



January 2004

# QPSK (Release C65) Software Upgrade and Installation Instructions

## Overview

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### Introduction

These upgrade and installation instructions provide you with the following information:

- An overview of the QPSK C65 software upgrade
- Guidelines that define how and when to monitor Explorer® Digital Home Communications Terminals (DHCTs) sign-on rates
- A description of the optional QPSK range extension features, which allow DHCTs to sign on to the system and operate at extended distances from the headend

### What's New in QPSK C65 Software?

The QPSK C65 software builds upon the features and benefits introduced in previous QPSK software releases. In addition, the QPSK C65 software provides the following features and benefits:

- DHCTs sign on to the network faster
- Several reboot issues are resolved
- The number of unnecessary alarms is reduced
- The extended range settings are not affected by reboots

### Changes In the config File

In the past, when new QPSK modulator software was created, the *version number* of the demodulator software was changed to match the version number of the new modulator software. As a result, the config file showed the modulator and demodulator having the same software *version number*. To accomplish this change in version number, the demodulator code was changed to report the new version number even though the remainder of the code was left untouched. The demodulators were needlessly being forced to load code for only a version number change. This resulted in a large number of demodulators being returned to the factory after download failures.

Beginning with the installation of QPSK C65 software, the version number of the demodulator software will not be changed to match the modulator version. Instead, the last released version of demodulator software will be installed. In the QPSK config file you will see different versions of code specified for the modulator and demodulator.

#### **Example:**

- If your site is currently running QPSK A62, the modulator will load the new version of software (C65), and the demodulator will reboot and keep the A62 code.
- If your site is currently running some other combination of QPSK software, then both the modulator and demodulator will download the new software (C65 and A62 respectively).

As a result of this change you will see fewer demodulator downloads and a lesser chance of a demodulator failing during the download process. Although we continue to investigate why demodulators fail during a software download, we feel that taking this step to reduce the number of downloads is justified.

### Replace Your Current Version of QPSK Software

If you currently have older or tested versions of QPSK A63 software installed on your system, Cisco® recommends that you replace the QPSK software with QPSK C65 software. If have any questions regarding the compatibility of QPSK C65 with your current system release, call Cisco Services before installing the QPSK C65 software.

## Overview, Continued

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### Requirements

In case you need to roll back to the version of QPSK software currently installed on your system, be sure that you locate the CD with that software version and have it available for the rollback.

### Read Me

Please read all instructions before beginning the upgrade process. If you are uncomfortable with any of the procedures presented in these instructions, contact Cisco Services for assistance.

**Important:** Look for this safety symbol throughout these instructions: . Pay particular attention to safety statements. Complete all of the procedures in the order in which they are presented in these instructions. Failure to follow all of the procedures may lead to undesirable results.

### Audience

These instructions are written for headend technicians using the Model D9482 QPSK Modulator with either the Cisco Resident Application (SARA) or the Pioneer resident application.

These instructions are also written for Cisco Services engineers and cable service provider personnel qualified in the following skills required to successfully complete the upgrade process:

- Working knowledge of UNIX vi editor

**Important:** The UNIX vi editor is not intuitive. Do *not* attempt to edit any files if you are not an experienced vi user.

- Recognizing differences between system errors currently seen on your Digital Broadband Delivery System (DBDS) network and new DBDS network errors
- Troubleshooting for basic system errors
- Stopping and starting system components
- Backing up file systems and databases
- Working knowledge of Sun hardware and Sun DiskSuite software

**Note:** The Sun DiskSuite software is necessary for the disk mirroring procedure.

- Working knowledge of Solaris

**Note:** Solaris is the standard format necessary to bundle the software for the installation.

- Working knowledge of script languages

## Overview, Continued

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### Document Version

This is the second release of these software upgrade and installation instructions.

### In This Document

These upgrade and installation instructions contain the following topics.

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# About This Upgrade

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## Introduction

This section highlights software enhancements implemented in this release.

Several changes (features and improvements) are introduced in the QPSK C65 software and other changes are currently in development.

This section provides descriptions of the change requests (CRs) implemented in the QPSK C65 software, known issues, and the impact of the change or issue on subscribers or the cable service provider.

## Implemented Software Improvements Introduced in QPSK C65

The following table lists, by CR number, the enhancements implemented in QPSK C65 software. If the subscriber does not benefit from the enhancement, the impact is listed in the matrix as “No impact.”

CR Number	Subscriber	Cable Service Provider
24997	DHCTs are unable to get two-way connection.	Extended range settings are not affected by reboots.
26882	Fewer disruptions in two-way services.	Changes to QPSK processing result in faster DHCT verification.
26987	Fewer disruptions in two-way services.	Process changes enable the QPSK to more efficiently handle alarms to the DNCS.
27016	Fewer disruptions in two-way services.	Changes to QPSK processing eliminate unnecessary ranging alarms and QPSK reboots
27017	Fewer disruptions in two-way services.	Process changes enable the QPSK to more efficiently handle large volumes of messages.
28305	Fewer disruptions in two-way services.	Process changes enable the QPSK to more efficiently handle alarms to the DNCS.

