Encoding Monitor 1000-1220 and 1000-1222

Equipment Manual

1050-1725 Revision M

For Nielsen Encoding Monitor

PN 1000-1220-00 Encoding Monitor, Multi-Channel, Analog, RoHS Compliant Model DB105A

PN 1000-1222-00 Encoding Monitor, Multi-Channel, Analog, RoHS Compliant Model DB105B

Revision History

Revision	Date	Change Made	Responsible Engineer
A	10/16/2014	First release	Ken Hennacy Bruce McCready Allen Zimmerman(editor)
B	5/12/2015	Updated Document to Nielsen template, fixed figure 31 missing item numbers, eliminated empty definitions in glossary, corrected bad cross references, added Table to for Audio Level assignments to dBFS	Allen Zimmerman Ken Hennacy Bruce McCready
C	1/21/2016	Updated for Version 1.1: added sections for the Detectability Confidence and Encodability views, removed Fast Qoe section and references, updated figures to reflect Web UI menu changes.	Bruce McCready Ken Hennacy
D	4/8/2016	Clarified details in Detectability View section; corrected user name and password in “Logging In to the Monitor Web Interface through Ethernet;” corrected SNMP Community String in “Setting Up SNMP for the Monitor;” changed MSSCheck Fail to MSSCheck Alarm; also, because they are now	Ken Hennacy Lee Dennis Bruce McCready

		alarms instead of alerts, changed LOW LEVEL IN to low level and CODECHK FAIL to codechk fail	
E	6/14/2016	Capitalized user name, Station, in step 5 of section 2.4.3 and identified it as case sensitive	Lee Dennis Lore Eargle (editor)
F	7/29/2016	Corrected Status Relay diagrams and tables, Corrected Baud rate in Section 3.4 to the correct value and fixed errata in Appendix A1. Updated document to indicate cellular networks mode is supported.	Bruce McCready Amy Gaither (editor)
G	06/08/2017	Release 1.2.0.x: added instructions on downloading audio capture files and edited the upload / download files section with how to use the Alarm/Alert History; added specifications of read-only login and constraints to appropriate sections; added statement that installing a security certificate applies to all browsers but that newest version of Chrome still displays warning; updated security certificate server path and screen shot and elaborated upon certificate warnings; added how to respond to “No Audio” alarms; added Version Management LCD view (editing IP address, MAC, new software update screen, etc.), and procedure for setting the MCEM as an NTP server; changed *Nielsen Audio* to *Nielsen* per new branding	Lore Eargle
H	12/05/2017	Release 1.3.x: on front panel, moved IP address for the monitor from LCD Operational Parameters view to new screen that displays Mask, Gate, and DNS addresses and identified that default trigger for detectability alarms for internet radio is 7 minutes out of the previous 10 minutes. Added: emphasis to use the front panel to shut down; Notification Setup page to the GUI that enables setting alerts for encoding detection issues and adds the ability turn on and off alarms for low power; examples of Detectability and Encodability messages; definition for low confidence for Detectability for internet radio stations; and a note that the MCEM learns to ignore alarms during low-power mode (dusk to dawn).	Ken Hennacy Lore Eargle
J	2018-01-29	Corrected Audio Input Level and Acceptable range table: interchanged Nominal Average Audio Input Level values for consumer and professional grade; updated figures for front panel view	Lore Eargle (editor) Allen Zimmerman (figures update)
K	2018-06-13	Updated contact information	Ken Hennacy Lois Price Lore Eargle (editor)
L	2019-01-16	Release 1.4.0.5: added Network Trace Log, email configuration, notifications, troubleshooting and capabilities in Remote Control web interface (Power Off, Reboot, and Force Call), Ethernet/Cell Trace log	Ken Hennacy Lore Eargle (editor)

		feature, “MCEM as a Server Option Does Not Work”; edited TLS Fingerprint Required”	
M	2021-01-08	Release 1.5: the web interface now has these options: capture audio from a single channel pair or from all pairs and save the files; restore an earlier software version; encryption and masking of the email password with an option to display the password before saving the page; updated security certificate installation. Updated items include the supported browser list is up to date; updated screen shots; added instructions for how to download Detectability data and how to download and open an audio capture file. This manual now covers 1000-1220 (monitor with a 3G modem) and 1000-1222 (monitor with a 4G modem and a different antenna).	Ken Hennacy Sinduja Anantha Lore Eargle (editor)

Contents

List of Figures

List of Tables

Contacts

If you need assistance or have any questions, contact or call:

United States

For any questions regarding this document, contact Nielsen as indicated below:

For radio and information on sending **large log files:**

Email: EncodingOperations@Nielsen.com

Call: 410-312-8123

For other media

Email: USEncoding@Nielsen.com

Call: 410-312-8199

For URGENT encoding equipment Issues, contact our 24/7 encoding issues hotline: 1-866-767-7212

Nielsen

7000 Columbia Gateway Drive

Suite 200

Columbia MD 21046-3370

Outside the United States

For routine support, contact your local support office.

For any questions regarding this document, contact Nielsen as indicated below:

Email: ProductSupportEngineering@nielsen.com.

Nielsen

7000 Columbia Gateway Drive

Suite 200

Columbia MD 21046-3370

Notices

To Ensure Proper Operation:

DO NOT expose this unit to rain or moisture. ONLY Nielsen authorized service personnel shall gain access to the inside of the Encoding Monitor. DO NOT disconnect the earth ground from the power cord since this is a very important safety feature. The Encoding Monitor should be mounted securely in a rack. The sides must be free of obstructions to provide adequate airflow through the instrument.

The Monitor contains a lithium battery backup to maintain its internal clock. Specialized tools are required to replace this part. Under no circumstances should anyone other than Nielsen authorized service personnel attempt to replace this part.

FAILURE TO INSTALL THE ENCODING MONITOR IN ACCORDANCE WITH THE SPECIFICATION IN THIS MANUAL AND/OR FAILURE TO MAINTAIN BROADCAST SIGNALS IN ACCORDANCE WITH GENERAL INDUSTRY STANDARDS AND SPECIFICATIONS MAY RESULT IN THE ENCODING MONITOR NOT OPERATING PROPERLY.

1. Introduction

1.1. Overview

The Nielsen 1000-1220 and 1000-1222 Encoding Monitors (referred to as the “MCEM monitor” in this document) are rack-mountable, dedicated-purpose appliances used in radio and television broadcast facilities to monitor Nielsen-encoded audio material. The 1000-1220 MCEM monitor has a 3G modem and the 1000-1222 MCEM monitor has a 4G modem and a different antenna.

To ensure that broadcasters using the Portable People Meter (PPM) system are properly credited for their audiences, it is important to verify that their outgoing audio signals are properly encoded. An MCEM monitor installed at a broadcast facility provides immediate notification of encoding outages to the broadcasters and provides a mechanism through which broadcasters can work with Nielsen to diagnose and resolve encoding issues.

Nielsen encodes outgoing signals at broadcaster facilities with devices installed within the broadcast chain. This encoding consists of acoustic watermarks inaudible to the human ear that are embedded within an audio signal. Each watermark corresponds to an entity ID tracked by Nielsen.

PPM devices worn by panelists in the field detect this encoding in ambient audio signals and send information about those detections to Nielsen. Nielsen uses the entity IDs to determine the origin of an audio signal. Timestamps included with the entity ID recorded by the PPM provide information about when the panelist was exposed to the signal.

The monitor can provide a remote monitoring capability when connected to Nielsen by an Ethernet network through a secure port, or by cellular connectivity, where available. This remote monitoring feature enables Nielsen to quickly react to encoding outages, minimizing the possibility of impact to ratings.

Prior to delivering the MCEM monitor to a broadcast station, Nielsen consults with the station engineer to determine the appropriate monitor configuration to suit the station's needs. Nielsen delivers the monitor to the broadcast station pre-configured to meet those specifications.

1.2. Audience for this Manual

This manual covers installation and configuration of the MCEM monitor. Your login and password determine the rights you have as a user of the monitor. Table 1 shows the tasks that each type of user, Station or Guest, can perform with the monitor.

Table 1: User Rights

Feature	Guest User	Station User
Install 1000-1220 and 1000-1222 Encoding Monitor hardware (configured by Nielsen)	√	√
Configure monitor IP address if LAN uses DHCP (Section 2.4.1)	√	√
Access views in LCD display: Channel Set Status, System Status, Audio Levels, Operational Parameters, System Management, Interactive Feedback (Section 3.1)	√	√
View alarms, alerts, system status, hardware status, version information (Section 4.2)	√	√
Monitor detectability (Section 4.7)	√	√
Monitor encodability (Section 4.8)	√	√
Upload software configuration update through USB port (with assistance from Nielsen)	√	√
Download copy of current monitor configuration, log reports and system logs, audio capture files, and alarm/alert history (Section 4.5)	√	√
Upload software configuration update through web page (Section 4.6.1)	X	√
View and edit some aspects of the network configuration through the LCD screen (Section 3.1.11)	√	√
View and edit some aspects of the network configuration through the web interface (Section 4.3)	X	√
Edit device name, identity type, and impedance (Section 4.4)	X	√
View and download the SNMP MIB (Section 4.9)	X	√
Edit the SNMP Notifications Community String, add or remove SNMP Network Managers, and view and download the Encoding Monitor Notifications Management Information Base (MIB) (Section 4.10)	X	√
Configure email recipient for status and alarm notifications (Section 4.11)	X	√
Configure relays to respond to CodeCheck and No Audio Alerts (Section 4.13)	X	√

1.3. How to Use this Manual

Before you attempt to install or use the MCEM monitor, read all of Section 1. This section provides essential information that you need to understand and use the rest of the manual, including:

- Remainder of Section 1
  - Section 1.4 summary of the features of the monitor
  - Section 1.5: description of the modes of network connectivity the monitor supports
  - Section 1.6: description of the monitor's physical features
  - Section 1.7: explanation of channel pairs, channel sets, and how they relate to each other
- Section 2 provides the information you need to properly install the monitor. Read all of this section before beginning the installation.
  - Section 2.1: list of the physical requirements that must be met before installing the monitor hardware. These requirements vary depending upon which optional features of the monitor are used.
  - Section 2.2: information to help determine the best place for the monitor within the broadcast facility
  - Section 2.3: step-by-step instructions to physically install the monitor hardware
  - Section 2.4 information needed to set up access to the monitor and initialize optional features

The remaining sections of this manual cover how to use the monitor. These sections are useful to most users at one time or another, but they need not be read in any particular order.

- Section 3 describes how to use the hardware interfaces:
  - The monitor front-panel interface, consisting of the LCD, LEDs, and buttons
  - The rear-panel remote monitoring interface
  - The rear-panel interface for real-time serial text status output
- Section 4 addresses how to use the web interface. User rights determine the tasks each user, Station or Guest, can perform. See Table 1.
- Section 5 describes how to update the configuration, firmware, and license for the monitor device.
- Section 6 summarizes the status and error messages the monitor generates and displays on the LCD on the front panel.

- Section 7 provides monitor technical specifications.

1.4. Feature Summary

The MCEM monitor provides the following features:

- Eight physical audio input devices offering either XLR or ¼ tip and sleeve input to support monitoring monophonic (mono, or single-channel), stereophonic (stereo, or dual-channel) or surround (three-channel) audio signals. The number of signals an individual unit can monitor varies depending on their types.
- An LCD display providing textual indication of encoding and operational status
- LEDs providing visual indication of encoding and operational status
- A cellular interface to support connectivity exclusively to Nielsen for remote monitoring and update of the unit. The unit supports outgoing calls only.
- An Ethernet interface for connectivity to a network using a secure protocol. This supports using a web client interface for control, status monitoring, update (firmware, configuration, and license), and downloading log files. The web interface for the monitor has been tested with the Microsoft Internet Explorer®, Firefox ®, Google Chrome™ and Safari browsers running on Microsoft Windows® 7, 8, and 10 operating systems.
- An interface to support monitoring system status using SNMP Version 2C with read-only attributes and traps for alarms
- An NTP client to synchronize the internal clock with a time source in the Nielsen backend system when remote connectivity is enabled. The monitor uses this to confirm accurate timestamp of encoded material.
- A type A USB port on the front panel to facilitate firmware, configuration, and license updates as well as downloading encrypted log files using a USB file storage device
- An Ethernet port to support a hardwired network connection with Nielsen for firmware, configuration, and license updates, clock synchronization, and downloading encrypted log files
- A set of relays that may be connected to a third-party device to facilitate remote monitoring of alarm conditions. These relays assert during an alarm condition of the system on one or more of the physical input channels.
- A type A USB port on the rear panel that supports streaming encoding and system status information in real-time to a third-party monitoring device

1.5. Connectivity Modes

Nielsen can configure the MCEM monitor to operate using three different modes of connectivity:

- Stand-alone mode
- Connected to an onsite Local Area Network (LAN)
- Connected to Nielsen via a cellular network

The functionality provided by each of these connectivity modes is described in the following sections. These modes of connectivity are not exclusive to each other: a monitor may be connected to the LAN or configured to connect with Nielsen using either Ethernet or cellular networks.

Regardless of the connectivity mode(s) the monitor is configured to use, the unit always reports encoding and system status through the front-panel LEDs and LCD, as well as through the real-time, streaming USB port on the rear panel. If remote notification of alarm conditions is required, a third-party monitoring device can be connected to the relay DA-15 port (Section 2.1.3).

1.5.1. Stand-Alone Mode

Requirement for Stand-Alone Setup

Directly connect the monitor device to a computer.

Do not connect either the computer or the monitor to a network. The user accesses the monitor through its web interface.

Functionality

- The monitor cannot synchronize its internal clock to an external time source, so the unit may not accurately report clock drift.
- Firmware, configuration, and license file updates must be performed manually as follows:
  - Station or Guest user: through a USB file storage device inserted into the front-panel USB type A port and with assistance from Nielsen
  - Station user: through the web interface from a drive accessible by the web client

Note Nielsen notifies you through email (followed by phone calls, if necessary) that updates are available.

- If log files are needed to diagnose a problem, the encrypted log files must be downloaded as follows and then sent to Nielsen for decryption and analysis. The “Contacts” section on page 9 lists the means of contacting Nielsen.

- Station or Guest user: through a USB file storage device inserted into the front panel USB port and with assistance from Nielsen
- Station user: through the web interface to a drive accessible by the web client (Section 4.6)

1.5.2. Internal Connection to a Local Area Network (LAN)

Requirement for LAN Setup

The MCEM monitor is connected to an onsite LAN through its rear-panel Ethernet port.

Functionality

- The monitor does not have access to network resources beyond the local firewall.
- Guest and Station users can access the monitor through the web interface from any computer on the same LAN to monitor encoding of incoming signals and system status of the monitor.
- Station users can use the web interface to do some system configuration of the monitor.
- Users can perform firmware, configuration, and license updates as follows:
  - Station and Guest users can make such updates by inserting a storage device into the front-panel USB type A port. Nielsen provides the files and assistance with this process.
  - Station users also have to the option to access a local drive through the web interface to make these updates. Nielsen provides the files.
- If log files are needed to diagnose a problem, a Station or Guest user downloads the encrypted log and sends the files to Nielsen for decryption and analysis. See Contacts on page 9.
  - Download the log files to a USB file storage device connected to the USB port on the front panel.
  - Download the log files through the web interface to a drive accessible by the web client. See Section 4.6.

1.5.3. Connection to a Wide Area Network (WAN)

Requirements for WAN Setup

- The monitor device is connected to the onsite LAN through its rear-panel Ethernet port
- LAN is configured to allow the monitor access to Nielsen through a secure network port.

Functionality

This setup provides the same functionality described in Section 1.5.2for local LAN access plus the following:

- The monitor's internal clock can be synchronized with the Nielsen NTP server.
- Firmware, configuration, and license updates are automatically performed over the network directly from Nielsen.
- The monitor sends encoding and system alarms directly to Nielsen.
- The monitor periodically automatically sends log files containing detailed information about quality of encoding and low priority alerts to Nielsen. Nielsen retains these files for auditing purposes.

1.5.4. Connection to a Cellular Network

Requirements for Cellular Network Setup

- The monitor must be equipped with a wireless wide area network (WWAN) antenna (provided with the unit)
- The monitor must have radio access to a cellular tower.

Functionality

This setup provides the same functionality described in Section 1.5.3 for local WAN access.

Verification

To verify communication with Nielsen, use the LCD display on the front panel to access System Management view and select Immediate Connect. The monitor immediately attempts to connect with the Nielsen back office to transmit status information. The monitor also checks for a new command script and, if one is available, the monitor downloads the script and runs it.

1.6. Physical Features of the MCEM Monitor

Throughout this manual are references to fixtures on the front and rear panels of the monitor.

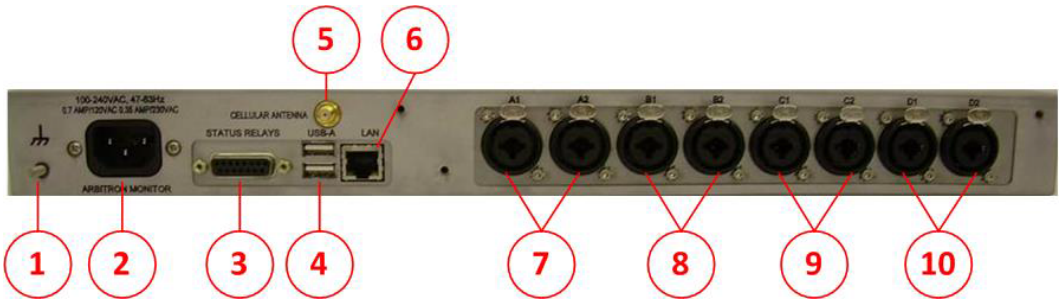


Figure 1: MCEM Monitor Front Panel

Figure 1 shows the front panel. The numbers refer to the following features:

1. Four red/green LEDs to provide status information
2. LCD with four lines of twenty characters each, providing system and encoding status information
3. Six push-buttons to allow users to navigate within the information provided by the LCD
4. USB 2.0 type A host port (for USB file storage device)

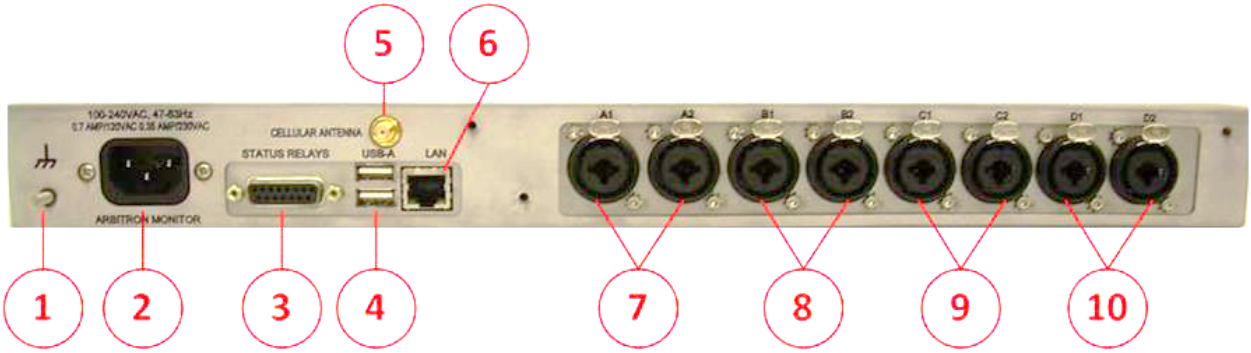


Figure 2: MCEM Monitor Rear Panel

The rear panel is pictured in Figure 2, and the rear panel features are described below:

1. Electrical ground post
2. International Electrotechnical Commission (IEC) 320 input power socket
3. DA-15 female port, used as an interface for remote status monitoring
4. Two USB 2.0 type A host ports for real-time serial status output
5. Subminiature version A (SMA) cellular antenna port
6. RJ-45 Ethernet port with integrated transmission/reception link status LED indicators

7. Combined female balanced XLR jacks with pushbutton release/unbalanced quarter-inch tip-sleeve phone jacks (combo jacks), to accept input for channels A1 and A2
8. Combined female balanced XLR jacks with pushbutton release/unbalanced quarter-inch tip-sleeve phone jacks (combo jacks), to accept input for channels B1 and B2
9. Combined female balanced XLR jacks with pushbutton release/unbalanced quarter-inch tip-sleeve phone jacks (combo jacks), to accept input for channels C1 and C2
10. Combined female balanced XLR jacks with pushbutton release/unbalanced quarter-inch tip-sleeve phone jacks (combo jacks), to accept input for channels D1 and D2

1.7. Understanding Channel Pairs and Channel Sets

This section presents some basic concepts about the organization of the monitor's audio input channels. This information is required to understand this manual and use the monitor.

The MCEM monitor is capable of monitoring up to eight channels of analog audio input. The physical inputs in the rear panel are organized into four *channel pairs*, each comprised of a left and a right channel (Figure 2). The inputs for these channel pairs are labeled on the back panel of the unit as follows:

- A1 and A2
- B1 and B2
- C1 and C2
- D1 and D2

For encoding detection, the monitor treats a group of one to three audio channels that comprise a broadcast signal as a unit. Such a logical group is called a *channel set*, and is identified and associated with the signal source. The monitor evaluates and reports encoding quality of the inputs collectively associated with a channel set.

The minimum number of physical inputs that can participate in a channel set is two—the channels of a physical channel pair. This is because a physical channel pair cannot be configured to split its inputs to serve two different audio sources. This means that when a channel set uses an odd number of inputs, one of the physical inputs assigned to the set remains unused.

Figure 3 provides an example illustrating the relationship between audio input signals, channel sets, and channel pairs. This figure represents a monitor configured to accept input signals from three different sources:

- The first audio source generates a three-channel surround signal. Physical inputs A1, A2, and B1 are configured to accept the signal as members of Channel Set

AB. Physical input B2 is an unused member of Channel Set AB because Channel Pair B cannot be split between different audio sources.

- The second audio source generates a dual-channel stereo signal. Physical inputs C1 and C2 are configured to accept the signal as members of Channel Set C.
- The third audio source generates a single-channel mono signal. Physical input D1 is configured to accept the signal as a member of Channel Set D. Input D2 is an unused member of Channel Set D because Channel Pair D cannot be split between different audio sources.

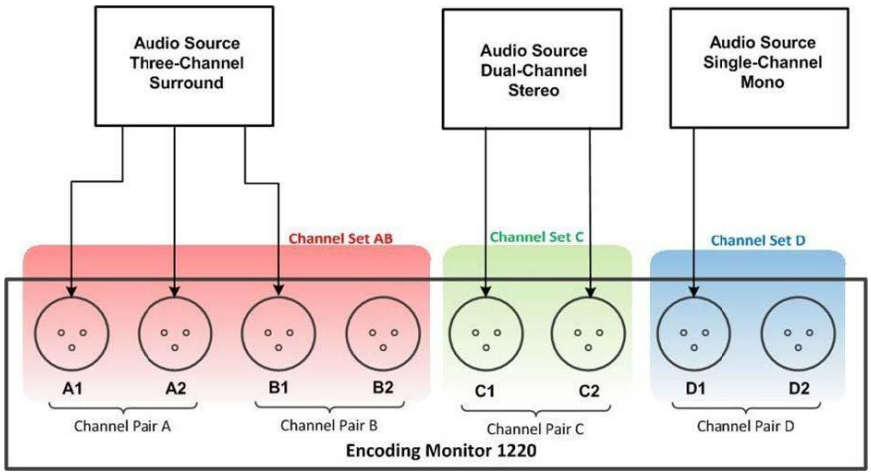


Figure 3: Sample Channel Set Configuration

2. Installation

The MCEM monitor is delivered to the broadcast station pre-configured for the input requirements specified by the station engineer during the pre-setup interview with Nielsen Operations. A diagram is supplied with the monitor to assist station personnel in properly connecting the unit to audio sources. Refer to Section 7 for monitor specifications.

2.1. Installation Hardware Requirements

The monitor provides several types of connections, each requiring a different type of hardware, as described in the following sections.

2.1.1. Analog Audio Input Connection

Establishing one or more audio input connections to the MCEM monitor is required. The monitor processes single-channel mono, dual-channel stereo, or three-channel surround analog input, and may accept those signals via cables with one of the following plugs:

- Three-pin XLR male plug
- Quarter-inch tip-sleeve phone plug

The number of cables needed varies depending upon the configuration established for a given unit. Each monitor comes with installation diagram describing how to connect these cables in the correct manner specific to that monitor's configuration.

2.1.2. Connection for Ethernet Access

The MCEM monitor supports Transmission Control Protocol/Internet Protocol compliant with Internet Protocol version 4 (IPv4). An RJ-45 Ethernet patch cable is required to connect the Ethernet port on the rear panel of the encoder to the broadcast facility's local area network to use any of the following optional functionality:

- Monitor and control the monitor device from a PC using an HTTPS web interface (Section 4)
- Monitor the monitor device from a PC using an SNMP interface (Section 2.5.1)
- Update the monitor configuration, firmware, and/or license via web page upload (Section 5) or via the USB port on the front panel with assistance from Nielsen
- Download encrypted log files (Section 3.5)

The monitor can be used on networks with and without DHCP.

Another option, if the monitor is not connected to a LAN, is to connect an Ethernet crossover cable from the Ethernet port on the monitor to an Ethernet port on a PC. This enables access to the web-based GUI despite the lack of LAN connectivity (Section 4).

2.1.3. Remote Monitor Connection (DA-15 Port)

The MCEM monitor is equipped with remote alerting relays. Using this feature is optional. When an encoding error or system error is detected by the system, a corresponding relay is asserted. This alerts a third-party remote monitoring device connected to the monitor via the DA-15 port.

To use this capability, the monitor must be connected to a third party, remote-monitoring device using a DA-15 cable with a male plug at the end that connects to the monitor. Be sure the third-party device complies with the pin out specifications found in Section 3.3.

2.1.4. Serial Status Output Connection (Rear-Panel USB Ports)

The rear panel on the MCEM monitor includes two USB type A ports. These ports can stream critical system events and real-time status for each of the audio sources being monitored. Events directed through these ports can be monitored by a third party, remote device that is capable of interpreting the ASCII text output (Section 3.4). For connection details, see Step 8 in Section 2.3.

2.1.5. Antenna for Cellular Communication

To support outgoing cellular calls to Nielsen, the monitor must have a wireless wide area network (WWAN) antenna (provided with the unit) connected to the subminiature version A (SMA) connector on the rear panel. Nielsen may use this connection for firmware/configuration/license updates, to retrieve log files from the monitor, or to transmit status data.

2.1.6. Connection for Front-Panel USB Type A Port Access

With assistance from Nielsen, you can update the MCEM monitor firmware, configuration, and license files through the front-panel USB type A port. You can also use this port to download log files from the monitor to a USB mass storage device. For downloads, the USB file storage device must have sufficient space to accept the log files.

This USB type A input is currently limited per the USB v 1.1 specification so, while it works with a USB file storage device, this input does not provide sufficient power for an external hard disk.

Note Connecting an external hard disk that requires power from the USB type A port greater than that specified by the USB v 1.1 specification may result in locking up the USB port. If the port locks up, use the System Management View on the front panel menu to reboot the monitor to recover use of the port.

2.1.7. Ground Connection

The MCEM monitor provides a standard electrical ground post. (A ground wire is not provided with the unit.)

2.1.8. Power Connection

The MCEM monitor comes with a Universal Power International Electrotechnical Commission (IEC) 320 power cord. Use this cord to supply power to the unit.

Important To reboot the monitor use the System Management View on the front panel menu to. Figure 25: LCD System Management View in Default Mode". Only unplug the monitor when you need to move it.

2.2. Suggested Placement

To ensure that media consumers are exposed to properly encoded material, Nielsen recommends that the MCEM monitor be installed such that it receives program material that has exited the transmitter, or over-the-air broadcasts. The monitor should receive the same signal that will be detected by PPM devices worn by panelists.

The monitor operates optimally as shown in Table 2.

Table 2: Audio Input Level and Acceptable Range

Audio Type	Nominal Average Audio Input Level	Acceptable Range
Consumer-grade (tip and sleeve)	-10 dBU (0.69 Vp-p)	+10 dBU to – 22.7 dBU
Professional-grade (XLR)	+4 dBU (3.5 Vp-p)	+19.4 dBU to – 15 dBU

Occasional spikes above the nominal level do not affect performance. To bring the native signal up or down to that level, the signal may need to go through an attenuator or amplifier before being input to the monitor.

2.3. Install the MCEM Monitor Hardware

Note Read and follow the instructions below before applying power to the unit!

Follow the steps below to install the MCEM monitor.

1. Place the monitor into a 19" rack in an indoor climate controlled environment as follows:

- Nielsen recommends allowing ½" of rack space above and below, and on each side of the MCEM Monitor to allow for adequate ventilation and reduce the chance of overheating.
- DO NOT block or otherwise impede airflow through the sides of the instrument.
- Select a location that will allow station personnel to easily view the status information provided by the front-panel LEDs and LCD.

