



Staging the Tuning Adapter

Addendum to 734375

Please Read

Important

Please read this entire guide. If this guide provides installation or operation instructions, give particular attention to all safety statements included in this guide.

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About This Guide

Introduction

This guide provides procedures for staging the Tuning Adapter in the Digital Broadband Delivery System (DBDS).

Notes:

- Tuning Adapters, DHCTs, and CableCARD™ modules are sometimes referred to in this document as *devices*.
- This document only addresses staging for Tuning Adapters. For information on staging other devices, refer to one of the following documents (see **Related Publications**, later in this section):
 - For staging non-CableCARD DHCTs and standalone CableCARD modules: *Explorer Digital Home Communications Terminal Staging Guide* (part number 734375)
 - For staging SSC (Separable Security host with CableCARD module) DHCTs: *Separable Security Host Staging Guide* (part number 736107) or *Separable Security Host Staging Guide for SR 4.3 and Later Operation & Maintenance Guide* (part number 4024836)

Scope

This document provides the procedures to properly stage Tuning Adapters. This document is an addendum to the *Explorer Digital Home Communications Terminal Staging Guide* (part number 734375).

Before you begin to stage Tuning Adapters, follow the recommendations in the *Explorer Digital Home Communications Terminal Staging Guide* (part number 734375) regarding the staging process, staging preparations, staging area considerations, obtaining and loading Entitlement Management Message (EMM) data, improving the speed and performance of the initial staging process, and staging set-tops.

Audience

This guide is written for staging area personnel responsible for staging Tuning Adapters, Tuning Adapter installation personnel, and system operators of the Digital Network Control System (DNCS).

Related Publications

You may find the following publications useful as resources when you implement the procedures in this document.

- *Cisco STA1520 Tuning Adapter Quick Reference* (part number 4024567)
- *DBDS Utilities Version 6.1 Installation Instructions and DNCS Utilities User Guide* (part number 4020695)
- *Download and Define Parameters in the Tuning Adapter Configuration File* (part number 4025013)
- *Downloading New Client Application Platform Installation Instructions* (part number 4003052)
- *Explorer Digital Home Communications Terminal Staging Guide* (part number 734375)
- *Explorer® Digital Home Communications Terminal Troubleshooting Guide* (part number 717867)
- *Staging Area Quick Reference Sheet* (part number 740230)
- *Recommendations for Data Carousel Rate Management Technical Bulletin* (part number 716377)
- *Separable Security Host Staging Guide* (part number 736107)
- *Separable Security Host Staging Guide for SR 4.3 and Later Operation & Maintenance Guide* (part number 4024836)
- *Understanding Diagnostic Screens for the Tuning Adapter* (part number 4025082)

Document Version

This is the second release of this document.

1

Staging Preparation

Introduction

This chapter provides an overview of the information and processes you need before you begin to stage Tuning Adapters.

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- Before You Begin..... 2
- Files Required for Staging 3
- Billing System Preparation 6
- Tuning Adapter Configuration File 7
- Setting Up Download Groups 8

Before You Begin

Overview

Before you begin to stage Tuning Adapters, follow the recommendations in the first five chapters of the *Explorer Digital Home Communications Terminal Staging Guide* (part number 734375) regarding the staging process, staging preparations, staging area considerations, obtaining and loading EMM data, and staging set-tops. Also, make sure to follow the recommendations in the document to improve the speed and performance of the initial staging process.

Important: If you are upgrading your DNCS at the same time as adding Tuning Adapters to your system, you must make sure that you upgrade your DNCS before you load the tar file for the Tuning Adapters. Refer to *Explorer Digital Home Communications Terminal Staging Guide* (part number 734375) for more information about tar files.

Files Required for Staging

This section describes the files that are required to stage Tuning Adapters.

Note: The file names follow the MS-DOS “8 plus 3” naming convention.

The following descriptions refer to the files and directories relative to the root directory of the distribution tree. For example, */toc* refers to the file named *toc* in the root directory of the distribution tree.

The following files and directory reside beneath the root of the distribution file tree, and they are discussed in detail in this section:

- **toc:** Table of Contents file
- **dncs:** DNCS directory
- **Tuning Adapter configuration file** (optional)
- **inventory:** Inventory file (not required, but included)
- **EMM files:** Entitlement Management Message files

Note: Refer to your billing system documentation for instructions and specific information for loading files into your billing system.

TOC File

When you load the EMMs into the DNCS for a shipment of Tuning Adapters, a table of contents file (TOC file) is created and is available to your billing system. The */toc* file contains the serial numbers, the MAC addresses, and the type (model and hardware revision) of all Tuning Adapters in the shipment.

The TOC file contains the following C structure:

```
struct dhct {
    char SerialNumber[10],          // ASCII
    char MacAddress[18],           // ASCII
    unsigned short Type_Type,
    unsigned short Type_Rev,
    char Type_Oui[3],              // this is binary data
    char fill2;                    // pad to 4-byte boundary
}
```

The serial number is formatted as **PKxxxxxxx**, where xxxxxxx represents a BASE-20 number starting at BBBBbbb. The MAC address takes the traditional UNIX syntax for a printed Ethernet address (**aa:bb:cc:dd:ee:ff**) where **a** through **f** are hexadecimal digits. All ASCII strings are NULL (0x0) terminated.

The Type_Type, Type_Rev, and Type_Oui fields communicate the type of device included in the shipment (SSC DHCTs excluded). These fields use the same values as those supplied in a BOSS DhctType descriptor. The OUI field is three binary bytes rather than a set of ASCII characters.

dncs Directory

The **/dncs** directory contains the following directories that include information needed by the DNCS:

- **/dncs/cauth** contains the key certificates required for Key Certification Authorities that have certified Tuning Adapter public keys. This directory includes the certificates for all the Certification Authorities that created the certificates carried in the records in the **/dncs/dhcts** directory. It might also include certificates for other Certification Authorities.
- **/dncs/dhcts** contains device records. Each file contains the records for one Tuning Adapter, and each record corresponds exactly with the Tuning Adapters represented in the **/toc** file.
- **/dncs/hcttypes** contains the Type definitions for all Tuning Adapters in the shipment. When the DNCS installs a batch of Tuning Adapters, it first checks for the prior installation of the types listed in the **/dncs/hcttypes** directory. Then, the DNCS only installs the types listed in the directory that have not been previously installed. Each file in this directory contains the records for one Tuning Adapter, and each record corresponds exactly with the Tuning Adapters represented in the **/toc** file.
- **/dncs/bootpgs** contains bootterm pages.