## About This Upgrade, Continued

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### Known Issues

The following table lists known issues by CR number and categorizes the impact to the subscriber or cable service provider. If the subscriber is not affected by the issue, the impact is listed as “No impact.”

CR Number	Subscriber	Cable Service Provider
2839	DHCTs are unable to get two-way connection.	Under certain conditions, the exact details of which are unknown, the QPSK modulator loses communications with the DNCS.
6781	No impact	The QPSK modulator may occasionally have difficulty in 10/100BaseT auto detection and operation with network equipment.  Workaround: Lock the port on the network equipment to 10BaseT mode.
8885	No impact	The QPSK demodulator may not correctly download new software when the terminal server is connected to the craft port.
8887	No impact	Poor QPSK upstream reservation mode performance.  <b>Note:</b> This mode is rarely used.
12250	No impact	The Element Management System may display alarms for a QPSK demodulator that are no longer active alarms (if the Demod was reset or rebooted).
14309	DHCTs are unable to get two-way connection.	A sustained high rate of small packets of upstream traffic (not typical usage) causes a QPSK modulator to reboot.

## About This Upgrade, Continued

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<b>CR Number</b>	<b>Subscriber</b>	<b>Cable Service Provider</b>
27239	DHCTs are unable to boot in two-way mode.	The QPSK provision occasionally fails after multiple reboots.
33022	No impact	When viewing information on the front panel of the QPSK modulator using the options button, the information sometimes runs together on the bottom line.
33023	No impact	When resetting a QPSK modular from the DNCS, the QPSK GUI times out. The reset has occurred as expected, but the modulator does not provide an acknowledgment of the reset commands.

# The Upgrade Process

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## Introduction

This section provides a timeline for each stage of the QPSK C65 upgrade and installation process. Read this section carefully; some of these procedures are not addressed in system release installation instructions.

## Take Full Advantage of QPSK DHCT Monitoring and Ranging Features

If the QPSK C65 software is already installed on your DNCS and downloaded to the QPSK modulators, do not install it again.

However, to take full advantage of the DHCT monitoring and ranging features provided in the QPSK software, Cisco recommends that you complete the procedures described in the following sections. These procedures are not included in system release installation instructions:

- Monitor the DNCS Disk Space
- Monitor DHCT Sign-On Rates
- Set DNCS Tracing Levels
- What to Look For in the signonCount Data
- Continue to Monitor the DHCT Sign-On Traffic
- What Is the QPSK Range Extension Feature?
- Activate Range Extension Feature (Optional)

## If You Are Replacing An Earlier Version of QPSK Software With QPSK C65

Complete all of the procedures provided in these instructions if you are upgrading to QPSK C65.

## The Upgrade Process, Continued

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### How Much Time is Required to Install the QPSK C65 Software?

The initial monitoring of the system and installing the QPSK C65 software requires approximately 2 hours. When installation is complete, continue to monitor the DHCT sign-on traffic for several hours. The following table provides a description and approximate time required for each stage of the QPSK C65 upgrade and installation process.

Stage	Description	Time Required
1	Monitor the available DNCS disk space. If the percentage of used disk space exceeds 80 percent, the DNCS is at risk of becoming full which would cause the DNCS to stop abruptly. Call Cisco Services immediately.	5 minutes
2	Monitor the DHCT sign-on rates using the data produced by the signonCount utility. Review the signonCount utility Help window for an understanding of the procedure.	30 – 60 minutes
3	Set the DNCS tracing levels to trace the maximum level of system activity.	5 minutes
4	Display and interpret the data produced by the signonCount utility so you can take appropriate action.	30 – 60 minutes
5	Install the QPSK C65 software onto the DNCS.	15 minutes
6	Reset the QPSK modulator. Allow the new QPSK C65 software to download to the QPSK modulator and wait for DHCTs to reconnect to the system. Verify that the software successfully downloaded to the QPSK modulator.	15 minutes per unit, average
7	After downloading the QPSK C65 software, continue to monitor the DHCT sign-on traffic for 10 to 48 hours.  <b>Note:</b> You do not need to watch the sign-on traffic continuously for 10 to 48 hours. You should check occasionally during this time to ensure that there are no problems.	10 – 48 hours

## The Upgrade Process, Continued

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### Is Service Impacted During the Upgrade?

The service impact to subscribers will vary based on the applications installed on your system and how the applications react to a loss of both the forward and reverse QPSK data paths. For a subscriber not actively using an interactive application, the outage will most likely go unnoticed.

### System Requirements

#### QPSK Software Version

The installation information in these instructions applies only to systems operating QPSK software version A47 or later.

If you have QPSK software version A34 or earlier installed on your system, you cannot directly upgrade to C65. To upgrade from QPSK software version A34 or earlier, you must first upgrade to QPSK software version A47, then upgrade to version C65 or later. Call Cisco Services to obtain information about upgrading from earlier versions of QPSK software.