2. Secure the monitor in the rack. Holes for screws are provided in each of the four front-panel corners, but other means of mounting the device may be used.
3. Use male XLR or quarter-inch tip-sleeve phone plugs to establish the monitor signal input connections.
4. Follow the instructions in the diagram provided with the monitor. This details how to establish the necessary connections to be compatible with the configuration specific to the monitor.
5. **Optional:** To monitor and control the monitor device through an Ethernet interface, do the following:
    a. Read and understand the information in Section 2.1.2.
    b. Connect an RJ-45 Ethernet cable to the rear-panel Ethernet port (item 6 in Figure 2).
    c. Connect the other end of the Ethernet cable into a port for the Local Area Network.
6. **Optional:** To monitor and control the monitor device using the web-based GUI without going through a local area network, do the following:
    a. Connect an Ethernet crossover cable to the rear-panel Ethernet port (item 6 in Figure 2).
    b. Connect the other end of the crossover cable to an Ethernet port on a PC.
7. **Optional:** To support remote monitoring of the monitor device, do the following:
    a. Read and understand the information in Section 2.1.3.
    b. Connect the male plug on a DA-15 cable to the female DA-15 port on the encoder rear panel (item 7 in Figure 2).
    c. Connect the other end of the DA-15 cable to a remote device that can comply with the pinout requirements described in Section 3.3.
8. **Optional:** To support sending encoding and system status information in real-time from the monitor device to a third-party device in ASCII text format, do the following:

a. Connect a cable to one of the USB 2.0 type A ports on the monitor rear-panel (item 8 in Figure 2). Either use a USB-to-serial cable, or attach a USB-to-serial adapter at one end of the cable.

b. Connect the monitor to a serial port on a device to receive serial status information from the monitor in real-time. Either of the rear-panel USB ports on the monitor may be used for this purpose, but only one port at a time may be used.

c. On the connected device, run a monitor program capable of accepting and processing serial input with the properties as listed in Section 3.4, which also shows the format of the output stream.

9. **Optional:** To enable the monitor to communicate with Nielsen via a cellular network, connect the cellular antenna provided with the unit to the cellular antenna port on the rear-panel (item 9 in Figure 2).

10. **Optional:** Connect an electrical ground wire (not provided with the unit) from the ground post (Item 1 in Figure 2) to the rack.

11. Connect the female end of the power cord to the socket labeled Item 2 in Figure 2. Connect the male end of the power cord to a grounded power source. The monitor turns on when the power cord is plugged in. The LCD screen displays text and the LEDs light green.

2.4. Access the Monitor

This section describes the different ways to access the MCEM monitor.

2.4.1. Identify the Monitor IP Address

The MCEM monitor is set to use a DHCP IP address on a local area network by default. The monitor obtains an IP address from the DHCP server. To locate and, if desired, edit the IP address of the monitor, navigate to the LCD menu on the monitor as described in Section 3.1.11. Once you have identified the IP address, use it to log into the web interface and, if you want to make any changes, follow the instructions in Section 4.3.

2.4.2. Log into the Monitor Web Interface through Ethernet

Nielsen Monitor Root Certificate Authority

When accessing the monitor via HTTPS (using Ethernet), the monitor uses Secure Sockets Layer (SSL) authentication. This means that, until and unless an SSL certificate is installed on the PC connected to the monitor, any attempt to access the monitor via HTTPS causes a warning message to appear (Figure 5). The message does not prevent access, but clicking through it adds another step to the login process. Nielsen recommends installing the Nielsen Monitor Root CA certificate provided with the monitor. For detailed information on the purpose of the certificate and for installing the certificate for PCs, see Appendix A – Install and Use a Security Certificate.

Nielsen recommends that the network administrator of every facility install the Nielsen Monitor Root CA certificate on the PCs used to access the monitor. Once the certificate is installed, the warning message no longer appears in most browsers.

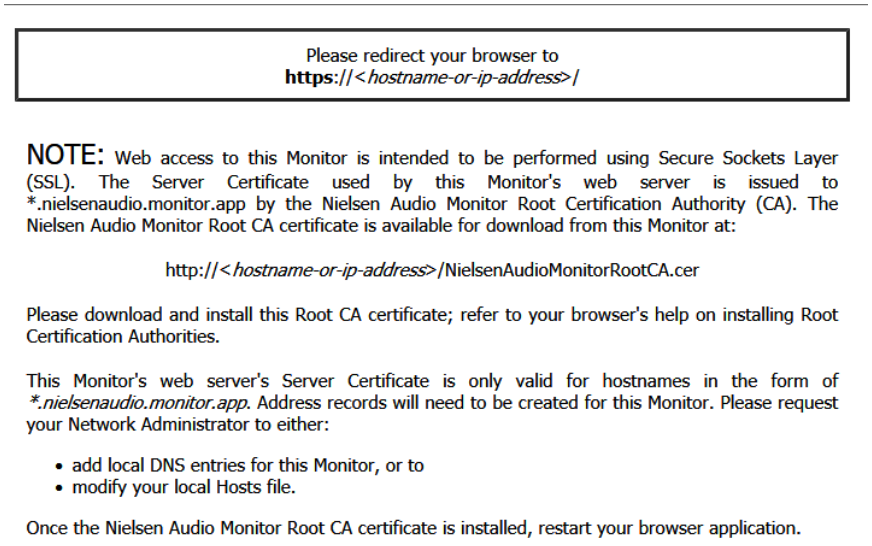


Figure 4: SSL Certificate Information on the Encoder Root Web Page

Use the Nielsen Monitor Root Certificate Authority for HTTPS Access

1. Launch a web browser (Internet Explorer [11.0.41 or later], Google Chrome, Microsoft Edge, Firefox, or Safari) on the computer connected to the encoder and enter https://IP-address in the address field, where ip_address is the address as seen on the LCD menu described in section 3.1.11. Do one of the following:

Note Rejection of the prior certificate occurs with the latest chrome browser (58.0.3029.110 or later).

- If no warning message appears, go to step 2.

- If the computer is connected to a network and the Nielsen Monitor Root CA certificate has not been installed on the PC, the certificate is out of date, or the computer has the latest version of the Chrome browser (58.03x), a warning message appears as shown in or similar to Figure 5. Depending on the browser you use, this message may have a different appearance. Do one of the following:

  a. Install a new certificate. See Appendix A – Install and Use a Security Certificate." After you have installed the certificate, go to step 2.

  b. Skip installing a certificate and click Continue to this website. Go to step 2.

- If the computer is directly connected through Ethernet to the monitor, go to step 2.
- If the computer is connected to a network and the Nielsen Monitor Root CA certificate has been installed, go to step 2.

Note Firefox may warn you about the certificate even after you have installed it.

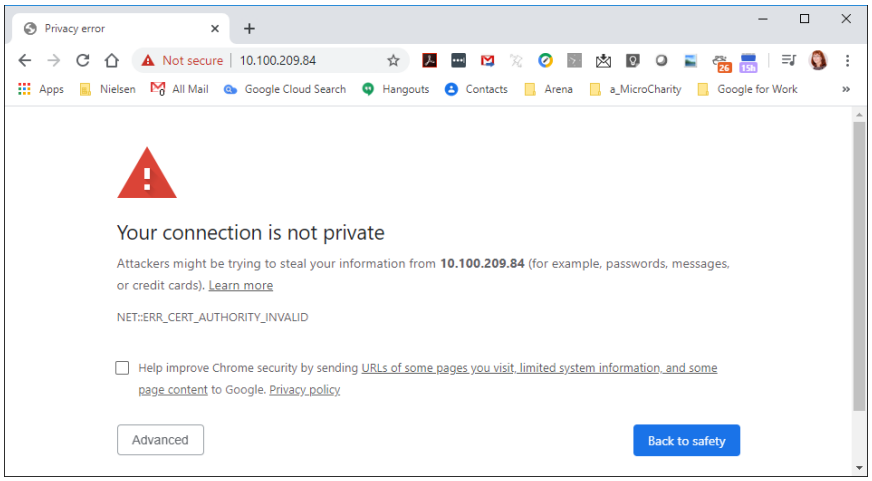


Figure 5: SSL Certificate Warning for Internet Explorer on Windows 7

Note When using the Safari® web browser on a Windows machine, the browser continues to warn about a missing SSL certificate, even after the certificate is installed. In this instance, ignore the message.

2. On the Windows Security (login dialog box), enter one of the following (the user name and password are case-sensitive):

Access Type	User Name	Password
Read/write	Station	C0lumb1aMD
Read only	Guest	G@t3w@y

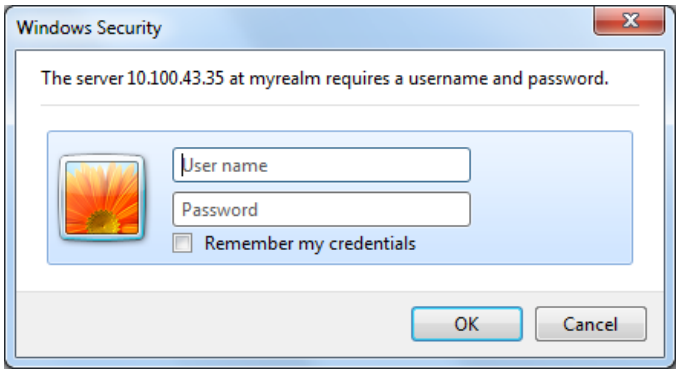


Figure 6: Monitor Web Interface Login Window for Windows 7

Note For a list of options available to Station and Guest users, see Table 1: User Rights

3. Click OK. The Monitor Status page appears. For details on using the web interface, see Section 4.

2.5. Optional Features

2.5.1. Set Up SNMP for the Monitor

The MCEM monitor supports the use of the Simple Network Management Protocol (SNMP) to provide status information to external systems. The monitor supports read-only requests and may be configured to send notifications to a management device.

- There is one Management Information Base (MIB) to support the read-only requests. Station users can download the MIB from the web user interface The SNMP community string for this MIB is nielsen1220monitor. See Section 4.9.
- A separate MIB supports the notifications and may be viewed or downloaded from the web user interface. The community string for notifications defaults to EM1220Notifications, however, a Station user can configure this value. For SNMP notifications to function correctly, the address of one to five network managers must be configured. See Section 4.10.

2.5.2. Synchronize Monitor System Time

The MCEM monitor uses its internal clock to confirm accurate timestamp of encoded material, so the internal clock must be accurate.

Use Automatic Synchronization with the Nielsen Portal Clock

If Nielsen configured the monitor to connect to the Nielsen portal through a wired Ethernet or cellular modem interface, the monitor's internal clock automatically synchronizes to the clock of the Nielsen portal during each portal connection session. The MCEM monitor synchronizes its internal clock with time provided by the Nielsen portal automatically every time it connects to the portal.

Use Cellular Connection to Synchronize the Monitor Real Time Clock

Nielsen configures the monitor to use cellular communication with the portal when any of the following conditions holds:

- The monitor is not configured to use the wired Ethernet connection for Nielsen portal connections.
- The monitor is not connected to the wired Ethernet.
- The wired Ethernet is behind a closed firewall.

Users only need to connect the cellular antenna as described in Step 9 of Section 2.3. Nielsen establishes the appropriate configuration for cellular communication with the portal. Station users need not perform any further configuration to cause time synchronization to take place via the cellular network connection.

If configured for cellular communication, to confirm that functionality, the unit automatically attempts to connect with Nielsen through the cellular network when it first boots up. The front-panel LCD displays the success or failure of this call.

3. Operation

The following sections address how to use monitor functionality not accessible via the web interface. Station and Guest users can access these views.

3.1. Use the Front-Panel LCD, LEDs, and Buttons

The MCEM monitor front panel includes four red/green LEDs, an LCD display, six buttons, and a type A USB port as shown in Figure 7.

Figure 7: MCEM Monitor Front Panel

3.1.1. LEDs

The four LEDs indicate the System status or the status for each channel set (Section 3.1.6).

3.1.2. LCD Display

The LCD displays four lines of information organized in six different views:

- Channel Set Status view (Section 3.1.8)

  This view displays status information on one or two lines for each channel set that the unit monitors, depending on the way the monitor channel pairs are configured into channel sets.

  The LCD defaults to the Channel Set Status view except when the system is booting or system alarms or critical events are in effect. This view operates in two modes:

  - Default mode: displays channel set status messages in short form.
  - Interactive mode: the user can move among and view channel set status messages in short and long form.

- System Status view (Section 3.1.9)

  This view displays alarm/alert messages about the current monitor system status. This is the default view when a system alarm is in effect or when the system is booting. You can also use the front panel buttons to select this view. To display the time stamp of the most recent update, click *System Status*.

- Audio Levels view (Section 3.1.10)

  When you use the front-panel buttons to select this view, the LCD displays the audio input level for each channel set on one or two LCD lines, depending upon how the monitor channel pairs are configured.

- Operational Parameters view (Section 3.1.11)

  When you use the front-panel views to select this view, the LCD displays basic system information about the monitor.

- Version Management view (Section 3.1.12)

  Enables you to roll the software back to a previous version

- System Management view (Section 3.1.13)

  This view provides interactive access to basic hardware functions of the monitor.

- Interactive Feedback (Section 3.1.14)

  When you insert a USB file storage device that contains a configuration or firmware update, the monitor displays this view, which overrides the current LCD view.

3.1.3. Buttons

The six, front-panel buttons provide two navigation functions:

- Navigate between LCD views
- Navigate within the Channel Set Status view in Interactive mode

3.1.4. Interpret Channel Set Information on the Front Panel LCD

Two of the monitor front-panel LCD views provide status information about logical channel sets, but the information is organized with respect to physical channel pairs. These are the Channel Set Status view (described in Section 3.1.8) and the Audio Levels view (described in Section 3.1.10). To interpret the front-panel LCD and LED information provided by these views, keep the following in mind:

- Each line of the LCD reflects the status/audio level of one of the physical channel pairs, numbered from 1 to 4.
- The status/audio level of a channel pair is the status/audio level of the channel set of which it is a member—this applies whether one or both channels of the

pair are configured. See Section 1.7 for an explanation of how channels and channel pairs relate to each other.

- If no system alarm is in effect, each LED reflects the encoding status of one of the physical channel pairs, numbered from 1 to 4.

Figure 8 shows an example of the connections for three stations and the corresponding Channel Set Status view.

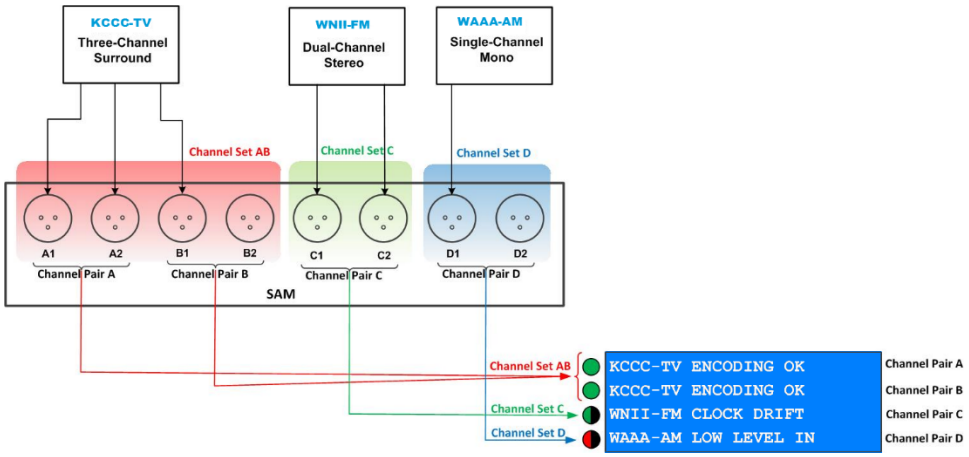


Figure 8: Representation of Channel Set Status View on LCD Display

Table 2 summarizes the example in Figure 8.

Table 3: Summary of Figure 8

Channel Set	Input	Channel Pair(s)	Lines
AB	KCCC-TV	A and B	1 and 2
C	WNII-FM	C	3
D	WAAA-AM	D	4

3.1.5. The Default LCD View

The front-panel LCD default view refers to the LCD view the monitor displays without intervention from the user. After a period of front-panel button inactivity, the LCD reverts to the default view.

To which of the LCD views the monitor defaults depends on the following conditions:

- When the monitor is booting up, the default is the System Status view.
- When the monitor has booted up, if system alarms exist, the default remains the System Status view.
- When the monitor has booted up, if no system alarms exist, the default Channel Set Status view is in effect.

If a user has inserted a USB storage device into the monitor, a feedback message appears. Interactive messages appear until they expire or the user clears the display.

3.1.6. Front-Panel LED Behavior

The four front-panel LEDs light in different ways depending upon various status conditions. The colored circle icons that appear in this section also appear throughout this document to represent the LED behaviors described below. These LEDs provide three categories of information:

- System power status

  If the LEDs are lit, regardless of color, the unit is powered on. This is, however, not the ultimate indicator for whether the unit is powered. If all four channel sets are inactive, all four LEDs are off. In this case, the LCD is lit and displays the `INACTIVE` status for each channel set.

- System alarm status: the four front-panel LEDs light solid red when:
  - The system is booting up.
  - A system alarm is in effect and the front-panel LCD displays the System Status view.
- Channel pair encoding status

  If no system alarm is in effect and the system is not booting up, the four front-panel LEDs reflect the encoding status of the channel sets as reported in the Channel Set Status view (Section 3.1.8.) This occurs regardless of which LCD view is currently displayed.

   When a channel set is encoded correctly, its LED(s) are solid green.

   When a channel set is not configured to detect encoding, the set is said to be inactive, and its LED(s) remain off.

   When one or more alarms are present for a channel set, its LED(s) alternate between red and off.

   When one or more alerts are present for a channel set with no alarms present at the same time, its LED(s) alternate between green and off.

3.1.7. Navigate Among LCD Views

You can use the front-panel buttons to display a different LCD view if the LCD is not currently displaying one of the following:

- System boot-up messages
- Channel Set Status view in Interactive mode
- Interactive Feedback view

If none of the above conditions is in effect, use the up-arrow (↑) and down-arrow (↓) front-panel buttons to navigate among the LCD views in the order shown below:

- Channel Set Status view (in default mode)
- System Status view
- Audio Levels view
- Operational Parameters view
- Version Management view
- System Management view (in default mode)
- Language Selection view (not currently operational)

Navigation among views occurs in a circular fashion so pressing the up-arrow (↑) button when displaying the Channel Set Status view displays the System Management view, and pressing the down-arrow (↓) button when displaying the System Management view displays the Channel Set Status view. Figure 9 provides a map of the LCD display views and how to use the front-panel buttons to navigate among them.

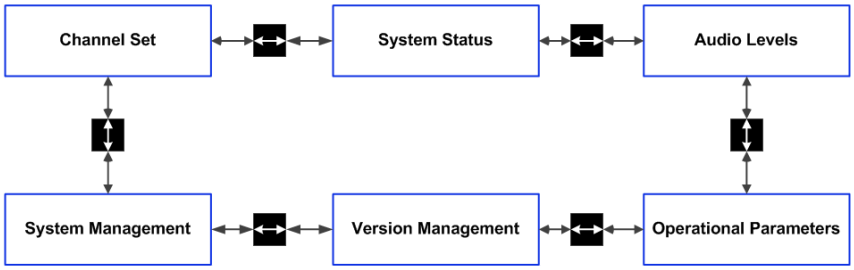


Figure 9: Navigating MCEM Monitor Front-Panel LCD Views

When the user has pressed the up-arrow (↑) or down-arrow (↓) button to navigate away from the default view, the LCD restores its display to the default view after a period of inactivity. The default LCD view varies depending upon the monitor status; see Section 3.1.5 for details. Each of these LCD views is described in detail in the following sections. Appendix C provides a detailed reference map of all five views in a single diagram.

3.1.8. Use the LCD Channel Set Status View

Note See also Section 4.2, “Monitor Status (Home) Page” for a description of the web interface view of this information.

The Channel Set Status view behaves differently depending upon its current mode—which in turn depends on the status conditions in effect at the time, and the selections the user makes with the front-panel buttons. These modes are described below, with information about the front-panel button functionality in each mode, and how the LCD transitions between modes.

In modes that respect the button activity timeout, if there is no front-panel button activity for a period, the LCD reverts to its current default view. Figure 10 provides a map of the Channel Set Status view and shows how to use the front-panel buttons to navigate within it.

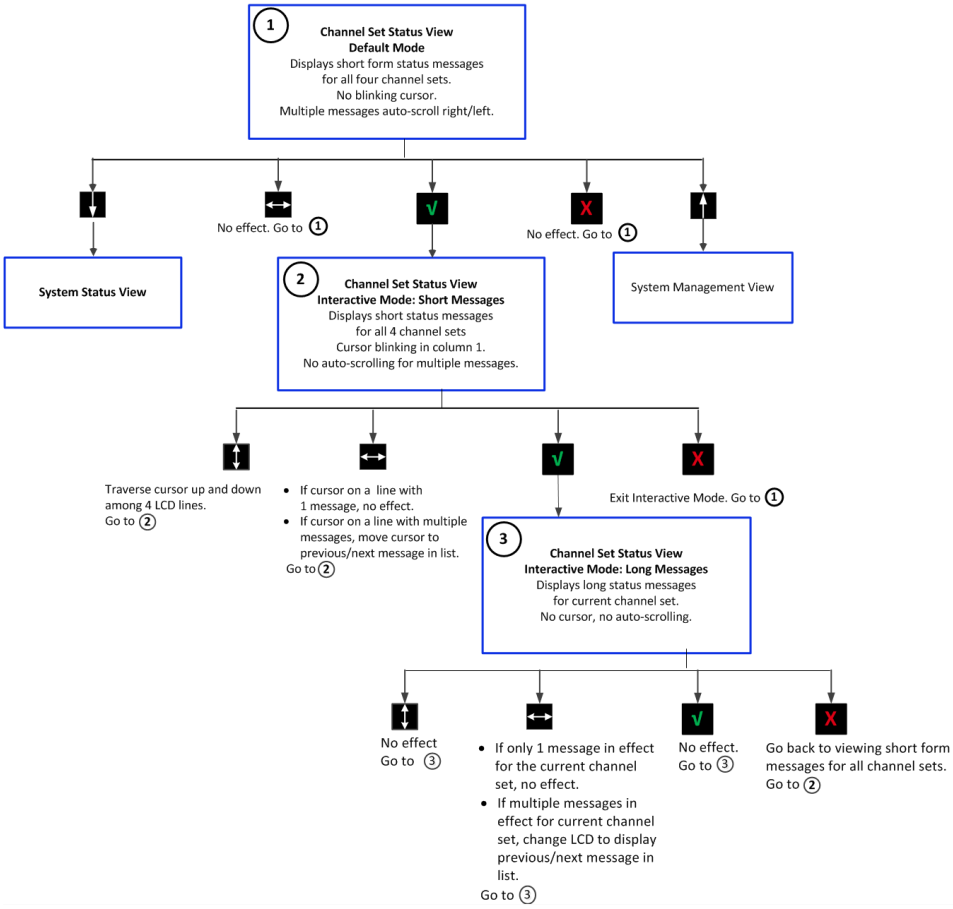


Figure 10: LCD Channel Set Status View Navigation

Channel Set Status View: Default Mode

This is the default LCD view, unless system alarm(s) or interactive event(s) are in effect, or the system is booting up.

- Each line of the LCD corresponds to one of the monitor's physical channel pairs. LCD line 1 displays status information for Channel Pair A, LCD line 2 displays status information for Channel Pair B, and so forth.
- Each line of the LCD displays the status for the channel set of which the corresponding channel pair is a member. (See Section 3.1.4 for a detailed explanation of how channel set status translates to the LCD.)
- Each LCD line shows one of the following:
  - ENCODING OK

- Short form alert/alarm message
- Cycling multiple alarm/alert messages; alert messages appear only if no alarm conditions are in effect

- No cursor appears on the screen.
- When this is the default LCD view, there is no change for the front-panel button timeout.
- The LEDs light to reflect the current encoding status of each channel set, as described in Section 3.1.6.

Figure 11 shows an example of the LCD displaying the Channel Set Status view in Default mode. In this example:

- Channel Pairs A and B are configured as Channel Set Zero, monitoring KCCC-TV. Encoding is good.
- Channel Pair C is configured as Channel Set One, monitoring WNII-FM. The monitor has detected two alert conditions, and the display alternates between two messages: UNKNOWN CODE and LOW LEVEL.
- Channel Pair D is not configured to monitor any input, so the LCD reports it as INACTIVE.

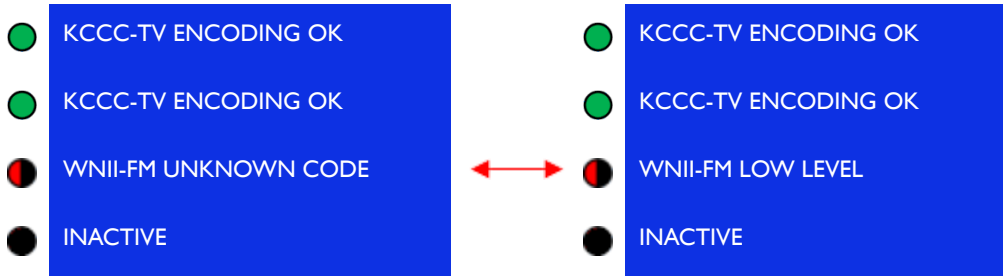


Figure 11: LCD Channel Set Status View in Default Mode

In Channel Set Status view, Default mode the front-panel buttons behave as summarized in Table 4.

Table 4: Channel Set Status View Default Mode

Button	Function
↓	Traverse LCD display to System Status view.
↑	Traverse LCD display to Operational Parameters view.
←→	Has no effect.
√	Enter Interactive mode.
X	Has no effect.

Channel Set Status View in Interactive Mode: Viewing Short Messages

The LCD displays Channel Set Status view Interactive mode when the user presses √ from the Channel Set Status view Default mode. When Interactive mode is first triggered:

- The display appears the same as in the Default mode with the exception that multiple messages for a single channel set no longer appear in rotation.
- A cursor blinks on character 1 of line 1.
- The button activity timeout is in force.
- The LEDs light to reflect the current encoding status of each channel set, as described in Section 3.1.6.

Figure 12 provides an example of the Channel Set Status view in Interactive mode displaying short messages. In this example, the same messages are displayed for each Channel Set as shown in Figure 11, but the messages for Channel Set One (WNII-FM) no longer cycle.

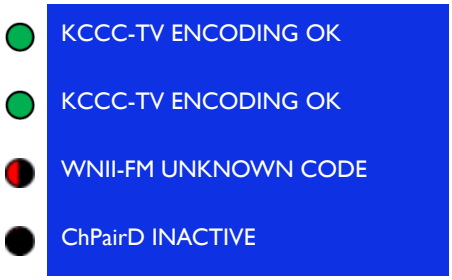


Figure 12: Channel Set Status View Interactive Mode Displaying Short Messages

The notable feature of Interactive mode is that the front-panel buttons can be used to move the blinking cursor within the Channel Set Status view and gather information that is more detailed. When Interactive mode is triggered, the front-panel buttons behave as described Table 5.

Table 5: Channel Set Status View When Viewing Short Messages

Button	Function
↑↓	Traverse up/down—cursor moves among the four lines of the Channel Set Status view.
←→	If the cursor is on a line with one alarm/alert message: no effect If the cursor is on a line with multiple status messages in force: The previous (←) or next (→) short form alert/alarm message in the sequence appears with each button press; the message list is circular. If a channel set has one or more alarm conditions in effect at the same time as one or more alerts, alarms take precedence and the LCD does not include the alert messages in the cycling display in Default mode. To see the each alarm and/or alert message currently in force, press ← or →

	in Interactive mode. To move to other LCD lines, press ↑ and ↓.
√	Toggle to viewing current short message in long form.
X	Exit Interactive mode. Return to Default mode.

Channel Set Status View in Interactive Mode: Viewing Long Messages

The LCD displays an alert/alarm message in long form if the user presses √ when the LCD cursor appears on a line displaying a short form alarm/alert message. When the long form of an alert/alarm message appears on the screen:

- The alarm/alert information uses all four lines of the LCD screen as follows:
  - LCD line 1 displays the short form message and a numeric status code
  - LCD lines 2 and 3 display the detailed message, up to 40 characters long.
  - LCD line 4 displays Contact Support when any alarm is active. The cursor does not show in this view.
- The button activity timeout is in force.
- The LEDs light to reflect the current encoding status of each channel set, as described in Section 3.1.6.

Figure 13 provides an example of the LCD displaying the detailed information for the `UNKNOWN CODE` message in the Channel Set Status view. This is one of the messages in effect for Channel Set One in Figure 12.

