SDV Operator's Guide

For System Releases 2.7/3.7 or SR 4.2 Service Pack 2

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.

Notices

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About This Guide

Introduction

Switched digital video (SDV) is a technology that allows cable operators to recover bandwidth from infrequently-viewed channels, by making these channels "on-demand." Instead of sending all channels to the set-top boxes, lightly viewed channels are put into a switching pool and only sent to the set-top boxes when viewers tune to them.

Purpose

This guide provides procedures to help you keep your SDV system running as expected. This guide explains various tools that you can use to monitor and troubleshoot SDV systems.

Scope

The procedures in this document only apply to Digital Broadband Delivery System (DBDS) networks operating with the Cisco Resident Application (SARA).

System Prerequisites

The Digital Network Control System (DNCS) must meet the following conditions to support SDV:

- Must run System Release (SR) 2.7/3.7 or SR 4.2 Service Pack 2 (SP2), or later
- Must have SDV feature enabled for DNCS
- Must have SDV feature enabled for the Netcrypt Bulk Encryptor
- SSP 2.3 Compliant

What's New for SDV in this Release?

For each SDV-enabled service group, a mini-carousel discovery file is created. Each BFS carousel is limited to 475 individual files; and therefore, before SR 2.7/3.7/4.2 SP2, the number of SDV-enabled service groups available on the DNCS was limited to 475.

A new feature in SR 2.7/3.7/4.2 SP2 allows the DNCS, by default, to create four additional BFS sources to deliver the mini-carousel discovery files. This enhancement provides for a *default* total of five carousels, or up to 2,375 SDV-enabled service groups. See ***Expand the Number of Available Service Groups*** (on page 11) for additional information.

Audience

This guide is for system operators who are responsible for operating and maintaining SDV systems. This guide assumes the operator has experience using the UNIX operating system.

Related Publications

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

- *DNCS Online Help (PC) 4.2.0.3* (part number 4012121)*
- *Maintenance Recommendations for the DBDS* (part number 4002341)
- *Netcrypt™ Bulk Encryptor Hardware Installation and Operation Guide* (part number 4001444)
- *Provisioning the DNCS to Support SDV Services User's Guide* (part number 4012948)
- *Switched Digital Video Architecture Guide* (part number 4012490)
- *Switched Digital Video CSR Guide* (part number 4016660)
- *Series D9500 Switched Digital Video Servers Installation and Operation Guide* (part number 4012584)
- *Troubleshooting Switched Digital Video* (part number 4002915)

*The *DNCS Online Help (UNIX) 4.2.0.3* (part number 4012122) should already be installed on your DNCS. The PC version is a separate CD that allows you to view the same online Help on a PC separate from the DNCS workstation.

Document Version

This is the second release of this document.

1

Maintaining Your SDV System

Introduction

An important goal of an SDV system is the ability to maintain optimal bandwidth and performance. Monitoring your bandwidth and service groups is an important part of ensuring that your SDV system is running at optimal performance.

This chapter outlines the procedures for managing your bandwidth and monitoring your service groups to maintain optimal bandwidth.

In This Chapter

Performance Optimization

Overview

To provide continuous, quality service to your subscribers, you must keep your SDV system in top condition by performing certain tasks on a daily basis. This section provides instructions for checking and maintaining the optimal performance of your SDV system.

Determining the Current SDV Software Version

Complete the following steps to determine the current version of SDV software installed on your system.

1. From an xterm window on the DNCS, type **ssh root <IP address of the SDV Server>** and press **Enter**.
2. Type **cd /opt/sdb/** and press **Enter** to change the directory.
3. Type **./sdb –v** and press **Enter**. The current software version displays.

   Note: Repeat steps 1 through 3 for each server.
4. For details about the image file loaded on the SDV server, type **more tnoswdog.conf** and press **Enter**. The current version of SDV software loaded on the SDV server is displayed in the format **IMAGE:sdb-1.2.0-1.i386.rpm**.

Monitoring SDV Server Activity with the Event and Activity Logs

Monitoring SDV Server Activity with the Event Log

Complete the following steps to delete any unnecessary EventLog files on the SDV server.

1. On the SDV server, log in as **root** user.
2. Type **df -k** and press **Enter** to determine the percentage of disk usage by partition.
3. Type **cd /opt/sdb/EventLog/** and press **Enter** to make the opt/sdb/EventLog directory the working directory.
4. Type **rm <file name>** and press **Enter** to delete any unnecessary text files from the opt/sdb/EventLog directory.

   Note: The event log filename is in the format ddmmmyyyy.txt.

   Example: rm 30Jun2006.txt
5. Type **df -k** and press **Enter** to check the disk usage by partition again. Because you deleted unnecessary Log files in this procedure, the percentage of disk usage should now be reduced.
6. Type **exit** and press **Enter** to log out as root user.
7. Type **exit** and press **Enter** to close the xterm window.

Notes:

- Check the EventLog directory on the SDV server. Consider reducing the number of days you have configured on the DNCS to delete SDV event logs from your system.
- Using the **Log All** setting causes the Event Log to fill faster.

Monitoring SDV Server Activity with the Activity Log

Complete the following steps to delete any unnecessary ActivityLog files on the SDV server.

1. On the SDV server, log in as **root** user.
2. Type **df -k** and press **Enter** to determine the percentage of disk usage by partition.
3. Type **cd /opt/sdb/ActivityLog/** and press **Enter** to make the opt/sdb/ActivityLog directory the working directory.
4. Type **rm <file name>** and press **Enter** to delete any unnecessary text files from the opt/sdb/EventLog directory.

   Note: The event log filename is in the format ddmmmyyyy.txt.

   Example: rm 30Jun2006.txt
5. Type **df -k** and press **Enter** to check the disk usage by partition again. Because you deleted unnecessary Log files in this procedure, the percentage of disk usage should now be reduced.
6. Type **exit** and press **Enter** to log out as root user.
7. Type **exit** and press **Enter** to close the xterm window.

Notes:

- Check the ActivityLog directory on the SDV server. Consider reducing the number of days you have configured on the DNCS to delete SDV event logs from your system.
- Using the **Log All** setting causes the Activity Log to fill faster.

Monitoring DNCS Logs

Introduction

The DNCS system logs can be helpful for identifying and monitoring SDV system issues. Review the DNCS log files each morning to find out about any recent issues that have occurred since the previous day. Check the file during the day if you suspect any issues.

The following DNCS logs are pertinent to monitoring the SDV system:

- sdvManager
- qamManager
- pkeManager
- drm
- dsm

Configuring DNCS System Logging Levels

The Logging utility allows you to fine-tune log levels for DNCS processes and their associated libraries in much the same manner as the legacy DNCS Tracing utility.

The Logging utility is most useful when you are experiencing problems and want to capture information that can help you resolve the problem. After you adjust the logging level for a specific site and process, you can open the DNCS log and view the data that the DNCS has recorded. You can also open the log for an individual process.

Note: For more information on how to configure and use the Logging utility, see the *DNCS Online Help (PC) 4.2.0.3* (part number 4012121).

Accessing DNCS Log Files

After you configure your logging levels, make sure you know how to access the DNCS log file and the log files for individual processes. You can open the DNCS log in **/var/log/dncsLog** and view the data that the DNCS has recorded.

You can find the most recent log files for an individual process in **/dvs/dncs/tmp/[name of process.*]**. The file name of the log for an individual process is the name of the process followed by a 3-digit counter. For example, the file name for the qamManager log might be qamManager.000.

Notes:

- All processing logging levels can be viewed in **/dvs/dncs/tmp**.
- Only the Emergency, Alert, Critical, and Error logging levels can be viewed in **/var/log/dncsLog**.

For more information on how to use log files to maintain a healthy system, see *Maintenance Recommendations for the DBDS* (part number 4002341).

Performance Monitoring

The Performance Monitoring tool allows you to display data collected from DNCS processes in a graphical format, such as a line chart. DHCT and VOD performance data is gathered from DNCS processes in comma separated value (CSV) files and is displayed in a graphical format to help you in maintaining and troubleshooting your system should the need arise.

Data can be collected and displayed for the drm, dsm, and qamManager processes.

For more information about using the Performance Monitoring tool, see the *DNCS Online Help (PC) 4.2.0.3* (part number 4012121).

Managing Bandwidth and Service Groups

Overview

Because the SDV technology is designed to recover bandwidth from infrequently-viewed channels, fine-tuning of access network bandwidth is an important management aspect of your SDV system.

Careful management of service groups is another important consideration for your SDV system. For example, you should split service groups in the event that the DHCT threshold capacity of the SDV service group is exceeded. Increases in channel demand also could warrant the need for splitting service groups.

This section provides information for properly managing your SDV bandwidth and service groups.

Fine Tuning SDV Bandwidth

This section provides procedures you can follow to monitor and fine tune your bandwidth.

Check SDV Server Specifications

Refer to the *Series D9500 Switched Digital Video Servers Installation and Operation Guide* (part number 4012584) to verify that your system conforms to maximum specification limits listed for the following:

- QAM modulators
- DHCTs
- Service Groups

  Note: See ***Expand the Number of Available Service Groups*** (on page 11) for procedures to expand the number of service groups available on your system.

Monitor Alarms

Use your Network Management System (NMS) to monitor your system for the following session and server capacity alarms:

- Alarm 101
- Alarm 204
- Alarm 205
- Alarms 207 through 209
- Alarm 400

If these alarms are occurring frequently and consistently, follow the recommended check and correct procedures for these alarms. See ***Monitoring SDV Alarms*** (on page 19). You can also do one or more of the following:

- Add bandwidth to the SDV service group
- Split your SDV service groups to decrease the number of DHCTs in the service group
- If the number of subscribers viewing a program is consistently greater than 1, consider making the program a broadcast program
- Add QAM carriers to the affected service group

Checking SDV Service Groups

Run the sgmParse.pl Utility

The sgmParse.pl utility can be used to read the service group map file. Service group map files contain all of the frequencies, transport stream identifiers (TSIDs), and modulation types that are assigned to a service group on gigabit quadrature amplitude modulation (GQAM) and multiple QAM (MQAM) modulators.

Complete the following steps to run the sgmParse.pl utility.

1 If necessary, open an xterm window on the DNCS.

2 Type **cd /dvs/dvsFiles/SGM** and then press **Enter**.

Important: Make sure you type a space before typing /dvs.