#### Variable-Length Subnet Masks (VLSM) Feature

To take advantage of variable-length subnet masks (VLSM), you must have System Release 2.1/3.0 (SR 2.1/3.0) or later installed. SR 2.1/3.0 utilizes the Solaris 8 operating system (OS) that includes full support for VLSM. To optimize network configuration and to take advantage of VLSM network technology, Cisco recommends that you modify all applicable network configuration files on both the Digital Network Control System (DNCS) and the Application Server when upgrading to SR 2.1/3.0.

# Monitor the DNCS Disk Space

## Introduction

The utilities used in monitoring the system during the loading of QPSK C65 software require that you enable the process tracing for some DNCS functions. This tracing may result in a significant increase in the size of the dnCSLog file. If allowed to grow unchecked, the dnCSLog file could, in rare cases, fill the hard disk and as a result cause the DNCS to stop functioning.

The procedures in this section describe how to monitor the DNCS disk space that is presently available. The procedures also indicate when to call Cisco Services to take action should the system start to run low on storage space. Use these monitoring procedures each time you are directed to check available disk space.

## Monitoring Disk Space

To monitor the disk space on the DNCS, complete the following steps.

1. From an xterm window, type **df -k** and press **Enter**.

**Result:** A list of DNCS files and disk space appears in the xterm window.

```
<PONY_DNCS_1>DNCS--/export/home/dnCS $ df -k
Filesystem      1024-blocks    Used   Available  Capacity  Mounted on
/dev/md/dsk/d500 482455        48794   385421    12%      /
/dev/md/dsk/d51  962571       125272  741045    15%      /usr
/proc           0             0        0          0%      /proc
fd              0             0        0          0%      /dev/fd
/dev/md/dsk/d50 1927383      133792  1600861   8%       /var
/dev/md/dsk/d53 6694765     2524602 3500693   42%      /disk1
/dev/md/dsk/d52 5781917     2391729 2811998   46%      /export/home
swap            422712        5152    417560    2%       /tmp
<PONY_DNCS_1>DNCS--/export/home/dnCS $
```

2. In the **Mounted On** column locate **/var**, and in the **Capacity** column, locate the **percentage** that relates to **/var**.
3. Before you activate the tracing process, is the capacity of used disk space in **/var** less than 80 percent?
  - If **yes**, it is safe to set the tracing levels for DNCS processes. But first, go to **Monitor DHCT Sign-On Rates**, next in these instructions, to understand how the signonCount utility can facilitate the DHCT sign-on process.
  - If **no**, call Cisco Services for assistance in freeing up space.

# Monitor DHCT Sign-On Rates

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## Introduction

When DHCTs download new software for the operating system and resident application, they lose the contents of their volatile memory. After the download, DHCTs sign back on to the network and their network configuration data is reloaded. The `signonCount` utility is useful in monitoring the rate at which DHCTs sign on to the network.

Because some DHCTs make repeated attempts to sign on to the network before they are successful, too many sign-on attempts by DHCTs contribute to network congestion. The `signonCount` utility can help system operators quickly identify those DHCTs that are having trouble signing on, and the utility can then be used to facilitate the DHCT sign-on process.

## When to Use the `signonCount` Utility

The `signonCount` utility enables system operators and Cisco engineers to monitor the rate at which DHCTs sign on to the network. This monitoring is required in the following circumstances:

- When DHCTs download new software – DHCTs lose the contents of their volatile memory when the DHCT downloads new software for the operating system and resident application. DHCTs reconnect to the network after the download, and the memory that contained information about the DHCT network connection (IP address, transmit timing, and level) is re-loaded. For systems that are forced to rapidly load DHCT software, the `signonCount` utility is useful in determining when to trigger the next group of DHCTs to load code.
- When the QPSK modulator and demodulator software is upgraded – In this case, the `signonCount` utility is used in the following two situations:
  - The first situation is to determine if the system is healthy enough to be upgraded. If it is not, the `signonCount` utility also provides a secondary mode of operation that can dramatically improve the health of the system prior to moving forward with the upgrade.
  - The second situation is to use the `signonCount` utility to provide more meaningful guidance regarding when you can move forward with upgrading the next QPSK modulator. Previous upgrade guides instructed you either to wait a little while between upgrading units or to monitor the log file, but they offered no real tools to help in this effort.

## Monitor DHCT Sign-On Rates, Continued

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### Two Modes of Operation

You can run the `signonCount` utility in two modes: **Fix Mode Off** and **Fix Mode On**. Both modes help system operators monitor the rate at which DHCTs are trying to sign on to the network. When run in *Fix Mode Off*, the utility takes no corrective action regarding DHCTs that are having difficulty signing on. When run in *Fix Mode On*, however, the utility reboots those DHCTs that have tried to sign on more than three times during a 10-minute period.