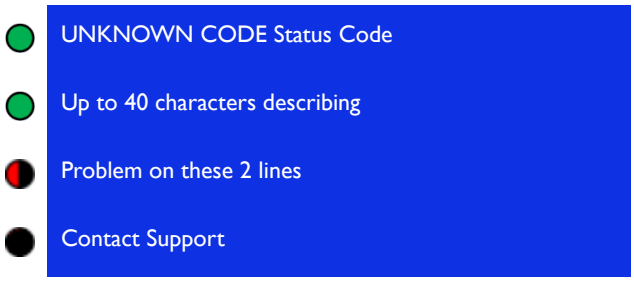


Figure 13: Long Form of UNKNOWN CODE Message

When a long form alert/alarm message appears on the screen, the front-panel buttons behave as described in Table 6.

Table 6: Set Status View When Viewing Long Messages

Button	Function
↑↓	Has no effect
←→	If only one alert/alarm condition is in effect for the current channel set, no effect. If multiple alert/alarm conditions are in effect for the current channel set, the previous (←) or next (→) long-form message in the sequence

	appears with each button press. The message list is circular.
√	Has no effect
X	Toggle to viewing current messages for all channel sets in short form. See Section 3.1.8.

3.1.9. Use the LCD System Status View

Whenever a system alarm is in effect or when the system is booting up, the front-panel LCD displays the System Status view by default. This view displays the system alarm and/or alert messages currently in effect on the monitor. To navigate to this view from other views, press the ↑ or ↓ buttons, as shown in Figure 9.

- When the System Status view appears on the screen:
- The alarm/alert information uses all four lines of the LCD screen.
  - LCD line 1 displays the short form message and a corresponding numeric status code. If you call Nielsen for assistance with troubleshooting, provide them with this code.
  - LCD lines 2 and 3 display the detailed message, up to 40 characters long.
  - LCD line 4 displays the phone number to call for support.
- If multiple alarm/alert conditions are in effect, the messages cycle.
- When this is the default LCD view, there is no change for the front-panel button timeout. Otherwise, the front-panel button activity timeout is in force.
- All the LEDs are red if a system alarm is in effect. Otherwise, they light to reflect the current encoding status of each channel set, as described in Section 3.1.6.

Figure 14 illustrates the System Status view with a sample alarm message, as well as the message displayed when no system alarms or alerts are in effect. If multiple alarm/alert conditions are in effect, the messages cycle.

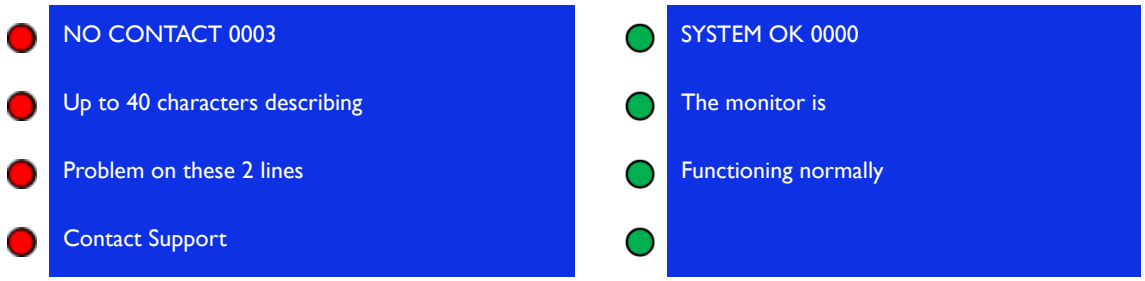


Figure 14: Sample Messages in the System Status View

When the System Status view appears on the screen, the front-panel buttons behave as described in Table 7.

Table 7: System Status View

Button	Function
↓	Traverse LCD display to Audio Levels view.
↑	Traverse LCD display to Channel Set Status view.
←→	If only one system status condition is in effect, this button has no effect. If multiple system status conditions are in effect, cycling display stops. The previous (←) or next (→) system status message in the sequence appears with each button press; the message list is circular. Message cycling resumes after one minute if no other button is pushed.
√	If only one alarm/alert condition is in effect, this button has no effect. If multiple alarm/alert conditions are in effect, this button stops the cycling display. Message cycling resumes after one minute if no other button is pushed.
X	If only one alarm/alert condition is in effect, this button has no effect. If multiple alarm/alert conditions are in effect, this button stops the cycling display. Message cycling resumes after one minute if no other button is pushed.

3.1.10. Use the LCD Audio Levels View

This view displays the audio input level the monitor detects for each configured channel set. Press ↑ or ↓ to navigate to this view from other views, as shown in Figure 9.

When the Audio Levels view appears on the screen, the following occurs:

- Each line of the LCD corresponds to one of the monitor's physical channel pairs. LCD line 1 displays audio level information for Channel Pair A (inputs A1 and A2, or 1 and 2), LCD line 2 displays audio level information for Channel Pair B (inputs B1 and B2, or 3 and 4), and so forth.
- Each line of the LCD displays the name of the channel set of which the corresponding channel pair is a member. (See Section 3.1.4 for a detailed explanation of how channel set audio level information translates to the LCD.)
- Each LCD line displays audio level information for channels A and B of a channel pair as described below:

- Audio input level is represented on a relative scale with numbers ranging from 0 to 5. All values within this scale represent audio input levels that can support proper encoding.
- The letter H indicates the audio level for the channel is too high to support reliable monitoring.
- The letter L indicates the audio level for the channel is too low to support reliable monitoring.
- The letter X indicates the channel is not configured.

Table 8 details the Audio Input Level Relative Scale Assignments.

Table 8: Audio Input Level Relative Scale Assignments

Button	Function
L	level < -60 dBFS
0	-60 dBFS <= level < -51.5 dBFS
1	-51.5 dBFS <= level < -43 dBFS
2	-43 dBFS <= level < -34 dBFS
3	-34 dBFS <= level < -25.5 dBFS
4	-25.5 dBFS <= level < -17 dBFS
5	-17 dBFS <= level < -8.5 dBFS
H	level < -60 dBFS

Figure 15 provides an example of the Audio Levels view. In this figure, Channel Pairs A and B are configured to accept 3-channel surround input from KCCC-TV as follows:

- Channel A1 of Channel Pair A (Input One) reports an audio level of 0 on the relative scale.
- Channel A2 of Channel Pair A (Input Two) reports an acceptable audio level of 1 on the relative scale.
- Channel B1 of Channel Pair B (Input Three) reports an acceptable audio level of 2 on the relative scale.
- Channel B2 of Channel Pair B (Input Four) is not configured to accept input, and displays X.
- Channel Pair C is configured to accept stereo input from WNII-FM.
- Channel C1 of Channel Pair C (Input Five) reports an acceptable audio level of 5 on the relative scale.
- Channel C2 of Channel Pair C (Input Six) displays an H to report that its audio input level is too high to support reliable encoding.
- Channel Pair D (Inputs Seven and Eight) is not configured to accept input, and displays X for each channel.

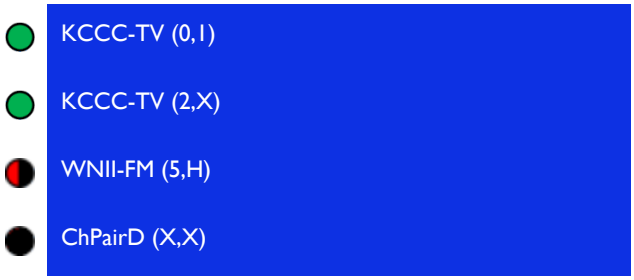


Figure 15: Example of the LCD Audio Levels View

When the LCD displays the Audio Levels view, the front-panel LEDs light to reflect the current encoding status of each channel set, as described in Section 3.1.6. The front-panel button activity timeout is in force.

When the Audio Levels view appears on the screen, the front-panel buttons behave as described in Table 9.

Table 9: Front-Panel Button Behavior in Audio Levels View

Button	Function
↓	Traverse LCD display to Operational Parameters view.
↑	Traverse LCD display to System Status view.
←→	Has no effect.
√	Has no effect.
X	Has no effect.

3.1.11. Use the LCD Operational Parameters View

The Operational Parameters view consists of two screens

- Screen 1 displays the content shown in Figure 16 and described below the figure.

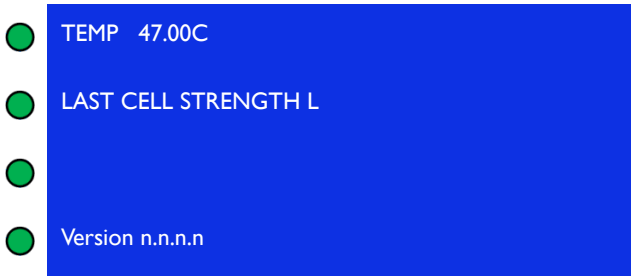


Figure 16: Example of the LCD Operational Parameters View

- Internal temperature in Celsius
- Strength of the cellular signal the monitor detects as follows:

- An integer ranging from 1 to 9 indicates an acceptable cell signal strength range.
- L indicates a low signal level (less than 1).
- H indicates a high signal level (greater than 9).

- The software version appears in the format *n.n.n.n*.
- Screen 2 appears (Figure 17) displays the IP address, Mask, Gate, and DNS and has an interactive mode so you can edit these parameters.

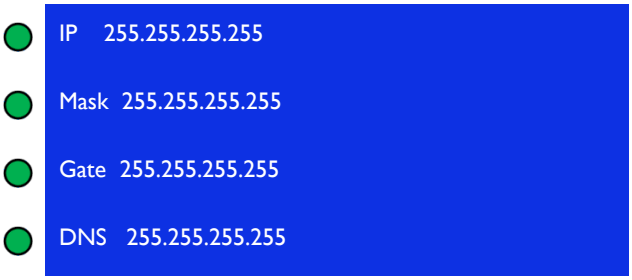


Figure 17: Screen to Edit Operational Parameters

When the LCD displays the Operational Parameters view, the front-panel LEDs light to reflect the current encoding status of each channel set, as described in Section 3.1.6. The front-panel button activity timeout is in force.

When the screen shows the Operational Parameters view, the front-panel buttons behave as described in Table 10.

Table 10: Front Panel Button Behavior in Operational Parameters View

Button	Function
↓	Traverse LCD display to Audio Levels view.
↑	Traverse LCD display to Channel Set Status view.
←→	Has no effect.
√	Has no effect.
X	Has no effect.

Enable or Disable DHCP and Edit IP Address, Mask, Gate, and DNS

You can use the LCD screen to edit the parameters as instructed below. Station users can also make these changes through the web interface (see Section 4.3).

1. When the LCD display shows the screen in Figure 18, press ↓. The DHCP screen appears.
2. Do one of the following:
   - When DHCP is enabled and you want to disable DHCP so you can enter a static IP address, press √ and wait a few seconds. The screen in Figure 17 appears

with the E flashing to indicate the location of the cursor. Press √ to toggle to Disabled. Go to step 3.

Figure 18: DHCP with Cursor

- When DHCP is disabled and you want to enable DHCP press √. A Commit Changes Page appears (Figure 19).

Figure 19: Commit Changes

3. To edit the IP address, do the following:
   a. Press √ and wait a few seconds. The first digit flashes.
   b. To change the first digit, press ↑ or ↓ until you arrive at the correct number.
   c. To change any number to the right of the first digit, press ⟶ to move the cursor to that digit. When the digit flashes, repeat this step until you have edited all the numbers you want to edit.
   d. To set the parameter, press √.

Important It is the user's responsibility to assign an IP address that ensures proper HTTP operation of the monitor, and does not interfere with any other device on the LAN. For example, do not use the 0.0.0.0 and 127.0.0.1 IP addresses because 0.0.0.0 cannot be resolved and 127.0.0.1 is the standard loopback address for all IP devices.

4. Do one of the following:
   - Press ↑ or ↓ to move to another parameter that you want to edit and repeat step 3.
   - If you have finished editing, press X.
5. On the Commit changes screen (Figure 19), press ↓ to reach OK.

6. Press √.

The IP address and Mask switch to the network manager's assignment to the device and the values may temporarily become UNASSIGNED for a short time. If the values do not return to valid addresses, troubleshoot the server and/or configuration of the MCEM to get the IP address and Mask to take.

3.1.12. Use the Version Management View

The Version Management View gives users the ability to roll back the software to the previous version or commit a newer version that was installed through remote communication with Nielsen's web portal or a front panel USB update. Users may use the ↑ or ↓ buttons to navigate to this view from other views, as shown in Figure 9. The front-panel LEDs are green.

When the Version Management view is displayed:

- Screen 1 (Figure 20) displays the Restore Version screen, which lists the current and previous software versions for this monitor. A restoration option is available for users who are working with Encoding Operations. Next does not have a function in this screen.

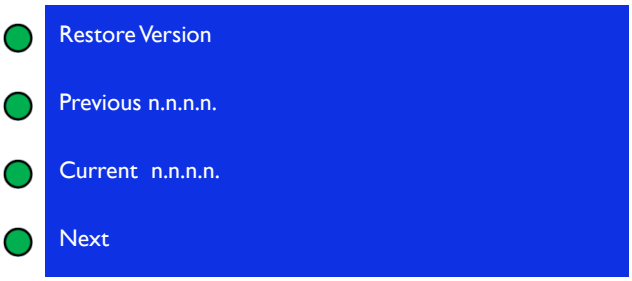


Figure 20: Restore Version

- To advance to Screen 2, press the √ button. Screen 2 enables you to enter a key that permits you to roll back the software. If, however, a version appears in the Next row, the user only needs to press the check button again to enter the code 000. When this screen is displayed, the cursor appears on the first 0 in row 1.

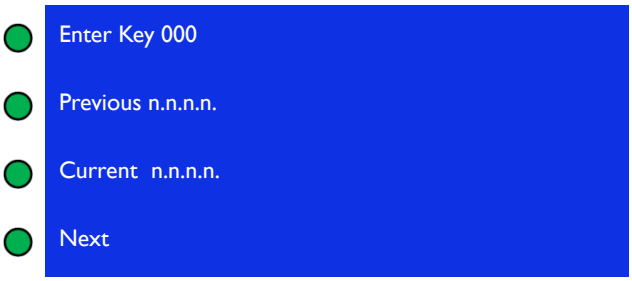


Figure 21: Enter Key

- Screen 3 appears if you enter the correct key. To enter a key, press the up arrow key to begin with zero or press the down arrow key to begin with 9. When you have the correct number in the first space, press the right arrow key to advance

to the second space. Press the up or down arrow keys as needed. Repeat for the third space. Press the check mark button.

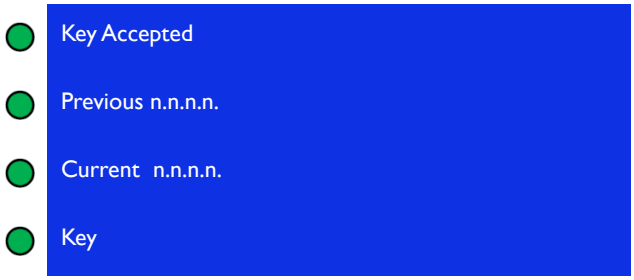


Figure 22: Key Accepted

- Screen 4 appears if you enter the wrong key. Next does not have a function in this screen.

Figure 23: Invalid Key

When the Version Management view is displayed, the front panel buttons display as described in Table 11.

Table 11: Front-Panel Button Behavior in Version Management View

Button	Function
↓	Traverse System Management view
↑	Traverse LCD Operational Parameters view
←→	Has no effect
√	Changes Restore Version to Enter Key
X	Has no effect

3.1.13. Use the System Management View

The LCD System Management view gives users access to the following hardware functions of the monitor:

- Shut down and reboot

  Perform an orderly shutdown and power off the monitor.

Important To reboot the monitor use the System Management View on the front panel menu to reboot the monitor. See Figure 25: LCD System Management View in Default Mode.

- Immediate Connect

  Force an immediate attempt to connect with Nielsen to transmit status information to the Nielsen portal, and check for a new command script. If a new command script is available, the monitor downloads and executes it.

- Reset network parameters

  Reset the wired Ethernet interface to the default DHCP setting and obtain a dynamic IP address from the DHCP server on the network.

The System Management view behaves differently depending upon its mode—Default, Interactive, or Confirmation. The current mode is determined by the selections the user makes with the front-panel buttons.

In all modes of the System Management view:

- The front-panel button activity timeout is in force.
- The LEDs light to reflect the current encoding status of each channel set, as described in Section 3.1.6.

Figure 24 provides a map of the System Management view and how to use the front-panel buttons to navigate within it.

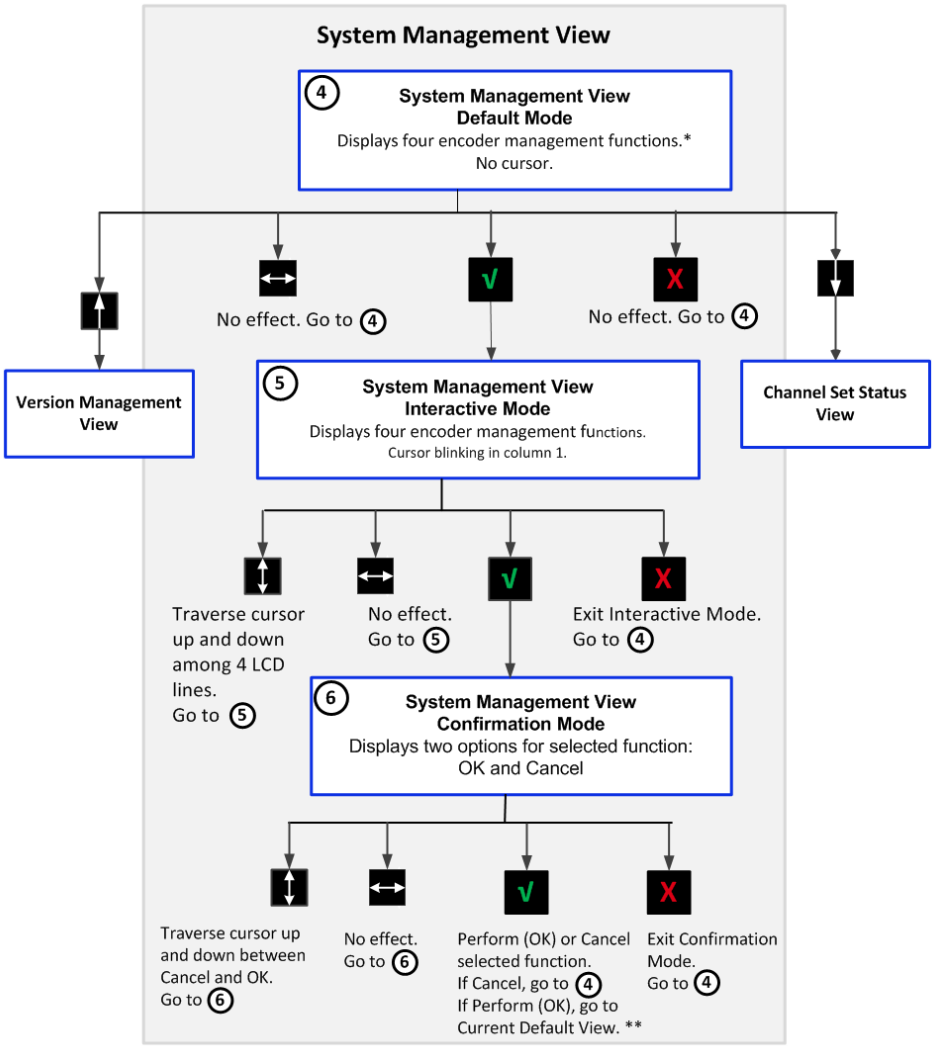


Figure 24: LCD System Management View Navigation

*Encoder Management Functions

- Shutdown monitor
- Reboot monitor
- Immediate connect Nielsen Audio
- Reset network configuration

**Current Default View

- During boot-up, the default view (System Status) is in effect.
- When boot-up is complete, if the monitor detects system alarms, the default view remains the System Status view. If the monitor detects no system alarms, the Channel Set Status view in Default mode is in effect.

- If a critical event is triggered (such as insertion of a USB drive into the port on the front panel), the Critical Event view (not shown in this diagram) is in effect.

System Management View: Default Mode

Figure 25 shows the LCD displaying the System Management view in Default mode with the available four functions. The front-panel buttons behave as summarized in Table 12.

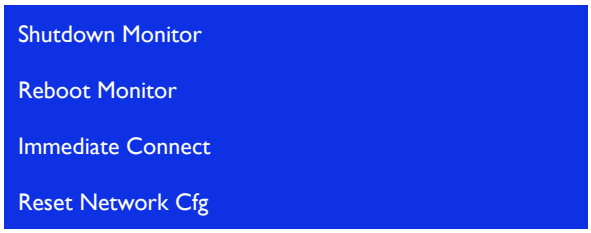


Figure 25: LCD System Management View in Default Mode

Table 12: Front-Panel Button Behavior in System Management View Default Mode

Button	Function
↓	Traverse LCD display to Channel Set Status view.
↑	Traverse LCD display to Operational Parameters view.
←→	Has no effect.
√	Enter Interactive mode. See Section 3.1.12.
X	Has no effect.

System Management View: Interactive Mode

The LCD displays System Management view in Interactive mode when the user presses √ from the System Management view Default mode. When Interactive mode is first triggered, the display appears the same as in Default mode with the exception that a blinking cursor appears on character 1 of line 1, as shown in Figure 26.

Figure 26: LCD System Management View in Interactive Mode

In System Management view Interactive mode, the user may navigate among the four display lines and select the function to perform. The front-panel buttons behave as summarized in Table 13.

Table 13: Front-Panel Button Behavior in System Management View Interactive Mode

Button	Function

↓↑	Traverse up/down—cursor moves among the four lines of the System Management view.
←→	Has no effect.
√	Select the current function. Toggle to System Management view in Confirmation mode.
X	Exit Interactive mode and return to Default mode.

System Management View: Confirmation Mode

The LCD displays System Management view in Confirmation mode when the user presses √ from the System Management view Interactive mode to select a System Management function. When Confirmation mode is triggered, the LCD displays the name of the function selected, and two options: OK and Cancel. The cursor initially appears on the first character of the OK option. Figure 27 illustrates this with the Reboot Monitor function selected.

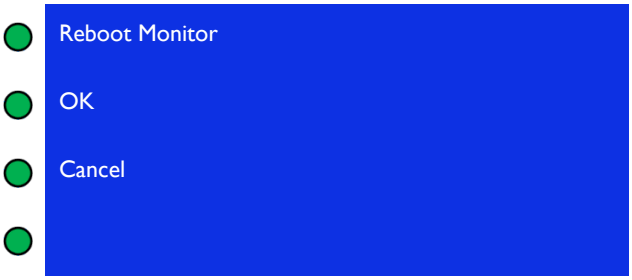


Figure 27: System Management View Confirmation Mode

In System Management view Confirmation mode, the front-panel buttons behave as summarized in Table 14.

Table 14: Front-Panel Button Behavior in System Management View Confirmation Mode

Button	Function
↓↑	Traverse up/down—cursor moves between OK and Cancel.
←→	Has no effect.
√	Perform the current function. Toggle to System Management view in Default mode.
X	Exit Interactive mode. Return to System Management view in Default mode.

3.1.14. LCD Interactive Feedback

Some activities the user may perform on the monitor require that the unit display feedback messages in the course of the activity. Such activities include performing a configuration or firmware update using the USB port on the front panel. When these messages appear, they persist for a short time until they are replaced either by another feedback message or, for a longer interval, until they timeout and the LCD display reverts to the current default view.

3.2. Initiate Monitoring

The MCEM monitor automatically begins monitoring input signals as soon as it has been installed as described in Section 2.3 and power is applied to the unit. No further activity is required to initiate monitoring.

3.3. Use Remote Monitoring

You can use a third-party device to remotely monitor the MCEM monitor to do the following:

- Remotely monitor whether encoding is detected on each pair of signal inputs.
- Remotely monitor system status of the MCEM monitor device itself.
- Stream critical system events and real-time status for each of the monitored audio sources.

3.3.1. DA-15 Pin-Outs for Remote Monitoring of Encoding Error Status

On the rear-panel of the MCEM monitor, connect to the DA-15 port as described in Step 7 of Section 2.3. Each of the monitor input channel pairs corresponds to three pins in the DA-15 port—one common, one normally open (NO) and one normally closed (NC). The pins are connected to an internal relay of the monitor. The relay contacts are rated at 0.3A max, 24VDC. For information on using the web interface to set alerts for encoding detection issues, see Section 4.13, “Notification Setup (Station User Only).”

.”

Important To use these features, the remote device must comply with the pin-out specifications in this section.

Channel Pair A Pin-Outs

Table 15: Pin-Outs for Channel Pair A

Pin	Channel Pair A Pin 2: ENCODING OK	Channel Pair A Pin 9: ALARM

Pin 1	Shorted	
Pin 1		Shorted

Figure 28 shows the DA-15 pin-outs and relays for an energized or “good” state.

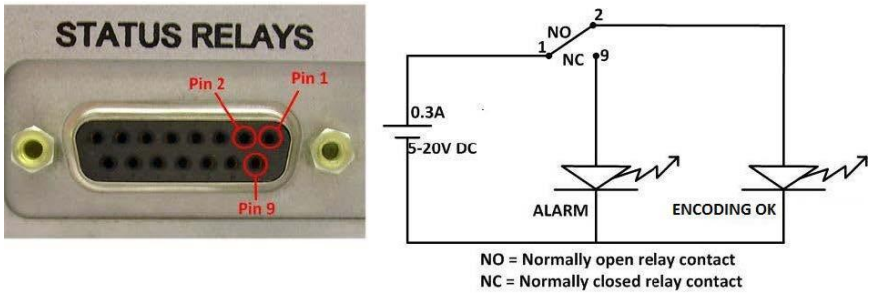


Figure 28: Pin-Outs and Relays for Channel Pair A Status Monitoring

Channel Pair B Pin-Outs

Table 16: Pin-Outs for Remote Encoding Status Monitoring for Channel Pair B

Pin	Channel Pair B Pin 11: ENCODING OK	Channel Pair B Pin 3: ALARM
Pin 10	Shorted	
Pin 10		Shorted

Figure 29 shows the DA-15 pin-outs and relays for an energized or “good” state.

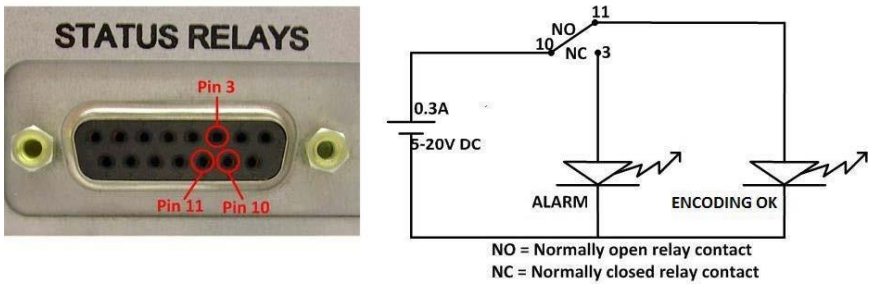


Figure 29: Pin-Outs and Relays for Channel Pair B Status Monitoring

Channel Pair C Pin-Outs

Table 17: DA-15 Pin-Outs for Remote Monitor Status Monitoring for Channel Pair C

Pin	Channel Pair C Pin 5: ENCODING OK	Channel Pair C Pin 12: ALARM
Pin 4	Shorted	

Pin 4		Shorted

Figure 30 shows the DA-15 pin-outs and relays for an energized or “good” state.

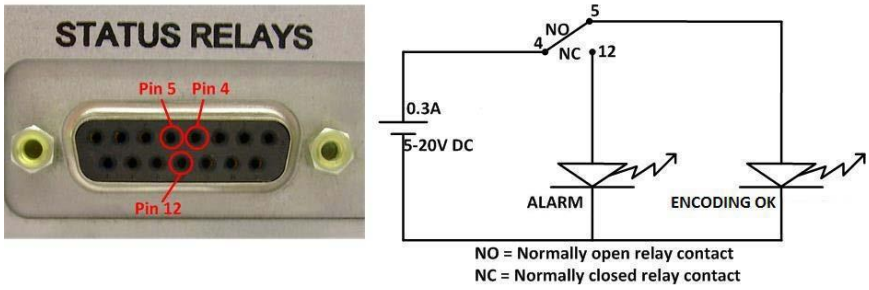


Figure 30: Pin-Outs and Relays for Channel Pair C Encoding Status Monitoring

Channel Pair D Pin-Outs

Table 18: DA-15 Pin-Outs for Remote Monitor Status Monitoring for Channel Pair D

Pin	Channel Pair D Pin 14: ENCODING OK	Channel Pair D Pin 6: ALARM
Pin 13	Shorted	
Pin 13		Shorted

Figure 31 shows the DA-15 pin-outs and relays for an energized or “good” state.