Note: The DNCS uses the files in the **/dncs** directory to register devices in the network, which must be performed before these devices can be authorized to receive secure services. These files are typically not used by billing systems.

Inventory File

The inventory file (**/inventory**) is not used by the Tuning Adapter, but it is included with the files required for a shipment of Tuning Adapters. This file will not affect the staging of Tuning Adapters.

EMM Files

After preparing the DNCS for staging, the DNCS operator must load the EMM data onto the DNCS. EMMs are encrypted packets of information that carry default PowerKEY® information and service authorizations for Tuning Adapters, set-tops, and CableCARD modules. EMMs let the devices use secure services.

Obtaining EMM Files

There are three options for obtaining the EMM data from us:

- FTP download
- EMM CD received by mail or shipping service
- Customer Self-Service Serial Number Tracking Application

Refer to the *Explorer Digital Home Communications Terminal Staging Guide* (part number 734375) for more information on obtaining and loading EMM files.

Billing System Preparation

Your billing system must be set up with the following parameters when the Tuning Adapter is scanned during staging:

- Admin Status: Set to **Two-Way**
- DIS: Set to **enabled**
- Package: At least one package must be sent

Refer to your billing system documentation to determine the best method for configuring your billing status to support staging.

Transactions Required for Staging

The Tuning Adapter must be authorized for the same set of services as the set-tops and/or CableCARD modules in the subscriber's home. The same service disconnect (brick mode) package used by the subscriber's other devices must also be applied to the Tuning Adapter.

For more information on authorizing services and applying the service disconnect package to a device, refer to *Explorer Digital Home Communications Terminal Staging Guide* (part number 734375).

Tuning Adapter Configuration File

You can configure the Tuning Adapter using a configuration file (trconfig.tbl). This configuration file is only necessary when your network setup is different than the default Tuning Adapter configuration, such as in a non-SARA environment or in an Overlay™ environment.

To use a different Tuning Adapter configuration, you must create a configuration file and place it on an out-of-band BFS carousel for use by the Tuning Adapter population.

Note: Refer to *Download and Define Parameters in the Tuning Adapter Configuration File* (part number 4025013) for more information on configuring and using the Tuning Adapter configuration file.

You can provide a separate configuration file for each hub. You can also assign channel maps (maps that are not tied to a physical or default hub) to the Tuning Adapter using Enhanced Channel Maps. Refer to the *Enhanced Channel Maps User's Guide* (part number 4011413) for information on how to define group definition rules and lineup groups (LUGs). The Tuning Adapter supports both virtual hub and LUG-based enhanced channel maps.

If present, the Tuning Adapter loads the configuration file when it boots and monitors the configuration file once a minute for changes. This monitoring includes checking for an added configuration file (if one was not originally present at boot time) and checking for removal of the configuration file from BFS if it was originally present. The Tuning Adapter reverts to the default configuration if the configuration file is removed from the BFS and a new configuration file is not added to the BFS within 24 hours.

Setting Up Download Groups

To stage Tuning Adapters in groups other than the default group, you must manually add the Tuning Adapters to the DNCS database. See *Add Tuning Adapters to the DNCS Database* (on page 8) for more information.

Then, if the download group does not already exist, you must create the CVT download group for the Tuning Adapter and add the Tuning Adapters to that group. See *Create CVT Download Groups* (on page 9) for more information.

Or, if the download group already exists, you must add the Tuning Adapters to the group. See *Add the Tuning Adapters to Existing CVT Download Groups* (on page 10) for more information.

Add Tuning Adapters to the DNCS Database

To use a download group other than the default group, your first step is to manually add the Tuning Adapters to the DNCS database.

Adding Tuning Adapters to the DNCS Database

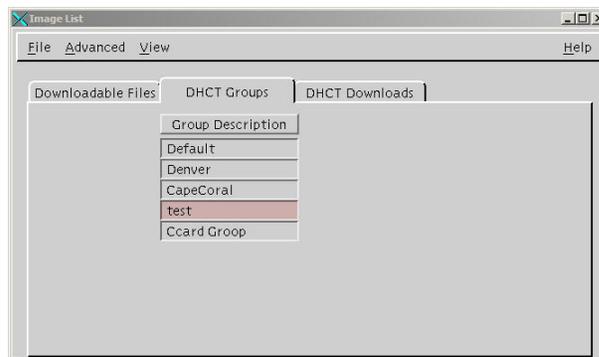
- 1 On the DNCS Administrative Console, select the **DNCS** tab.
- 2 Select the **Home Element Provisioning** tab.
- 3 Click **DHCT**. The DHCT Provisioning screen opens.
- 4 Select the **New** option.
- 5 Type the MAC address for the Tuning Adapter you are adding in the **By MAC Address** field.
- 6 Click **Continue**. The Set Up DHCT window opens.
- 7 Select the **DHCT Type** of the Tuning Adapter you are adding.
- 8 Type the **DHCT Serial Number** of the Tuning Adapter you are adding.
- 9 Click the arrow next to **Admin Status** and select **In Service Two Way**.
- 10 Click **Save**.
- 11 Repeat steps 4 through 10 for every Tuning Adapter you need to add to the database.
- 12 Your next step is to add the Tuning Adapters to the download group. Do you need to create the download group for the Tuning Adapters?
 - If **yes**, go to *Create CVT Download Groups* (on page 9)
 - If **no**, go to *Add the Tuning Adapters to Existing CVT Download Groups* (on page 10)

Create CVT Download Groups

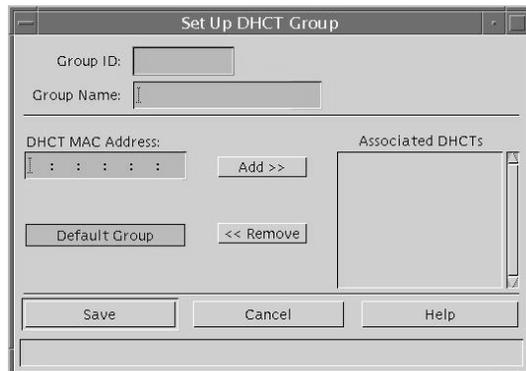
If your download group does not yet exist, follow these steps to create the download group and to add the Tuning Adapters to that group. If your download group already exists, follow the steps in *Add the Tuning Adapters to Existing CVT Download Groups* (on page 10).