3 Type **ls** and then press **Enter** to list the service group map files.

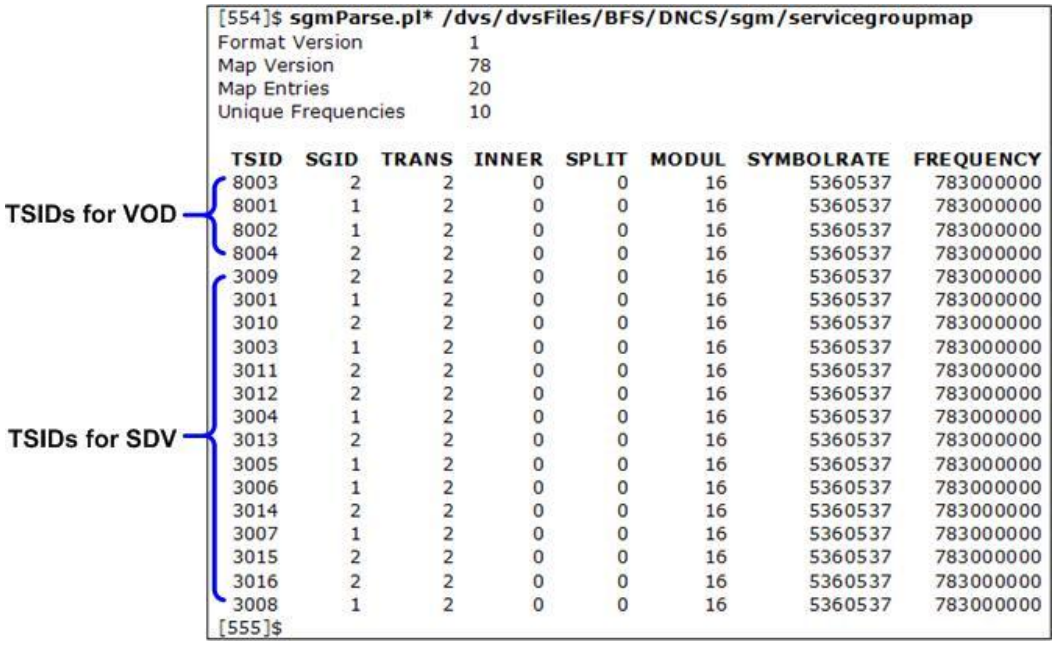
Example: The following sample output shows the list of SGM files:

core **sdb** **sdv** **servicegroupmap.dat**

4 Type **sgmParse.pl <service group map file name>** and then press **Enter**.

Note: In the following example, TSIDs 8001 through 8004 are for video-on-demand (VOD); TSIDs 3001 through 3016 are for SDV.

Example:




```
[554]$ sgmParse.pl* /dvs/dvsFiles/BFS/DNCS/sgm/servicegroupmap
Format Version          1
Map Version             78
Map Entries             20
Unique Frequencies      10

  TSID  SGID  TRANS  INNER  SPLIT  MODUL  SYMBOLRATE  FREQUENCY
  8003     2      2      0      0     16     5360537  783000000
  8001     1      2      0      0     16     5360537  783000000
  8002     1      2      0      0     16     5360537  783000000
  8004     2      2      0      0     16     5360537  783000000
  3009     2      2      0      0     16     5360537  783000000
  3001     1      2      0      0     16     5360537  783000000
  3010     2      2      0      0     16     5360537  783000000
  3003     1      2      0      0     16     5360537  783000000
  3011     2      2      0      0     16     5360537  783000000
  3012     2      2      0      0     16     5360537  783000000
  3004     1      2      0      0     16     5360537  783000000
  3013     2      2      0      0     16     5360537  783000000
  3005     1      2      0      0     16     5360537  783000000
  3006     1      2      0      0     16     5360537  783000000
  3014     2      2      0      0     16     5360537  783000000
  3007     1      2      0      0     16     5360537  783000000
  3015     2      2      0      0     16     5360537  783000000
  3016     2      2      0      0     16     5360537  783000000
  3008     1      2      0      0     16     5360537  783000000
[555]$
```

Run the mcParse.pl Utility

The **mcParse.pl** utility is used to read the service group files for the mini-carousel transport stream ID (TSID) and frequencies.

Complete the following steps to run the mcParse.pl utility.

1 If necessary, open an xterm window on the DNCS.

2 From the dvs/dvsFiles/SGM directory, type **cd sdv** and then press **Enter**.

3 Type **ls** and then press **Enter** to list the service group files.

Example: The following sample output shows the list of service group files:

00000002 00000005 00000009 0000000c 0000000f 00000012 00000015 00000018 00000066 00000069 0000006c

00000003 00000006 0000000a 0000000d 00000010 00000013 00000016 00000032 00000067 0000006a

00000004 00000007 0000000b 0000000e 00000011 00000014 00000017 00000065 00000068 0000006b

4 Type **mcParse.pl <service group file number>** and press **Enter**.

Example: The following sample output shows the mini-carousel TSID and frequencies for Service Group 1

```
[563]$ .mcParse.pl* /dvs/dvsFiles/SGM/sdv/00000001
Time Stamp              Wed Jul  5 13:26:18 2006  (1152120375)
Service Group           1
Parent Service Group    0
Unique RF outputs       8

TSID        SYMBOLRATE    FREQUENCY     MODUL
 3001          5360537     741000000       16
 3002          5360537     747000000       16
 3003          5360537     753000000       16
 3004          5360537     759000000       16
 3005          5360537     765000000       16
 3006          5360537     771000000       16
 3007          5360537     777000000       16
 3008          5360537     783000000       16
[564]$
```

Expand the Number of Available Service Groups

Introduction

For each SDV-enabled service group, a mini-carousel discovery file is created. Each BFS carousel is limited to 475 individual files; and therefore, in earlier system releases, the number of SDV-enabled service groups available on the DNCS was limited to 475.

Important: The number of 475 SDV-enabled service groups available is based on a block size of 4,000 bytes. Decreasing the block size on your system will decrease the number of available service groups that an inband source can support. Cisco recommends a block size of 4,000 bytes for these sources. This section assumes a block size of 4,000 bytes.

Starting with this system release, the DNCS, by default, creates four additional BFS sources to deliver the mini-carousel discovery files. This enhancement provides for a default total of five carousels, or up to 2,375 SDV-enabled service groups.

The following table shows the default source IDs and the corresponding names for each source ID.

Source ID	Source ID Name
24 (the original)	SGM IB
26	SGM IB1
28	SGM IB2
30	SGM IB3
32	SGM IB4

Notes:

- After upgrading to SR 2.7/3.7/4.2 SP2, Source IDs 26, 28, 30, and 32 are created, but are disabled by default.

  Important: If a BFS source is enabled *before* the upgrade, the source will remain enabled *after* the upgrade.

- The data rate for each source (including source ID 24) should be set to 0.50 Mbps and the block size should be 4,000 bytes.

Configuring Secondary BFS QAMs on an SDV System (Optional)

If you are currently utilizing Distributed BFS and you are upgrading your system to support SDV, you must add a number of BFS sources to your BFS source list. These additional sources will need to be added to all of your secondary BFS QAMs.

Note: If your site does not support the SDV option, you may skip the procedures in this section.

This section provides procedures for sites using either a BFS BIG or a Direct ASI model. Choose the procedure that pertains to your system.

Adding BFS Sources - Sites Using a BFS BIG

Complete the following procedure if your DNCS uses a BFS BIG to distribute the BFS carousel data.

1. Configure your BFS source setup procedures per the *Provisioning the DNCS to Support SDV Services User's Guide* (part number 4012948).
2. Open the Set Up BIG window by following the quick path:
   DNCS Administrative Console > Network Element Provisioning tab > BIG > File > Open
3. Click **PAT Configuration** to open the BIG PAT window.
4. Verify the BIG PAT Session Number and Program Number data, making sure your Program Numbers are sequentially in order and in line with the Session Numbers shown.

Note: Your DNCS sessions 2 through 22 should not change; however, DNCS sessions greater than 22 must be deleted and reentered with the correct sequential Program Number.

Example: BIG PAT Session Number and Program Number Data (Program Numbers in Sequential Order and in line with Session Numbers).

Session Number	Program Number
2	128
4	129
6	130
8	131
10	132
12	133
14	134
16	135
18	136
20	137
22	138
24	139
26	140
28	141
30	142
32	143
199	144

5 Cisco recommends that you go ahead and add all SDV sources 24 through 32 to reduce the number of times that the PAT Configuration table has to be edited. Refer to *Provisioning the DNCS to Support SDV Services User's Guide* (part number 4012948) for more information.

6 After the SDV sessions are built, if the sessions are not immediately utilized, then disable the DNCS ATM source by following the quick path:

DNCS Administrative Console > Application Interface Modules tab > BFS Admin > select DNCS > File > Select > Sources tab > select source to be modified > File > Open > set source to Disable > Save

7 Once the PAT Configuration Table has been modified, update any secondary BFS QAMs by tearing down any session greater than 22 and rebuilding the session with the correct Program Number.

Adding BFS Sources - Sites Using Direct ASI

Complete the following procedure if your DNCS uses the Direct ASI option to distribute BFS data.

Note: A benefit of using the Direct ASI option is that you only need to build sessions *as you need them* on your primary and secondary BFS QAMs. There is no need to tear down any DNCS sessions greater than 22 as you would do within a BFS QAM system.

1 Configure your BFS source setup procedures per the *Provisioning the DNCS to Support SDV Services User's Guide* (part number 4012948).

2 Manually add your BFS sources by following the quick path:

DNCS Administrative Console > DNCS tab > Source

3 As BFS sources are built, the DNCS automatically retrieves the next available program number from the source list. As a result, there is no need to update the PAT Configuration Table by hand.

In the following example, note that Session 22 is Program Number 138, while Session 199 is Program Number 139, and Session 24 is Program Number 140.

When Session 24 was built, it took the next available Program Number, which was 140. With the Direct ASI model, you can have Program Numbers out of sequence in the PAT Configuration table.

Example:

Session Number	Program Number
2	128
4	129
6	130
8	131
10	132
12	133
14	134
16	135
18	136
20	137
22	138
24	140
26	141
28	142
30	143
32	144
199	139

4 After adding the BFS sources, update any secondary BFS QAMs by adding the same sessions to the secondary BFS QAMs.

Example: If you added sessions 24 and 26 to the primary BFS QAM, you must add the same sessions to all secondary BFS QAMs as Continuous Feed sessions.

Monitoring the Number of Available Service Groups

You must actively monitor the number of SDV-enabled service groups on your system. Complete the following steps to monitor the number of SDV-enabled service groups on your system.

Note: For additional details on configuring your system for SDV, refer to *Provisioning the DNCS to Support SDV Services User's Guide* (part number 4012948).