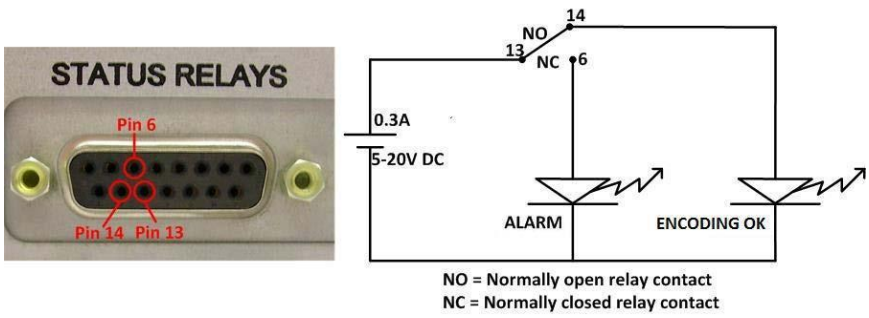


Figure 31: Pin-Outs and Relays for Channel Pair D Encoding Status Monitoring

3.3.2. DA-15 Pin-Outs for Remote Monitor of System Status

To support remote monitoring of the system error status of the MCEM monitor, the connections described in Table 18 below are provided in the DA-15 port at the rear of the encoder. The pins are connected to an internal relay of the monitor. The relay contacts are rated at 0.3A max, 24VDC.

Table 19: DA-15 Pin-Outs for Remote System Error Monitoring

Pin	System Status Pin 8: MONITOR OK	System Status Pin 15: MONITOR ALARM
Pin 7	Shorted	
Pin 7		Shorted

Figure 32 shows the DA-15 pin-outs and relays for an energized or “good” state.

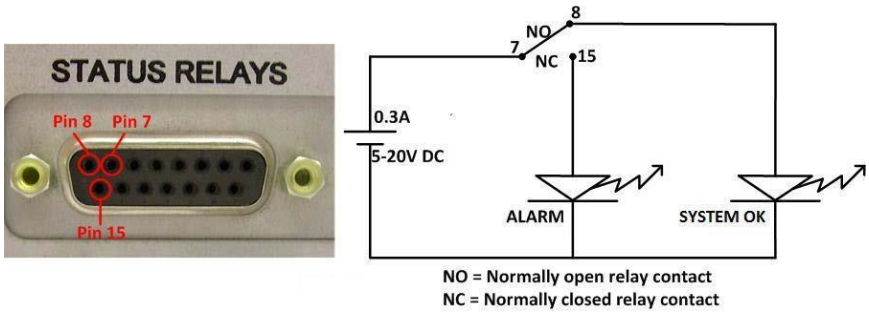


Figure 32: Pin-Outs and Relays for Remote System Error Status Monitoring

3.3.3. Pin-Outs Tables (Consolidated)

The following tables display the contents of Table 14 through Table 18 in one page.

Pin	Channel Pair A Pin 2: ENCODING OK	Channel Pair A Pin 9: ALARM
Pin 1	Shorted	
Pin 1		Shorted

Pin	Channel Pair B Pin 11: ENCODING OK	Channel Pair B Pin 3: ALARM
Pin 10	Shorted	
Pin 10		Shorted

Pin	Channel Pair C Pin 5: ENCODING OK	Channel Pair C Pin 12: ALARM
Pin 4	Shorted	
Pin 4		Shorted

Pin	Channel Pair D Pin 14: ENCODING OK	Channel Pair D Pin 6: ALARM
Pin 13	Shorted	
Pin 13		Shorted

Pin	System Status Pin 8: MONITOR OK	System Status Pin 15: MONITOR ALARM
Pin 7	Shorted	
Pin 7		Shorted

3.4. Use the Rear Panel Serial Status Output

The MCEM monitor is equipped with two USB type A ports on the rear of the unit that can stream critical system events and real-time status for each of the audio sources being monitored. (See Appendix B – Real Time Remote Serial Status Messages on page .)

To use this capability, connect the monitor to a third-party device as described in Step 8 of Section 2.3. On the connected device, run a monitor program capable of accepting and processing serial input with the properties listed below:

- 19200 baud
- 8 data bits, no parity bits
- 1 stop bit

To view this status information, the third-party device must be capable of interpreting the ASCII text messages output from the monitor, which comply with the formats described below.

- Format for encoding status messages:

  <NOTE@P[Linenum] [TimeStamp] [ENCODING] [Severity] [Entity ID] [Message]>

- Format for system status messages (including messages generated during system boot up):

  <NOTE@P[Linenum] [TimeStamp] [SYSTEM] [Severity] [Message]>

Where:

- ***Linenum*** is a monotonically increasing integer that resets when it reaches 4,294,967,296 (2^{32}).
- ***TimeStamp*** is a date-time value associated with the event to the closest millisecond. The format is ***YYYY-MM-DD HH:MM:SS.mmm***, where:
- ***YYYY*** is the four-digit year
- ***MM*** (first occurrence) is the month, ranging from 01 to 12
- ***DD*** is the day of the month, ranging from 01 to 31
- ***HH*** is hour of the day, ranging from 00 to 23
- ***MM*** (second occurrence) is minutes, ranging from 00 to 59
- ***SS*** is seconds, ranging from 00 to 59
- ***mmm*** is milliseconds, ranging from 000 to 999
- ***Severity*** indicates the severity level of the event, and can be INFO, ALERT, or ALARM .
- ***Entity ID*** is provided only if event type is ENCODING.

- ***Message*** is text that provides details of the status.

The monitor generates messages regularly. When no alerts or alarms are active, the ***message*** reads Encoding OK; the incrementing ***Linenum*** and ***TimeStamp*** confirm activity when the message does not change. The monitor generates messages for alert and/or alarm conditions when they are first detected, and then at regular intervals as long as the conditions are active.

See “Appendix B – Real Time Remote Serial Status Messages” for examples.

3.5. Retrieving Log Files

The Nielsen MCEM monitor generates health and status information during its operation, which is stored in either log reports or system logs. The log reports contain health and status information related to the encoding monitoring and the system logs contain information related to the health and status of the system and software. While none of these files is useful to the end user, they can provide useful information to Nielsen support staff when attempting to address an issue at a monitoring site. To download these log files, do one of the following:

- Get instructions from Nielsen support staff on use of the USB port on the front panel. For information on contacting Nielsen, see the Contacts section on page .
- Use the web interface to download the files (Section 4.6).

4. Use the Web Interface

The Nielsen MCEM monitor web interface provides easy access to several features also available on the LCD display (Section 3.1). The content is organized differently, however, plus additional features are available such as downloading log files. In addition, users with Station access can perform tasks that users with only Guest access cannot. The Station users decide who should get the password for Station or Guest access.

On a PC, use a web browser to access the web interface. The interface has been tested with these browser versions: Internet Explorer 10 and 11, Firefox 32, Chrome 37.0.2062.120, and Safari 5.1.7.

As with all web interfaces, status information reflects the status values at the time the page was last refreshed. Monitor status information automatically updates at a 20-second interval or when the user refreshes the page.

Important Some web browsers cache the authentication for web pages. This means that once a user has logged into the monitor web interface through a browser window, if the window is subsequently used to access other web pages not associated with the monitor, that window can access the monitor again simply by pointing it at the appropriate URL—an additional login is not required. Some users find this a convenience, but it does present a security risk, because unauthorized users (including malware scripts) may exploit this feature to access the authenticated monitor web pages. As a sound security practice, Nielsen recommends that users CLOSE the browser (not just the current tab, but all running instances of the browser) after completing activities on the monitor web pages.

4.1. Web Interface Overview

Note For instructions on logging into the web interface, see Section 2.4.2.

All pages of the web interface (Figure 33) share certain characteristics to present a consistent look and feel to the user.

- Drop-down menu (Items 1 and 6, described below Figure 33)
- The blue title bar across the top of the page displays
  - Name assigned to the monitor (Item 2)
  - Serial number of the monitor (Item 3)
  - Current user type—Guest or Station (Item 4)
  - Link to log out of the monitor web session (Item 5).
- Contact information for product support (Item 7)

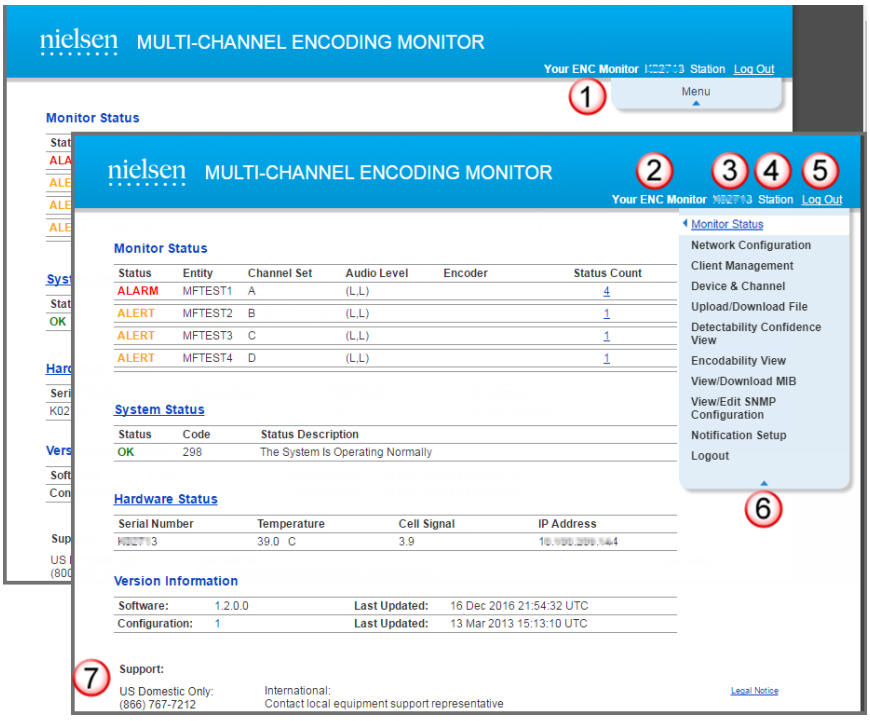


Figure 33: Elements Common to All Pages for Station Users

The title bar and footer information are the same for all pages in the web interface. The menu of links (Item 1 in Figure 33) is used to navigate among pages. The contents of the menu are different for a Station user, who has read/write rights (Figure 34) from the rights for a Guest user, who has read-only rights. To expand a closed menu or close and open menu, click the blue arrow at the bottom of the menu.

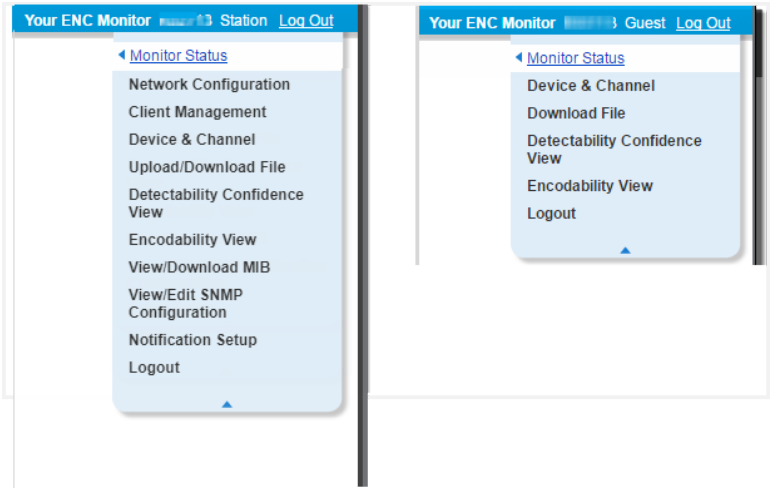


Figure 34: Menus for Station and Guest Users

The following descriptions appear in the order they appear on the menu for Station users:

- Monitor Status: Guest and Station can view status information for the input signals the system is monitoring, as well software and hardware status for the monitor system itself. See Section 4.2.
- Network Configuration: Station users can view and edit the configuration of the monitor rear-panel Ethernet port. See Section 4.3 for more information.
- Client Management: Station users can enter an IP address to enable an MCEM to be used as an NTP server. See Section 4.4 for more information.
- Device & Channel: Guest and Station users can view information about the configuration of the audio channels input to the monitor. See Section 4.5 for more information.
- Upload/Download File: Station users can upload software and configuration updates to the monitor system, or download the current monitor configuration or log files to a PC. Guest users can download files. See Section 4.6 for more information.
- Detectability Confidence View: Station and Guest users can display charts that show a per-minute view of the confidence of detections by a PPM (Section 4.7).
- Encodability Confidence View: Station and Guest users can see charts that indicate how encodable the content is (Section 4.8).
- View/Download MIB: Station users can download the monitor SNMP Control Management Information Base (MIB), which can be used to retrieve information about the health and status of the monitor using an SNMP protocol (Section 4.9).
- View/Edit SNMP Notification Configuration: Station users can set up the monitor to send SNMP notifications to a list of up to five SNMP manager servers (Section 4.10).
- Remote Control: Stations users can turn off power to the monitor or reboot it or they can force an immediate call to the CDP Portal, which is the backend system that the MCEM communicates with.
- Email Configurations: Stations users can configure the MCEM to send daily status and alarm notifications to one email account (Section 4.11)
- Notification Setup: Station users can set the channel pair relays to alert when there is a CodeCheck and/or No Audio condition (Section 4.13).
- Logout: logs the user out of the graphical user interface.

After logging out, close the browser to ensure the session is fully closed. The monitor interface cannot reliably ensure the browser session is properly deleted so the user is still effectively logged in. This means anyone using that same browser instance can access the monitor simply by entering the correct URL in the address bar, without entering a user name or password.

Note Because the logout feature does not work in Safari, close all instances of Safari to completely exit the web interface.

4.2. Monitor Status (Home) Page

Note Station and Guest users see the same page and can perform the same tasks.

The Monitor Status page displays the encoding status of the input signals the device is monitoring. For any given audio input, multiple status conditions may be in effect at the same time. This page enables the user to focus on the most severe issue and review the status of all input signals. In addition, this page shows the health status of the monitor unit itself. The figures and tables below describe the features and functions of this page. Table 20 describes the main sections of the page. Table 21 provides more details about the Monitor Status section.

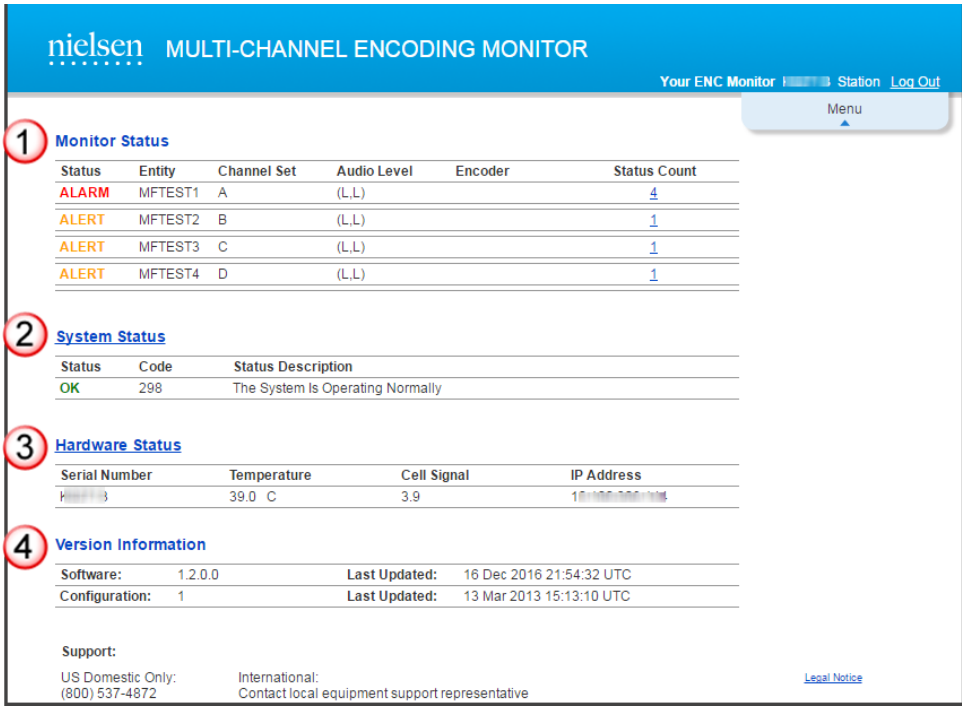


Figure 35: Monitor Status Page for Station Users

Table 20: Descriptions for Figure 35

Number	Item	Description
1	Monitor Status	For a description, see Table 21.
2	System Status	Information for the entire monitor system ● Status: possible values are **ALARM**, ALERT, and **OK**. ● Code: event code associated with the status condition ● Status Description: description of the event associated with the Status and Code ● To display the time stamp of the last update, click the term, *System Status*.

3	Hardware Status	• Serial Number: unique identifier that matches the number on the bar code sticker on the front panel of the monitor • Temperature: current temperature in Celsius If the temperature exceeds an alert or an alarm threshold for safe operation, the system status displays the alert/alarm. • Cell Signal: signal strength for the monitor's cellular connection with Nielsen The possible values are: • L: cellular signal level is too low to ensure reliable status reporting to Nielsen To address this problem, place the antennae attached to the back panel so that communication with a cell tower can be achieved. • 1 – 10*:* audio signal level is within the range to support status reporting to Nielsen. • H: cellular signal level is too high to ensure reliable status reporting to Nielsen This is an unusual condition and may be due to different causes. For help with troubleshooting, see "Contacts" on page 9. • IP Address: address assigned to the monitor See section 3.1.11. • Last updated: last time that the hardware status was updated (taken from the monitor's internal clock, not the PC used to access the GUI interface) Click Hardware Status to display this.
4	Version Information	Note that, at present, local configuration changes do not update the displayed configuration version. The version only updates when a configuration synchronization process takes place between Nielsen Encoding Operations and the monitor. • Software: version currently installed on the monitor and the date and time it was installed • Configuration: version currently installed on the monitor and the date and time it was installed The version information refers to installation-unique configuration parameters whose values Nielsen establishes during consultation with the customer. Customers cannot access these parameters.

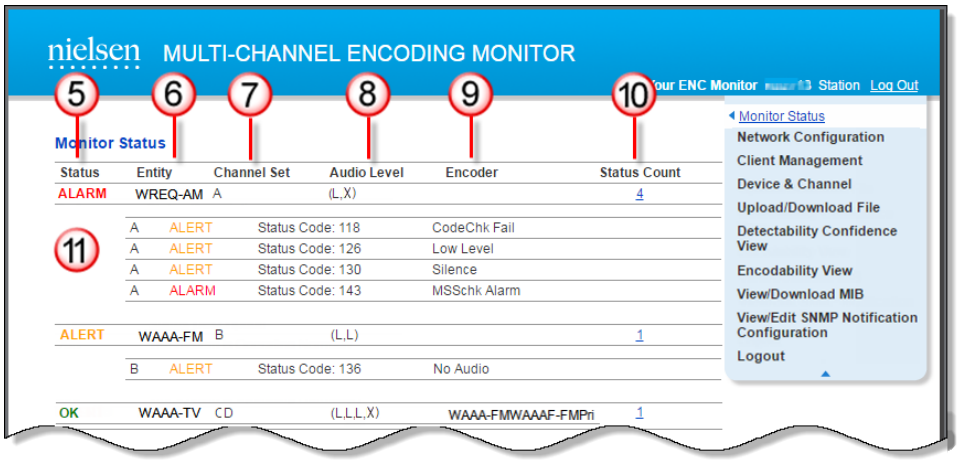
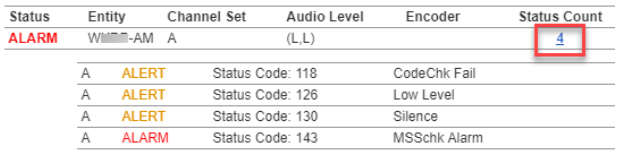


Figure 36: Monitor Status Details

Table 21: Descriptions for Figure 36

Number	Item	Description
5	Status	Displays the most severe status condition currently in effect for each audio input being monitored The possible values are **ALARM**, **ALERT**, and **OK**.
6	Entity	Displays the identifier assigned to each input signal being monitored. Nielsen configures these identifiers in consultation with customers. Broadcast station call signs are frequently the entity identifiers.
7	Channel Set	Displays the channel pairs (A, B, C, and D) used for each monitored input signal ● If an input signal uses a single channel (mono configuration), it uses the left channel of a single channel pair, and this column displays the letter identifying that pair (channel set A monitors WREQ-AM in Figure 36 shows Entity WAAA-TV, which uses channel pairs). ● If an input signal uses two channels (stereo configuration), it uses both channels of a single channel pair, and this column displays the letter identifying that pair (channel set B monitors WAAA-FM). ● If an input signal uses three channels (surround configuration), it uses both channels of one channel pair, and the left channel of a second channel pair (channel sets C and D monitor WAAA-TV). See Section 1.7 for a full explanation of channel sets and channel pairs.
8	Audio Level	Displays the audio signal level for each channel comprising an input signal being monitored. The possible values are:

		• L: too low to ensure proper encoding. Check the broadcast equipment processing this signal checked for potential causes. • 1 – 5: within the range to support proper encoding • H: too high to ensure proper encoding. Check the broadcast equipment processing this signal checked for potential causes. • X: channel is not in use; the monitor detects no input. X only appears when a signal uses a single channel or three channels so an X appears for the unused member of a channel pair. The Audio Level indicator displays one level indicator character for each channel that comprises an input signal, and an X for any unused channels. Thus, the Audio Level indicator informs the user not only of the audio levels for each channel in use, but the number of channels used for each input signal. The possible display combinations are: • If an input signal uses a single channel, Audio Level displays two characters: the first indicates the audio level of the channel in use, and the second is an X, indicating a channel not in use. In Figure 36, this is illustrated by the Entity WREQ-AM, which uses Channel Pair A. • If an input signal uses two channels, audio level displays two characters: each indicates the audio level of one of the channels in use. • If an input signal uses three channels, it uses both channels of one channel pair, and the **left** channel of a second channel pair. This column displays four letters: three identify the audio levels for the three channel pairs in use, the fourth is an X, indicating a channel not in use. Figure 36 shows Entity WAAA-TV, which uses channel pairs C and D.
9	Encoder	Displays the identifier assigned to the encoder processing each monitored signal. Nielsen configures these identifiers after consultation with customers. For example, for entity WAAA-FM, the identifier that is detected is WAAA-FMWAAA-FMPri. This information appears to enable you to trace back problems the monitor detects to the appropriate encoder.
10	Status Count	Displays the total number of status conditions currently in effect for each entity. Click the underlined number to expand and display the details on each alert and alarm for this entity.
11	(Monitor status events)	 **Figure 37: Monitor Status Events** To see alert and alarm details, click the value in the Status Count column (boxed in Figure 37). These columns do not

		have identifying headers. Each row reports a status event for a single channel pair associated with the channel set. From left to right, the status event displays the following: • 2+ Code or 2+ Code Rcvd: on a monitored channel, the monitor detected multiple attempts to encode on the same layer (referred to as “double encoding”) • Channel pair ID (A, B, C, D, AB, CD, or BC) • Status for the channel pair: possible values are **ALARM**, **ALERT**, and **OK** • Event status code for the channel pair • Brief description of the status For alerts and alarms, the status also appears on the front panel LCD. The following list shows descriptions for some of the events that can appear: • Audio Wired: clears the No Audio alert that had been present earlier • CodeChk Fail: not enough expected codes have been observed • Encoding Ok: all encoding tests have passed for a particular channel pair • Low Level: audio level has been below the acceptable threshold for an extended period of time • MSSChk Alarm: the signal-to-noise ratio threshold for adequate detections has not been reached • No Audio: no audio connected (wired) to channel pair • If a monitor is in a constant alarm state, (1) check the audio connections on the back panel and their assignments and (2) check the integrity of the audio feed (Is a tuner involved? Is more than one station bleeding through?) • Silence: audio level has been virtually non-existent for an extended period of time • Unknown Code: code that is detected which is not designated for any stations assigned to this monitor. Unknown Code can result from a wrong Configuration of input to the monitor.

Figure 38 illustrates the setting of alarms and alerts for WREQ-AM. Figure 39 illustrates the clearing of two alert conditions (Silence and CodeChk Fail).

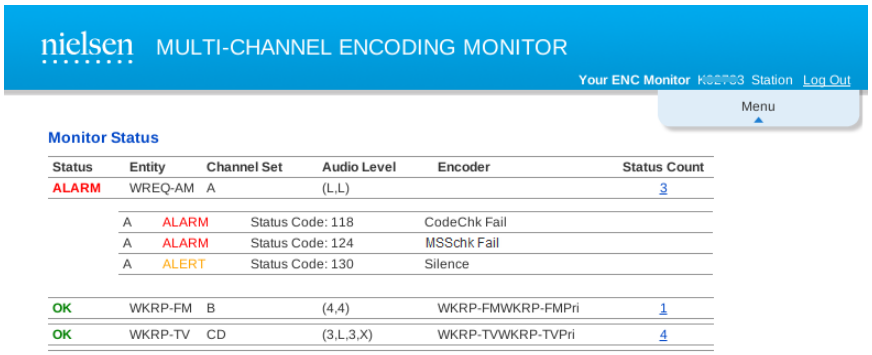


Figure 38: Entity with Alarm and Alert Conditions

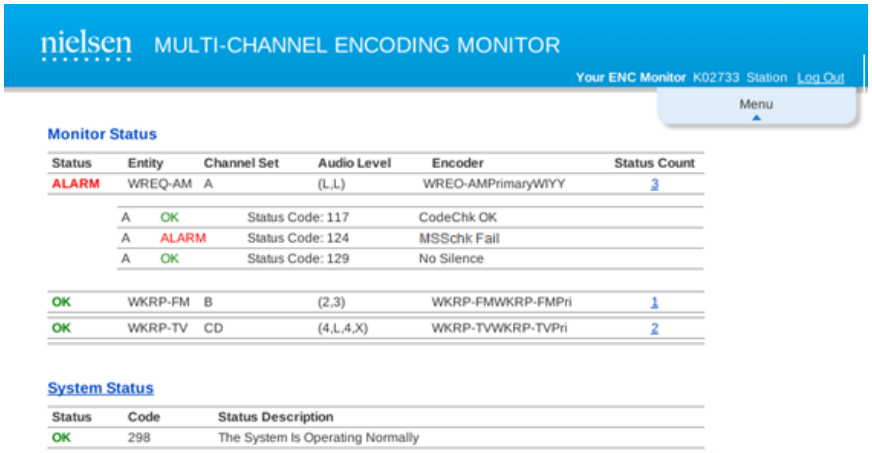


Figure 39: Clearing of Entity's Alarm and Alert Conditions

4.3. Network Configuration Page (Station User Only)

Note Guest users do not have access to this page.

The monitor Network Configuration page provides the ability to view and edit various aspects of the configuration for the monitor's rear-panel Ethernet port.

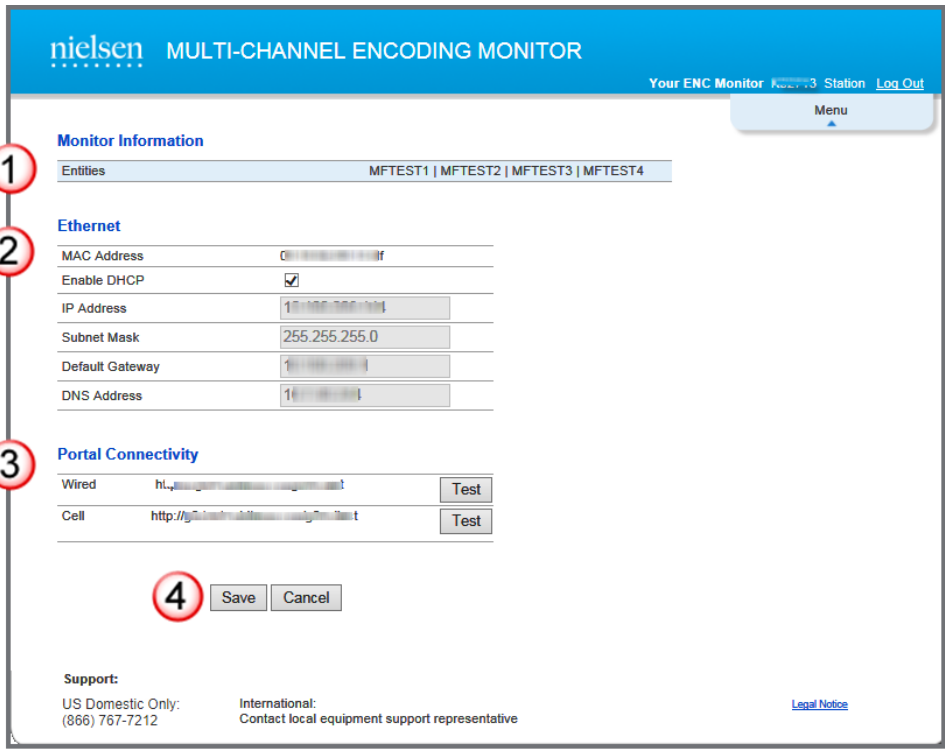


Figure 40: Network Configuration Page

Table 22: Descriptions for Figure 40

Number	Item	Description
1	+	Input signals to this encoding monitor
2	Ethernet	• MAC Address: fixed address (which cannot be changed) assigned to the network interface card • Enable DHCP • Checked (default): disables entry of the other fields in the Ethernet section because device "expects" to be connected to a HCP-enabled LAN and automatically assigned an IP address • Unchecked, enter the appropriate information. • IP Address (see the note following this table), Subnet Mask, Default Gateway, and DNS Address
3	Portal Connectivity	Click Test to perform a quick verification that the monitor can reach the Nielsen portal through the Ethernet or cellular connection. A dialog box indicates success or failure. In

	and Network Trace	addition to this test, a network trace log is generated, which is available on the Upload/Download File page.
4	Save/Cancel	Save: click to save changes Cancel: click to clear changes that have not yet been saved

Important It is the user's responsibility to assign an IP address that ensures proper HTTP operation of the monitor, and does not interfere with any other device on the LAN. For example, do not use the 0.0.0.0 and 127.0.0.1 IP addresses because 0.0.0.0 cannot be resolved and 127.0.0.1 is the standard loopback address for all IP devices.