Creating CVT Download Groups

- 1 On the DNCS Administrative Console, select the **DNCS** tab.
- 2 Select the **Home Element Provisioning** tab.
- 3 Click **Image**. The Image List window opens.
- 4 Click the **DHCT Groups** tab. The DHCT Groups tab opens.



- 5 Click **File > New**. The Set Up DHCT Group window opens.



- 6 Configure the fields on the Set Up DHCT Group window as follows:
 - **Group ID** – Type a unique group identification number (other than zero).
 - **Group Name** – Type a meaningful name for the group.
Example: Tuning Adapter_Download_Group
 - **DHCT MAC Address** – Type the MAC address of a Tuning Adapter that you want to include in the new group.
- 7 Click **Add**. The MAC Address of the Tuning Adapter moves to the Associated DHCTs column.
- 8 Repeat steps 6 and 7 for each Tuning Adapter you want to add to the group.

- 9 Click **Save**. The new group appears in the list of group descriptions on the DHCT Groups tab.

Note: The Tuning Adapter should be connected to the network within 2 hours of creating or adding it to a test group. If the device is not connected within 2 hours, then the device does not receive a group assignment until the DNCS database cycles through all in-service devices at a rate of approximately one device per second. Depending on the number of devices in your system, this process could take a significant amount of time.

- 10 Confirm that the Tuning Adapter was successfully placed into the test group by displaying the Tuning Adapter diagnostic screens on the UDCP and looking at the **Group ID** field. This group ID should match the Group ID field displayed on the Set Up a DHCT Group window on the DNCS.

Note: The Group ID on the Tuning Adapter is in hexadecimal format. The Group ID on the DNCS is in decimal format. You might need to convert the Group ID to verify this step.

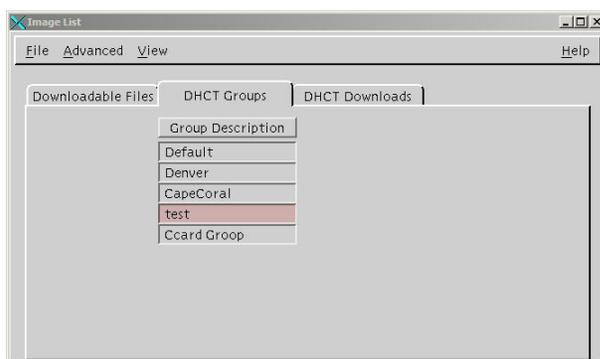
- 11 Do the Group ID values on the diagnostic screen and DNCS match?
 - If **yes**, go to *Staging the Tuning Adapter* (on page 13)
 - If **no**, contact Cisco Services

Add the Tuning Adapters to Existing CVT Download Groups

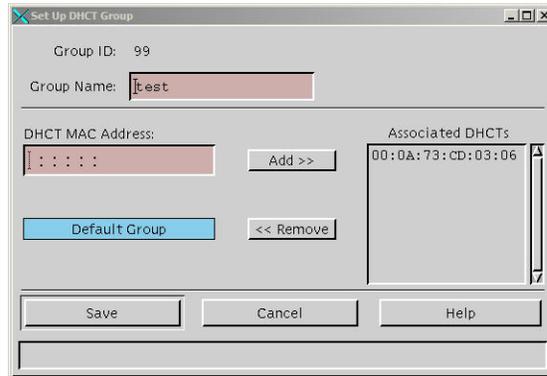
If your download group already exists, follow these steps to add the Tuning Adapters to the group. If your download group does not already exist, follow the steps in *Create CVT Download Groups* (on page 9).

Adding Tuning Adapters to Existing CVT Download Groups

- 1 On the DNCS Administrative Console, select the **DNCS** tab.
- 2 Select the **Home Element Provisioning** tab.
- 3 Click **Image**. The Image List window opens.
- 4 Click the **DHCT Groups** tab. The DHCT Groups tab opens.



- 5 Double-click the group you want to which you want to add Tuning Adapters. The Set Up DHCT Group window for the group opens.



- 6 Type the **DHCT MAC address** of a Tuning Adapter that you want to include in the new group.
- 7 Click **Add**. The MAC Address of the Tuning Adapter moves to the Associated DHCTs column.
- 8 Repeat steps 6 and 7 for each Tuning Adapter you want to add to the group.
- 9 When you are finished adding Tuning Adapters to the group, click **Save**.

Note: The Tuning Adapter should be connected to the network within 2 hours of creating or adding it to a test group. If the device is not connected within 2 hours, then the device does not receive a group assignment until the DNCS database cycles through all in-service devices at a rate of approximately one device per second. Depending on the number of devices in your system, this process could take a significant amount of time.

- 10 Confirm that the Tuning Adapter was successfully placed into the test group by displaying the Tuning Adapter diagnostic screens and looking at the **Group ID** field. This group ID should match the Group ID field displayed on the Set Up a DHCT Group window on the DNCS.

Note: The Group ID on the Tuning Adapter is in hexadecimal format. The Group ID on the DNCS is in decimal format. You might need to convert the Group ID to verify this step.

- 11 Do the Group ID values on the diagnostic screen and DNCS match?
 - If **yes**, go to *Staging the Tuning Adapter* (on page 13)
 - If **no**, contact Cisco Services

2

Staging the Tuning Adapter

Introduction

This chapter provides procedures for staging Tuning Adapters and procedures for verifying the staging process.

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- Staging Tuning Adapters..... 15
- LED Indicators Displayed During a Software Download 16
- Verify the PowerKEY Information..... 18
- Verify the Staging Process 19

Overview

This section contains procedures for staging area personnel to stage Tuning Adapters.

Important: Some billing systems automatically send EMMs to devices when you scan the bar code and/or when you move the device from inventory to a technician's account in the billing system. If your billing system sends EMMs to devices when you scan the bar code, make sure that the Tuning Adapters are connected to an RF signal, have already downloaded software, and currently display either the service disconnect (Brick mode indicator - LED blinks 8 times, pauses, then repeats) or the ready state (steady-on LED) before you scan the device into the billing system.

Note: If the Tuning Adapter LED remains off and does not indicate either brick mode or the ready state, the Tuning Adapter is probably in standby mode. To take the Tuning Adapter out of standby mode, press the **POWER** button on the front panel.