1. In the DNCS Monitor window on the DNCS Administrative Console, observe the status of the sgManager process. The light adjacent to this process should be green.
2. If the sgManager was unsuccessful in adding the MCDiscovery file to a BFS carousel, the sgManager process light will turn yellow.
3. To verify that the number of SDV-enabled services groups on your system has exceeded 475, open the sgManager log file and locate an entry that indicates that the carousel is full.
4. Go to ***Expanding the Number of Available Service Groups*** (on page 16).

Expanding the Number of Available Service Groups

To expand the number of available service groups, you must manually build the additional BFS carousels. Complete the following procedure for each available service group in the exact order shown.

Important: Complete this procedure for one BFS source (for example, BFS source 26) before enabling the next available BFS source (for example, BFS source 28).

1. To enable an additional set of 475 service groups in your system, enable the next available BFS source (26, 28, 30, or 32) from the DNCS BFS Admin GUI sequentially and in the exact order shown here. Then, go to step 2. For example:
   - To expand the number of available service groups to between 476 and 950 enable BFS source 26 (SGM IB1).
   - To expand the number of available service groups to between 951 and 1425, enable BFS source 28 (SGM IB2).
   - To expand the number of available service groups to between 1,426 and 1,900, enable BFS source 30 (SGM IB3).
   - To expand the number of available service groups to between 1,901 and 2,375 enable BFS source 32 (SGM IB4)

   Important: See the *Digital Network Control System Online Help* on your system for additional details on configuring and enabling BFS sources.
2. Stop the sgManager process.
3. Using a text editor, edit the /dvs/dncs/etc/sgManager.conf file, and add a new sequential 4-digit source ID to the existing list (for example “0026”), and then save the file.

4 Restart the sgManager process.

5 Do you want to enable an additional BFS source?

- If **yes**, repeat this procedure from step 1.
- If **no,** you have complete this procedure

Important: To expand the number of available service groups beyond 2,375, contact Cisco Services for further assistance.

Enabling Service Group PassThru Messages

In SR 2.7/3.7/4.2 SP2, all Service Group PassThru messages are disabled. To enable the PassThru (0x8065) message on your system, you must edit the .profile file to add the environment variable **SEND_SG_PASSTHRU=true** and then stop and restart the sgManager process.

Note: 0x8065 PassThru messages are sent only when service group hierarchical changes are made. For example, when parent-child relationships are changed, both the parent and child service groups are included in the 0x8065 PassThru message. Therefore, only enable this variable if a hierarchical service group architecture exists on the system.

Disabling Service Group PassThru Messages

To disable the PassThru message, comment out the entry in the .profile file by adding a **#** at the beginning of the line and then restarting the sgManager process.

2

Monitoring SDV Alarms

Introduction

The SDV server is capable of sending third-party network management system (NMS) alarms, or traps. These alarms are generated to provide system operators with an indication of an abnormal hardware or software condition.

The health of the SDV server is vital to your system operations. Cisco recommends that you monitor the SDV alarm data as a part of your daily SDV system checks.

Note: Cisco's Alarm Manager NMS can be used to check on the status of your SDV server alarms. Contact your North American marketing manager for more information.

This chapter provides detailed procedures for identifying, troubleshooting, and clearing the SDV server alarms to keep your SDV system running properly.

In This Chapter

SDV Alarms

This section provides detailed information for troubleshooting alarms that are generated by the SDV server.

Because there are several different categories of SDV server alarms, the alarms are divided into the following individual sections:

- ***SDV System Communications Alarms*** (on page 21)
- ***SDV Server Process Alarms*** (on page 24)
- ***SDV Session Alarms*** (on page 32)
- ***SDV Server Capacity Alarms*** (on page 34)
- ***SDV Maintenance and Provisioning Alarms*** (on page 46)
- ***SDV Program Management Alarms*** (on page 48)
- ***SDV Redundancy Alarms*** (on page 49)

The alarms are arranged in the ascending numerical order of the trap identifiers. For your convenience, the alarms are listed in both decimal and hexadecimal format. You can look up the possible causes and then follow the Check and Correct procedures for each alarm to help you troubleshoot and clear the alarm.

SDV System Communications Alarms

SDV Server Trap 1 (1 Hex)

Alarm Summary:

SDV Server Unable to Communicate with DNCS SRM

Description:

This alarm occurs when the resource manager of the SDV server failed to acquire bandwidth from the DNCS SRM.

Severity:

Major

Service Impact:

- An initializing SDV SRM cannot acquire bandwidth for SDV programs.
- SDV Servers already running cannot acquire additional bandwidth as needed.

Check and Correct:

Possible Causes	Check and Correct Instructions
■ The DNCS is not responding. ■ The DNCS SRM is not responding. ■ There is a possible network problem between the SDV server and the DNCS. ■ A VASP entry for the SDV server is not entered into the DNCS database.	■ Investigate and troubleshoot your network, as this issue could be network-related. Contact Cisco Services for further assistance. ■ Verify that the correct VASP ID is entered for the SDV server. **Note:** In rare cases, you may see toggling between the primary and backup SDV servers. This condition should be resolved within approximately 1 minute.

SDV Server Trap 2 (2 Hex)

Alarm Summary:

SDV Server Unable to Communicate with Partner SDV Server

Description:

This alarm occurs when the secondary SDV server attempts to connect with the primary SDV server.

Severity:

Minor

Service Impact:

When this alarm occurs, no protection switch or failover can take place between the secondary and primary server.

Check and Correct:

Possible Causes	Check and Correct Instructions
■ The primary SDV server is not responding. ■ The primary SDV server High Availability Manager is not responding. ■ There is a possible network problem between the SDV server and the DNCS. ■ The incorrect IP Address is entered for the primary SDV server.	■ Investigate and troubleshoot your network, as this issue could be network-related. Contact Cisco Services for further assistance. ■ Verify that the correct IP Address is entered for the primary SDV server.

SDV Server Trap 6 (6 Hex)

Alarm Summary:

SDV Server Failed to Communicate with Edge Device

Description:

This alarm occurs when the SDV SRM process cannot ping the edge device or QAM modulator.

Severity:

Major

Service Impact:

When this alarm occurs, an SDV program cannot be established on the edge device.

Check and Correct:

Possible Cause	Check and Correct Instructions
The network between the SDV server and the edge device is not responding.	1 Try to ping the edge device and/or query it through SNMP using an alternate route (for example, not through the SDV server). 2 If the edge device responds, the problem is probably within the network between the edge device and SDV server. 3 If the edge device does not respond, then proceed to the next possible cause. 4 Check and verify the amount of bandwidth allotted for your service groups.
The edge device is not responding.	Try to assess the cause of the failure, and then reset the QAM device to restore service.

SDV Server Process Alarms

SDV Server Trap 50 (32 Hex)

Alarm Summary:

SDV Server Resource Manager Stopped

Description:

This alarm occurs when the SDV server SRM process stops.

Severity:

Critical

Service Impact:

When this alarm occurs, some CCMIS requests for new SDV programs will fail, if the Resource Manager bandwidth is exhausted. The SDV Server cannot create new program bindings on the edge device or request additional bandwidth from the DNCS as needed.

Check and Correct:

Possible Cause	Check and Correct Instructions
A software bug such as a memory leak or exceptions.	1 Reboot the SDV server. 2 Contact Cisco Services immediately to request an examination of the memory logs.

SDV Server Trap 51 (33 Hex)

Alarm Summary:

SDV Server CCMIS Process Stopped

Description:

This alarm occurs when the SDV server CCMIS process has stopped.

Severity:

Critical

Service Impact:

When this alarm occurs, all CCMIS requests for SDV programs fail, and new SDV programs cannot be established on the edge device. The mini-carousel will not contain tuning information for new programs.

Note: If this alarm is the only failure, then the SDV server will continue to multicast the mini-carousel.

Check and Correct:

Possible Cause	Check and Correct Instructions
A software bug such as a memory leak or exceptions.	1 Reboot the SDV server. 2 Contact Cisco Services immediately to request an examination of the memory logs.

SDV Server Trap 52 (34 Hex)

Alarm Summary:

SDV Server MCMIS Process Stopped

Description:

This alarm occurs when the SDV server MCMIS process has stopped.

Severity:

Critical

Service Impact:

When this alarm occurs, mini-carousel data is not available for the DHCTs to update program tuning information.

Note: DHCTs will be able to get program tuning information through CCMIS requests. However, new DHCTs that are trying to access the SDV service will not be able to register or receive programming information.

Check and Correct:

Possible Cause	Check and Correct Instructions
A software bug such as a memory leak or exceptions.	1 Reboot the SDV server. 2 Contact Cisco Services immediately to request an examination of the memory logs.

SDV Server Trap 53 (35 Hex)

Alarm Summary:

SDV Server Bandwidth Manager Stopped

Description:

This alarm occurs when the SDV Bandwidth Manager process has stopped. The SDV bandwidth manager monitors bandwidth to enable the SDV server to stay ahead of demand for new programs.

Severity:

Major

Service Impact:

When this alarm occurs, the SDV server cannot monitor bandwidth utilization and request bandwidth to stay ahead of the demand. The SDV server will need to request bandwidth or unbind low priority programs in real-time in this situation. CCMIS requests may also experience some latency when this alarm occurs.

Note: There is a setting on the Server Configuration page called **Demand BW Request**. The default setting is **Off**. If the server Bandwidth Manager fails in this configuration, the server will not go out and request bandwidth from the DNCS. The server will only use what it has existing in its pool. If the Demand BW Request setting is **On**, then the screen will go out and request bandwidth in real time. This is a manual setting, not automatic.

Check and Correct:

Possible Cause	Check and Correct Instructions
A software bug such as a memory leak or exceptions.	1 Reboot the SDV server. 2 Contact Cisco Services immediately to request an examination of the memory logs.

SDV Server Trap 54 (36 Hex)

Alarm Summary:

SDV Server Program Manager Stopped

Description:

This alarm occurs when the SDV Program Manager process has stopped. The program manager manages SDV program attributes and ranks program priorities.

Severity:

Minor

Service Impact:

When this alarm occurs, the SDV server is unable to activate new programs or tear down old programs.

Check and Correct:

Possible Cause	Check and Correct Instructions
A software bug such as a memory leak or exceptions.	1 Reboot the SDV server. 2 Contact Cisco Services immediately to request an examination of the memory logs.

SDV Server Trap 55 (37 Hex)

Alarm Summary:

SDV Server Maintenance Manager Stopped

Description:

This alarm occurs when the maintenance manager process has stopped. The maintenance manager monitors the health of the SDV server system.

Severity:

Minor

Service Impact:

When this alarm occurs, the SDV server cannot perform scheduled maintenance on itself and the devices it controls.