4.4. Client Management (Station User Only)

The Client Management page enables you to set up the MCEM as an NTP server to ensure the clock in each encoder in your facility is synchronized with the Nielsen back office.

1. On the Menu, click Client Configuration.
2. Check the Enable NTP Server check box.

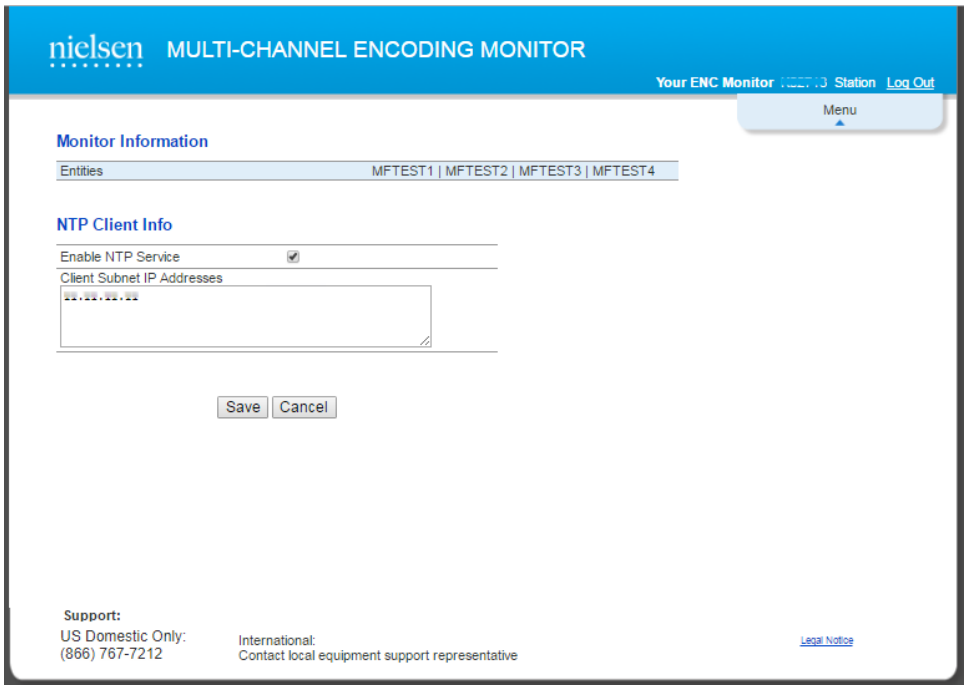


Figure 41: Client Management

3. For the NTP client, enter one or more IP Addresses, one per line.
4. Click Save.

4.5. Device & Channel Page

Note Guest users can view this page but not make changes.

The Device & Channel page displays information about the physical configuration of the input signals the monitor analyzes. The information on this page relates directly to the organization of the monitor's physical inputs (audio input signals, channel sets, and channel pairs) as described in Section 1.7.

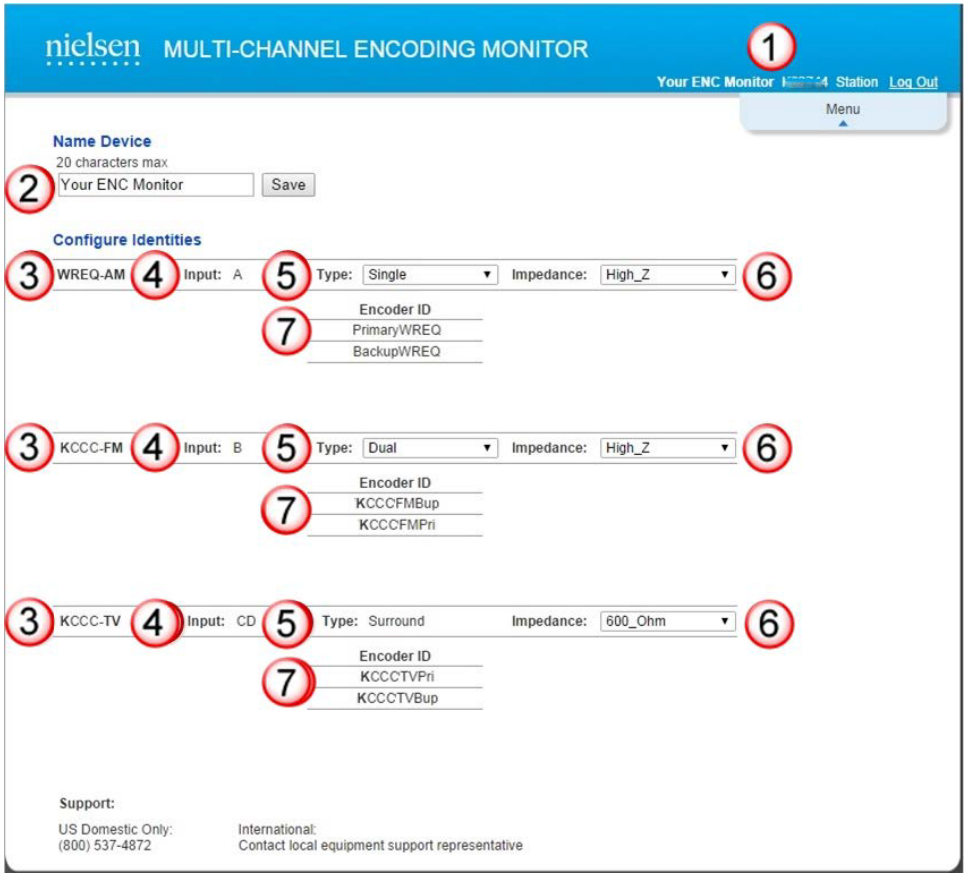


Figure 42: Device & Channel Page (Station User Access)

The Name Device field (Item 2) allows a Station user to enter a name for this MCEM monitor. The name appears in the title bar next to the serial number (Item 1). When assigning a name to the monitor, you must click Save for the change to take effect.

Item 3 marks the leftmost column in the Configure Identities section. This is the identifier for signal input to the monitor. In Figure 42 these are:

- WREQ-AM
- KCCC-FM
- KCCC-TV

Item 4 in Figure 42 identifies the channel set the monitor uses to accept each input signal.

- WREQ-AM uses Channel Set A (consisting of Channel Pair A)
- KCCC-FM uses Channel Set B (consisting of Channel Pair B)
- KCCC -TV uses Channel Set CD (consisting of Channel Pairs C and D)

Item 5 identifies the Type of signal being processed:

- WREQ-AM broadcasts a mono (single-channel) signal (the input for this is expected to be plugged into the jack labeled A1 on the rear panel of the monitor).
- KCCC -FM broadcasts a dual (stereo) signal (the inputs are plugged into the jacks labeled B1 and B2).
- KCCC -TV broadcasts a three-channel surround signal (the inputs are plugged into C1, C2, and D1).

When you change the Type setting, the monitor automatically saves the change.

Note Setting the Type to surround requires the assistance of Nielsen Encoding Operations to ensure proper configuration.

Item 6 identifies the impedance setting for the XLR inputs. This setting has no effect if the inputs are quarter-inch tip-sleeve phone jacks (combo jacks). When you change the Impedance setting, the monitor automatically saves the change.

Item 7 identifies the encoder(s) that are being monitored by the configuration. For example, the configuration for WREQ-AM is set up to monitor the primary and backup encoders (PrimaryWREQ and BackupWREQ, respectively) for the audio being broadcast on WREQ-AM.

4.6. Upload/Download File and Download File Pages (Station User Only)

Station users can upload and download files. Guest users can only download files.

Note The downloaded files are solely for use by Nielsen. The end user cannot view these files.

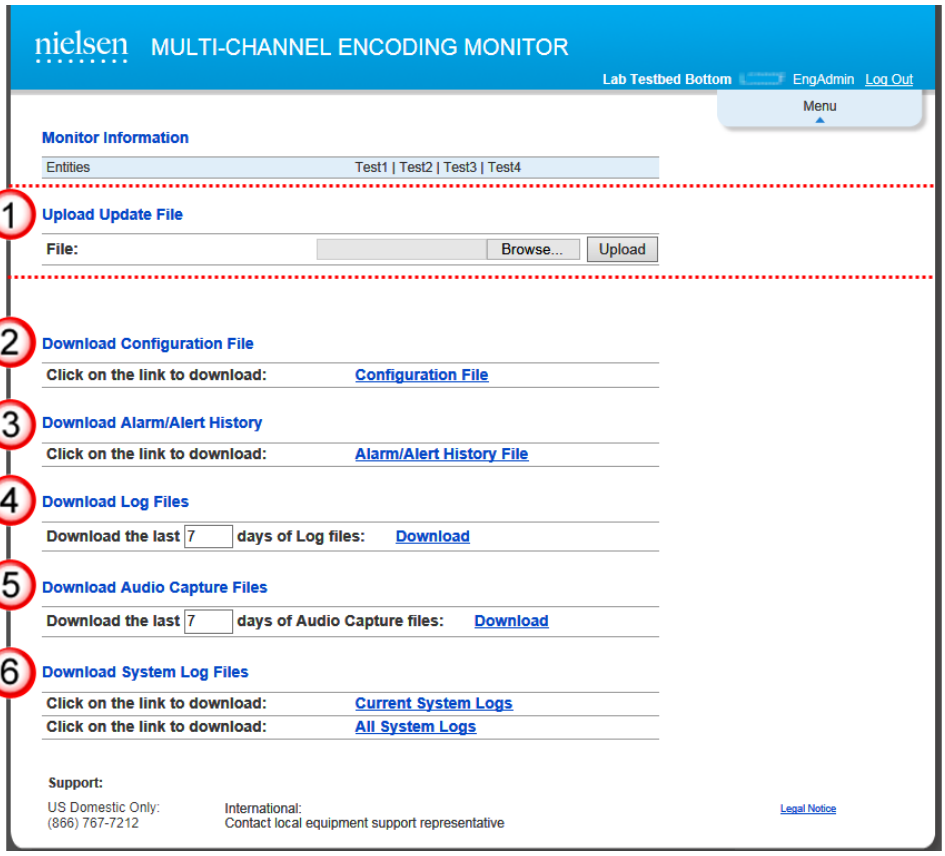


Figure 43: Upload/Download File Page

4.6.1. Upload Configuration Update File

1. Click Choose File and browse to the Nielsen-supplied file on the PC (item 1 in Figure 43).
2. Click Upload. The monitor validates and applies the update file. Update progress messages appear on the front-panel LCD. If the monitor determines the file is invalid, the monitor rejects the update without generating a notification.

4.6.2. Download Current Configuration File

Click Configuration File (Item 2 in Figure 43). The current monitor configuration file downloads to the default downloads folder as set in the browser. The name for this “sam file” is formatted as follows:

Format: configuration_ XXXXX YYYY-MM-DD_XX-XX-XX.sam

Example: configuration_K02721_2013-12-03_15-22-36.sam

4.6.3. Download Alarm/Alert History

Click Alarm/Alert History (Item 3 in Figure 43). The history, if it exists, downloads to the default downloads folder as set in the browser. If either of the following conditions exists, the software truncates the file by removing the oldest events.

- The file contains the alarm and alert history for the previous 180 days (or up to the number of days the unit has been running, if that number is less than 180 days). If no events required recording or were generated during this time, there is no file.
- The file can be no larger than 1 MB.

As the file grows beyond 180 days or 1 MB, the oldest content is deleted. The file shows the following:

- Alarm/alert state (triggered or cleared)
- Date and time
- Channel pair ID (A, B, C, or D)
- Event ID
- Long description of event (60 characters maximum)
- Short description of event (20 characters maximum)

4.6.4. Download Log Files

1. Enter the number of days of log reports (Item 4 in Figure 43) that Nielsen has asked you to obtain.
2. Click Download. The file name includes the unit serial number and the date range of the log reports.

   Example: logReports_K02744_20140828_20140904.zip

4.6.5. Download Audio Capture Files

1. Enter the number of days of audio capture files (Item 5 in Figure 43) that you want. Files for up to the previous 30 days (maximum 100 files) are available.
2. Click Download. The monitor creates a zip file with 5-minute *.wav files named according to the trigger that caused the monitor to save the files:

The wav files names that begin with *audiomss* were triggered by an MSSChk Alarm, which indicates that the signal-to-noise ratio threshold (MSS level) for adequate detections was not reached.

Example: audiomss_A_20160928203001.wav

The wav file names that begin with *audio2plus* were triggered by a 2Plus Code Received Alarm, which means that the monitor detected two or more unique codes in the audio.

Example: audio2plus_B_20160929202001.wav

4.6.6. Download System Log Files

Click one of the following (Item 6 in Figure 43) and the file downloads to the default downloads folder as set in the browser:

- Current System Logs
- All System Logs

The file name (*.zip) indicates whether it contains the current system log or all system logs and the current date.

4.6.7. Network Trace Log

If the Network Trace link is red, then no network trace log is available. If the link is blue, then a file with a record of hops between nodes is available for download. The file is encrypted and must be sent to Support for analysis.

4.7. Detectability Confidence View

Audio content has various characteristics that determine the amount of possible detectable code insertions for it. Examples include signal strength, presence of silence, and the spectrum of the audio between 1 and 3 kHz.

The Detectability Confidence graph (Figure 44) shows a per-minute view of the confidence of detections by a PPM on a scale of 0 to 4.

- 0: no detections (worst) condition
- 4: best detection condition

To download the data into a CSV (comma-separated values) file, do the following:

1. At the bottom of the page, click Detectability History File.
2. At the prompt, select the directory where you want to save the file. The file name includes the date and the station (A, B, C, or D).
3. To open the file, browse to the saved file and use a spreadsheet program to open it (Microsoft Office Excel, Google Sheets, etc.).

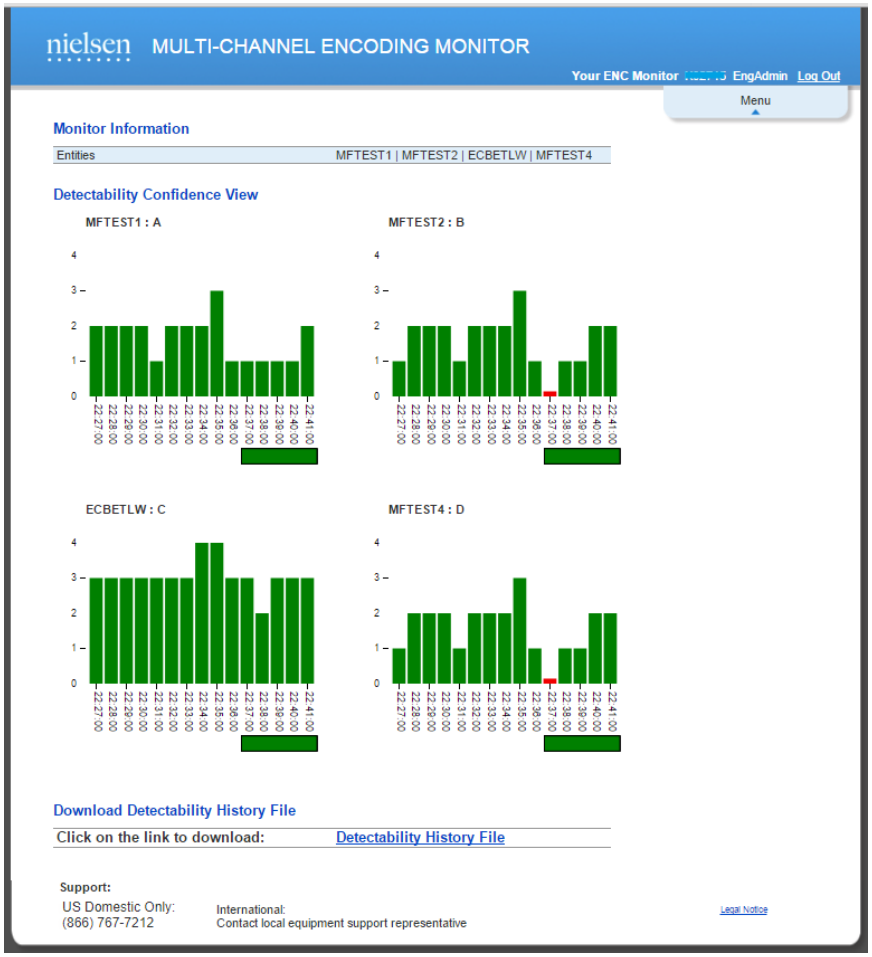


Figure 44: Detectability View

The confidence of detections is calculated using message signal strength (MSS) averaged over the left and right channels for the past minute.

- MSS: average of encoded symbol power divided by the average of unencoded symbol power over a minute interval
- Detectable Code: average MSS value per channel over a preset threshold
- Not Detectable Code: average MSS value per channel is lower than a preset threshold

The Detectability Confidence graph shows zeroes for a Wrong Code or Unknown Code detected over an accumulated minute for a monitored station.

- Wrong Code: detected code that the MCEM recognizes but that is not the code designated for this audio feed. Incorrect audio feed assignments to the back panel of the monitor or the encoder can produce Wrong Code. An MCEM can simultaneously monitor up to four audio feeds.

- Unknown Code: code that is detected which is not designated for any stations assigned to this monitor. Unknown Code can result from a wrong configuration of input to the monitor.

The MSS thresholds were determined by examining various types of material from sparse talk to music and then relating these to PPM detections under various listening conditions.

Table 23: MSS Thresholds

Bar Height	Color	MSS Threshold	Description
< 1	Red	MSS < 1.7	Indicates an encoding error (e.g. low audio input) or material with excessive silence
1	Green	1.7 <= MSS < 2.2	For a period of 15 minutes or longer, may indicate a setup error
2	Green	2.2 <= MSS < 3.0	Acceptable Detectability Confidence for encoded material
3	Green	3.0 <= MSS < 3.5	Acceptable Detectability Confidence for middle-to-high-end encoded material such as classical music
4	Green	MSS >= 3.5	Acceptable Detectability Confidence with strongly encoded material

MSS greater than 2.2 (represented by two to four green bars) indicates proper encoding that the PPM should be able to detect under all but the harshest listening conditions.

Axes

- X axis represents time in 1-minute intervals
- Y axis represents confidence of detections between 0 to 4 for the minute interval

Alarm Bar

The horizontal bar below each graph, the alarm bar, provides alarm indication based on X minutes of the past Y minutes of PPM Detection Confidence status, where the defaults are:

Note Currently, you cannot configure these settings.

The bars are either green or red as determined by the following:

- Green: The bar turns green upon startup as soon as a high-confidence status is calculated. After a transition to a red alarm bar condition, the bar turns green as follows:
  - As soon as Z of the past Y minutes have a high-confidence status OR
  - The confidence level is low for less than X of the previous Y minutes.
  - The default for Z is 1 in the previous 5 minutes.

- Red: The bar turns red when X of the previous Y minutes has low-confidence status as follows:
  - Broadcast audio: low confidence for 3 of the previous 5 minutes.
  - Internet audio: low confidence for 7 of the previous 10 minutes.

The monitor displays an alarm status on the front panel, and the alarm relays are set.

Note The MCEM learns to ignore alarms (not alerts) for MSSCheck during the interval when an AM station goes into low-power mode (dusk to dawn).

4.8. Encodability Confidence View

The Encodability Confidence View shows charts of percentages calculated by dividing the number of codes inserted per minute on the left and right channels by the maximum number of codes that are possible to insert (up to 12.5 codes per minute on each channel).

In general, encodability is dependent upon the content type. The Encodability Confidence view complements the Detectability Confidence View. Encodability validates the encoding of the material and detectability indicates whether an issue is actionable. See the previous Section 4.7 “Detectability Confidence View.”

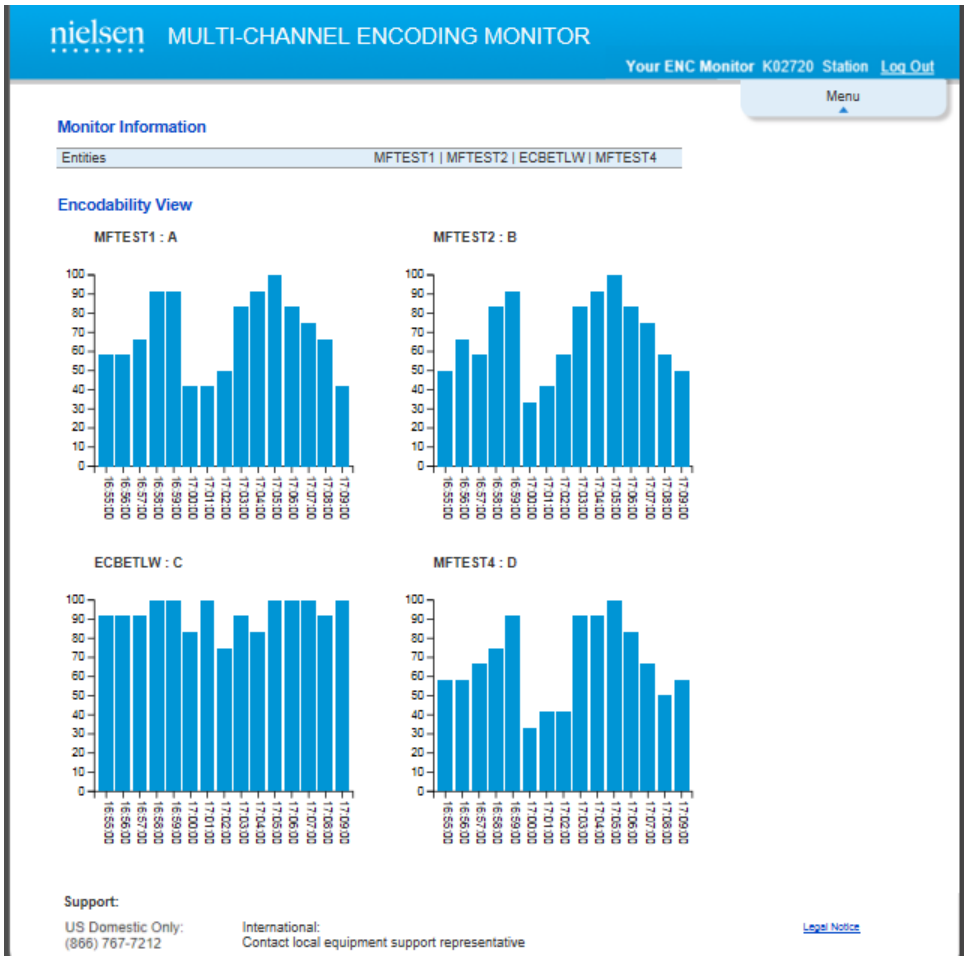


Figure 45: Encodability View

Axes

- X axis represents time in 1 minute intervals
- Y axis represents percentage code detections for each minute interval

4.9. View/Download MIB Page (Station User Only)

The MCEM monitor comes with an SNMP Management Information Base (MIB) which can be used to monitor the unit via an SNMP protocol. To view or download the encoder SNMP MIB (named NIELSEN-1220-ENCODINGMONITOR-MIB), select View/Download MIB from the web interface main menu.

The web interface displays the SNMP MIB in text form in a scrollable window (Item 2 in Figure 46). The page also provides a link (Item 1 in Figure 46) that you can use to download the SNMP MIB using the conventions appropriate to the browser in use.

Note The NIELSEN -1220-ENCODINGMONITOR-MIB is provided for remote monitoring of the encoder via SNMP. This is separate and distinct from the NIELSEN-1220-MONITOR-NOTIFICATIONS-MIB, which is provided to aid in setting up one or more SNMP manager servers to receive event notifications from the monitor via SNMP traps (described in Section 4.10).

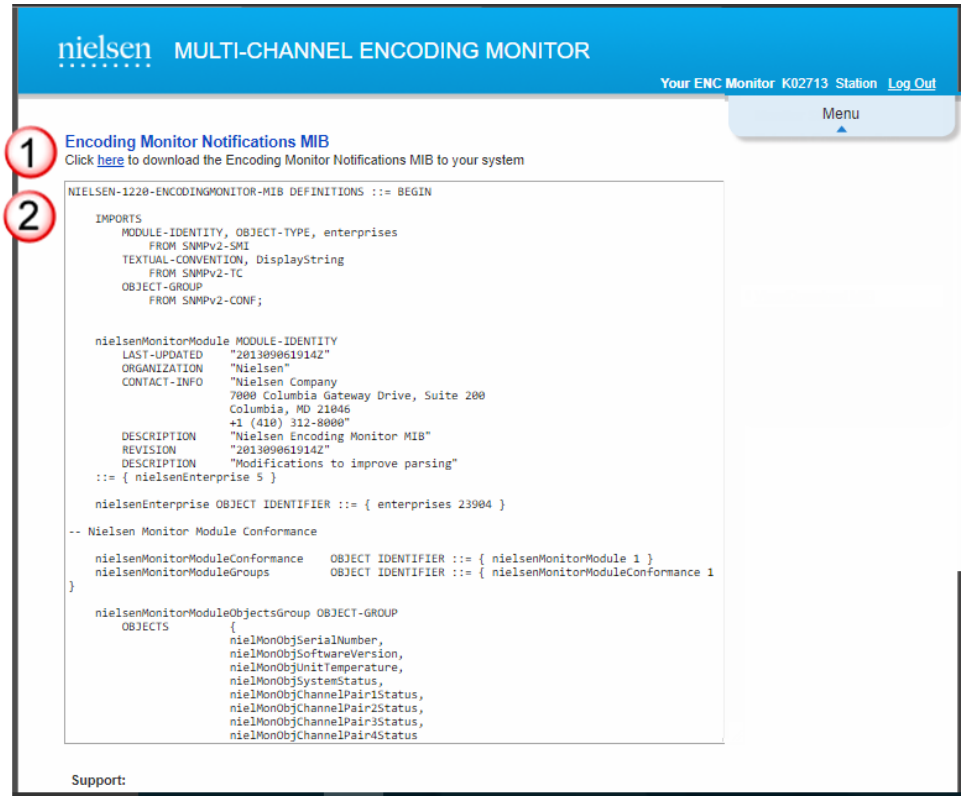


Figure 46: View/Download MIB Page

4.10. View/Edit SNMP Notification Configuration Page (Station User Only)

The Nielsen MCEM monitor comes with an SNMP Notifications MIB (named NIELSEN-1220-MONITOR-NOTIFICATIONS-MIB) that defines event notifications the monitor can send via SNMP traps to up to five SNMP manager servers. To view or download the MIB, select View/Download MIB from the web interface main menu (Item 6 in Figure 47).

Note This MIB is separate and distinct from the monitor SNMP MIB (NIELSEN-1220-ENCODINGMONITOR-MIB, described in Section 4.10), which is provided for remote monitoring and control of the monitor via SNMP.