Staging Tuning Adapters

Follow these steps to stage Tuning Adapters.

- 1 Scan the Tuning Adapters into the billing system using the appropriate procedures authorized by your billing system vendor.
Important: Ensure that the billing system operator does not send transactions to the DNCS at this time.
- 2 Unpack the Tuning Adapters you want to stage.
- 3 Place the Tuning Adapters on the staging rack.
- 4 Connect the CABLE IN port to an RF signal.
- 5 Connect the Tuning Adapters to AC power. Each Tuning Adapter downloads the required software from the DNCS.
- 6 Wait for the Tuning Adapters to indicate that the download is complete. The POWER LED will light for two seconds, go off for one second, then light for two seconds before each Tuning Adapter reboots.
- 7 Once the Tuning Adapter reboots, send a "hit" to the DNCS from the billing system to place the Tuning Adapters in service with at least one package. Wait for the Tuning Adapters to show the correct indication (either the Brick mode indicator or a steady-on LED).
- 8 Connect the CABLE OUT port on each Tuning Adapter to a properly staged UDCP device.
- 9 Connect the UDCP device to a TV monitor and verify authorized channels.
- 10 Does your business process require inventory Tuning Adapters to be authorized for service?
 - If **yes**, go to step 11.
 - If **no**, downgrade (disable) the Tuning Adapters in accordance with your site process, wait for the Brick mode indicator or loss of channel tuning information for SDV channel change requests.
- 11 Disconnect the Tuning Adapters and either return them as staged inventory to your warehouse or give them to technicians to install at the subscribers' locations.

LED Indicators Displayed During a Software Download

Devices provide feedback during the process of downloading, installing, and booting into the SARA using LED indicators.

Location of LED Indicators on the Tuning Adapter

Tuning Adapters display the codes associated with downloading, installing, and booting into the OS as a series of flashing lights using the POWER LED indicator light on the front panel.



The following table shows an example of a CVT download sequence of front panel LED displays that appear after AC power is applied to the Tuning Adapter.

Note: The front-panel LED indicator may change for each stage of the Tuning Adapter software download process. Therefore, in the following table, the LED displays that correspond to certain stages of the download process may be repeated or skipped. In other words, the stages do not always occur in the order shown.

Stage	LED Indicator	Description
1	On for several seconds, then blinks on and off steadily	The Tuning Adapter is booting into the OS.
2	Blinks twice, pauses, repeats	The Tuning Adapter is scanning the recommended QAM frequencies for the CVT.
3	Blinks three times, pauses, repeats	The Tuning Adapter is downloading and installing software into flash memory.
4	On for two seconds, off for one second, on for two seconds, reboot	The Tuning Adapter has installed the software update into flash memory. Note: There will be a slight delay between this step and the next step as the Tuning Adapter reboots.
5	On for several seconds, then blinks on and off steadily	The Tuning Adapter resets and boots into the OS.
6	Blinks eight times, pauses, repeats	The Tuning Adapter is in Service Disconnect (brick) mode.

Stage	LED Indicator	Description
7	Off (no blinks)	<p>The Tuning Adapter is preparing to launch the resident application or has entered standby mode. If the LED remains off for more than a few seconds, press the POWER button on the front panel to power on the Tuning Adapter.</p> <p>Note: The Tuning Adapter will complete its boot process even in standby mode, but will not provide tuning information to the UDCP until powered on.</p>
8	Blinks on and off steadily	The Tuning Adapter is initializing.
9	On (no blinks)	The Tuning Adapter is fully operational, and is able to service UDCP requests.
10	Blinks six times, pauses, repeats	<p>The Tuning Adapter has encountered a problem that prevents it from servicing UDCP requests or the UDCP authentication failed.</p> <p>Refer to <i>Troubleshooting</i> (on page 21) for more information.</p>
11	Blinks four times, blinks a series of dim and bright blinks, repeats	<p>The Tuning Adapter has encountered an internal error. The four blinks indicate that an error exists and the series of dim and bright blinks refer to the error code.</p> <p>Refer to <i>Bootloader Error Codes</i> (on page 38) for more information.</p>

Verify the PowerKEY Information

You can verify the staged PowerKEY information using the diagnostic screen on the UDCP device to which the Tuning Adapter is connected.

- 1 Connect the Tuning Adapter to a UDCP device that is connected to a TV.
- 2 Access the diagnostic screens using the instructions supplied with your UDCP device.
- 3 Go to the Network and Tuning Status page of the diagnostic screens.
- 4 Verify that the **ENTITLEMENT AGENTS / ISE(1)**: field displays **0x0000001**.
- 5 Verify the **EMMs: / ISE**: field displays the same number of EMMs that the UDCP device requires.
- 6 Verify that the **Sub Expires** field displays the appropriate time stamp (usually 30 days in the future).

Notes:

- The EMMs: / ISE field will vary based on the level of Service Authorizations provisioned for the UDCP device.
- When the Tuning Adapter has received all its PowerKEY information, the Time GBAMs: / ISE field will increment, and the ISE error count will no longer increase.
- Refer to *Understanding Diagnostic Screens for the Tuning Adapter* (part number 4025082) for more information.

Results:

- The Entitlement Agent displays ISE (1) 0X000000001
 - The Sub Expire date is set to 30 days from today
- 7 Do the pages display all of the items shown in the results of the preceding step?
 - If **yes**, go to step 8.
 - If **no**, send an instant hit to the Tuning Adapter using one of the following methods:
 - **Using the billing system.** The billing system has been set up to send the DhctInstantHit command to Tuning Adapters. Refer to your billing system documentation for instructions and specific information.
 - **Using the DNCS.** See *Send Instant Hits* (on page 29) for more information.
 - 8 Did the instant hit increase the EMM count to the required number?
 - If **yes**, you are finished with this procedure.
 - If **no**, go to *Tuning Adapter Errors* (on page 23) for more information.

Verify the Staging Process

After the staging process is complete, use the following checklist to check each Tuning Adapter and confirm that the staging process was correctly completed.

- 1 Verify that the front-panel LED on the Tuning Adapter is steadily on and not blinking. If the LED is blinking, refer to *LED Indicators Displayed During a Software Download* (on page 16) to understand what the blinking pattern indicates.
- 2 Verify that the UDCP is receiving audio and video on the following channels:
 - Analog channels (if supported)
 - Digital channels
 - Switched digital channels
 - Premium channels
- 3 Access the Tuning Adapter diagnostic screens on the UDCP device using the process required by the UDCP device. Verify that the ENTITLEMENT AGENTS / ISE[1] field displays **0x0000001**.
- 4 View the diagnostic screens and verify that the date in the SUB EXPIRES field is at least 30 days in the future.