Check and Correct:

Possible Cause	Check and Correct Instructions
A software bug such as a memory leak or exceptions.	1 Reboot the SDV server. 2 Contact Cisco Services immediately to request an examination of the memory logs.

SDV Server Trap 56 (38 Hex)

Alarm Summary:

SDV Server Web Server Stopped

Description:

This alarm occurs when the Web Server has stopped. The Web Server allows access to the SDV server platform from a Web interface.

Severity:

Minor

Service Impact:

When this alarm occurs, the SDV server Web interface is not available.

Check and Correct:

Possible Cause	Check and Correct Instructions
A software bug such as a memory leak or exceptions.	1 Reboot the SDV server. 2 Contact Cisco Services immediately to request an examination of the memory logs.

SDV Server Trap 57 (39 Hex)

Alarm Summary:

SDV Server Redundancy Process Stopped

Description:

This alarm occurs when the redundancy process has stopped. The redundancy process is responsible for protection switches between partner SDV servers and the communications between these servers.

Severity:

Major

Service Impact:

Until this alarm is resolved, protection switches are not possible.

Check and Correct:

Possible Cause	Check and Correct Instructions
A software bug such as a memory leak or exceptions.	1 Reboot the SDV server. 2 Contact Cisco Services immediately to request an examination of the memory logs.

SDV Session Alarms

SDV Server Trap 100 (64 Hex)

Alarm Summary:

SDV Session Bind Failure

Description:

This alarm occurs when the server fails to bind a program to a session on the edge device.

Severity:

Major

Service Impact:

When this alarm occurs, the SDV client is denied service because a new program could not be established on the edge device.

Check and Correct:

Possible Cause	Check and Correct Instructions
The edge device may be unreachable.	1 Analyze the error code associated with the alarm and determine if the SDV Server Trap 6 (6 Hex) also occurred. 2 If SDV Server Trap 6 has occurred, then refer to the Check and Correct procedures for ***SDV Server Trap 6 (6 Hex)*** (on page 23). 3 If the SDV Server Trap ID 6 has *not* occurred, then proceed to the next possible cause. 4 Check and verify the amount of bandwidth allotted for the service groups.
Edge device software error.	Investigate the edge device alarms and try to assess the cause of the error.

SDV Server Trap 101 (65 Hex)

Alarm Summary:

SDV SRM Interactive Session Bandwidth Request Denied

Description:

This alarm occurs when the DNCS denies the SDV server's request for more bandwidth.

Severity:

Major

Service Impact:

This condition may hamper the following abilities of the SDV server:

- The ability to stay ahead of demand for new programs
- The ability to satisfy a new CCMIS request in real-time

Check and Correct:

Possible Cause		Check and Correct Instructions
No available edge device bandwidth.	1	Check the bandwidth allocated for the affected service group and verify that the maximum bandwidth is allocated.
	2	Verify that all allocated QAMs are operational.
	3	Verify that all service group resources are being fully utilized.
	4	The service group may need to be re-engineered to provide additional QAM capacity. Contact Cisco Services for further assistance.

SDV Server Capacity Alarms

SDV Server Trap 200 (C8 Hex)

Alarm Summary:

SDV Server Disk Full

Description:

This alarm occurs when the server's hard disk is full.

Severity:

Critical

Service Impact:

The server stops logging data when this condition occurs.

Check and Correct:

Possible Cause	Check and Correct Instructions
Unnecessary files are taking up disk space on the SDV server.	**Note:** Check the ActivityLog and EventLog directories on the SDV server. Consider reducing the number of days you have configured on the DNCS to delete SDV activity and event logs from your system. **(Quick Path: DNCS > SDV Server List > Update SDV Server > Constraints)** Follow these steps to delete any unnecessary ActivityLog and/or EventLog files on the SDV server. 1 On the SDV server, log in as **root** user. 2 Type **df -k** and press **Enter** to determine the percentage of disk usage by partition. 3 Type **cd /opt/sdb/ActivityLog/** and press **Enter** to make the opt/sdb/ActivityLog directory the working directory. 4 Type **rm <file name>** and press **Enter** to delete any unnecessary text files from the opt/sdb/ActivityLog directory. 5 **Note:** The activity log filename is in the format ddmmmyyyy.txt. For example: rm 30Jun2006.txt. 6 Type **cd /opt/sdb/EventLog/** and press **Enter** to make the opt/sdb/EventLog directory the working directory. 7 Type **rm <file name>** and press **Enter** to delete any unnecessary text files from the opt/sdb/EventLog directory. 8 **Note:** The event log filename is in the format **ddmmmyyyy.txt**. For example: **rm 30Jun2006.txt**. 9 Type **df -k** and press **Enter** to check the disk usage by partition again. (Because you deleted unnecessary Log files in this procedure, the percentage of disk usage should now be reduced.) 10 Type **exit** and press **Enter** to log out as root user. 11 Type **exit** and press **Enter** to close the xterm window.

SDV Server Trap 201 (C9 Hex)

Alarm Summary:

SDV Server Memory Threshold Exceeded

Description:

This alarm occurs when the SDV server exceeds the configured memory usage threshold that triggers a major alarm.

Severity:

Major

Service Impact:

When this alarm occurs, the SDV server is within 10% of reaching the maximum memory usage threshold.

Important: If this alarm occurs frequently, you should consider upgrading the SDV server memory, as this condition might impact your overall SDV server performance.

Check and Correct:

Possible Cause	Check and Correct Instructions
SDV server loading problems.	If loading problems periodically occur, it could be a result of too much load on your system. You may need to reduce the size of your service groups or upgrade your server memory. Contact your Cisco North American marketing manager to arrange a memory upgrade for your SDV server.
Memory leak.	Call Cisco Services immediately for further assistance.

SDV Server Trap 202 (CA Hex)

Alarm Summary:

SDV Server DHCT Table Full

Description:

This alarm occurs when the SDV server exhausts the capacity of its DHCT table. (The SDV server keeps track of the DHCT population across all service groups.)

Severity:

Major

Service Impact:

DHCTs will not be able to tune to additional SDV channels.

Check and Correct:

Possible Cause	Check and Correct Instructions
The DHCT table for the SDV server is full.	1 Consider moving a service group to another SDV server. 2 Consider purchasing an SDV server license capable of handling more DHCTs. Contact your Cisco North American marketing manager for more information.

SDV Server Trap 203 (CB Hex)

Alarm Summary:

SDV Server Total DHCT Capacity Threshold Exceeded

Description:

This alarm occurs when the SDV server exceeds the default threshold of its DHCT table. (The SDV server keeps track of the DHCT population across all service groups.)

Severity:

Minor

Service Impact:

When this alarm occurs, the SDV server is within 10% of the maximum number of DHCTs that the server can support across the server's service groups.

Check and Correct:

Possible Cause		Check and Correct Instructions
The DHCTs table for the SDV server is approaching the maximum threshold value due to the number of DHCTs per service group on the SDV server.	1	Consider moving a service group to another SDV server.
	2	Consider purchasing an SDV server license capable of handling more DHCTs. Contact your Cisco North American marketing manager for more information.

SDV Server Trap 204 (CC Hex)

Alarm Summary:

SDV Server Bandwidth Utilization Threshold Exceeded

Description:

This alarm occurs when a customer-defined threshold based on the maximum bandwidth for the service group has been exceeded. The SDV server keeps track of the bandwidth utilization per service group.

Severity:

Minor

Service Impact:

When this alarm occurs, the service group bandwidth utilization is within 10% of reaching your defined bandwidth threshold.

Check and Correct:

Possible Cause	Check and Correct Instructions
Too many DHCTs in the SDV server service group.	1 Consider splitting the service group for the SDV server and moving the new service group to a different server. 2 Consider adding additional QAMs to your system. Contact your Cisco North American marketing manager for more information.

SDV Server Trap 205 (CD Hex)

Alarm Summary:

SDV Server Bandwidth Exhausted

Description:

This alarm occurs when the service group bandwidth is fully utilized. When this event occurs, the server cannot fit any additional programs on the remaining bandwidth.

Severity:

Major

Service Impact:

This event limits the ability of the SDV server to satisfy CCMIS requests for new programs.

Check and Correct:

Possible Cause	Check and Correct Instructions
Service group bandwidth is fully utilized.	1 Check the bandwidth allocated for the affected service group and verify that the maximum bandwidth is allocated. 2 Consider adding additional QAMs to your system. Contact your Cisco North American marketing manager for more information.

SDV Server Trap 206 (CE Hex)

Alarm Summary:

SDV Server Disk Exceeding Threshold

Description:

This alarm occurs when the SDV server exceeds its hard disk capacity threshold.

Severity:

Major

Service Impact:

When this alarm occurs, the SDV server is within 10% of reaching the hard disk capacity threshold.

Check and Correct:

Possible Cause	Check and Correct Instructions
Too many non-service affecting files are taking up disk space on the SDV server.	**Note:** Check the ActivityLog and EventLog directories on the SDV server. Consider reducing the number of days you have configured on the DNCS to delete SDV activity and event logs from your system. **(Quick Path: DNCS > SDV Server List > Update SDV Server > Constraints)** Follow these steps to delete any unnecessary ActivityLog and/or EventLog files on the SDV server. 1 On the SDV server, log in as **root** user. 2 Type **df -k** and press **Enter** to determine the percentage of disk usage by partition. 3 Type **cd /opt/sdb/ActivityLog/** and press **Enter** to make the opt/sdb/ActivityLog directory the working directory. 4 Type **rm <file name>** and press **Enter** to delete any unnecessary text files from the opt/sdb/ActivityLog directory. 5 **Note:** The activity log filename is in the format **ddmmmyyyy.txt**. For example: **rm 30Jun2006.txt**. 6 Type **cd /opt/sdb/EventLog/** and press **Enter** to make the opt/sdb/EventLog directory the working directory. 7 Type **rm <file name>** and press **Enter** to delete any unnecessary text files from the opt/sdb/EventLog directory. 8 **Note:** The event log filename is in the format **ddmmmyyyy.txt**. For example: **rm 30Jun2006.txt**. 9 Type **df -k** and press **Enter** to check the disk usage by partition again. (Because you deleted unnecessary Log files in this procedure, the percentage of disk usage should now be reduced.) 10 Type **exit** and press **Enter** to log out as root user. 11 Type **exit** and press **Enter** to close the xterm window.

SDV Server Trap 207 (CF Hex)

Alarm Summary:

SDV Service Group DHCT Capacity Threshold Exceeded

Description:

This alarm occurs when the DHCT capacity threshold is exceeded for a given service group.

Severity:

Minor

Service Impact:

DHCTs will not be able to tune to additional SDV channels.