**Note:** By forcing DHCTs that are having trouble signing on to reboot, the memory in the DHCT is refreshed and the sign-on process is made easier.

**Important:** By default, the utility runs in Fix Mode Off. Because the utility interacts with the database when run in Fix Mode On, Cisco recommends that you contact Cisco Services before switching modes.

### Accessing the `signonCount` Help Window

Before using the `signonCount` utility to monitor the DHCT sign-on rates, Cisco recommends that you review the descriptions, entries, and options provided on the `signonCount` utility Help window. The information on the Help window may supplement the information and procedures in these instructions.

**Note:** If the `signonCount` utility is not currently installed on your system, call Cisco Services for assistance.

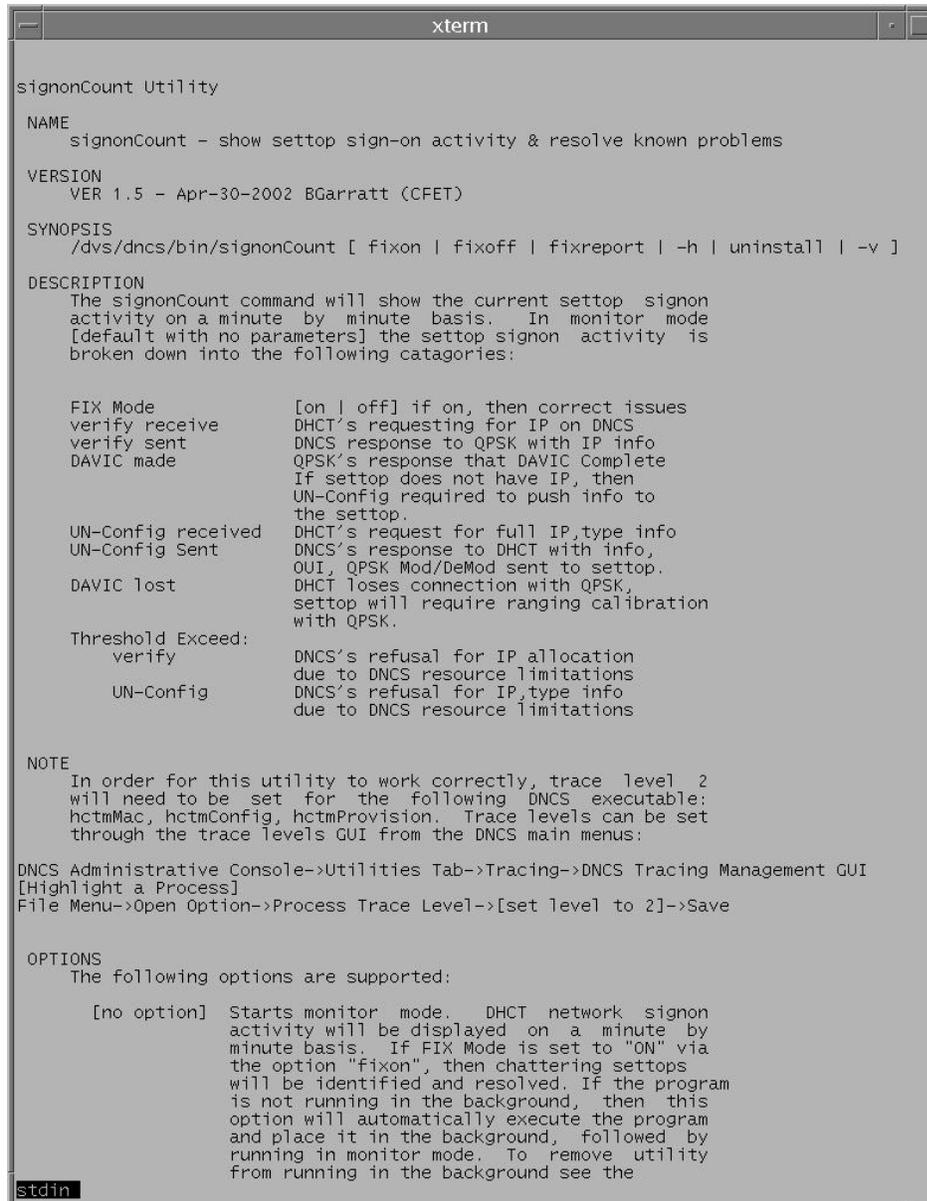
To access the `signonCount` utility Help window, complete the following instructions.