3

Troubleshooting

Introduction

This chapter provides suggestions for troubleshooting Tuning Adapters that fail the staging process. It also contains general troubleshooting guidelines.

Suggested solutions are also included; however, in some instances, it may be necessary to contact us. Refer to *Customer Information* (on page 34) for contact information.

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■ Send Instant Hits.....	29
■ PowerKEY/EA Issues	30

Staging Failures

In the unlikely event that a Tuning Adapter fails to stage, the tables in this chapter provide the following troubleshooting information:

- The source of the staging failure including symptoms
- Possible solutions for the failure

Refer to the tables in this chapter to troubleshoot problems before returning a Tuning Adapter to us. Identify the problem or symptom and try the possible solutions offered.

If the condition persists, or if the symptom is not identified in this chapter, see *Customer Information* (on page 34) for information on returning products to us for repair.

Note: Refer to *Explorer® Digital Home Communications Terminal Troubleshooting Guide* (part number 717867) for additional information on troubleshooting Tuning Adapters.

General Guidelines

Follow these general guidelines as you troubleshoot Tuning Adapters.

- Compare the performance of a suspected failed Tuning Adapter to a known good Tuning Adapter of the same type and revision.
- Always make sure that your RF connections are connected correctly before you determine whether the Tuning Adapter is defective.
- Make sure that you use the CVT download method for the Tuning Adapters.
- If you must return a Tuning Adapter to us for repair, always use a repair tag to properly identify the problem. You can fill out and submit a repair tag (RMA form) on the customer self-service website. See *Customer Information* (on page 34) for instructions to access the customer self-service website.

Tuning Adapter Errors

This section provides a list of suggested solutions for problems with the Tuning Adapter.

DHCT EMM Count Errors

If you stage a Tuning Adapter and the EMM count is zero, you should take the Tuning Adapter out of service then try to stage it again. The Tuning Adapter might have an IP address on a different hub and, as a result, the EMMs are being sent to the wrong hub.

If you stage a Tuning Adapter and the EMM count does not meet the required number for your system, you should send an instant hit to the Tuning Adapter. See *Send Instant Hits* (on page 29) for more information.

If the instant hit does not increase the EMM count to the required number, go to the Secure Services tab of the Set Up DHCT screen and confirm the following:

- The Secure Element Serial number on the DNCS matches the ISE number on the Tuning Adapter (view the diagnostic screens from a UDCP device attached to a TV monitor). If the numbers do not match, return the Tuning Adapter to us for repair.

Notes:

- To view the Secure Element Serial number on the DNCS, follow the instructions in *Viewing the Secure Element Serial Number on the DNCS* (on page 24).
- To view the ISE number on the diagnostic screens, follow the instructions in *Viewing the ISE on the Diagnostic Screens* (on page 24).
- The MAC address on the DNCS matches the RF-MAC number on the Tuning Adapter (view the diagnostic screens from a UDCP device attached to a TV monitor). If the numbers do not match, return the Tuning Adapter to us for repair.
- The Tuning Adapter is on the FRL in the DNCS. If the Tuning Adapter is no longer on the list, add it to the list and recheck the Tuning Adapter after 5 minutes.
- Ask the DNCS operator to perform the following command:
modDhctCfg -s [MAC address of the Tuning Adapter]
 Do not type the brackets [] in the command. This command resets the Tuning Adapter and forces it to download the OS and EMMs again.

Note: If none of these situations apply, you may need to run the deleteDHCT script to delete the Tuning Adapter from the DNCS, and then scan it again. Contact Cisco Services for more information.

If you stage a Tuning Adapter and the EMM count is correct, but there are ISE errors, ask the DNCS operator to run the **modDhctCfg -s [MAC address of the Tuning Adapter]** command. If this does not work, contact Cisco Services to obtain new EMMs for the Tuning Adapter and try to stage the Tuning Adapter again.

Viewing the Secure Element Serial Number on the DNCS

To access the ISE number for the Tuning Adapter in the DNCS, follow these instructions:

- 1 From the DNCS tab, click **Home Element Provisioning**.
- 2 Click **DHCT**. The DHCT Provisioning window opens.
- 3 Type the **MAC Address**, **IP Address**, or the **Serial Number** of the Tuning Adapter and click **Continue**. The Set Up DHCT screen opens.
- 4 Click the **Secure Services** tab. The **Secure Element Serial Number** for this Tuning Adapter is listed at the top of the window.

Viewing the ISE on the Diagnostic Screens

To view the diagnostic screen with the ISE number, follow these instructions:

- 1 Access the Tuning Adapter diagnostic screens using your preferred method. See *Access the Diagnostic Screens* (on page 36) for more information.
- 2 Navigate to the **Versions and MACs** diagnostic screen (there might be more than one based on your access method).
- 3 The ISE number is listed in the **Serial Number** section.

Tuning Adapter Errors Solutions Table

The following table lists some common symptoms and the corresponding POWER LED indicator, and possible solutions to the problem. These errors, where appropriate, are listed in the POWER LED Indicator column in the following table.

Note: If you must return a Tuning Adapter to us for repair, see *Return Products for Repair* (on page **Error! Bookmark not defined.**) for information.

Symptom	POWER LED Indicator	Possible Solution
<p>Tuning Adapter displays the following symptoms:</p> <ul style="list-style-type: none"> ■ No display on UDCP device or UDCP displays error message indicating a problem with the Tuning Adapter ■ POWER button does not work 	Off	<ol style="list-style-type: none"> 1 Switch the AC input and power cycle the Tuning Adapter. 2 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with F1. No Power/Bad Keypad Button.
<p>Tuning Adapter displays the following symptoms:</p> <ul style="list-style-type: none"> ■ No display on UDCP device ■ POWER button works 	On	<ol style="list-style-type: none"> 1 Follow these steps: <ol style="list-style-type: none"> a Connect the Tuning Adapter to a known good RF cable. b Connect the Tuning Adapter to the UDCP with a known good USB cable. c Power cycle the Tuning Adapter. d Wait 5 minutes. 2 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with D2. Unable to Connect to Network.