Check and Correct:

Possible Cause		Check and Correct Instructions
Increased DHCT population.	1	Consider splitting the service group for the SDV server and moving the new service group to a different server.
	2	Consider purchasing an SDV server license capable of handling more DHCTs, or purchasing additional SDV servers for your system. Contact your Cisco North American marketing manager for more information.

SDV Server Trap 208 (D0 Hex)

Alarm Summary:

SDV Service Group DHCT Capacity Exceeded

Description:

This alarm occurs when the SDV server is getting requests from more DHCTs than the server can support.

Severity:

Major

Service Impact:

DHCTs will not be able to tune to additional SDV channels.

Check and Correct:

Possible Cause	Check and Correct Instructions
Too many DHCTs in service group.	The current SDV server license cannot support any additional DHCTs. Contact your Cisco North American marketing manager for more information.

SDV Server Trap 209 (D1 Hex)

Alarm Summary:

SDV Channel Change Request Denied for Lack of Bandwidth

Description:

This alarm occurs when the SDV server denies channel changes for new programs for lack of available bandwidth.

Severity:

Major

Service Impact:

This event affects the end-user experience.

Check and Correct:

Possible Cause		Check and Correct Instructions
SDV server does not have additional bandwidth available.	1	Check the bandwidth allocated for the affected service group and verify that the maximum bandwidth is allocated.
	2	Verify that all allocated QAMs are operational.
	3	Verify that all allocated QAMs are fully loaded based on bandwidth allocation.
	4	Consider adding additional QAMs to your system. Contact your Cisco North American marketing manager for more information.

SDV Maintenance and Provisioning Alarms

SDV Server Trap 300 (12C Hex)

Alarm Summary:

SDV Server Initialization Trap

Description:

This event occurs when the SDV server sends an exception to the SDV Manager to request provisioning.

Severity:

Status

Service Impact:

This event is an indication that the SDV server is initializing. No action is required.

SDV Server Trap 301 (12D Hex)

Alarm Summary:

SDV Server Provisioned

Description:

This status event is sent to inform the SDV Manager that the server successfully initialized or provisioned itself.

Severity:

Status

Service Impact:

This event is an indication that the SDV server has initialized. No action is required.

SDV Server Trap 302 (12E Hex)

Alarm Summary:

SDV Server Provision Request Failure

Description:

This alarm occurs when the SDV request for provisioning times out.

Severity:

Major

Service Impact:

If the SDV server is initializing for the first time or is synching up with the SDV Manager after provisioning data loss, the SDV server is unable to provide service.

Check and Correct:

Possible Cause		Check and Correct Instructions
Initialization has timed out too many times.	1	If any SDV System Communications or SDV Server Process alarms occurred, refer to the specific alarm Check and Correct procedures to troubleshoot and resolve any issues.
	2	You may need to reboot the SDV server.

SDV Program Management Alarms

SDV Server Trap 400 (190 Hex)

Alarm Summary:

Program Removed with Viewers

Description:

This alarm occurs when the SDV server removes a program from the edge device to free up bandwidth for a higher-priority program.

Severity:

Minor

Service Impact:

Important: If this alarm occurs frequently, it may be an indicator of insufficient bandwidth allocation for the service group.

Check and Correct:

Possible Cause	Check and Correct Instructions
Program priority or business rule triggered action.	This alarm occurs when one of the following instances occurs: ■ When the DNCS demands the removal of programs from the SDV server ■ When the SDV server detects no recent subscriber activity and bandwidth is required to satisfy a new program request (for example, bandwidth reclamation) If this alarm occurs frequently, consider the following options to add additional bandwidth to the affected service group: ■ Check the bandwidth allocated for the affected service group and verify that the maximum bandwidth is allocated. ■ Add additional QAMs to your system. Contact your Cisco North American marketing manager for more information.

SDV Redundancy Alarms

SDV Server Trap 500 (1F4 Hex)

Alarm Summary:

SDV Server Standby Active

Description:

This event occurs when the standby or backup SDV server takes over for the primary SDV server.

Severity:

Status

Service Impact:

None

Check and Correct:

Possible Cause	Check and Correct Instructions
Primary SDV server failure.	Investigate all SDV server alarms that may have occurred around the time of the SDV server failure, as this issue could be network-related. Contact Cisco Services for further assistance.
Forced switchover from primary SDV server to backup SDV server.	No action required.

SDV Server Trap 501 (1F5 Hex)

Alarm Summary:

SDV Forced Protection Switch Failure

Description:

This alarm occurs when the SDV server cannot perform a protection switch to its partner SDV server.

Severity:

Major

Service Impact:

This is a redundancy failure that impacts the ability to use an SDV server as a backup.

Check and Correct:

Possible Cause	Check and Correct Instructions
Communications problem.	Investigate and troubleshoot all SDV System Communications alarms.
Partner SDV server is down.	1 Investigate all SDV server alarms and errors that may have occurred around the time of the SDV server failure, particularly SDV Server Process alarms before the time of the failure. 2 Call Cisco Services immediately for further assistance.

SDV Server Trap 502 (1F6 Hex)

Alarm Summary:

SDV Server Heartbeat Trap

Description:

This event is sent to the SDV Manager by a secondary SDV server (operating in standby mode) or by a primary SDV server (if redundancy is not implemented).

Severity:

Status

Service Impact:

If redundancy is implemented, the primary SDV server periodically issues a heartbeat to the backup server and not to the SDV Manager. No action is required.

SDV Server Trap 504 (1F8 Hex)

Alarm Summary:

SDV Server Redundant Network Failure

Description:

This alarm occurs when the backup SDV server cannot communicate with all of its primary servers.

Severity:

Major

Service Impact:

A forced or automatic protection switch cannot take place with any primary server that the backup server cannot communicate with if this condition persists.

Check and Correct:

Possible Cause	Check and Correct Instructions
Communications problem.	Investigate and troubleshoot the communications link between the backup SDV server and the primary SDV servers. Contact Cisco Services for further assistance.

3

Understanding Diagnostic Screens

The Cisco Resident Application (SARA) captures system data from the DHCTs, and then the application reports the data in the appropriate diagnostic screens. The diagnostic screens allow you to quickly confirm the current SARA and PowerTV OS version, check upgrade status by viewing Bootloader information, examine DOCSIS* information, and view details about the video-on-demand (VOD) and digital video recorder (DVR) services. For example, if customers call in with macroblocking questions, you can use the diagnostic screens to view the data transmission error rate and the signal levels.

To successfully view the information within the diagnostic screens, you must know how to access them. This section provides instructions to help you access, navigate, and exit the diagnostic screens. Instructions are provided for accessing the diagnostic screens using the following methods:

- Front Panel buttons
- Remote Control keys
- DNCS Web browser

This chapter also includes instructions for displaying a blended image. A blended image displays the current channel video in combination with the diagnostic screen. For more information on blended images, see ***Troubleshoot with a Blended Image*** (on page 59).

* Data-Over-Cable Service Interface Specification

In This Chapter

Access the Diagnostic Screens

Accessing Screens Using Front Panel Buttons

This section provides procedures to help you use the Explorer DHCTs to access and navigate the diagnostic screens, to display a blended image, and to exit the diagnostic screens.

You can access the diagnostic screens by pressing a combination of buttons on the front panel of the Explorer DHCT. The buttons that you press differ among the various models of Explorer DHCTs.

Note: After pressing the buttons on the front panel, the Message LED will flash. This indicates that diagnostic screens are ready to access.

1. Press and hold the **Center** or **Select** button until the Message LED on the front panel blinks, and then release the button.
2. While the Message LED blinks, press the **Diamond** or the **INFO** button.
3. To navigate the diagnostic screens, press either the **Vol+** or the **Vol-** button.
4. To display a blended image for troubleshooting purposes, press the **Center** or **Select** button to scroll through the following three blending levels:
   - Dark
   - Light
   - None

   Note: For more information on using blended images, see ***Troubleshoot with a Blended Image*** (on page 59).
5. To exit the diagnostic screens, press the **Diamond** or the **EXIT** button.

Remote Control Examples

You can access the diagnostic screens using one of the following Cisco remote controls:

■ Model ER1 Remote Control	■ Model AT2400 AllTouch Remote Control
■ Model AT2000 AllTouch Remote Control	■ Model AT8400 AllTouch Remote Control
■ Model AT2300 AllTouch Remote Control	■ Model AT8550 AllTouch Remote Control

Accessing the Diagnostic Screens Using the Remote Control

This section provides procedures to help you use the Cisco remote controls to access and navigate through the diagnostic screen sequence, to display a blended image, and to exit the diagnostic screens.

1 Is your remote control an ER1 model?

- If **no**, go to step 2.
- If **yes**, set its VCR/VOD switch to the **VOD** mode.

Example:

2 Press and hold the **Pause** key until the message LED blinks, and then release.

Note: If you are accessing diagnostic screens on an 8000 or 8300 Home Entertainment Server, the program that you are currently viewing will pause.

3 Is your remote control an AT2000 or AT2400?

- If **yes**, press the **+ NEXT** key to display the Status Summary diagnostic screen on the TV monitor.
- If **no**, press **+** on the **PAGE** key to display the Status Summary diagnostic screen on the TV monitor.

4 Is your remote control an AT2000 or AT2400?

- If **yes**, press the **+ NEXT** or the **- PREV** key to navigate through the diagnostic screens.
- If **no**, press the **+** or **-** on the **PAGE** key to navigate through the diagnostic screens.

5 To display a blended image, press the **B** key to scroll through the **light** and **none** blending level options.

Note: For more information on using blended images, see ***Troubleshoot with a Blended Image*** (on page 59).

6 To exit the diagnostic screens, press the **EXIT** or **C** key on the remote control.

Notes:

- If you are accessing diagnostic screens on an 8000 or 8300 Home Entertainment Server, press the Play key to resume the program from its current position.
- If you are accessing diagnostic screens on an 8000 or 8300 Home Entertainment Server and want to resume the program in to real time, tune away from the current channel and then tune back.

  Note: If you are using an AT8550 remote control, press the **LIVE** key to resume the program in real time.

Accessing the Diagnostic Screens Using the DNCS Web Browser

Starting with SARA version 1.21, you can use the Web browser on the DNCS to view the diagnostics screens of any DHCT that is booted "two-way" (information can travel to and from the headend) and accessible from that DNCS.

Complete the following steps to access the diagnostic screens from the DNCS.

1. Launch a Web browser that is installed on the DNCS.
2. Type **http://<the.dhct.ip.address>:5030/1.html** in the **Address** field located at the top of your Web browser, and then press **Enter**. Your Web browser displays the first diagnostic screen (Status Summary) of the DHCT you are using.

