAN IP address is **192.168.100.1**.
- 2 Depending on your operating system and your network, you may be able to find the CODA-45/46/47's IP address by looking up your computer's default gateway. To do this on (most) Windows machines, click **Start > Run**, enter "cmd", and then enter "ipconfig". Get the IP address of the **Default Gateway**, and enter it in your browser's address bar.

Problem: I Forgot the CODA-45/46/47's Admin Username or Password

Because the CODA-45/46/47's UI displays only status information, it has no login screen. You do not need a username or password; when you access the CODA-45/46/47 you will see the **Status** screen immediately.

Problem: I Cannot Access the CODA-45/46/47 or the Internet

- 1 Ensure that you are using the correct IP address for the CODA-45/46/47.
- 2 Check your network's hardware connections, and that the CODA-45/46/47's LEDs display correctly (see [LEDs](#) on page 13).
- 3 Make sure that your computer is on the same subnet as the CODA-45/46/47; see [IP Address Setup](#) on page 15.
- 4 If the above steps do not work, you need to reset the CODA-45/46/47. See [Resetting the CODA-45/46/47](#) on page 19. The CODA-45/46/47 is returned to its default settings.

5 If the problem persists, contact your vendor.

Problem: I Cannot Access the Internet and the DS and US LEDs Keep Blinking

Your service provider may have disabled your Internet access; check the **Status > DOCSIS WAN** screen's **Network Access** field (see [The Status: DOCSIS WAN Screen](#) on page 31).

Index

A

accounts, login 18
address, IP 15
address, IP, local 16
attached network devices 31
authorization 30

B

bar, navigation 19
Baseline Privacy Interface 30
BPI 30
BPI status 29
buttons 11

C

cable connection 10
cable connection status 29
cable data security 30
cable modem 10
cable security 30
CATV 21, 22
channel ID 31
config file 29
configuration file 26
connection status, cable 29
conventions, document 3
correcteds 31

customer support 3

D

Data Over Cable Service Interface
Specification 21
default IP address 16
default username and password 18
DHCP 16, 24, 29
DHCP lease 25
DHCP lease time 31
DOCSIS 21
DOCSIS BPI 30
DOCSIS logs 35
DOCSIS provisioning 29
document conventions 3
download CM config file 29
downstream transmission 26
DS 15
duplex 37

E

EAE status 29
Ethernet 37
Ethernet cables 12
Ethernet port 16
event logs 35

F

factory reset [19](#)
Fast Fourier Transform,FFT,Fourier analysis [28](#)
FDMA [27](#)
find downstream [29](#)
frequencies, cable [26](#)
frequency [31](#)
full duplex [37](#)

G

gateway IP [31](#)
graphical user interface [10](#)
GUI [10, 18](#)
GUI overview [18](#)

H

half duplex [37](#)
hardware [11](#)
hardware version [28](#)
host ID [22](#)
HW init [29](#)
HW version [28](#)

I

IANA [22](#)
interface, user [10](#)
IP address [15, 16, 22, 31, 40](#)
IP address lease [25](#)
IP address renewal [25](#)

IP address setup [15, 16](#)
IP address, default [16](#)
IP address, format [22](#)
IP address, local [16](#)
ISP [22](#)

L

LAN [21](#)
LAN port status [37](#)
LAN ports [12](#)
LEDs [13, 39, 41](#)
lights [13](#)
local IP address [16](#)
logging in [17](#)
login accounts [18](#)
login screen [15](#)
logs [35](#)

M

MAC address [25, 28](#)
MAC filtering [11](#)
main window [19](#)
Media Access Control address [25](#)
Microsoft Windows [16](#)
modem [10](#)
modem status [29](#)
modulation [27, 31](#)

N

navigation [19](#)
navigation bar [19](#)
network access [31](#)

network devices, attached 31
network number 22

O

octets 31
OFDM, Orthogonal Frequency-Division
Multiplexing, Radio Frequency, RF,
multiplexing, encoding 28
overview, GUI 18

P

password 40
password and username 18
PIN configuration 11
port status 37
port, Ethernet 16
ports 11
priority 35
private IP address 23
push-button configuration 11

Q

QAM 27
QAM TCM 27
QPSK 27

R

radio frequency module 28

ranging 29
registration 29
reset 19
RF MAC 28
RF module 28
RJ45 connectors 12
routing mode 23, 26

S

SCDMA 27
security, wireless 11
serial number 28
signal strength 31
signal-to-noise ratio 31
software version 28
Status 15
status 31
status, cable connection 29
subnet 15, 16, 22
subnet mask 31
subnet, IP 15
support, customer 3
SW version 28
system time 28
system up time 28

T

TCP/IP 16
TDMA 27
TEK 30
time of day 29
Transport Encryption Key 30
troubleshooting 29

U

uncorrectables [31](#)
upstream transmission [26](#)
US [15](#)
user interface [10](#)
username [40](#)
username and password [18](#)

W

WAN [22](#)
WAN connection [31](#)
WEP [11](#)
Wifi Protected Setup [11](#)
window, main [19](#)
Windows [16](#)
wireless connection [41](#)
wireless security [11](#)
WPA2-PSK [11](#)
WPA-PSK [11](#)
WPS [11](#)