1. Open an `xterm` window on the DNCS and then maximize the window.

## Monitor DHCT Sign-On Rates, Continued

2. Type **signonCount -h** and press **Enter**.

**Result:** The Help window for the signonCount utility opens.



```
xterm

signonCount Utility
NAME
  signonCount - show settop sign-on activity & resolve known problems
VERSION
  VER 1.5 - Apr-30-2002 BGarratt (CFET)
SYNOPSIS
  /dvs/dnacs/bin/signonCount [ fixon | fixoff | fixreport | -h | uninstall | -v ]
DESCRIPTION
  The signonCount command will show the current settop signon
  activity on a minute by minute basis.  In monitor mode
  [default with no parameters] the settop signon activity is
  broken down into the following categories:

  FIX Mode          [on | off] if on, then correct issues
  verify receive    DHCT's requesting for IP on DNCS
  verify sent       DNCS response to QPSK with IP info
  DAVIC made        QPSK's response that DAVIC Complete
                   If settop does not have IP, then
                   UN-Config required to push info to
                   the settop.
  UN-Config received DHCT's request for full IP,type info
  UN-Config Sent     DNCS's response to DHCT with info,
                   OUI, QPSK Mod/DeMod sent to settop.
  DAVIC lost         DHCT loses connection with QPSK,
                   settop will require ranging calibration
                   with QPSK.

  Threshold Exceed:
    verify           DNCS's refusal for IP allocation
                   due to DNCS resource limitations
    UN-Config        DNCS's refusal for IP,type info
                   due to DNCS resource limitations

NOTE
  In order for this utility to work correctly, trace level 2
  will need to be set for the following DNCS executable:
  hctmMac, hctmConfig, hctmProvision.  Trace levels can be set
  through the trace levels GUI from the DNCS main menus:

DNCS Administrative Console->Utilities Tab->Tracing->DNCS Tracing Management GUI
[Highlight a Process]
File Menu->Open Option->Process Trace Level->[set level to 2]->Save

OPTIONS
  The following options are supported:

  [no option] Starts monitor mode.  DHCT network signon
  activity will be displayed on a minute by
  minute basis.  If FIX Mode is set to "ON" via
  the option "fixon", then chattering settops
  will be identified and resolved.  If the program
  is not running in the background, then this
  option will automatically execute the program
  and place it in the background, followed by
  running in monitor mode.  To remove utility
  from running in the background see the
stdin
```

3. Press the **Spacebar** as often as necessary to page through the Help window.
4. After reviewing the descriptions, entries, and options provided on the signonCount utility Help window, go to **Set DNCS Tracing Levels**, next in these instructions.

# Set DNCS Tracing Levels

## Introduction

To ensure that the DNCS captures the maximum level of detail, you need to set the tracing levels of three DNCS processes to level 2. The three DNCS processes are:

- hctmConfig
- hctmMac
- hctmProvision

**CAUTION:** Activating the tracing process as described in this section could cause the dnclslog file to grow large enough to fill the hard disk. If this is allowed to happen, the DNCS will stop functioning. While gathering data, carefully monitor the disk usage.

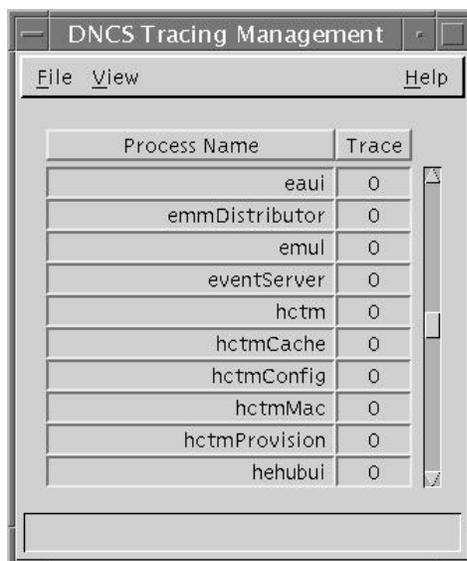
Once you begin the tracing process, do not leave the DNCS unattended. The disk space capacity must be closely monitored because it can change rapidly. If the disk space capacity approaches or exceeds 80 percent, call Cisco Services immediately.

## Setting the DNCS Tracing Levels

To set the tracing levels of the hctmConfig, hctmMac, and hctmProvision processes to level 2, complete the following instructions.