   Note: In this command, <the.dhct.ip.address> represents the actual IP address of the DHCT you are using.
3. Follow the on-screen instructions and the links to view the other diagnostic screens.

Identify Information Within Diagnostic Screens

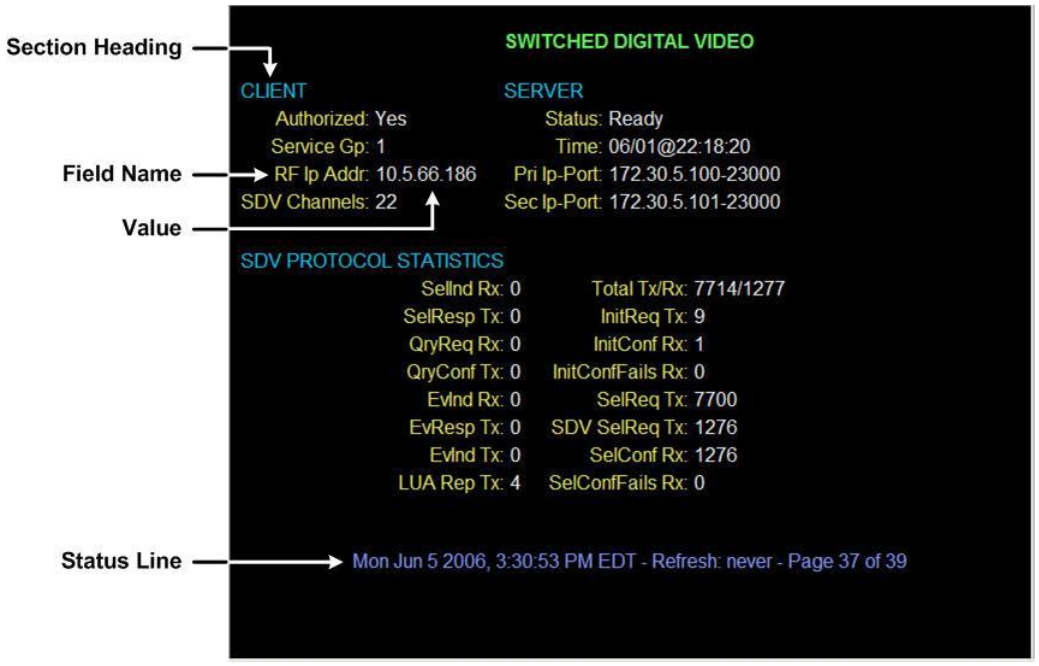
Overview

This section helps you to locate information within diagnostic screens and provides the following information:

- An example of a diagnostic screen with its key elements
- Descriptions of the color-coded text
- Descriptions of the status line content

Diagnostic Screen Layout

The following example of a diagnostic screen shows the section heading, the field name, the field text, and the status line that will appear on various sections of each diagnostic screen.



Locating Page Numbers on Diagnostic Screens

The page number for each diagnostic screen is located at the bottom of each screen in the Status Line. The page number is displayed in the following format:

Page<page number> of <total pages for DHCT>

Note: The page number for some diagnostic screens will vary depending on the version of software that is loaded on the DHCT.

Color-Coded Field Text

The color of the field text within the diagnostic screens varies depending on the condition of the specific component. The following table lists the conditions that the color represents.

Field Text Color	Condition
Green	Indicates a passed condition for a one-time test or self-test
White	Indicates a normal or and expected condition
Amber	Indicates an unusual condition
Red	Indicates an error, an unexpected condition, or an inability to obtain status information for that particular field

Status Line Descriptions

The status line appears at the bottom of all diagnostic screens. The following table describes the field information contained in the status line.

Field Information	Description
Time	Provides the time of day at which the screen was last displayed or refreshed
Ref	Provides the number of seconds between screen refreshes for the current page (example, Ref:5) **Note:** If the current page displays **Play**, it means that the information on the screen does not automatically refresh. To refresh the information on a screen that displays **Play**, press the **Play** key on the remote control.
Pg	Provides the current page number and the total number of diagnostic screen pages (current/total)
[Exit] or [Diamond]	Indicates to choose one of the following keys to press to exit the diagnostic screens: ■ For the Explorer 2000, 2000 Rev 3, or 3000 DHCTs, press **[Diamond]** on the front panel of the DHCT ■ For all other Explorer DHCTs, press **[Exit]** on the front panel of the DHCT ■ For all Explorer DHCTs, press the **EXIT** key on the remote control.

Troubleshoot with a Blended Image

To help you troubleshoot the DHCT, you can view a blended image. A blended image displays the current channel program in combination with the diagnostic screen. You can display a blended image to diagnose macroblocking issues, to check the signal levels, and to capture a live problem on videotape. You can view a blended image of the diagnostic screen using the dark and light blending levels. This section provides an example of a blended image.

Note: The instructions for displaying a blended image are presented in Accessing Diagnostic Screens Using Explorer Front Panel Buttons.

Troubleshooting with a Blended Image

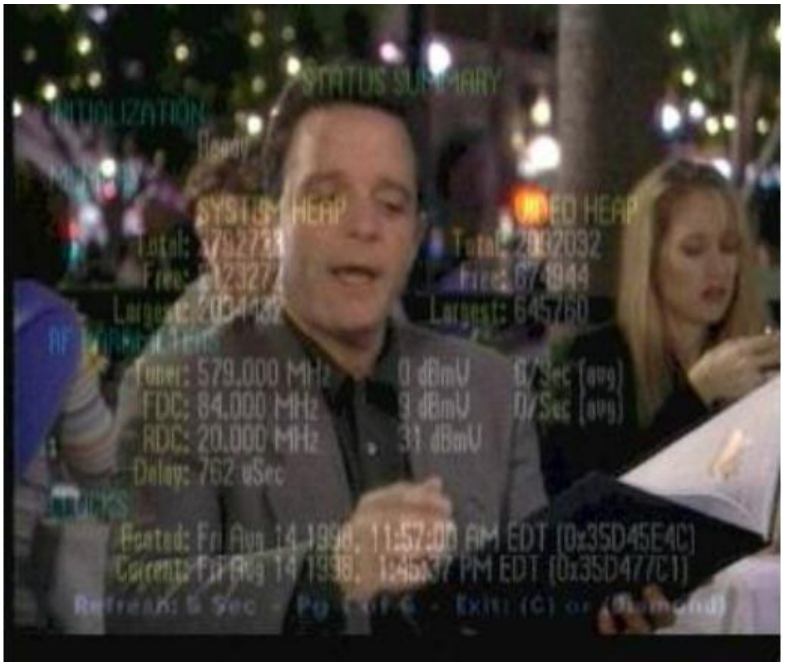
To help you troubleshoot the DHCT, you can view a blended image. A blended image displays the current channel program in combination with the diagnostic screen. You can display a blended image to diagnose macroblocking issues, to check the signal levels, and to capture a live problem on videotape. You can view a blended image of the diagnostic screen using the dark and light blending levels. This section provides an example of a blended image.

Note: The instructions for displaying a blended image are presented in ***Access the Diagnostic Screens*** (on page 54).

Blended Image Diagram

The following example of a blended image (with light blended level selected) shows the current channel program in the background and the diagnostic screen in the foreground.

Note: You can only blend an analog or a digital channel. When you are tuned to a PPV channel with no event playing or tuned to a Music Channel, you cannot display a blended image.



4

Accessing SDV Diagnostic Screens

This chapter includes the diagnostic screens specific to SDV, including the fields and parameters that are included within these screens. These screens accumulate data that describe information about the SDV feature, as well as transmission information and the mini-carousel.

In This Chapter

Switched Digital Video Diagnostic Screen

Introduction

This section provides an overview of the Switched Digital Video diagnostic screen, and includes information that describes the SDV client and server, including the number of SDV channels that have been authorized for this service. Detailed statistics about the SDV protocol are also included in this diagnostic screen.

Performing Tasks

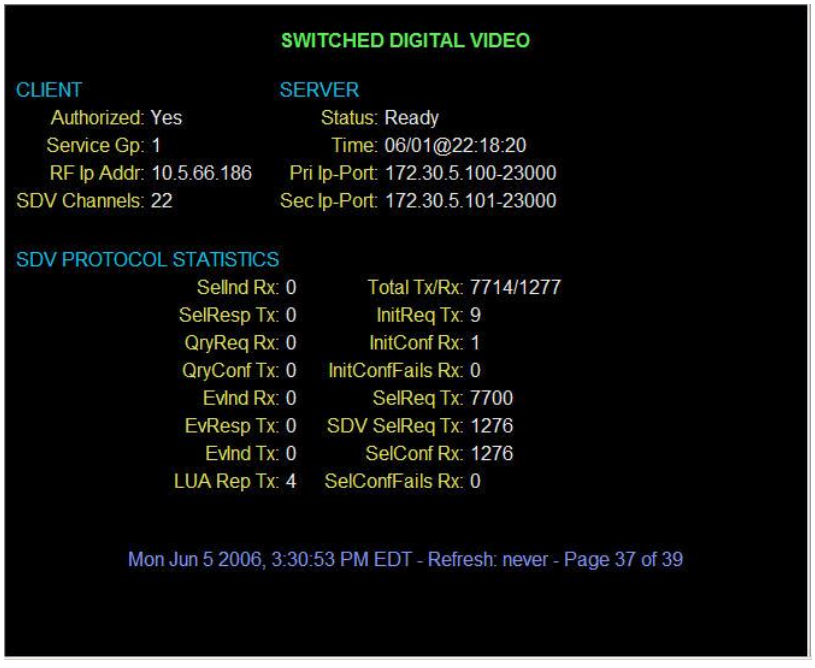
By accessing this diagnostic screen, you can perform the following tasks:

- Determine if the client (DHCT) is authorized for SDV services
- Identify the status of the SDV server
- Verify details about the transmission of data for the SDV service

Screen Components

- Client
- Server
- SDV Protocol Statistics

Example:



Screen Fields and Values

This section describes the fields and possible values that can appear in this diagnostic screen.