Symptom	POWER LED Indicator	Possible Solution
No display on UDCP device or UDCP displays error message indicating a problem with the Tuning Adapter	Blinks six times, pauses, repeats	<ol style="list-style-type: none"> 1 Power off the Tuning Adapter by pressing the POWER button on the front panel. After a few moments, power the Tuning Adapter back on by pressing the POWER button on the front panel again. 2 Disconnect and reconnect the USB cable. 3 Follow these steps: <ol style="list-style-type: none"> a Access the Tuning Adapter diagnostic screens on the UDCP device and confirm the UDCP Authentication status. b If the UDCP Authentication status displays No, this could indicate a UDCP problem. Connect the UDCP to a known good Tuning Adapter, power cycle the UDCP, and recheck the UDCP Authentication status on the Tuning Adapter diagnostic screen. c If the UDCP Authentication status displays Undetermined or In Progress, wait one minute and recheck the UDCP Authentication status on the Tuning Adapter diagnostic screen. d If the UDCP Authentication status displays Yes, follow these steps: <ol style="list-style-type: none"> i Disconnect the USB cable from the Tuning Adapter. ii Reboot the Tuning Adapter by unplugging the power cord from the power receptacle and replugging the power cord. iii Wait for the Tuning Adapter to boot (when the POWER LED stops blinking and remains on for more than 5 seconds). If the POWER LED does not turn on, press the POWER button on the Tuning Adapter. iv With the POWER LED on (and not blinking), reconnect the USB from the Tuning Adapter to the UDCP. 4 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with D7. Error Code (BRXX, ERXX, or XXXX) and write the error code in the Comments section of the tag.

Symptom	POWER LED Indicator	Possible Solution
Tuning Adapter will not download and stays in hunt mode	Blinks twice, pauses, repeats	<ol style="list-style-type: none"> 1 If a known good Tuning Adapter of the same type and revision does not download, contact your DNCS operator to resolve the network issue. 2 Connect the Tuning Adapter to the UDCP with a known good USB cable. 3 Power cycle the Tuning Adapter. 4 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with D6. DHCT in Hunt Mode (hXXX).
Tuning Adapter does not transition to a known state (ready, brick mode, UDCP authentication failure, hunt mode, code download, or code install mode)	Blinks on and off steadily	<ol style="list-style-type: none"> 1 Follow these steps: <ol style="list-style-type: none"> a Power cycle the Tuning Adapter. b Access the Tuning Adapter diagnostic screens through the UDCP. c If you can access the diagnostic screens, it is not a USB communications issue. 2 Follow these steps: <ol style="list-style-type: none"> a Connect the Tuning Adapter to a known good RF cable. b Connect the Tuning Adapter to the UDCP with a known good USB cable. c Power cycle the Tuning Adapter. d Wait 5 minutes. 3 If a known good Tuning Adapter of the same type and revision does not enter a known state after staging, contact your DNCS operator to resolve the network issue. 4 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with D2. Unable to connect to network.
Tuning Adapter continuously reboots	N/A	<ol style="list-style-type: none"> 1 Power cycle the Tuning Adapter. 2 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with D5. Constantly Resets/Reboots.

Symptom	POWER LED Indicator	Possible Solution
Tuning Adapter unresponsive	Off	<ol style="list-style-type: none"> 1 Force a download by following these steps: <ol style="list-style-type: none"> a With the Tuning Adapter powered off, press and hold the POWER button until the LED flashes at a moderate rate. b Quickly release and press and hold the POWER button again. c Hold the POWER button until the LED flashes at a fast rate. 2 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with D4. Unit Stuck in DIAG.
Tuning Adapter stuck in brick mode	Blinks eight times, pauses, repeats	<ol style="list-style-type: none"> 1 Follow these steps: <ol style="list-style-type: none"> a Confirm that the Tuning Adapter MAC address matches the billing MAC address and that the Tuning Adapter is authorized for service. b Ask the DNCS operator to correct any mis-match and send a hit to the Tuning Adapter. 2 See <i>PowerKEY/EA Issues</i> (on page 30) for more information. 3 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with one of the following: <ul style="list-style-type: none"> – S2. Stays in Brick Mode (---) – S1. No EMMs/ISE/EA
Tuning Adapter is unresponsive	Blinks four times, blinks a series of dim and bright blinks, repeats	<p>The Tuning Adapter is displaying an internal error code. Refer to <i>Bootloader Error Codes</i> (on page 38) for more information.</p> <p>Mark the repair tag with D7. Error Code (BRXX, ERXX, or XXXX) and write the error code in the Comments section of the tag.</p>

Send Instant Hits

Sometimes, when you stage a device, one of the following might occur:

- The Entitlement Agent might not display.
- The EMM count may not increment to the required number.
- The Sub Expire date is not set correctly.

In these cases, you might need to send an instant hit to the device. This section provides the procedures for sending instant hits to Tuning Adapters.

Sending an Instant Hit to a Tuning Adapter

- 1 From the DNCS Administrative Console, click the **DNCS** tab.
- 2 From the DNCS Administrative Console, select the **Network Element Provisioning** tab.
- 3 Click **DHCT**. The DHCT Provisioning Screen opens.
- 4 On the DHCT Provisioning screen, select **Open**.
- 5 Type the **MAC Address**, **IP address**, or **serial number** of the Tuning Adapter and click **Continue**. The Set Up DHCT screen opens.
- 6 From the Set Up DHCT screen, click the **Secure Services** tab.
- 7 Click **DHCT Instant Hit**.

PowerKEY/EA Issues

This section provides a list of suggested solutions for problems that result from PowerKEY Conditional Access or EA.

You can verify the EMM count, Sub Expire date, and ISE errors using the Tuning Adapter diagnostic screens, viewed from the UDCP device.

Note: If you must return a Tuning Adapter to us for repair, see *Return Products for Repair* (on page **Error! Bookmark not defined.**) for information.