NIELSEN-1220-MONITOR-NOTIFICATIONS-MIB specifies the format of the SNMP notifications that the monitor sends to configured network managers. Whenever the active state of a monitor condition changes, the monitor sends an SNMP notification containing the following parameters:

- Monitor serial number
- Monitor system time when the event occurred
- Alarm state (active or inactive)
- Alarm type (channel or system)
- Alarm channel pair ID (1–4 or 0 for system)
- Description of the alarm

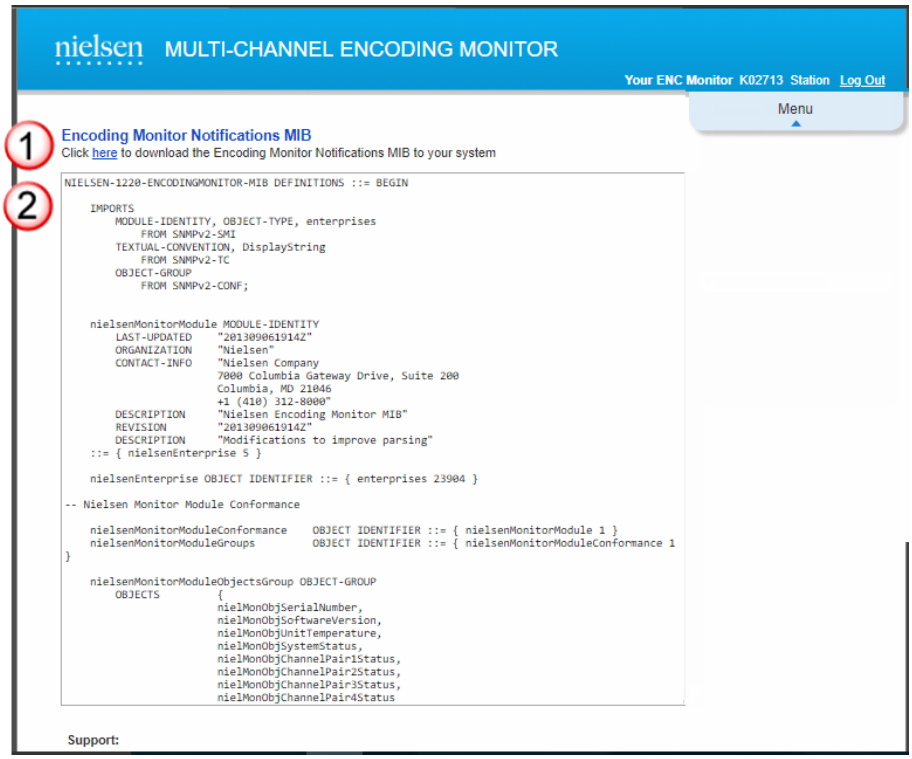


Figure 47: View/Edit SNMP Notification Configuration Page

The View/Edit SNMP Notification Configuration page provides the ability to edit two parameters that are not part of the NIELSEN-1220-MONITOR-NOTIFICATIONS-MIB, but determine the following aspects of SNMP traps generated by the monitor:

- SNMP Community String

  The text box labeled Item 1 in Figure 47 provides a place to enter the SNMP community string to be included in notification traps sent from the monitor to the SNMP network managers listed in the text box. Devices cooperating on an SNMP network use these community strings as a filter to determine which SNMP traps they accept and process. The SNMP community string should be set to a value determined in consultation with local network administrators.

  The SNMP Community String may be from 1 to 255 characters long, including alphanumeric characters, underscores, and hyphens. The monitor web interface requires that a syntactically valid value be set for the community string (even if the list of SNMP Network Managers [item 2 in Figure 47] is left blank). The default community string value set by Nielsen is EM1220Notifications, but this can be changed to suit the requirements of the local network.

- SNMP Network Managers

  The text box labeled Item 2 enables you to enter the addresses of the SNMP network management station(s) to which the monitor will send event notifications. If no network management station names are entered, the monitor sends no notifications.

Enter no more than five manager names, each on a separate line. These may be host names or IP4 network addresses. The monitor will send SNMP Trap notifications containing the SNMP Notification Community String (Item 2) to each SNMP network manager in this list. Whether those managers accept and process the traps depends on how they are configured. Select the SNMP Network Managers in consultation with local network administrators.

On this page, you can also do the following:

- Click Save to keep any changes you have made and put the changes into effect (Item 3).
- Click Reset Form to Current Values to clear any changes you have made (Item 4).

The Monitor Notifications MIB appears on this page in a scrollable window (Item 5). To download the MIB, click the “here” link in the sentence below the Encoding Monitor Notifications MIB subtitle.

4.11. Remote Control (Station User Only)

The Remote Control page enables you to do the following:

- Turn off the power for the monitor.
- Reboot the monitor.
- Force a call to the CDP Portal.
- Capture audio.
- Restore an earlier version of the MCEM software.

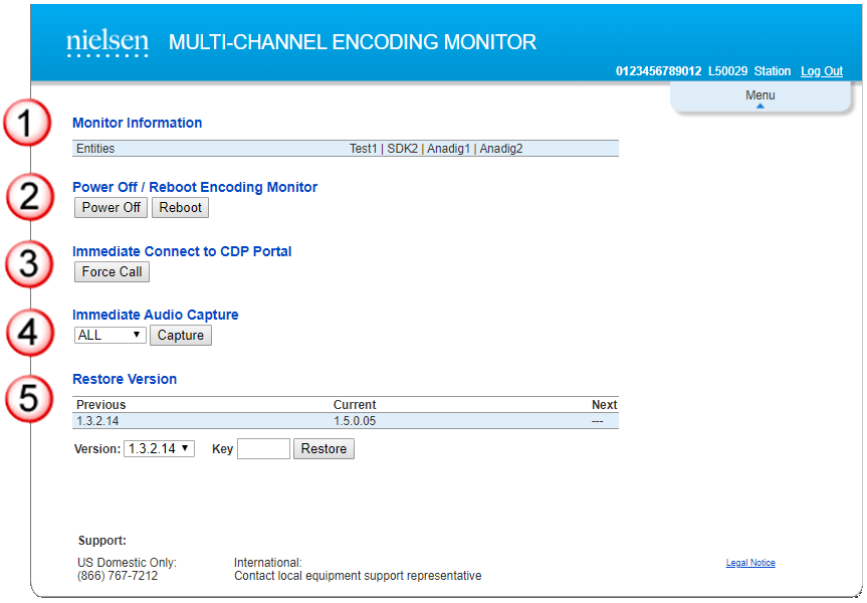


Figure 48: Remote Control Page

4.11.1. Power Off the Monitor

Figure 48 (#2) enables you to either power off the MCEM or reboot it. The LCD displays corresponding messages.

4.11.2. Immediately Connect to the CDP Portal

Click Force Call in Figure 48 (#3) to immediately connect to the CDP Portal, which is the backend system that the MCEM communicates with. This may be used to troubleshoot an issue with communications, or verify the operation.

4.11.3. Audio Capture On Demand

Use the Immediate Capture feature (#4 IN Figure 48) to capture audio for channel pairs that the MCEM is actively monitoring. Some alarms trigger an audio capture. You may also use this feature for the following reasons:

- You see an anomaly and want to test the audio quality of the monitor.
- You want to diagnose an audio issue that is happening at the moment.
- You have a question about results, encoding, or audibility.

Do one of the following:

- To capture audio from all channel pairs, select All. The MCEM immediately dumps the previous 10 minutes of 8-kHz-sampled audio into files.
- To capture audio generated from a specific channel pair, select the entity for the channel pair(s).

To download the captured file, do the following:

1. On the Upload/Download page, in the Download Audio Capture Files section, set the number of days. Note that “today” equals 1. See Figure 43 Upload/Download File Page.
2. Click Download. A zipped file of the audio captured downloads to your computer.

4.11.4. Restore Version On Web

Use the Restore Feature, Figure 48 (#5) to select the MCEM version you want to restore.

1. To display a list of previous versions, click Version then the version you want to restore.

1. Contact the Encoder Support Team to get a key then enter the key.
2. Click Restore. A popup window indicates whether or not the request is authorized.
3. Click OK. The MCEM reboots and the software is reinstalled.

4.12. Email Configuration Page (Station User Only)

The MCEM can send daily status and alarm notifications to one receiving email account, as specified in the configuration page (Figure 49).

4.12.1. Use MCEM Email Server

If more than one user needs to receive status and alarm notifications, set up email forwarding or an email alias with the receiver's email account. A small set of parameter options associated with network access and security are available for configuring the MCEM as a client to send the email. Typically, for servers such as Gmail or Outlook, however, these values are the same. Follow the procedure below Figure 49. Note that the password is masked and encrypted.

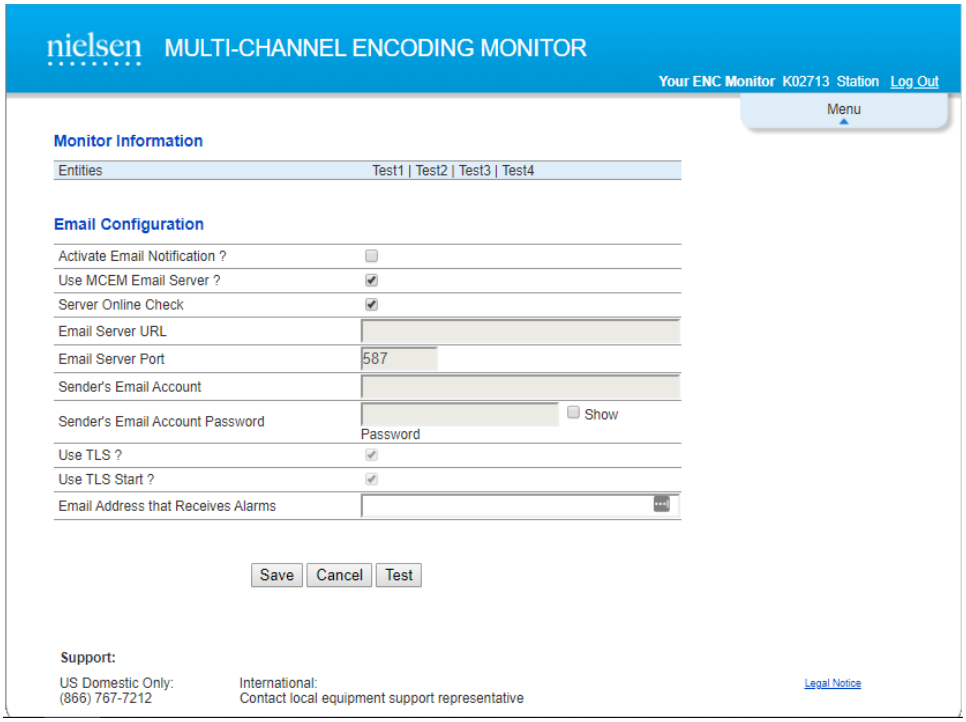


Figure 49: Email Configuration

Figure 49 shows the default setup. Do the following:

1. Check the box for Activate Email Notification.
2. Check the box for Use MCEM Email Server.
3. If the server previously has not responded to a ping, check the box for Server Online Check.
4. Enter the URL for the server.

5. Enter the email address for the sender.
6. Enter the password for that email address.
7. Enter the email address to where alarms will be sent.
8. Click Save.
9. Click Test. A dialog box notifies that the test email is about to be sent, and a follow-up dialog appears up to 90 seconds later. It confirms whether the email was sent. If it was not sent, see Appendix D on page to determine the steps necessary to resolve the issue.

4.12.2. Disable Server Online Check

For servers that do not respond to the IMCP protocol (ping), clear the Server Online Check checkbox.

4.12.3. Set MCEM to Send to Client Email Account

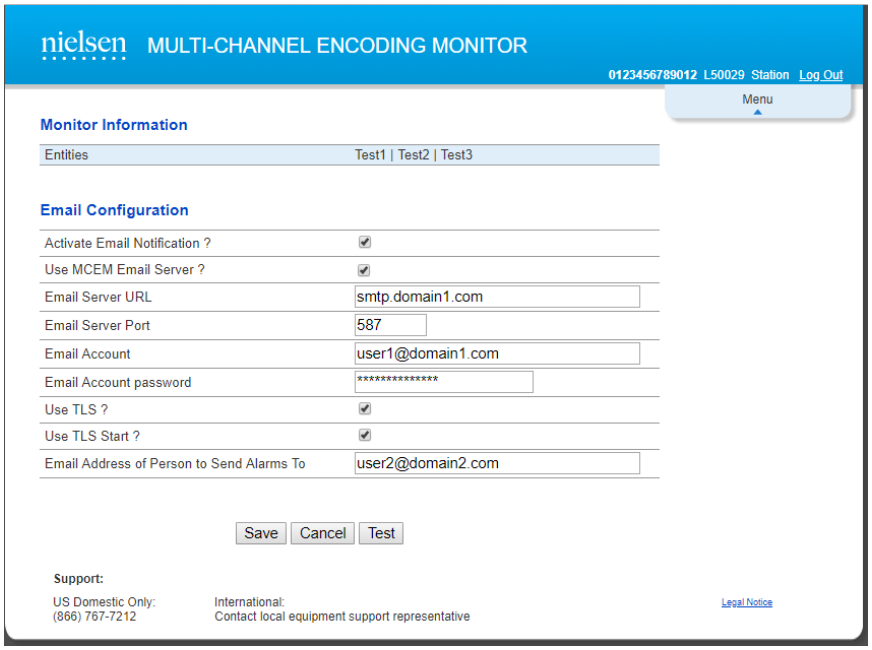


Figure 50: Send to Client Email

When the destination rejects the emails from the MCEM server as spam, configure the MCEM to use a client email account by clearing the checkbox for Use MCEM Email Server.

Configuring the MCEM to use a client email account is similar to what is done on a mobile device. One of the differences, though, is that the MCEM does not *receive* emails: it only *sends* them, and, hence, there is no interference with the emails of the sender account.

In addition, security settings that support email server configurations, not typically found on the internet, are required.

- To select a secure connection with SSL/TLS, check Use TLS? The MCEM validates the certificate for the email server host.
- For servers that do not allow TLS Start to be enabled, clear the check box, Use TLS?

See Table 24 for descriptions of the configuration parameters for email.

Procedure

To configure email when not using the MCEM as the email server (see Figure 49), do the following:

1. Check the box for Activate Email Notification.
10. If Use MCEM Email Server is checked, clear the checkbox.
11. Enter the URL and port for the email server.
12. Enter the sender's email address and password.

Note The password is encrypted and masked. To see the password before it is saved, check the Show checkbox.

13. Enable TLS and TLS Start unless these are not supported.
14. Enter the recipient's email address.
15. Click Save.
16. Click Test. A notification appears that the test email is about to be sent. Up to 2 minutes later, a message appears that indicates whether the email was sent. If it was not sent, see Appendix D on page to troubleshoot the issue.

Table 24: Email Configuration Parameters

Parameter	Description
Activate Email Notification ?	Option to enable the sending of emails to recipient
Use MCEM Email Server ?	Option to use the MCEM as an email forwarder. If this option is not selected the MCEM acts as an email client.
Server Online Check	Pings the server to check whether it is available on the network
Email Server URL	DNS lookup address of the SMTP email server, such as, *smtp.domain.com*
Email Server Port	Port used to access the server, such as *465*.

Sender's Email Address	Address of the client email account used for sending, such as, *accountname@domain.com*
Sender's Email Account Password	Password for the sender's email account (encrypted)
Use TLS ?	Enables security with email host validation. For typical internet email servers, enable this.
Use TLS Start ?	Automatically converts an insecure connection to a secure connection. For some servers, this is not supported, but for most, enable this.
Email Address that Receives Alarms	Address for recipient of emails regarding alarms

Email Host Validation and Man-in-the-Middle Attacks

With every connection to the email server, a certificate is exchanged that allows the MCEM to validate the email host. This involves two steps. First, the fingerprint of the certificate is compared to the fingerprint captured when the MCEM first contacted the email server. If they do not match, the expiration date of the original certificate is compared with the system's date. If the certificate expired, the new server certificate is accepted. If the expiration did not take place, and the fingerprints do not match, then an error is logged.

The action taken in this case is to stop sending email. Daily Status messages stop arriving. There is always the possibility that a man-in-the-middle attack compromised the integrity of the network connection, either through an intercepted cellular signal or via the local Ethernet network. See Appendix D for further discussion of steps to take if Daily Status messages top arriving.

4.13. Notification Setup (Station User Only)

Each of the input channel pairs on the monitor corresponds to three pins in the DA-15 port that are connected to an internal relay of the monitor. These relays may be connected to a third-party device to facilitate remote monitoring of alarm conditions (Section 3.3). The relays de-assert during an alarm condition of the system on one or more of the physical input channels.

In the web interface, Station users can add a specific set of alerts to trigger a channel pair relay notification. These alerts are labeled as Code Check/Unknown/Wrong and No Audio condition and listed below Figure 51. In addition, for AM stations that normally operate at low power, this page includes a means of suppressing false alarms during low-power operation.

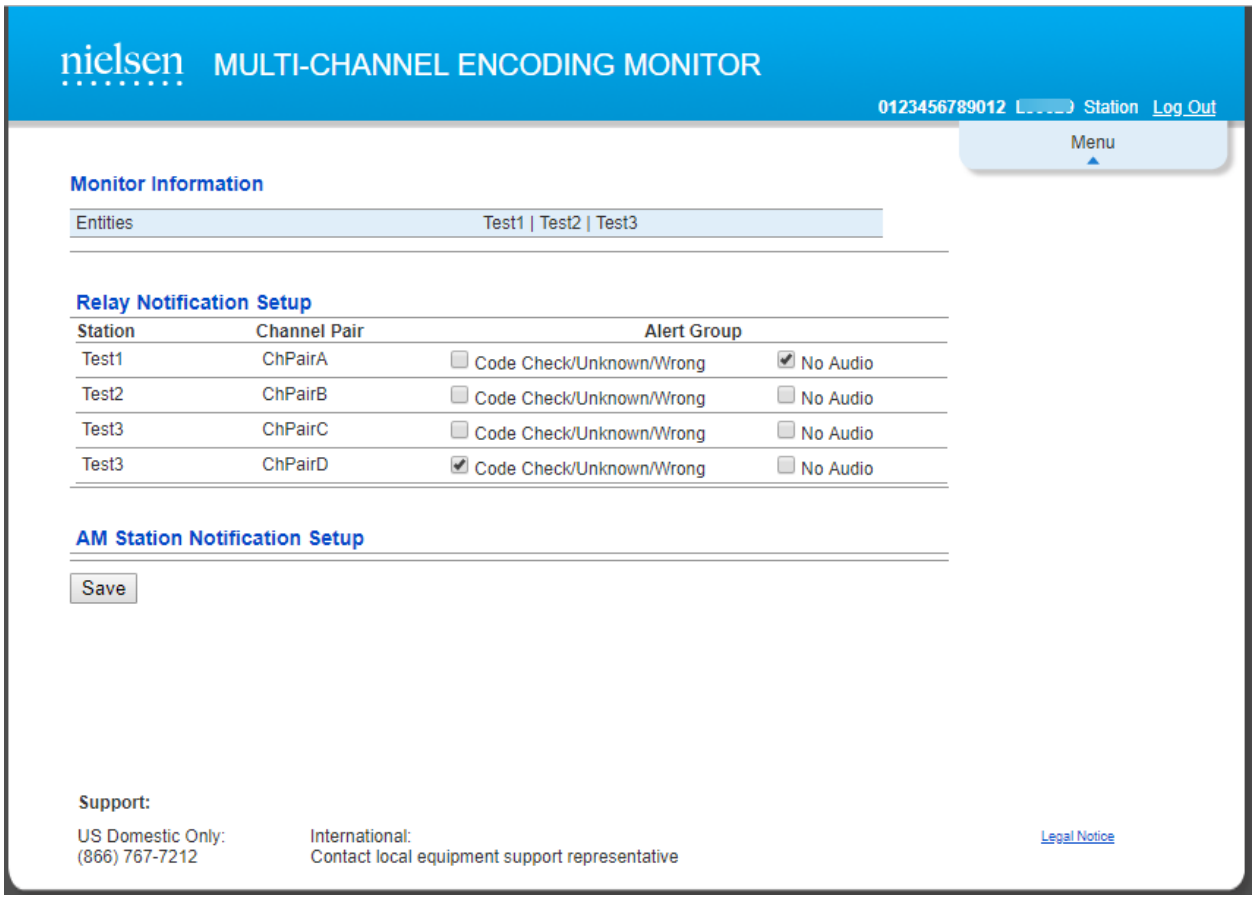


Figure 51: Notification Setup View

- Relay Notification Setup
  - Alert Group: Code Check/Unknown/Wrong
- 118 ALERT CodeChk Fail Expected Codes are Not Being Detected

- 120 ALERT Wrong Code The Wrong Code is Detected
- 122 ALERT Unknown Code A Code has No Alias Assigned
    - Alert Group: No Audio: 136 ALERT No Audio No Audio Connection is Detected
- AM Station Notification Setup: Low Power Alarm Suppression—when enabled, suppresses false alarms during low power operation for the monitored station

5. Update Configuration, Firmware, or License

When the monitor does not have connectivity to a wide area network (WAN) and so does not automatically receive and install updates from Nielsen, you can manually update the configuration, firmware, and license for the monitor with an update package that Nielsen delivers to you. Do either of the following to update the monitor:

- Primary method: save the file to a PC hard drive or LAN drive or to a USB drive that you will insert into a PC accessible by the monitor. A Station user can use the Download/Upload File page of the web interface to apply the update (Section 4.6).
- Secondary option: save the file to a USB file storage device and insert the device into the USB port on the front panel of the monitor. For assistance with installing update, see “Contacts” on page .

6. Status/Error Messages

There are three basic status categories of text on the LCD display on the front panel when it displays the default audio monitoring page.

- ALARM: appears in upper case with a blinking red LED for each channel of the four pairs. A channel pair is composed of left and right channels of audio in a stereo configuration.
- Alert: appears in lower case text with a blinking green LED for each channel pair, but does not display by default unless there are no alarms present.
- Encoding Ok: appears in solid green LED in mixed upper and lower case text for each channel pair only when there are no alerts or alarms present for that channel pair.
- When a system alarm is present, associated for example, with the boot-up process, all LEDs appear in solid red.

There are different types of alarms and alerts that are posted when a failure condition is either present for all channels that are monitored for a station, or whenever a failure for any particular channel of a station is present. These are two examples:

- If the monitor detects multiple attempts to encode on the same “layer” (referred to as “double encoding”) on any channel being monitored, the alarm, DBL ENCODING, appears for the corresponding channel pair.
- On the other hand, only if there is a low audio level present for all channels monitored for a particular feed does the LOW LEVEL alarm appear (default configuration).

7. Nielsen Multi-Channel Monitor

Specifications

7.1. Enclosure

The MCEM monitor is designed to fit in an industry standard 19” equipment rack. Its frame is made of metal, and the dimensions are:

- 1 RU (1.75") high
- 12 5/8" deep

7.2. Front Panel

From left to right, the features on the front panel of the MCEM monitor are:

- Four LEDs for status indication (including both encoding status and system status)
- LCD (4 lines X 40 characters)
- 6 LCD menu buttons
- USB 2.0 host type A ports (USB file storage device)

7.3. Rear Panel

From left to right, the rear panel features are:

- Electrical ground post
- Universal Power IEC-320 input socket
- Relay contact interface for status monitor (DA15-pin female socket)
- Two USB 2.0 host type A port

- Subminiature version A (SMA) antenna jack providing a connection to the internal cellular modem
- RJ-45 Ethernet jack with integrated transmission/reception link status LED indicators
- Eight combined female balanced XLR jacks with pushbutton release/unbalanced quarter-inch tip-sleeve phone jacks (combo jacks) for audio input

7.4. Side Panels

- Vent openings for passive cooling
- Rack mount brackets

7.5. USB Host Interfaces

The front-panel USB 2.0 type A host interface is used to:

- Update the MCEM monitor configuration parameters, firmware, and license from a flash memory device
- Download the encrypted log file from the MCEM monitor to a flash memory device.

The rear-panel USB 2.0 type A host interfaces are used to stream critical system events and real-time status for each of the audio sources being monitored. These status events can be captured by a third-party device connected to the monitor with a USB cable with a USB type A male plug at the monitor end and an RS232 serial plug at the other end. Either USB port on the monitor may be used for this purpose, but only one port at a time may be used.

7.6. Ethernet Interface

The rear-panel Ethernet interface:

- Complies with the IEEE 802.3-2002 standard for wired network communications
- Complies with TCP/IP version 4 (IPv4)
- Supports 10/100Mbps connections, auto-sensing
- Supports both internal and external networks with one Ethernet controller
- Uses an Organizationally Unique Identifier (OUI) assigned to Nielsen by the IEEE: 00:16:6E:xx:xx:xx (hex)
- Supports encoder control, configuration, and monitoring via web-based GUI over Ethernet connection

7.7. Rear-Panel DA-15 Port

The rear-panel DA-15 female port provides the following features:

- Remote interface for monitoring encoding status on a channel pair basis
- Remote interface for monitoring the operational status of the unit
- Internal relay contacts rated for 0.3A Max, 24VDC

7.8. Front-Panel LEDs for Encoding Status

The four LEDs on the front of the MCEM monitor provide basic at-a-glance system status or encoding status information as detailed in Table 25.

Table 25: Encoding Status LED Colors

LED Color	Meaning
Solid red	One of the following: • The system is booting up • A system alarm is in effect. Refer to the front-panel LCD for System Status view
Solid green	The channel set associated with the channel pair is encoded correctly. (Also, the LED is green if the corresponding channel is not configured and the LCD displays the text, “Inactive.”)
Flashing red/off	One or more alarms are present for the channel set associated with the channel pair.
Flashing green/off	One or more alerts are present for the channel set associated with the channel pair.

7.9. Front-Panel LCD

The front-panel LCD (Item 2 in Figure 1) supports four lines of text, 40 characters each.

7.10. Front-Panel Control Buttons

The front-panel control buttons provide the means to navigate the menu displayed on the front-panel LCD. The function of each button is described in Section 3.1.3.

7.11. Environmental

The MCEM monitor is designed to operate in an ambient temperature of 0 –35° C.

7.12. BTU Output

The MCEM monitor generates 120 BTUs per hour, assuming it is operating at 117.8V, 35.1W.

7.13. Power Input

The MCEM monitor uses power meeting the following specifications:

- 100-240 VAC
- 40 Watts
- 50/60 Hz

7.14. SNMP

The monitor supports SNMP version 1 and version 2c connections for read-only access and notifications.

- GET commands retrieve status information.
- The monitor can be configured to send SNMP Trap notifications to an SNMP manager.

7.15. DHCP

The MCEM monitor can be assigned an IP address, sub-net mask, and optional gateway address either statically or dynamically. Dynamic assignment uses DHCP. DHCP must comply with IPv4.

The user may disable DHCP to manually set the IP address, subnet mask, default gateway, and domain name system for the monitor Ethernet port.

Important When DHCP is disabled, it is the user's responsibility to assign an IP address that ensures proper HTTP operation of the monitor, and does not interfere with any other device on the LAN. For example, do not use the 0.0.0.0 and 127.0.0.1 IP addresses because 0.0.0.0 cannot be resolved and 127.0.0.1 is the standard loopback address for all IP devices.

7.16. HTTP

The MCEM monitor provides HTTPS access via the Secure Sockets Layer (SSL) protocol. The Nielsen Root CA certificate should be installed onto the connecting computer to allow that computer to recognize that the connection is valid and secure. The monitor root web page provides instructions for installing the certificate (Section 0). It is possible to communicate with the MCEM monitor before installing the certificate by ignoring the certificate error; see Section 2.4.2.

Monitor configuration, control, and status information is available through the HTTP interface using a web browser. Configuration and control changes require proper authentication. The monitor web pages require that JavaScript® be enabled. The web pages have been tested using the following browsers:

- Microsoft Internet Explorer®
- Firefox®
- Chrome™
- Safari®

7.17. Analog Audio Input Specifications

The following specifications describe the rear-panel analog input connections:

- Maximum steady input level: +19 dBu (19.5 Vp-p) Occasional spikes above this level do not affect performance.
- Connectors: Combined female balanced XLR jacks with pushbutton release/unbalanced quarter-inch tip-sleeve phone jacks (combo jacks)
- Input impedance characteristics: 600 ohm or high impedance (>10k ohms)

Note See also Table 2: Audio Input Level and Acceptable Range.

7.18. EMC/Safety Standards

The MCEM monitor has been tested for compliance with the following standards:

EMC

- Title 47 of the Code of Federal Regulations (CFR), Part 15 Subpart B for a Class A Digital Device
- ICES-003 Issue 5, August 2012 for a Class A Device, Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard for Digital Apparatus

- ETSI EN 301 489-1 with ETSI EN 301 489-17 (Article 3.1(b) of R&TTE Directive)

Safety

- UL60950-1/CSA C22.2 No. 60950-1, Information Technology Equipment - Safety - Part 1: General Requirements
- IEC60950-1, Information Technology Equipment-Safety-Part 1: General Requirements
- EN60950-1, Information Technology Equipment-Safety-General requirements

Appendix A – Install and Use a Security Certificate

Overview

If you use HTTP to access an MCEM monitor, Nielsen recommends that you install the Nielsen 1000-1220 Monitor Root CA certificate on the PCs used to access the monitor. When you use HTTPS to access the monitor, the MCEM monitor uses Secure Sockets Layer (SSL) authentication. Until an SSL certificate is installed on the PC connected to the monitor, accessing the monitor through HTTPS causes a warning message to appear. (See Figure 52) This message provides two pieces of information that you need:

- The correct address to use HTTPS to retrieve the certificate from the monitor, which is http://<hostname-or-ip-address>/NielsenAudioMonitorRootCA.cer.
- Information that you or the network administrator can use to install this certificate and add an entry for the monitor to the Hosts file on the PC.

The warning that appears does not prevent access—clicking through it just adds more steps to the login process. It is possible that, after installing the certificate, the browser may require you to view or inspect the certificate the next time that you launch the browser.