Client

Field Name	Description	Possible Values
Authorized	Indicates whether or not the client is authorized for SDV service (_SASD service) or the _SASD service does not exist	■ **Yes**: service is authorized ■ **No**: service is not authorized ■ **n/a**: service does not exist
Service Gp	The ID of the service group to which this client belongs	■ **[Integer ≥ 1]** ■ **n/a**: service does not exist
RF Ip Address	The IP address for the RF network	■ **[Network-dependent]**
SDV Channels	The number of SDV channels (WatchSDV services) in the channel lineup	■ **[Integer ≥ 0]**

Server

Field Name	Description	Possible Values
Status	The current status of the client communications with the SDV server (init request and receiving a response)	■ **Ready**: (desired value) init request is successfully confirmed and accepted by the SDV server ■ **Pending**: the set-top is in the process of establishing communications with the SDV server ■ **Unavailable**: init request failed ■ **Unknown**: init request not yet initiated
Time	The time of the last successful initial request confirmed by the server	■ **[month/day@hh:mm:sec]**
Pri Ip-Port	The IP address and port number (IP address-Port number) for the primary SDV server	■ **[Network-dependent]** **Example**: 192.168.99.5-2300 ■ **0.0.0.0-n/a**: primary SDV server is not available
Sec Ip-Port	The IP address and port number (IP address-Port number) for the secondary SDV server	■ **[Network-dependent]** **Example**: 192.168.99.5-23000 ■ **0.0.0.0-n/a**: secondary SDV server is not available

SDV Protocol Statistics

The SDV Protocol section displays statistics for the external protocol messages used for SDV. These statistics are combined for all sessions and protocols.

Field Name	Description	Possible Values
SelInd Rx	The number of Select Indications received	■ **[Integer ≥ 0]**
SelResp Tx	The number of Select Responses sent	■ **[Integer ≥ 0]**
QryReq Rx	The number of Query Requests received	■ **[Integer ≥ 0]**
QryConf Tx	The number of confirmed Query Responses sent	■ **[Integer ≥ 0]**
EvInd Rx	The number of Event Indications received	■ **[Integer ≥ 0]**
EvResp Tx	The number of Event Responses sent	■ **[Integer ≥ 0]**
EvInd Tx	The number of Event Indications sent	■ **[Integer ≥ 0]**
LUA Rep Tx	The number of LUA (Last User Activity) reports sent	■ **[Integer ≥ 0]**
Total Tx/Rx	The total number of requests sent and received	■ **[Integer ≥ 0]/[Integer ≥ 0]**
InitReq Tx	The total number of init requests sent, excluding retransmissions	■ **[Integer ≥ 0]**
InitConf Rx	Total number of initial confirm messages received from SDV server that indicate success or failure	■ **[Integer ≥ 0]**
InitConfFails Rx	Total number of initial confirms received from the SDV server that indicate failure	■ **[Integer ≥ 0]**
SelReq Tx	The total number of select requests sent for SDV and non-SDV services, excluding retransmissions	■ **[Integer ≥ 0]**
SDV SelReq Tx	The total number of select requests sent for SDV, excluding retransmissions	■ **[Integer ≥ 0]**
SelConf Rx	The total number of select confirm messages received from SDV server that indicate success or failure	■ **[Integer ≥ 0]**

Field Name	Description	Possible Values
SelConfFails Rx	The total number of select confirms received from the SDV server that indicate failure	■ **[Integer ≥ 0]**

SDV Mini Carousel Diagnostic Screen

Introduction

This section provides an overview of the SDV Mini Carousel diagnostic screen, and includes information that describes the Mini Carousel (MC) Discovery Files, as well as details about the MC data. The MC Discovery Files are generated by the DNCS and placed on BFS to support the inband MC discovery process for an SDV client. Only one SDV MC Discovery file exists per service group. It is located in the bfs:///sgm/sdv/ib directory. MC data is generated by the SDV server for each service group and placed in the transport stream as Private MPEG packets.

Performing Tasks

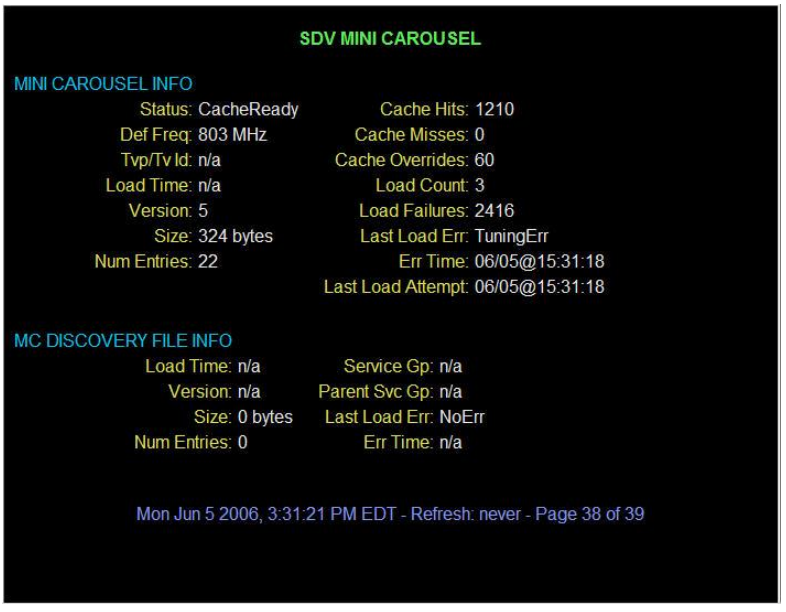
By accessing this diagnostic screen, you can perform the following tasks:

- Determine the date and time that the mini-carousel was last loaded in cache
- Determine the current status for the mini-carousel
- Identify the version for the mini-carousel

Screen Components

- Mini Carousel Info
- MC Discovery File Info

Example:



Screen Fields and Values

This section describes the fields and possible values that can appear in this diagnostic screen.

Mini Carousel Info

Field Name	Description	Possible Values
Status	The current status of the information from the mini-carousel	■ **Init**: initial state at boot time before loading mini-carousel data. Also the state reported when the set-top is not authorized for SDV ■ **SgDiscovery**: client is performing or waiting to perform the service group discovery process ■ **McpDiscFileRead**: client is reading or waiting to read the BFS file to obtain a list of SDV QAM frequencies to scan for mini-carousel data ■ **McpDiscovery**: client is scanning or waiting to scan SDV QAM frequencies in search of mini-carousel data ■ **CacheReady**: (desired value) mini-carousel loaded and data acquired to allow viewing of SDV channels
Def Freq	The default or home SDV frequency in MHz. The client will tune to this frequency to read the mini-carousel data if not already tuned to another SDV frequency	■ **[Integer ≥ 0]**
Tvp/Tv Id	The internal identifier of the logical hardware resource assigned or allocated for loading inband mini-carousel data	■ **[Integer ≥ 1]** ■ **n/a**: no logical tuner resource is currently assigned or allocated for loading the inband mini-carousel
Load Time	The time when the mini-carousel information was loaded into cache	■ **[month/day@hh:mm:sec]**
Version	The version number for the mini-carousel cached file	■ **[0 to 31]**
Size	The size of the mini-carousel data (bytes)	■ **[Integer ≥ 0]**
Num Entries	The number of programs (channels) in the mini-carousel data	■ **[Integer ≥ 0]**

Field Name	Description	Possible Values
Cache Hits	The number of times requested tuning parameters were successfully received from the mini-carousel cache **Notes:** ■ This includes cache hits after forcing a reload of the mini-carousel. ■ This value is only reset to zero when it rolls over or the agent is reset.	■ **[Integer ≥ 0]**
Cache Misses	The number of times requested tuning parameters were not found in the mini-carousel cache even after reloading mini-carousel data **Note:** This value is only reset to zero when it rolls over or the agent is reset.	■ **[Integer ≥ 0]**
Cache Overrides	The number of times the cached tuning parameters from the mini-carousel have been overridden by fresh tuning parameters received from the SDV server via CCP (Channel Change Protocol) **Note:** This value is only reset to zero when it rolls over or the agent is reset.	■ **[Integer ≥ 0]**
Load Count	The number of times the mini-carousel data has successfully been read (or loaded) by the client **Note:** This value is only reset to zero when it rolls over or the agent is reset.	■ **[Integer ≥ 0]**
Load Failures	The number of times the client has failed to read the mini-carousel data **Note:** This value is only reset to zero when it rolls over or the agent is reset.	■ **[Integer ≥ 0]**

Field Name	Description	Possible Values
Last Load Err	The type of error for the last load (read) of the mini-carousel	■ **NoErr**: last load was successful ■ **ReadErr**: read of last load failed ■ **MemFull**: not enough memory for last load ■ **Aborted**: last load attempt was aborted ■ **TuningErr**: tuning failure during last load ■ **SGMismatch:** service group identified in the mini-carousel data does not match the set-top's service group found during service group discovery ■ **UnknownErr**: an unknown error occurred during load
Err Time	The time when the last error occurred in loading	■ **[month/day@hh:mm:sec]** ■ **n/a**: no load errors have occurred since reset
Last Load Attempt	The time when the last load was attempted on the DHCT	■ **[month/day@hh:mm:sec]** ■ **00/00@00:00:00**: no load errors have occurred since reset

MC Discovery File Info

Field Name	Description	Possible Values
Load Time	The time when the MC Discovery file was loaded on the DHCT during discovery	■ **[month/day@hh:mm:sec]** ■ **n/a**: file is not loaded
Version	The current version of the MC Discovery File, expressed as a timestamp of when the file contents were generated by the DNCS	■ **[month/day@hh:mm:sec]**
Size	The size of the MC Discovery File in bytes	■ **[Integer ≥ 0]**
Child Svc Gp	The service group of the currently loaded MC Discovery File **Note:** In systems with no parent/child service groups, this should match the service group identified on the VOD Information and the Switched Digital Video diagnostic pages	■ **[Integer ≥ 1]** ■ **n/a**: MC Discovery file not loaded
Parent Svc Gp	The next higher level parent service group in the hierarchy above the child service group	■ **[Integer ≥ 1]** ■ **n/a**: MC Discovery File not loaded or there is no parent service group above the child service group
Num Entries	The total number of tuning parameter entries in the MC Discovery File	■ **[Integer ≥ 1]** ■ **0**: no entries

Field Name	Description	Possible Values
Last Load Err	The error status from the last load of the mini-carousel data (MCD) in discovery. The status reflects the last error type after a successful load of the MCD	■ **NoErr**: successful load ■ **BadParamErr:** bad parameters specified ■ **OutOfStateErr:** load request denied due to inappropriate state ■ **FileNotFoundErr:** MCD file does not exist on BFS for this service group ■ **OutOfMemoryErr:** insufficient memory to process request ■ **ReadErr**: failed to read MCD file from BFS ■ **TunerConflictErr**: could not load MCD file due to higher priority tuner request ■ **FileChangedErr**: MCD file changed on BFS during read ■ **TimeoutErr**: request timed out ■ **AbortedErr**: request was intentionally aborted ■ **BadDataErr**: the data was loaded successfully but is invalid ■ **UnknownErr**: unknown error occurred during load attempt
Err Time	The time at which the last discovery file load error was reported	■ **[month/day@hh:mm:sec]** ■ **n/a**: no file load has occurred

SDV Session Info Diagnostic Screen

Introduction

This section provides an overview of the SDV Session Info diagnostic screen, and includes information that describe the details of SDV-related sessions, including the current SDV and tuner status.