Symptom	Type of Tuning Adapter	Possible Solution
No Entitlement Agent (EMMs)	Unstaged	<ol style="list-style-type: none"> 1 Does the Tuning Adapter's MAC address match the MAC address recorded in the billing system? <ul style="list-style-type: none"> – If yes, follow these steps: <ol style="list-style-type: none"> i Confirm that the actual MAC address for the Tuning Adapter matches the MAC address recorded in the DNCS. ii Confirm that the Secure Micro Address for the Tuning Adapter matches the Secure Micro Address recorded in the DNCS. iii Ask the DNCS operator to perform a modDhctCfg -s [MAC address of the Tuning Adapter] on the Tuning Adapter. iv Stage the Tuning Adapter again. – If no, follow these steps: <ol style="list-style-type: none"> i Ask the DNCS operator to correct any existing mismatches. ii Stage the Tuning Adapter again. iii Go to step 2 if these actions do not remedy the situation. 2 Follow these steps: <ol style="list-style-type: none"> a Take the Tuning Adapter out of service. b Try to stage the Tuning Adapter again. 3 Follow these steps: <ol style="list-style-type: none"> a Delete the Tuning Adapter from the DNCS. b Contact us to have new EMMs built. c Try to stage the Tuning Adapter again using the new EMMs. 4 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with S1. No EMMs/ISE/EA.

Symptom	Type of Tuning Adapter	Possible Solution
Sub Expire shows expired or past date	Deployed	<ol style="list-style-type: none"> 1 Follow these steps: <ol style="list-style-type: none"> a Confirm that the Tuning Adapter is authorized for service in the billing system. b Confirm that the Tuning Adapter is authorized for service in the DNCS. c Send an instant hit to the Tuning Adapter. d Stage the Tuning Adapter again. 2 Follow these steps: <ol style="list-style-type: none"> a Ask the DNCS operator to perform a modDhctCfg -s [MAC address of the Tuning Adapter] on the Tuning Adapter. b Stage the Tuning Adapter again. 3 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with S3. Invalid Sub Expire Date.
Insufficient number of EMMs (less than the minimum number required by the UDCP device)	Unstaged or Deployed	<ol style="list-style-type: none"> 1 Follow these steps: <ol style="list-style-type: none"> a Confirm that the Tuning Adapter is authorized for service in the billing system. b Confirm that the Tuning Adapter is authorized for service in the DNCS. c Send an instant hit to the Tuning Adapter. d Stage the Tuning Adapter again. 2 Follow these steps: <ol style="list-style-type: none"> a Ask the DNCS operator to perform a modDhctCfg -s [MAC address of the Tuning Adapter] on the Tuning Adapter. b Stage the Tuning Adapter again. 3 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with S1. No EMMs/ISE/EA.

Symptom	Type of Tuning Adapter	Possible Solution
No Incoming EMMs	Unstaged	<ol style="list-style-type: none"> 1 Does the DNCS have the EMMs loaded for the Tuning Adapter? <ol style="list-style-type: none"> a If yes, follow these steps: <ol style="list-style-type: none"> i Ask the DNCS operator to perform a modDhctCfg -s on the Tuning Adapter. ii Stage the Tuning Adapter again. b If no, contact us to get the correct EMMs. 2 Does the Tuning Adapter's MAC address match the MAC address recorded in the billing system? <ol style="list-style-type: none"> - If yes, follow these steps: <ol style="list-style-type: none"> i Confirm that the actual MAC address for the Tuning Adapter matches the MAC address recorded in the DNCS. ii Confirm that the Secure Micro Address for the Tuning Adapter matches the Secure Micro Address recorded in the DNCS. iii Ask the DNCS operator to perform a modDhctCfg -s [MAC address of the Tuning Adapter] on the Tuning Adapter. iv Stage the Tuning Adapter again. - If no, follow these steps: <ol style="list-style-type: none"> i Ask the DNCS operator to correct any existing mismatches. ii Stage the Tuning Adapter again. iii Go to step 3. 3 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with S1. No EMMs/ISE/EA.
No Incoming EMMs	Deployed	<ol style="list-style-type: none"> 1 Follow these steps: <ol style="list-style-type: none"> a Confirm that the Tuning Adapter boots into two-way mode (that it has an IP address listed on the diagnostic screens). b Ask the DNCS operator to send an instant hit to the Tuning Adapter. c Stage the Tuning Adapter again. 2 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with S1. No EMMs/ISE/EA.

Symptom	Type of Tuning Adapter	Possible Solution
ISE errors continually increment when an instant hit is sent to the Tuning Adapter from the billing system or from the DNCS	Unstaged	<ol style="list-style-type: none"> 1 Do the MAC addresses and Secure Micro for the Tuning Adapter match what is recorded in the DNCS? <ul style="list-style-type: none"> – If yes, follow these steps: <ol style="list-style-type: none"> i Ask the DNCS operator to perform a modDhctCfg -s on the Tuning Adapter. ii Stage the Tuning Adapter again. – If no, continue with step 2. 2 Follow these steps: <ol style="list-style-type: none"> a Delete the Tuning Adapter from the DNCS. b Contact us to have new EMMs built. c Try to stage the Tuning Adapter again using the new EMMs. 3 If these steps do not work, return the Tuning Adapter to us for repair. Mark the repair tag with S1. No EMMs/ISE/EA.

4

Customer Information

If You Have Questions

If you have technical questions, call Cisco Services for assistance. Follow the menu options to speak with a service engineer.

Access your company's extranet site to view or order additional technical publications. For accessing instructions, contact the representative who handles your account. Check your extranet site often as the information is updated frequently.

A

Accessing Tuning Adapter Diagnostic Screens

Introduction

This appendix explains how to access the Tuning Adapter diagnostic screens.

Access the Diagnostic Screens

UDCP Diagnostic Screens

You can access Tuning Adapter screens through the UDCP. Follow the directions appropriate to your UDCP to access the Tuning Adapter screens on your UDCP.

Web Browser Diagnostic Screens

Follow these steps to access the diagnostic screens from a web browser on the DNCS via HTTP.

- 1 Launch a web browser that is installed on the DNCS.
- 2 From the **Address** field located at the top of your web browser, type **http://[tuning_adapter.ip.address]:5030/1.html** and then press **Enter**. Your web browser displays the first diagnostic screen (Status Summary) of the DHCT you are using.
Note: In this command, [tuning_adapter.ip.address] represents the actual IP address of the tuning adapter that you are using. Do not type the brackets [] in the http address.
- 3 Follow the on-screen instructions and click the links to view other diagnostic screens.

For more information on the contents of the diagnostic screens, refer to *Understanding Diagnostic Screens for the Tuning Adapter* (part number 4025082).

B

Bootloader LED Error Codes

Introduction

This appendix discusses how the bootloader error codes that might display on the Tuning Adapter. It includes a section on how to read the error codes and what the error codes indicate.