Install this certificate regardless of the version of Windows or type of web browser used to access the monitor. The certificate applies to most of the other supported browsers. If you install the certificate on a Windows XP system, you may need to contact Nielsen.

The procedure covers using Chrome as the means to do the following:

1. Import the certificate in *.cer format.
2. Install the certificate in *.cer format.
3. Export the certificate in *.p7b format (as a PKCS #7 certificate).
4. Import the PKCS #7 certificate. You must do this step twice.
5. Create an association in the Windows hosts file between the IP address for the monitor and its domain name.

Procedure

Step One: Import Certificate

1. Ensure that **Chrome** has the most recently available update.
2. In the browser address bar, type the IP address of the monitor when the Ethernet connection is established (Section 2.1.2) and press Enter. An alert appears (Figure 52).

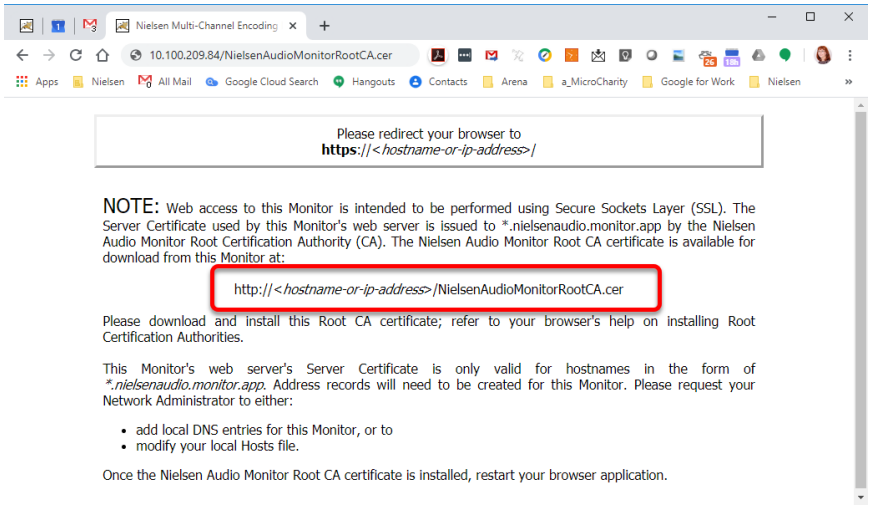


Figure 52: Message to Download Root Certificate

3. In the address bar, type the **host name** or **IP address** for the monitor and add **/NielsenAudioMonitor.cer** then press **Enter**.

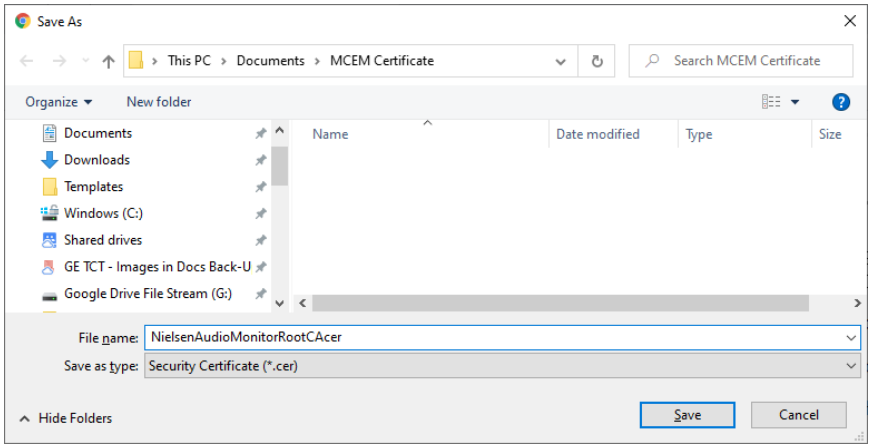


Figure 53: Save Certificate

4. Click **Save**.

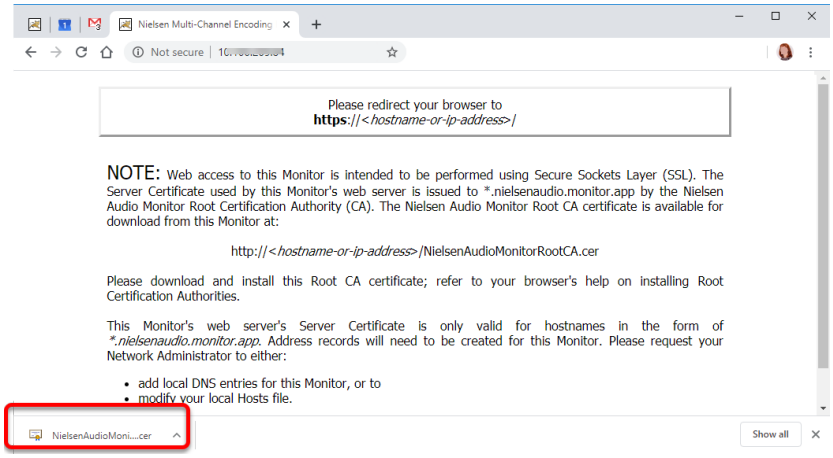


Figure 54: Root Certificate

5. Click the download notification in the lower left corner. A dialog box appears (Figure 56).

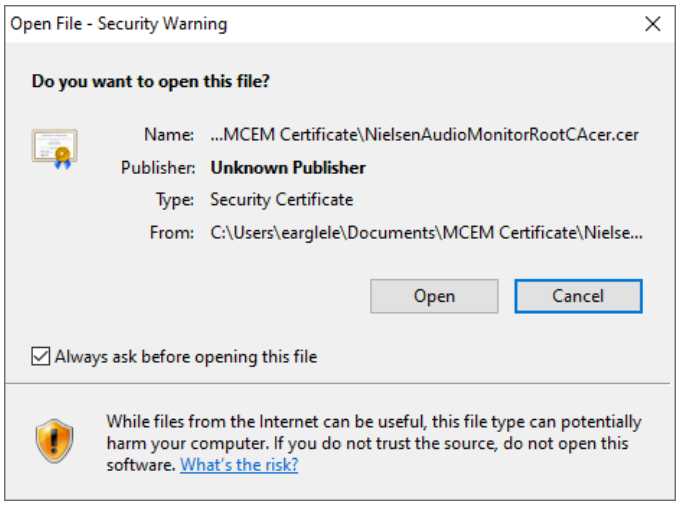


Figure 55: Open Certificate File

6. Click **Open**.

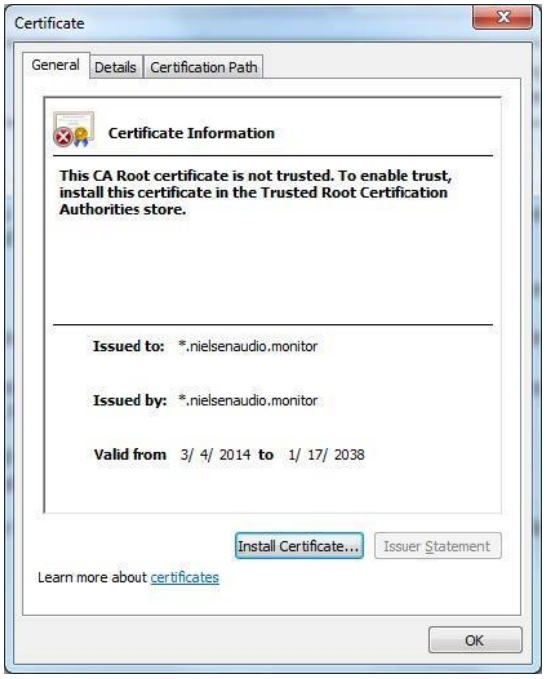


Figure 56: Install Certificate

7. Click **Install Certificate**. The first screen of the Certificate Import Wizard appears (Figure 57).

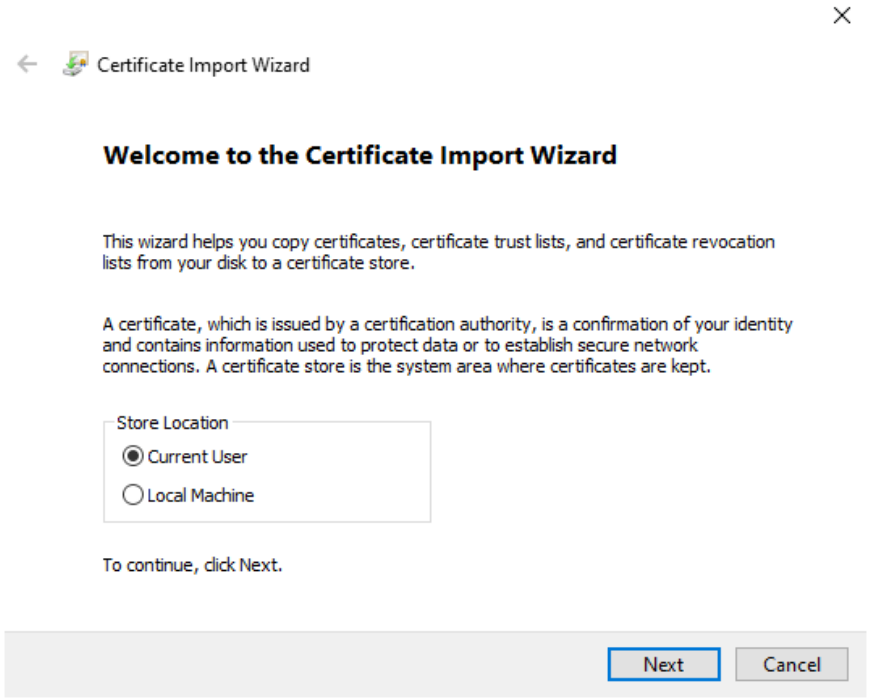


Figure 57: First Dialog of the Certificate Import Wizard

8. Click **Next**. The dialog show in Figure 58 appears.

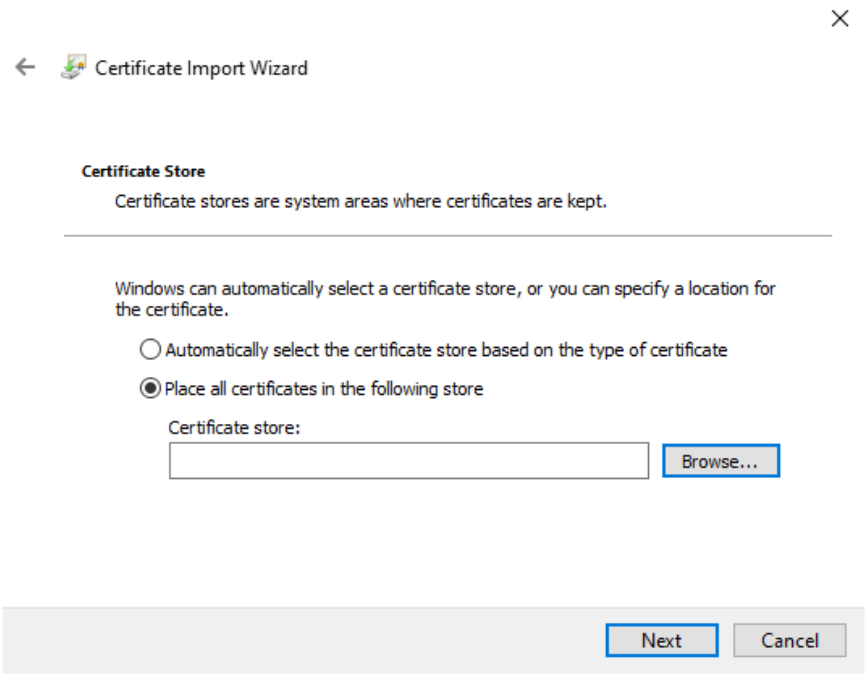


Figure 58: Specify Certificate to Import

9. Select **Place all certificates in the following store** then click **Browse**.

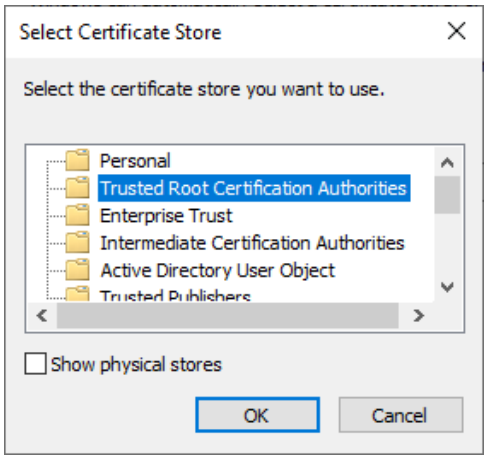


Figure 59: Select Certificate Store

10. Select **Trusted Root Certificate Authorities** and click **OK**.

11. On the dialog that appears (Figure 60), click **Finish**.

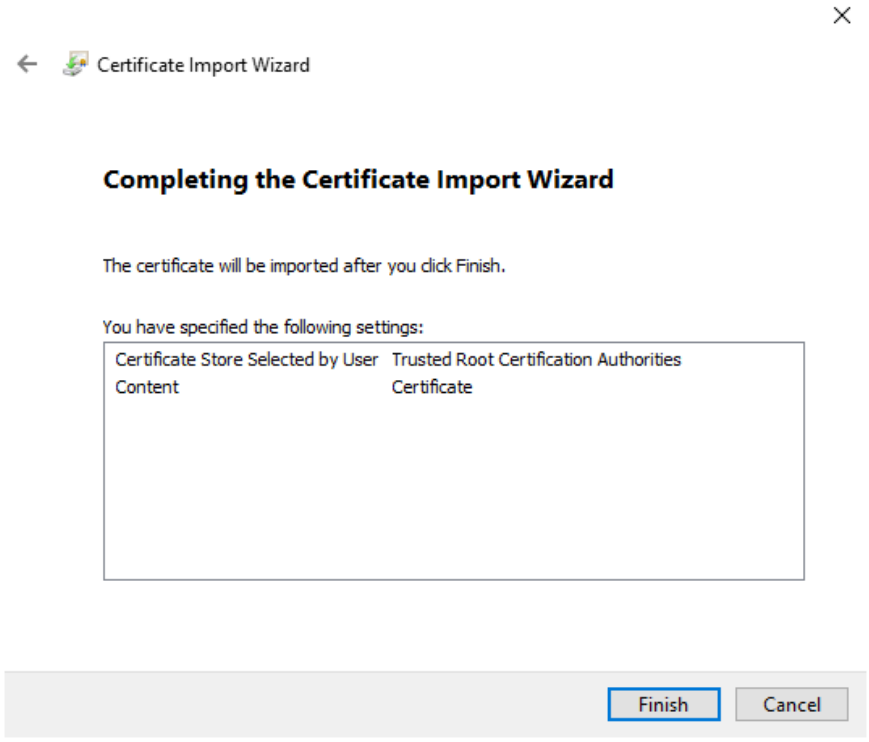


Figure 60: Certificate Import Completed

12. When the import is complete, a security warning may appear. Click **Yes**.

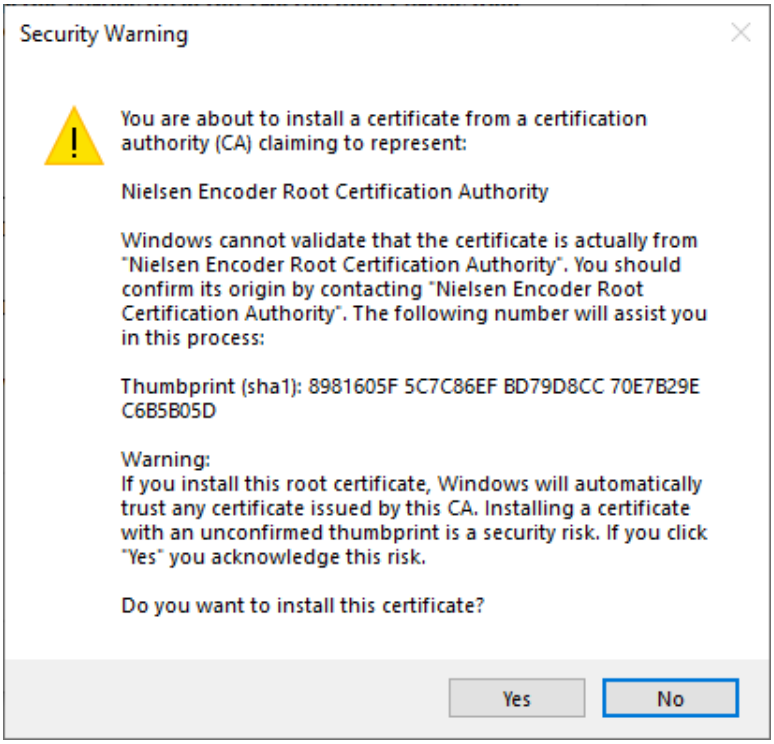


Figure 61: Security Warning

13. On the confirmation dialog box (Figure 62), click **OK**.

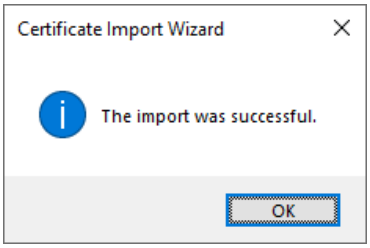


Figure 62: Certificate Import Confirmation

14. Close **Chrome**.

Step Two: Install and Export Certificate

Install and Export PKCS #7 Certificate

This procedure enables Chrome to automatically accept a self-signed certificate.

1. Launch **Chrome**.
2. Type the **host name** or **IP address** for the MCEM monitor and press **Enter**.

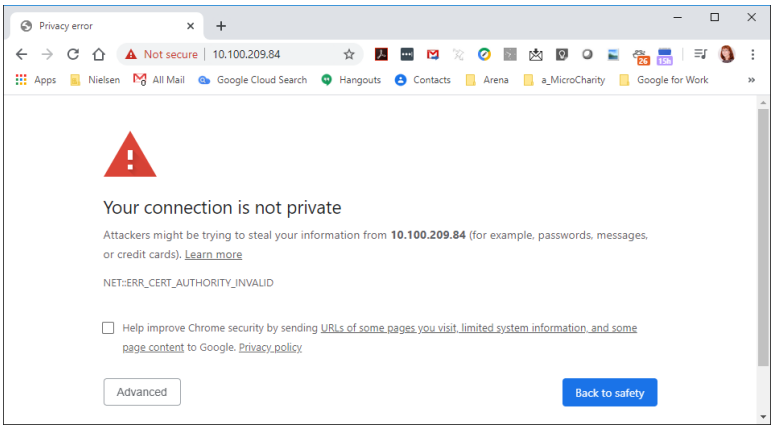


Figure 63: Not Secure Warning in Chrome

3. On the address bar, click **Not Secure** then click **Certificate (Invalid)** as shown in Figure 64.

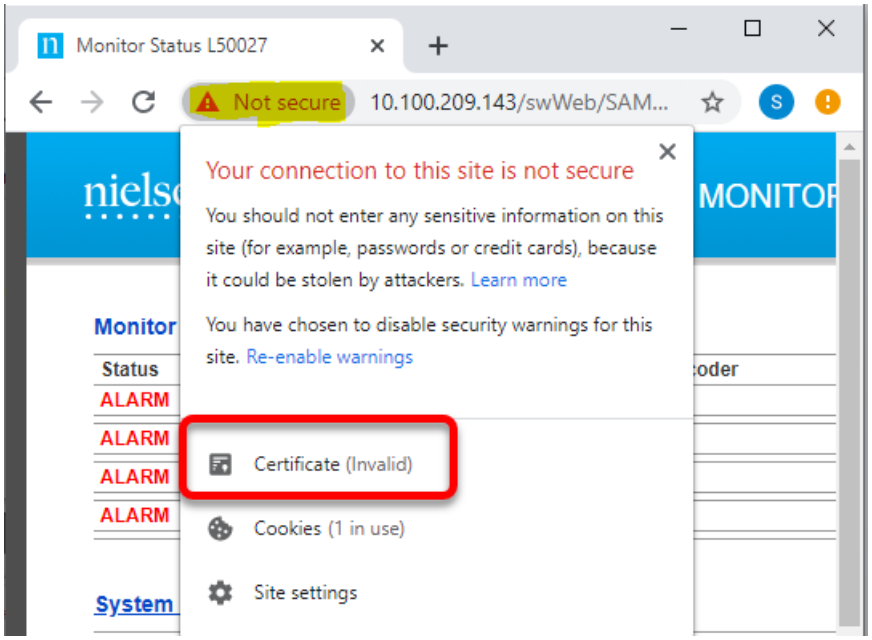


Figure 64: Click "Not Secure" Warning

4. On the **Certificate** dialog box (Figure 65), select the **Details** tab then click **Copy to File**.

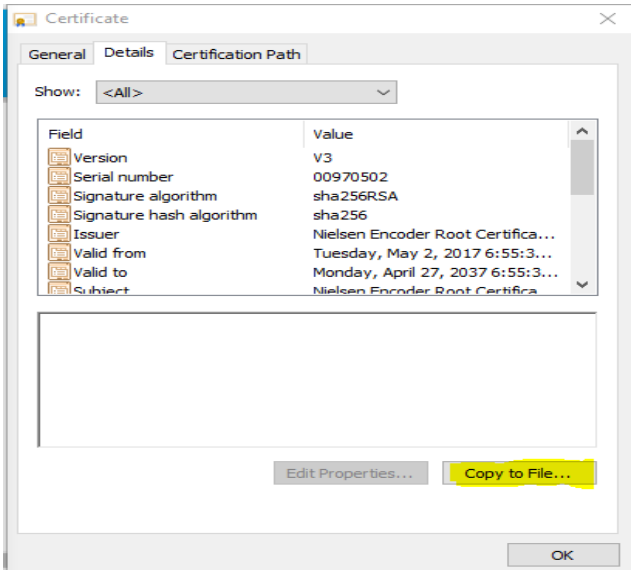


Figure 65: Copy to File

5. The Certificate Export Wizard opens. Click **Next.**

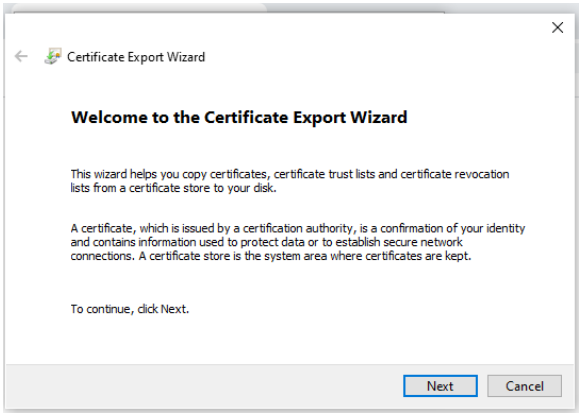


Figure 66: Certificate Export Wizard Startup

6. To export the certificate in the correct format, select **Cryptographic Message Syntax Standard – PCCS #7 Certificates (.P7B)** as shown in Figure 67.

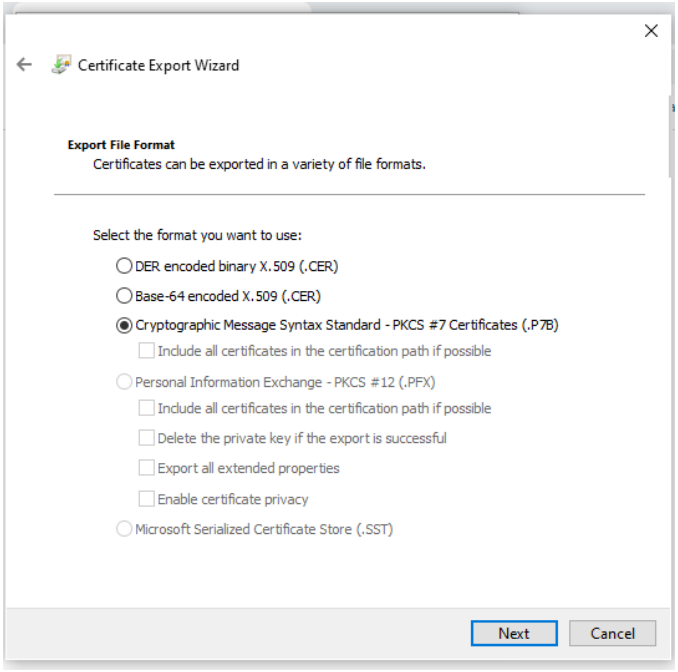


Figure 67: Select the P7B format to export certificate

7. Browse to the folder where you want to save the exported certificate the click **Next**.

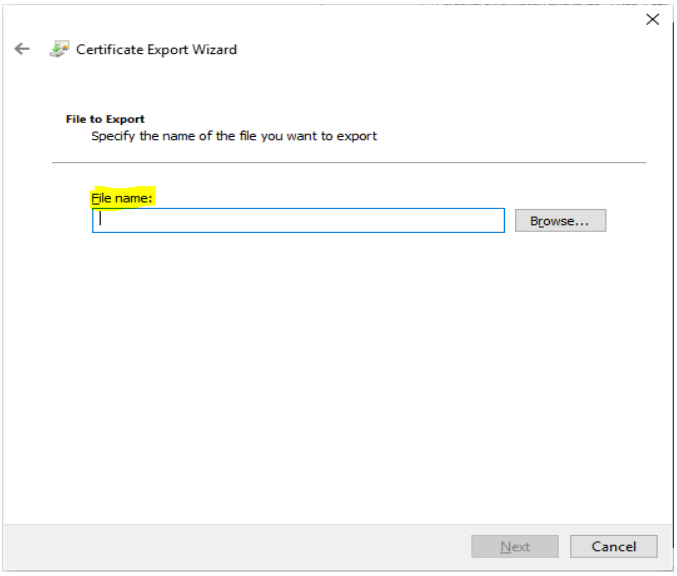


Figure 68: Certificate Export Complete

8. Chrome exports the certificate. Click **Finish**.

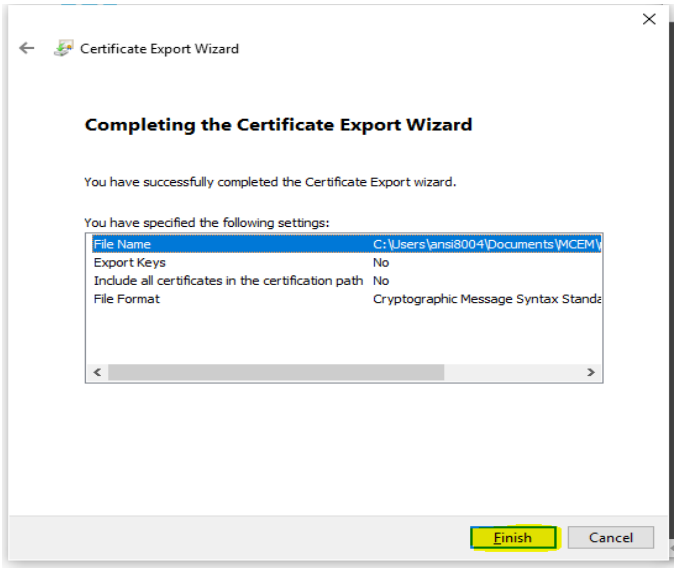


Figure 69: Specify Path to Export Certificate

9. On the confirmation message, click **OK**.

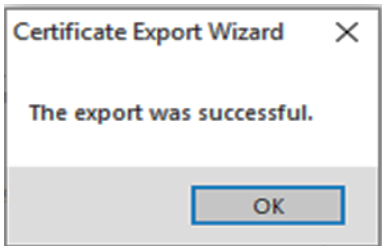


Figure 70: Certificate Successfully Exported

10. On the **Certificate** dialog box (Figure 65), click **OK**.

Import Certificate into the Settings for Chrome

1. In **Chrome**, click the three dots in the upper-right corner of the browser window, and select Settings (Figure 71).

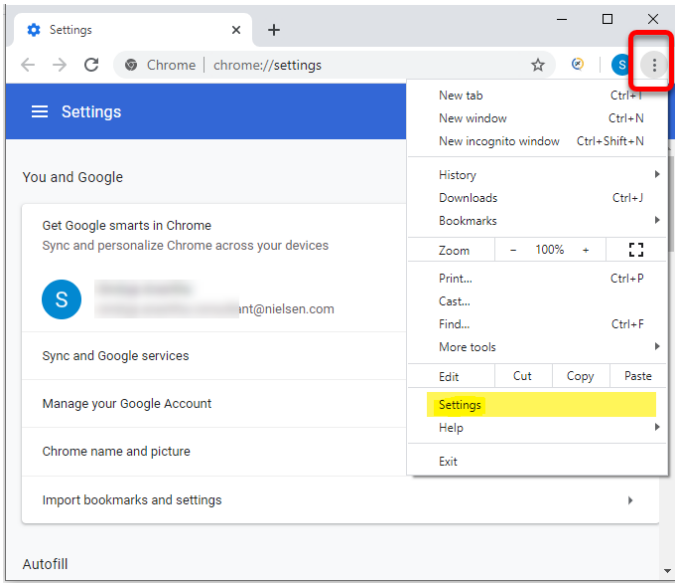


Figure 71: Open Browser Settings

2. At the bottom of the **Privacy and Security** section on the Settings page, click **More** then click **Manage certificates** (Figure 72).