Performing Tasks

By accessing this diagnostic screen, you can perform the following tasks:

- Determine the current status of an SDV session
- Determine the current status of the tuner
- Verify the name of the current SDV session

Screen Components

- Session-1
- Session-2

Example:

Screen Fields and Values

This section describes the fields and possible values that can appear in this diagnostic screen.

Field Name	Description	Possible Values
Name – Status	The name and current status of the session	■ **[Name of Session]** and one of the following: • **Ready**: tuning parameters have been acquired • **Idle**: no service is selected for this session • **Pending**: Session Manager is waiting for tuning parameters from either the cache manager or the SDV server • **Unavailable**: failed to acquire tuning parameters for the selected SDV service
Session Id	The 10-byte session ID for the that uniquely identifies the SDV client/server session within the system	■ **[Session-dependent]**
SamSvcId/Type	The SAM service ID identifying the program and type of service defined for that session	■ **[Integer ≥ 0]** and one of the following: • **Switched**: switched digital service • **Broadcast**: broadcast service • **n/a**
Source Id	The ATSC source ID	■ **[Integer ≥ 0]**
Act Time	The time of activation for the session	■ **[month/day@hh:mm:sec]**
Retries/Resends	The number of times a select request has been resent due to timeout or user initiated retry, or due to a resend request for the currently selected service	■ **[Integer ≥ 0]/[Integer ≥ 0]**
Retunes	The number of times the client has received updated tuning parameters for currently selected service requiring a retune	■ **[Integer ≥ 0]**
Tuner Status	The tuner status from an SDV perspective	■ **Active**: successfully tuned ■ **Inactive**: not using a tuner ■ **n/a**: session has not yet requested a tuner

Field Name	Description	Possible Values
Tuner Use	An indication of how the tuner is being used	■ **Main**: tuner is being used for main TV display ■ **Rec**: tuner is being used for a scheduled recording ■ **PPV**: tuner is being used for pay-per-view (PPV) content ■ **PIP**: tuner is being used for picture-in-picture (PIP) ■ **n/a**: no tuner is in use for this session
Tv/Rec Rsrc	The internal identifiers for the logical hardware resources allocated for presenting and recording the SDV service	■ **[Integer ≥ 0]**: current service to viewer is either on main TV, PIP, or AUX OUT ■ **0**: current service to viewer is not on main TV, PIP, or AUX OUT
SDV Freq	The frequency (MHz) used by the agent to tune to the currently selected SDV service	■ **[Integer ≥ 0]**
LUA Tx Time	The time when the last user action was reported to the SDV server	■ **[month/day@hh:mm:sec]** ■ **n/a**

Field Name	Description	Possible Values
Last CCP Err	The last error from the CCP (Channel Change Protocol) for this session	■ **NoErr**: no error was reported ■ **Timeout**: timeout waiting on response from server ■ **OutOfService**: program is no longer available ■ **FormatErr**: invalid format in CCP sent to server ■ **Redirect**: force tune indication from server ■ **InvalidSG**: server cannot identify service group from its topology ■ **UnknownClient**: agent has not registered with server ■ **NoResource**: session resource is unavailable ■ **BWNotAvail**: bandwidth bind on edge device failed ■ **ExceedsCapacity**: server capacity of agents has exceeded ■ **VerNotSupported**: agent version is not supported ■ **unknownErr**: unknown error ■ **n/a**: CCP was not initiated
Err Time	The time that the last error was reported from the CCP for this session	■ **[month/day@hh:mm:sec]** ■ **n/a**: no errors reported

5

Troubleshooting SDV System Issues

Introduction

This chapter identifies how to troubleshoot and resolve any SDV issues that may occur in the field. Common issues are described and diagnostic measures are presented to help you to determine why these system issues might be present.

Note: If the suggested actions to any system issue do not yield results or you are unable to correct a problem that the diagnostics tool seems to demonstrate, contact Cisco Services.

In This Chapter

Troubleshooting Scenarios

This section identifies the SDV troubleshooting scenarios that could arise in the field, and includes the steps for resolving these scenarios.

The most common issues are described and diagnostic measures are presented to help you to determine why these issues might be present.

Note: Suggested resolutions are provided for two groups: field technicians and Customer Service Representatives (CSRs).

Subscribers Are Seeing a Black Screen on an SDV Channel

Description

No picture is displaying for SDV channels on the television screen.

Possible Causes

- An authorization issue exists at the source.
- RF signal is lost.
- QAM signal is lost.

Diagnosing the Issue

See the following table to diagnose why subscribers are seeing a "black screen."

Important: The page number for the SDV diagnostic screens may vary, depending on the set-top model.

Access the following diagnostic screen.	Gather the following parameters.	Action
Page 38–SDV Session Info	ATSCSrcId	Field Techs: Escalate the problem to the appropriate tier
	SDV Freq	Field Techs: Record the frequency value for the agent

Macroblocking Issues

Description

The picture on an SDV channel freezes, shows blocking, or shows tiling (Macroblocking).

Possible Causes

- Some type of interference with the external signal.
- The signal-to-noise (S/N) ratio is out of range.
- The signal level is not within the acceptable working range.

Diagnosing the Issue

See the following table to diagnose why the SDV channel is freezing, showing blocking, or showing tiling.

Important:

- The page number for the diagnostic screens may vary, depending on the set-top model.
- Please check all of the diagnostic screens and fields contained in the following table *before* you call Cisco Services. Various combinations of failures will point to the source of any potential problems as listed in the following examples.

  Examples:

  - If the signal levels are good, the S/N value is poor, and there is a rapid change in byte counts, then noise ingress is present.
  - If the signal levels are poor, the S/N value is poor, and there is a rapid change in byte counts, then there is a "drop" problem.
  - If the signal levels, S/N value, and byte counts are good, and a problem continues to exist, an issue exists before the QAM or transport network.

Access the following diagnostic screen.	Evaluate the following field.	What value do I want to see?
Page 1–Status Summary	Tuner (or Tuner 1 if a DVR set-top	Frequency level of inband tuner should display in the "white"—acceptable range **-8dBmV** to **+8dBmV**—recommended range **Note:** If the tuner value appears in amber or red, check the signal levels.

Access the following diagnostic screen.	Evaluate the following field.	What value do I want to see?
Page 4–Statuses and Network Parameters **Important:** If all of these values are 0 and Macroblocking still exists, call Cisco Services.	MPEG STATS PEI PER SER RST A/V Disc	**0**—desired value **Note:** If all of these values are 0 and macroblocking still exists, check the QAM and the quality of feed coming out of the QAM.
Page 5–RF Status	CURRENT QAM Freq	**Tuner**—should be tuned to correct QAM **Status**—locked (desired value) **Note:** If the status is not “locked,” check the QAM and the RF signal levels.
	CURRENT QAM S/N	**QAM-64**—28 dBmV to 34 dBmV desired range (minimum 25 dBmV) **QAM-256**—32 dBmV to 34 dBmV desired range (minimum 39 dBmV) **Note:** If the S/N value is not within the desired range, check the QAM and the RF signal levels.
	CURRENT QAM Corr Bytes and Uncor Blks/Current FDC	**Corr Bytes** and **Uncor Blks should be static**—if the values are incrementing rapidly, the QAM could be sending bad blocks of data. Check the RF signal levels coming out of the QAM and the DHCT connection
	CURRENT FDC Current FDC	**FDC frequency**—should match the frequency on the QPSK **Note:** If the FDC frequency does not match that of the QPSK or is changing, check the RF signal levels and the signal quality coming out of the QPSK and the DHCT connection.

Cannot Tune to SDV Channels

Description

A subscriber cannot tune to an SDV channel.

Possible Causes

- The DHCT is not authorized for the SDV service.
- Verify the DHCT has initialized with the SDV server.
- The reverse path may be down.
- Verify that the mini-carousel is loaded.

Diagnosing the Issue

See the following table to diagnose why the subscriber cannot tune to an SDV channel.

Important: The page number for the SDV diagnostic screens may vary, depending on the set-top model.

Access the following diagnostic screen.	Evaluate the following field.	What value do I want to see?
Page 38–SDV Session Info	CLIENT Authorized	**Yes**—desired value **Note:** If **No** appears, contact your DNCS administrator to verify that the DHCT is authorized for the SDV package.
	SDV PROTOCOL STATISTICS InitConfRx	**1**—desired value **Note:** If value is **0**, reboot the set-top, and then tune to an SDV channel. If unable to tune to SDV channel, the reverse path may be down. Contact Cisco Services for assistance.
Page 39–SDV Mini Carousel	Status	**CacheReady**—desired value

Loss of Two-Way Connectivity

Description

Subscribers are unable to use the DHCT in an interactive mode.

Possible Causes

- The SDV server may be down.

  Note: If the loss of connectivity only affects SDV channels, the SDV server may be down. See ***Cannot Tune to SDV Channels*** (on page 81) for troubleshooting information.

- The DHCT is not receiving UNcfg (User to Network Configuration) messages from the DNCS.
- RF levels may not be set correctly.
- The QPSK has a modulator/demodulator configuration issue.

Diagnosing the Issue

See the following table to diagnose why the DHCT may not be in two-way mode.

Access the following diagnostic screen.	Evaluate the following field.	What value do I want to see?
Page 2–Post and Boot Results	UNcfg	**READY**—desired value; DHCT is in two-way mode **B'cast only**—check the DNCS configuration and RF levels **SEARCHING**—not receiving UNcfg message. Check the RF signal levels. If the signal levels are within range and you still have an issue, call Cisco Services
Page 4–Statuses and Network Parameters	IP Address (in RF Network section)	**IP Address**—DHCT successfully booted in two-way mode **Note:** If **No IP Address** appears, the DHCT did not boot in two-way mode. Contact your DNCS administrator to verify that the DHCT is enabled for two-way communication.

Access the following diagnostic screen.	Evaluate the following field.	What value do I want to see?
Page 5–RF Status	CURRENT FDC/DAVIC	**Connected**—desired value; DHCT is in two-way mode **Note:** If **Ready B'cast Only** appears, the DHCT is in one-way mode. Contact your DNCS administrator to verify that the DHCT is enabled for two-way communication.
	CURRENT RDC/Freq	Should match frequency of the demodulator at the headend
	CURRENT RDC/Power	Refer to specific hardware specifications ■ If the value is displayed in white the signal level is nominal ■ If the value is displayed in amber the signal level is marginally too high or too low ■ If the value is displayed in red the signal level is unacceptably too high or too low

6

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.

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