Bootloader Error Codes

Low-level bootloader error codes on the single-LED Tuning Adapter display if there is an error condition detected by the bootloader when the Tuning Adapter boots, or when it loads or installs software.

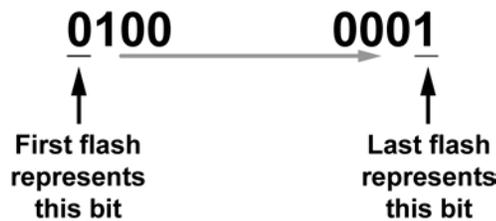
The Tuning Adapter displays the error code between a series of 4 illuminations. Before the Tuning Adapter displays the error code, it will blink 4 times, then display the error code, then blink 4 times, etc.

4 blinks, [error code] 4 blinks, [error code] 4 blinks, etc.

Note: The error code can display as many as 10 times.

Reading Error Codes on the Tuning Adapter

Error codes are displayed by the Tuning Adapter LED as a series of bright and dim illuminations, which correspond to the ones and zeros of a binary code. The bright illuminations represent 1 (or 'on') digits, and the dim illuminations represent 0 (or 'off') digits. The binary code is displayed by the Tuning Adapter from left (most-significant bit) to right (least-significant bit).



T13681

The LED is located on the face of the Tuning Adapter.



T13626

Example: The binary code **0100 0001**, representing a hexadecimal value of 0x41, is read as one dim illumination followed by one bright illumination, followed by five dim illuminations, and finally one bright illumination.

Important: You might not be able to distinguish a 'space' between consecutive dim or bright illuminations. However, the relative time for each illumination is the same. Therefore, two illuminations take twice as long to display as a single illumination.

Example: The Tuning Adapter displays the following code:

4 blinks, [2 dim, 2 bright, 4 dim], 4 blinks, [2 dim, 2 bright, 4 dim], 4 blinks, etc.

This blinking pattern (between the brackets [] in the example above) represents a binary code of **0011 0000** (hex **0x60**). You refer to the error codes in this document and see that this error indicates that the image length is incorrect.

BootLo Error Codes

The following table contains the bootLo error codes that might display on the Tuning Adapter.

Important: The bootLo error codes are 2-byte codes.

Illuminations	Codes	Binary	Hex	Error Indication
dim, dim	00	00	0x00	One of the clock initializations failed.
dim, bright	01	01	0x01	Loading bootHi failure.
bright, dim	10	10	0x10	bootHi load memory failure.
bright, bright	11	11	0x11	bootHi security check failure.

BootHi Error Codes

The following table contains the bootHi error codes that might display on the Tuning Adapter.

Illuminations	Binary	Hex	Error Indication
2 dim, 1 bright, 5 dim	0010 0000	0x20	Failed reception after the maximum retries.
2 dim, 1 bright, 4 dim, 1 bright	0010 0001	0x21	Transfer parameters are incorrect.
2 dim, 1 bright, 3 dim, 1 bright, 1 dim	0010 0010	0x22	CRC on the received image is incorrect.
2 dim, 1 bright, 3 dim, 2 bright	0010 0011	0x23	Wrong address (overflow/underflow).
2 dim, 1 bright, 2 dim, 1 bright, 2 dim	0010 0100	0x24	Start offset error.
2 dim, 1 bright, 2 dim, 3 bright	0010 0111	0x27	Overflow - Image is too long.
2 dim, 2 bright, 4 dim	0011 0000	0x30	Image length wrong.
2 dim, 2 bright, 3 dim, 1 bright	0011 0001	0x31	CRC in signature failed.
2 dim, 2 bright, 2 dim, 1 bright, 1 dim	0011 0010	0x32	Signature values wrong.

Appendix B
Bootloader LED Error Codes

Illuminations	Binary	Hex	Error Indication
2 dim, 2 bright, 2 dim, 2 bright	0011 0011	0x33	Image does not pass verification.
2 dim, 5 bright, 1 dim	0011 1110	0x3E	Bootloader repl. - duplicate found.
2 dim, 6 bright	0011 1111	0x3F	Bootloader replacement verification failed.
1 dim, 1 bright, 5 dim, 1 bright	0100 0001	0x41	Failed communication with tuner.
1 dim, 1 bright, 3 dim, 1 bright, 1 dim, 1 bright	0100 0101	0x45	QPSK receiver expected but not found.
1 dim, 2 bright, 3 dim, 1 bright, 1 dim	0110 0010	0x62	Invalid image list.
1 dim, 2 bright, 3 dim, 2 bright	0110 0011	0x63	Failed check of one of module headers.
1 dim, 2 bright, 2 dim, 1 bright, 2 dim	0110 0100	0x64	Boot image load failure.
1 dim, 2 bright, 2 dim, 1 bright, 1 dim, 1 bright	0110 0101	0x65	Storage unavailable for boot/save.
1 dim, 2 bright, 2 dim, 2 bright, 1 dim	0110 0110	0x66	Image invalidated due to 7-strike ovf.
1 dim, 2 bright, 2 dim, 3 bright	0110 0111	0x67	File name too long.
1 dim, 2 bright, 1 dim, 4 bright	0110 1111	0x6F	Invalid module number.
1 dim, 3 bright, 1 dim, 1 bright, 2 dim	0111 0100	0x74	Invalid LO1 status in ForceLock().
1 dim, 3 bright, 1 dim, 1 bright, 1 dim, 1 bright	0111 0101	0x75	LO1 could not be forced to lock.
1 dim, 3 bright, 1 dim, 2 bright, 1 dim	0111 0110	0x76	LO2 is not locked.
1 dim, 3 bright, 1 dim, 3 bright	0111 0111	0x77	Tuning/decode script error.
1 dim, 4 bright, 3 dim	0111 1000	0x78	Wrong parameter passed to script process.
1 bright, 7 dim	1000 0000	0x80	USB hardware initialization failure.
1 bright, 2 dim, 1 bright, 3 dim, 1 bright	1001 0001	0x91	Error accessing NAND flash.

LxLoader Error Codes

The following table contains the LxLoader error codes that might display on the Tuning Adapter.

Flashes	Binary	Hex	Error Indication
1 bright, 1 dim, 1 bright, 5 dim	1010 0000	0xA0	Error loading image.
1 bright, 1 dim, 1 bright, 4 dim, 1 bright	1010 0001	0xA1	Error loading image.

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