1. From the DNCS Administrative Console, select the **Utilities** tab.
2. Click **Tracing**.

**Result:** The DNCS Tracing Management window opens.



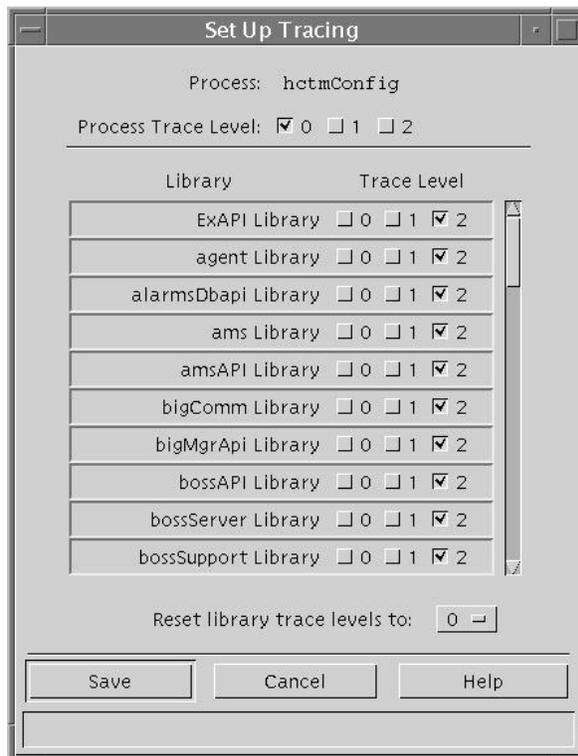
## Set DNCS Tracing Levels, Continued

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3. Scroll down until the **hctmConfig**, **hctmMac**, and **hctmProvision** processes come into view.
4. Are the tracing levels, in the Trace column, for all three of these processes already set to **2**?
  - If **yes**, continue with **What to Look for in the signonCount Data**, next in these instructions.
  - If **no**, go to step 5 to begin setting the tracing levels.
5. Double-click one of the processes.

**Example:** Double-click hctmConfig.

**Result:** The Set Up Tracing window opens. In the example in step 3, the tracing levels are all set to 0.



## Set DNCS Tracing Levels, Continued

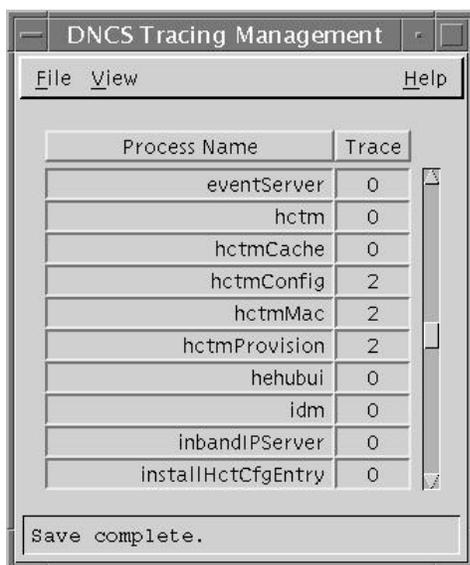
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- To configure the Set Up Tracing window, select **2** in the Process Trace Level field and then click **Save**.

### Results:

- The DNCS Tracing Management window updates with the new tracing level.
  - The Set Up Tracing window closes.
- Repeat steps 5 and 6 for the hctmMac and hctmProvision processes (if necessary) to update the tracing level to 2.

**Example:** When you are finished, the DNCS Tracing Management window should look like the following example. The tracing levels for the hctmConfig, hctmMac, and hctmProvision utilities are set to level 2.



- Click **File** and select **Close** to close the DNCS Tracing Management window.
- Go to **What to Look for in the signonCount Data**, next in these instructions.

# What to Look for in the signonCount Data

## Introduction

This section provides instructions on how to display the signonCount utility interface, provides an explanation of each field of the interface, and states which fields you should focus on first.

## Displaying the signonCount Interface

Follow these steps to display the interface of the signonCount utility.

1. If necessary, open an xterm window on the DNCS.
2. Click and drag the edges of the xterm window to maximize the screen width.  
**Note:** The signonCount utility fills the width of the screen with data.
3. Type **signonCount** and press **Enter**.  
**Result:** The signonCount utility interface opens.
4. Look at the following example of the signonCount utility interface; then, go to **Understanding the signonCount Utility Data Fields**, next in this section.

## signonCount Utility Example

The signonCount utility interface is similar to the following example.

SETTOP SIGNON STATUS																
TIME	FIX Mode	Verified Rcvd Sent	DAVIC Made	UN-Config Rcvd Sent	DAVIC Lost	Threshold Exceeds Ver UCfg	Inv HCT Type	IHCT Wrng Mod	Total In-Srvc 2-Way	Total DHCTs NonResponding w/o IP w/IP	Total DAVIC 2-Way	NUM of DHCT CHANGE	TOTAL PERCENT SIGN-ON	OPSK Reboots		
Nov 11 16:40	OFF	9 9	7 13	5	9	0 0	0 0	0 0	93643	3973 3203	86467	0	92.33%			
Nov 11 16:41	OFF	16 16	11 19	11	17	0 0	0 0	0 0	93643	3973 3203	86467	0	92.33%			
Nov 11 16:42	OFF	9 9	6 20	4	7	0 0	0 0	0 0	93643	3973 3203	86467	0	92.33%			
Nov 11 16:43	OFF	18 18	16 28	15	16	0 0	0 0	0 0	93643	3972 3203	86468	1	92.33%			
Nov 11 16:44	OFF	16 16	14 13	8	13	0 0	0 0	0 0	93643	3972 3203	86468	0	92.33%			
Nov 11 16:45	OFF	14 14	13 20	12	14	0 0	0 0	0 0	93643	3972 3203	86468	0	92.33%			
Nov 11 16:46	OFF	19 19	16 17	9	14	0 0	0 0	0 0	93645	3973 3202	86469	1	92.33%			
Nov 11 16:47	OFF	18 18	13 22	14	18	0 0	0 0	0 0	93652	3980 3202	86470	1	92.33%			
Nov 11 16:48	OFF	16 16	13 21	6	19	0 0	0 0	0 0	93660	3988 3201	86471	1	92.32%			
Nov 11 16:49	OFF	15 15	13 18	8	14	0 0	0 0	0 0	93664	3992 3201	86471	0	92.32%			

# What to Look for in the signonCount Data, Continued

## Understanding the signonCount Utility Data Fields

This section provides an explanation of the meaning associated with each field of the signonCount utility.