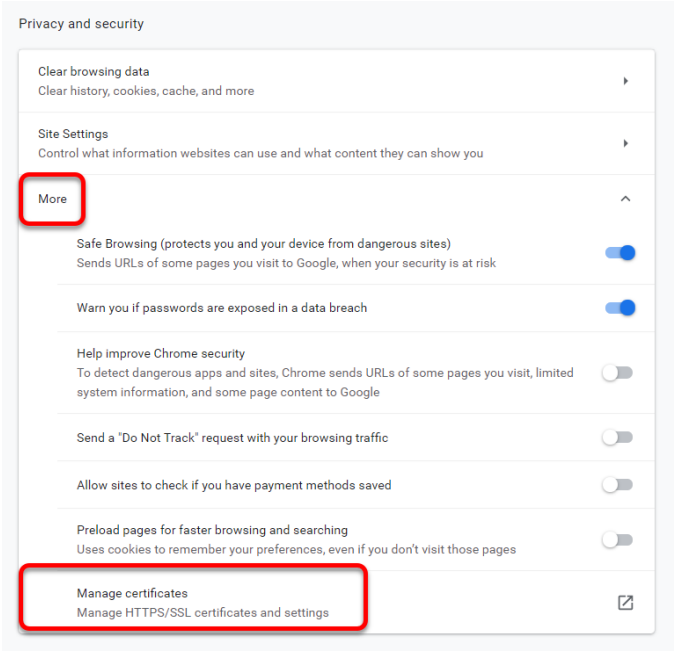


Figure 72: Manage Certificates

3. On the **Certificates** dialog box, click **Import** (Figure 73).

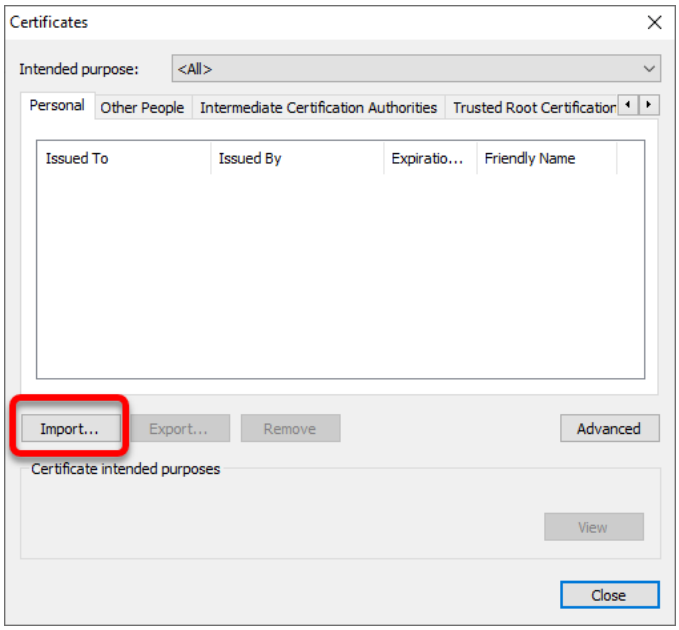


Figure 73: Import Certificate into Browser

4. The Certificate Import Wizard starts (Figure 74). Click **Next**.

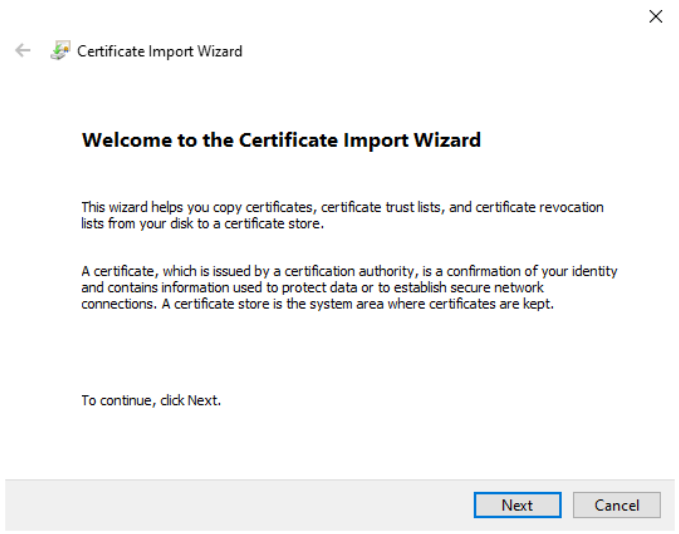


Figure 74: Certificate Import Wizard Start

5. Browse to **NielsenAudioMonitorRootCA.cer**, which you saved in the previous procedure and click **Open** (Figure 75).

Note If the file does not appear in the folder, in the lower right corner of the Open dialog box, select All Files (*.*), which is circled in Figure 80.

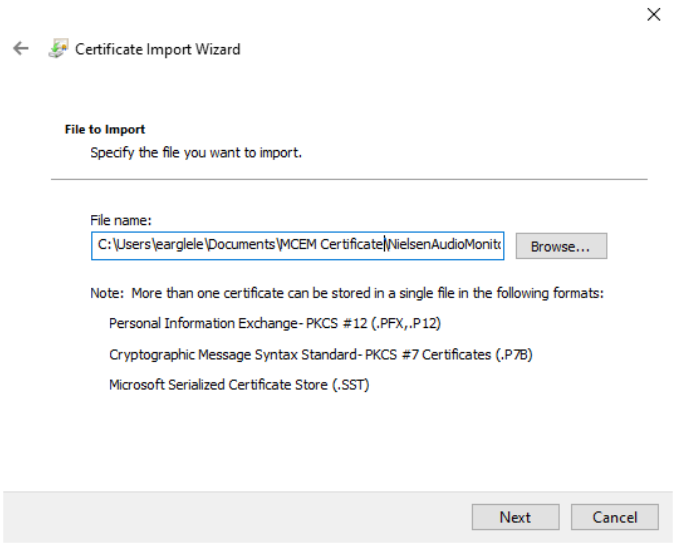


Figure 75: Select Certificate to Import

6. Click **Next**.
7. In Select **Certificate Store**, select **Trusted Root Certification Authorities** and then click **OK**.

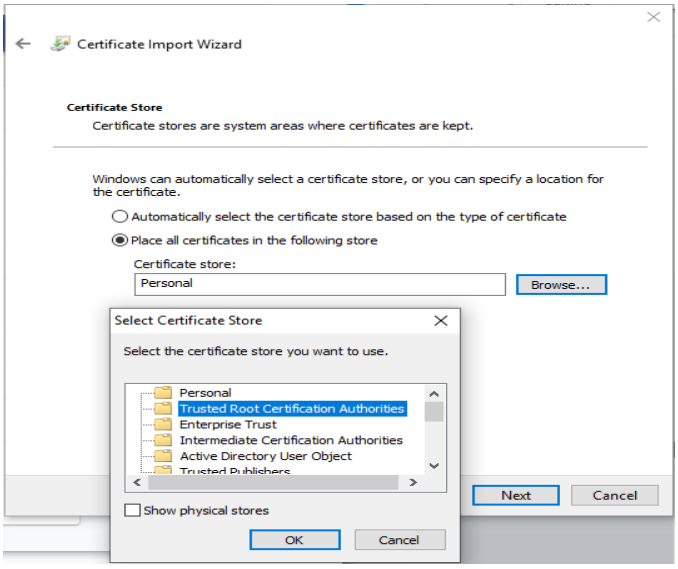


Figure 76: Select Certificate Store

8. On the **Certificate Import Wizard**, click **Finish**.

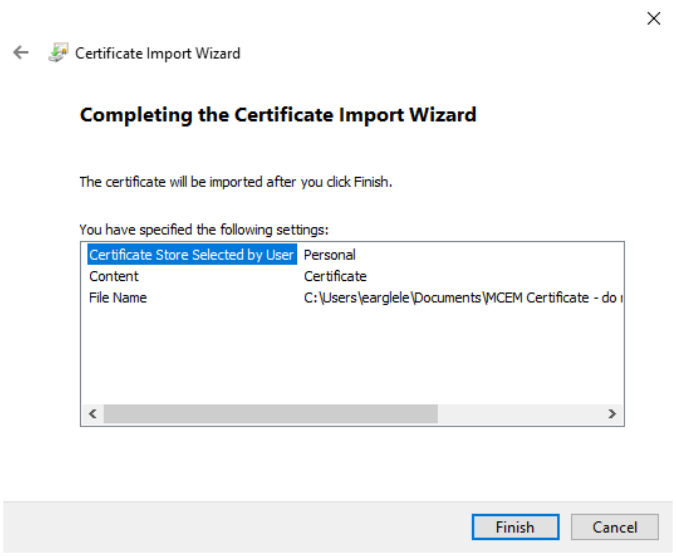


Figure 77: Certificate Import Complete

9. When the import is complete, a security warning may appear. Click **Yes**.

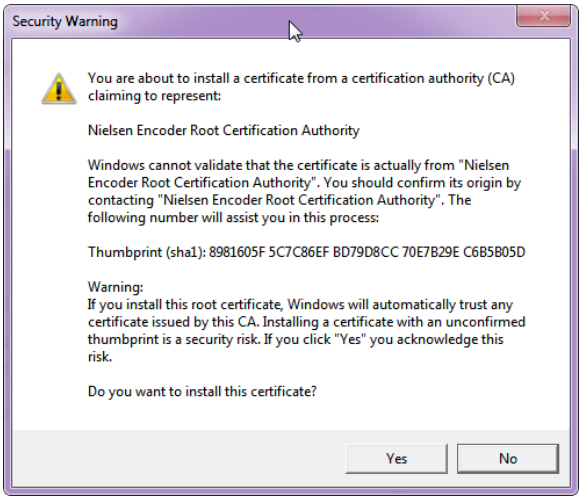


Figure 78: Security Warning

10. Close **Chrome**.
11. When you re-launch **Chrome**, one of the following occurs:
    - If this is the first time you have performed this procedure, the certificate warning, Not Secure, appears again in the address bar. Repeat this procedure from step 1.
    - If this is the second time you have performed this procedure, go to **Step Three: Create a Host Name Association for the Monitor**.

Step Three: Create a Host Name Association for the Monitor

Whether you use Internet Explorer or Chrome, before a computer can use an installed security certificate to access the MCEM monitor, someone with system administrator rights must add a host name associated with the IP address for each monitor to the hosts file on the computer.

1. On the **Start** menu in Windows 10, navigate to **All Programs > Accessories** and right-click the **Notepad** entry.
2. Select **More > Run** as administrator (Figure 79).

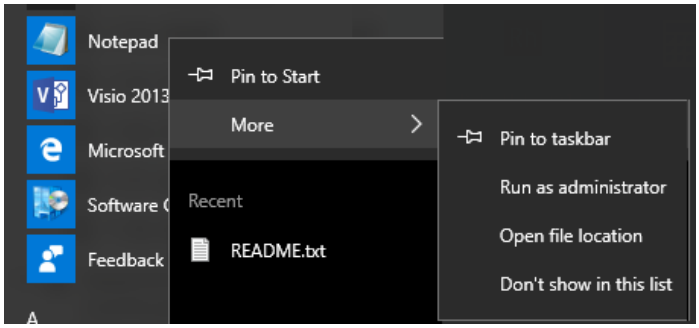


Figure 79: Run Notepad as Administrator

3. In **Notepad**, click **File > Open** and browse to Windows\System32\drivers\etc\ and open the **hosts** file.

Note If the hosts file does not appear in the etc folder, in the lower right corner of the Open dialog box, select All Files (*.*), which is circled in Figure 80.

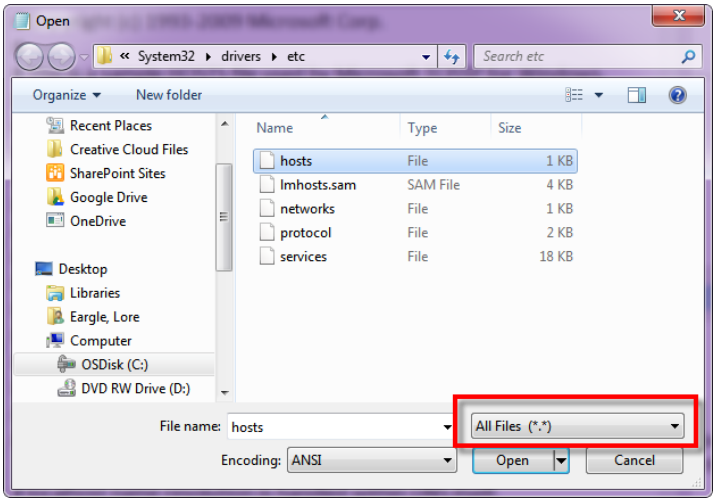


Figure 80: Contents of etc Folder

4. In **Notepad**, at the end of the **hosts** file (Figure 81), do the following:

a. Add a line.

b. Enter the IP address to associate with the certificate.

c. Type one blank space.

d. Enter a host name to be associated with the IP address and the monitor SSL certificate. Nielsen recommends that you use the following format to so you can distinguish among Nielsen monitors when you have more than one:

nn.nnn.nnn.nnn MCEMxxxxx.nielsenaudio.monitor.app

Where:

- nn.nnn.nnn.nnn is the IP address
- xxxxx is the serial number that appears on the label with the bar code on the front panel of the monitor.
- nielsenaudio.monitor.app is the domain with which the certificate is associated.

Example

Figure 81 shows the contents of a host file that includes an MCEM monitor with the IP address 10.222.333.444 and serial number X9876Y:

10.222.333.444 MCEMX9876Y.nielsenaudio.monitor.app

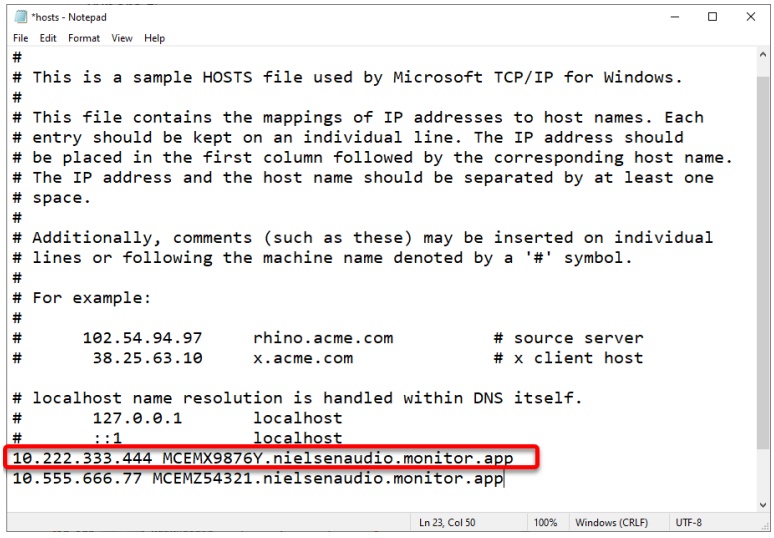
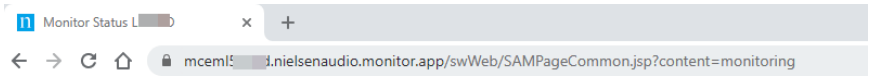


Figure 81: Example Hosts File

5. Do one of the following:

- If the facility has no more monitors, save the file and exit **Notepad**.
- If the facility has another monitor, repeat step 4.

6. Save the file and close it. When you log into the monitor the address bar should no longer display a warning on the address bar.



Appendix B – Real Time Remote Serial

Status Messages

Note See Section 3.4. ”Use the Rear Panel Serial Status Output.”

INFO, ALERT, and ALARM Messages

The ASCII messages output though the rear-panel USB ports come in three severity levels:

1. INFO messages provide information related to non-error conditions
2. ALERT messages provide notification of issues that indicate abnormal states that do not affect monitoring.
3. ALARM messages provide notification of system error conditions that affect monitoring or indicate errors detected with the encoding of the monitored audio.

The following lines show an example of the output from the remote serial status:

```
<NOTE@P[0000368798][2014-09-15 13:42:15.677][ENCODING][INFO][WNII-FM][Encoding OK]>
<NOTE@P[0000368799][2014-09-15 13:42:15.696][ENCODING][INFO][WKRP-AM][Encoding OK]>
<NOTE@P[0000368800][2014-09-15 13:42:15.716][ENCODING][INFO][KCCC-TV][Encoding OK]>
<NOTE@P[0000368801][2014-09-15 13:42:15.725][ENCODING][INFO][KCCC-TV][Encoding OK]>
<NOTE@P[0000781421][2014-09-15 13:44:59.017][ENCODING][INFO][WREQ-FM][Encoding OK]>
<NOTE@P[0000781422][2014-09-15 13:44:59.091][ENCODING][INFO][WKRP-AM][Encoding OK]>
<NOTE@P[0000781423][2014-09-15 13:44:59.137][ENCODING][ALARM][KCCC-TV][Low Level]>
<NOTE@P[0000781424][2014-09-15 13:44:59.151][ENCODING][ALERT][KCCC-TV][Silence ]>
<NOTE@P[0000781425][2014-09-15 13:44:59.112][ENCODING][ALARM][KCCC-TV][CodeChk
Fail]>
<NOTE@P[0000781426][2014-09-15 13:44:59.124][ENCODING][ALARM][KCCC-TV][MSSChk
Alarm]>
```

Detectability and Encodability

The Detectability and Encodability data is output to the back panel USB serial port every minute.

Detectability is the per-minute-view of the confidence of detections by a PPM on a scale of 1 to 4. The two messages below show that, for the Mars station, the MSS level was 4.550 for the left channel and 4.520 for the right channel and the confidence level is 4, which is the maximum possible.

<NOTE@P[00000000137][2017-08-29
09:14:00.000][DETECTABILITY][METRIC][Mars_L][4.550][4]>
<NOTE@P[00000000136][2017-08-29
09:14:00.000][DETECTABILITY][METRIC][Mars_R][4.520][4]>

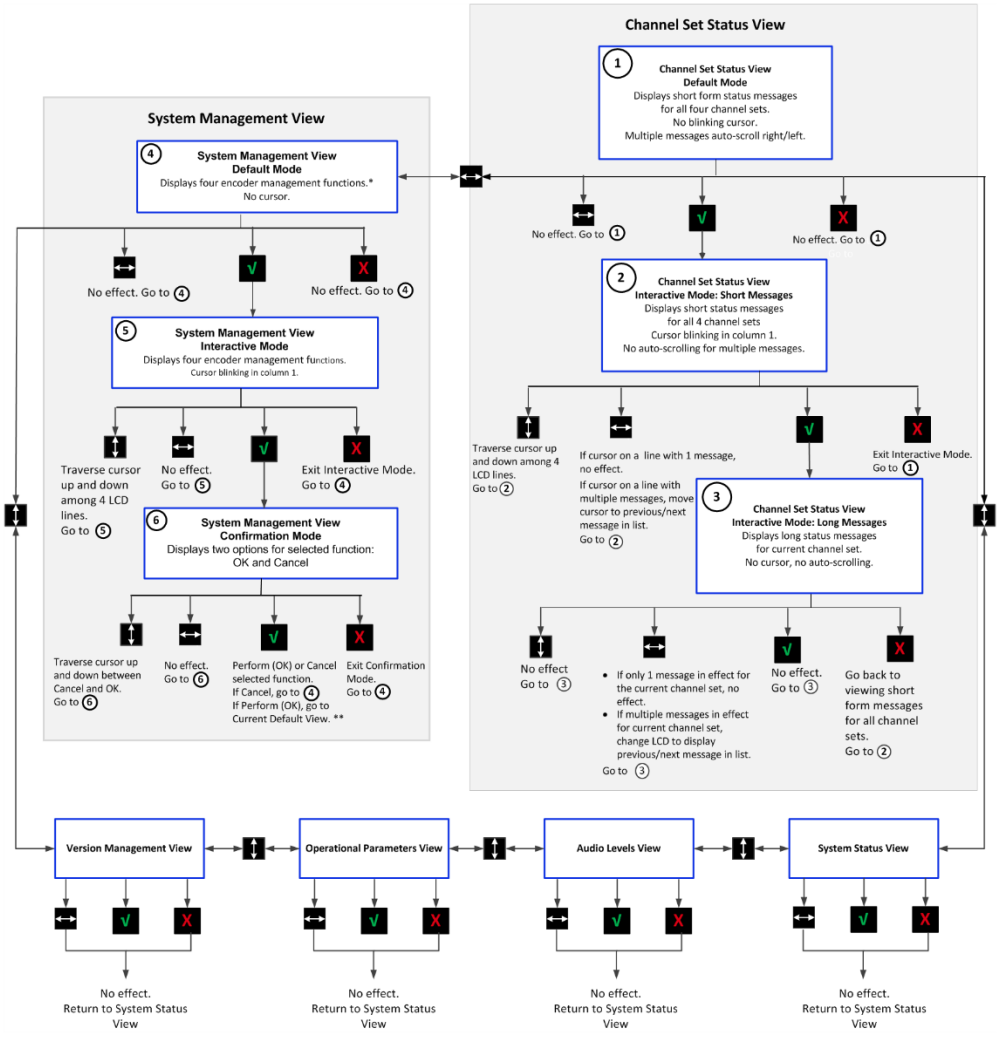
Encodability is a percentage calculated by dividing the number of codes inserted per minute on the left and right channels by the maximum number of codes that are possible to insert (up to 12.5 codes per minute on each channel). The example below shows that, for the Sun station, approximately 7 of the 12.5 codes per minute that could be detected were detected; this is approximately 58% of the codes.

<NOTE@P[00000000135][2017-08-29 09:13:00.000][ENCODABILITY][METRIC][Sun][7][58]>

Note See also Section 4.7 “Detectability Confidence View” and Section 4.8 “Encodability Confidence View.”

Appendix C – Front Panel LCD Map

The diagram below provides a detailed summary of how to use the MCEM monitor front-panel buttons and LCD menu. This diagram is intended as a reference for users who are already familiar with the front-panel controls (Section 3.1).



*Encoder Management Functions

- Shutdown monitor
- Reboot monitor
- Immediate connect Nielsen Audio

- Reset network configuration

**Default View

- During boot-up, the default view (System Status) is in effect.
- When boot-up is complete, if the monitor detects system alarms, the default view remains the System Status view. If the monitor detects no system alarms, the Channel Set Status view in Default mode is in effect.
- If a critical event is triggered (such as insertion of a USB drive into the port on the front panel), the Critical Event view (not shown in this diagram) is in effect.

Appendix D – Troubleshooting Email

This appendix covers the following issues:

- Attempt to send email may have timed out
- Authentication fails (non-specific)
- Authentication fails: user account or password not recognized when Test button is clicked
- Cellular signal strength is weak
- Configuration parameters are not recognized in test
- Daily status notification email messages do not arrive
- Email is sent, but not received
- Email server port not accessible when Test button is clicked
- Email server URL not found when Test button is clicked
- MCEM as a Server Option does not work
- TLS fingerprint required
- TLS handshake error

Attempt to Send Email May Have Timed Out

On the Email Configuration tab, if you selected Use MCEM Email Server and yet sending email times out, consider the following:

1. The email was sent, but not in time for the status to be reported back to the Web client. Check whether the email has been received, including looking in a spam folder.
2. The problem could be network related. Try the following:
    - To check whether the MCEM Email Server is running, on the Email Configuration tab, do the following:
        a. Click Use Server Online Check.
        b. Click Save.

c. Click Test.

- If the MCEM is configured to communicate to an email server through Ethernet, the MCEM Server may be attempting to access servers via this connection using standard email ports. Check the gateway firewall for the local network. If that is not the issue, contact Encoder Support.

Authentication Fails (Non-specific)

If no other cause described in this appendix relates to the authentication failure, the most likely cause is rejection of the user or device validation by the email server. Log into the email account and look for messages that require you to take action.

Authentication Fails: User Account or Password is Not Recognized when Test Button Is Clicked

The message returned for this case contains a significant amount of feedback, but the problem is that either the email account address or password is not recognized.

Cellular Signal Strength is Possible Problem for Connection

In this case, the unit performs a test to see if it can access a resource on the cellular network. If this fails, then the likely cause is that the cellular signal strength is not high enough. Check the Cellular Signal Strength measurement on the front panel of the MCEM to ensure that the level reads out as a number, and not L. Cellular modem connections can fail for a variety of reasons and be fine in the next attempt.

Configuration Parameters Not Recognized In Test

On the Network Configuration tab, always save changes to the configuration parameters prior to clicking the Test button.

If you did click Save before clicking then Test, look for other issues listed in this appendix. If you do not find a resolution, contact Nielsen Encoder Support.

Daily Status Notification Email Messages Are Absent

If daily status emails are missing, consider the following possible causes:

- The integrity of the network connection could be a cause.
- If cellular service is used to connect to the Nielsen web portal, check the cellular modem signal strength. On the Network Configuration page, in the Portal Connectivity section near the bottom of the page, click Test at the end of the row labeled Cell.
- If Ethernet is used to connect to the Nielsen web portal, on the Network Configuration page, in the Portal Connectivity section, click Test at the end of the Ethernet row.
- If tests are passing, the recipient's server is most likely rejecting the emails.
- Check the recipient's email account to determine if any device or user validation requests are present.
- If no actions are required there, a man-in-the-middle attack is possible. This means that the integrity of the cellular or Ethernet connection could be at fault. Consult with Encoder Support if you need help to address this possibility.
- If the network integrity is not questionable, click the Test button again. This refreshes the server's certificate and allows authentication to pass.

Email Is Sent but Not Received

If the email does not appear in the recipient's inbox or spam folder, the server is likely rejecting the email before it gets to the account. This is a known problem with the option to use the MCEM as a server. Do either of the following:

- Adjust the spam filtering of the receiving server
- Clear Use MCEM as Email Server option and use the MCEM as an email client instead.

Email Server Is Not Found When Test Button Is Clicked

Check to see that the correct SMTP URL is being entered and saved into the email configuration page. If it is saved, then the DNS resolution of the URL for the email server is not happening. Consider the following:

- One way around this is to use *nslookup* on a PC to find the IP address of the email server. This IP address can be used in place of the URL.
- Otherwise, if the email server is accessible via the Ethernet, check the router/gateway (where the DHCP server is running), to ensure that a functional DNS server is being assigned to units that receive their IP address from the DHCP server.

Email Server Port is Not Accessible When Test Button Is Clicked

This will happen when a firewall is preventing access to an email server port, or the wrong port is being used. If the email server is accessible via Ethernet, then the firewall on the Ethernet may be causing this problem.

MCEM as a Server Option Does Not Work

On the Email Configuration tab, you can enable the option, Use MCEM Email Server? See section 4.12.1, “Use MCEM Email Server.” At the time of this release, this option is for trial use. There are several possible explanations for failure to receive email having to do with spam filtering or network security. This feature is included here because it is possible that future changes in security settings will permit this feature to work.

TLS Handshake Error

If the email server is expecting encryption in the connection (e.g., TLS), and the Use TLS option is *not* selected, then a handshake error is returned.

TLS Fingerprint Required

If a message is returned that refers to the requirement for a fingerprint, then you must enable Use TLS Start. Some servers do not support this option and so reject the message. Either this or the email server was not set up with a certificate. If TLS is used, the email server must provide a certificate.

Glossary

This appendix provides definitions for acronyms and terms of art used in this document.

C

Channel

A single stream of audio information.

Channel Pair

Two audio channel physical interfaces often used together to carry a stereo signal. (Member channels of a channel pair may also be used individually to carry a mono signal or part of a surround signal.)

Channel Set

A logical grouping of physical channels that work together to carry a single audio signal. In the encoding monitor, a single channel set may be comprised of one, two, or three channels.

Code Check

Correct code is not being detected with enough frequency to guarantee robust detections.

D

DHCP

Dynamic Host Configuration Protocol. A network protocol that manages network addresses for devices participating in a network so they can communicate with each other using the Internet Protocol.

I

IP

Internet Protocol.

IP address

An Internet Protocol address is a numerical label assigned to each device participating in a computer network that uses the Internet Protocol for communication.

M

Mono input

Monophonic audio signals use a single channel of audio information.

S

Stereo Signal

Stereo signals carry two channels of audio information, referred to as the left and right channels.

Surround Signal

The 1000-1220 and 1000-1222 Encoding Monitors support three-channel surround signals, using right, center, and left channels.

U

Unknown Code

Code that is detected which is not designated for any stations assigned to this monitor. Unknown Code can result from a wrong configuration of input to the monitor.

W

Wrong Code

Code that the MCEM recognizes but that is not the code designated for this audio feed. Incorrect audio feed assignments to the back panel of the monitor or the encoder can produce Wrong Code.

FCC Disclaimer

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

ICES Disclaimer

This Class A digital apparatus complies with Canadian ICES-003.

CAN ICES-3 (A)/NMB-3(A)