TIME
Feb 21 09:40
Feb 21 09:41
Feb 21 09:42
Feb 21 09:43
Feb 21 09:44
Feb 21 09:45
Feb 21 09:46
Feb 21 09:47
Feb 21 09:48
Feb 21 09:49

**TIME** – The system polls the communication link between the QPSK modulators and the DNCS every minute and records the date and time.

Fix Mode
OFF

**Fix Mode** – This field reveals whether the signonCount utility is configured to correct DHCT sign-on problems (*Fix Mode On*) or whether the utility is running in information-only mode (*Fix Mode Off*).

**Note:** By default, the utility runs in Fix Mode Off.

**Important:** Do not change modes unless you have been instructed to do so by Cisco Services engineers.

Verified Rcvd Sent
57 55
73 73
62 59
66 61
64 62
74 64
94 95
70 66
67 65
78 72

**Verified Rcvd** – The QPSK modulator reports the number of DHCTs that have made sign-on requests.

**Verified Sent** – The DNCS has responded to this number of DHCTs.

DAVIC Made
18
26
8
15
20
16
37
17
19
22

**DAVIC Made** – The QPSK modulator reports the number of DHCTs that have connected to the QPSK modulator and are waiting for UN-Config information.

## What to Look for in the signonCount Data, Continued

UN-Config Rcvd Sent	
0	0
0	0
4	4
3	3
6	6
4	4
8	8
3	3
5	5
2	2

**UN-Config Rcvd** – This number of DHCTs is requesting a UN-Config message from the DNCS.

The UN-Config message contains information, like an IP address, that allows DHCTs to sign on to the network.

**UN-Config Sent** – The DNCS has sent this number of UN-Config messages to DHCTs, allowing the DHCTs to sign on to the network.

At this point, the DHCTs are physically in two-way mode and have completed the sign-on process.

DAVIC Lost
30
23
23
19
28
26
33
20
32
17

**DAVIC Lost** – This field indicates the number of DHCTs that have lost the communication link with the QPSK modulator.

The QPSK modulator then sends a message to DHCTs that have lost the communication link. The message requests that the DHCTs recalibrate themselves with the modulator so the entire sign-on process can begin again.

Threshold Exceeds	
Ver	UCfg
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0

**Threshold Exceeds Ver** – The DNCS reports the number of DHCTs that simultaneously attempt to verify their configuration in excess of what the system queues allow.

**Threshold Exceeds UCfg** – The DNCS reports the number of DHCTs that simultaneously attempt to sign on to the system in excess of what the system queues allow.

The numbers in the Threshold Exceeds Ver and Threshold Exceeds UCfg columns should be zero.

Inv HCT Type
0
0
0
0
0
0
0
0
0
0

**Inv HCT Type** – This field represents the number of DHCTs reporting a DHCT type that does not match the values presently in the database.

## What to Look for in the signonCount Data, Continued

IHCT Wrng Mod
0
0
0
0
0
0
0
0
0

**IHCT Wrng Mod** – This field represents the number of DHCTs that have responded through a QPSK modulator that differs from the modulator through which the DHCT responded in the past.

Numbers in this column typically represent DHCTs that have been moved from one subscriber’s home to another without having gone through the correct process.

Total In-Srvc 2-Way
100694
100694
100695
100695
100697
100697
100697
100702
100703
100704

**Total In-Srvc 2-Way** – The utility reports the number of DHCTs listed in the database with a status of In-Service 2-Way.

These DHCTs should be capable of two-way communication.

Total DHCTs NonResponding	
w/o IP	w/IP
6114	12331
6113	12328
6114	12338
6113	12343
6115	12346
6115	12349
6115	12348
6118	12351
6119	12358
6120	12356

The following fields list the number of DHCTs in the database that should be capable of two-way communication, but they are listed as non-responders:

- **w/o IP** – The number of two-way DHCTs that have never connected to the network to receive an IP Address.
- **w/IP** – This number of DHCTs that have connected at least once to the network and have an IP address, but they are presently not responding.

Total DAVIC 2-Way
82249
82253
82243
82239
82236
82233
82234
82233
82226
82228

**Total DAVIC 2-Way** – This field represents the number of DHCTs that have physically signed on to the network with two-way communication ability.

## What to Look for in the signonCount Data, Continued

---

NUM of DHCT Change
-8
4
-10
-4
-3
-3
1
-1
-7
2

**NUM of DHCT Change**— This field represents the number of DHCTs with two-way capability that have been added to or removed from the database during the last minute.

Substantial numbers in this column usually indicate staging activity.

TOTAL PERCENT SIGN-ON
81.68%
81.68%
81.67%
81.66%
81.66%
81.66%
81.65%
81.65%
81.68%
81.68%

**TOTAL PERCENT SIGN-ON**— The DNCS reports the percentage of DHCTs with two-way capability that are signed on to your network.

QPSK Reboots

**QPSK Reboots**— In the event that a QPSK modulator reboots, the name and ID of the modulator is listed in this column.

### Concentrate on Three Fields

Allow the system to gather signonCount data for several minutes and then examine the numbers in the following fields:

- **Verified Rcvd** (Verified Received)
- **Verified Sent**
- **DAVIC Made**

These fields track the number of sign-on requests made by DHCTs (Verified Rcvd and Verified Sent), as well as the number of sign-on requests that were successful (DAVIC Made). Ideally, the numbers in the three fields should be equal.

If you notice that the numbers in the DAVIC Made column regularly becoming less than the numbers in the Verified Rcvd and Verified Sent columns, your DHCTs may be having trouble signing on and may be contributing to network congestion.

## What to Look for in the signonCount Data, Continued

---

### When to Call Cisco Services for Assistance

If you notice that the numbers in the DAVIC Made column regularly becoming less than the numbers in the Verified Rcvd and Verified Sent columns, call Cisco Services. Cisco Services engineers may log in to your system and examine the logfiles associated with the hctmConfig, hctmMac, and hctmProvision processes. Additionally, Cisco Services engineers may instruct you to run the signonCount utility in *Fix Mode On*.

**Important:** Do not run the utility in *Fix Mode On* unless you have been instructed to do so by Cisco Services engineers.

# Install QPSK C65 Software Onto the DNCS

---

## Introduction

This section provides instructions for determining which version of QPSK software is currently installed on the DNCS and, if necessary, instructions for installing the QPSK C65 software.

**Important:** If QPSK C65 software was installed as part of a system release upgrade do not install the QPSK C65 software again.

## Determining the Current Version of QPSK Software

To determine the version of QPSK software currently installed on the DNCS, complete the following steps.

1. Press the **Options** button on the front panel of any QPSK modulator until the LED displays **OPTION: 302 App Version**.
2. Does the bottom line on the LED display look similar to **A302\_C65**?
  - If **yes**, QPSK C65 is installed and it is not necessary to install it again.

**Assumption:** The assumption is that most, if not all, of your QPSK modulators have the same version of QPSK software installed.
  - If **no**, go to **Installing the QPSK C65 Software**, next in this section.

## Installing the QPSK C65 Software

If the QPSK C65 software is not currently installed on the DNCS, complete the following steps.

1. From an xterm window on the DNCS, log in as a **root** user.
2. Type **cd /tftpboot** and press **Enter** to change the directory.
3. Type **cp -p qpsk.config qpsk.config.<xxx>** and press **Enter** to make a backup copy of the current file.

**Note:** Replace the <xxx> in this entry with the number of the current QPSK software version installed on your system.

**Example:** `cp -p qpsk.config qpsk.config.A55`

**Result:** The system makes a backup file of the current configuration file.

## Install QPSK C65 Software Onto the DNCS, Continued

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4. Insert the CD labeled **QPSK Mod/Demod C65** into the CD drive of the DNCS.

**Note:** If the File Manager window opens, close it before continuing.

5. Type **does** and press **Enter** to confirm that the system mounted the CD successfully.

**Result:** The last line of the `df` command output lists the number of free disk blocks on the CD.

**Note:** The number of free disk blocks existing on the CD does not matter. The fact that the CD is listed in the `df` command output verifies that the system successfully mounted the CD.

6. Type `cd -d /cdrom/cdrom0` and press **Enter**.

7. Type `./install-pkg` and press **Enter**.

**Result:** A confirmation message appears.

8. Type **y** and press **Enter**.

**Result:** The QPSK software installs.

9. When the system displays a message that indicates that the QPSK software installed successfully, type `cd /` and press **Enter**.

10. Type `eject cdrom` and press **Enter**.

**Result:** The CD ejects.

11. Go to **Download QPSK C65 Software to the QPSK Modulators**, next in these instructions.

# Download QPSK C65 Software to the QPSK Modulators

---

## Introduction

After installing the QPSK C65 software on the DNCS, your next step is to upgrade the QPSK modulators.

When you reset a QPSK modulator, the DNCS downloads the new QPSK software to the QPSK modulator. Follow the instructions in this section to download the QPSK C65 software to the QPSK modulators.

## Do I Need to Place the QPSKs in Broadcast Mode Before Upgrading?

No. When upgrading the QPSK software, it is no longer required that you place the QPSKs in Broadcast mode.

For sites that have interactive applications deployed, download the QPSK C65 software at a time when subscribers or staging activity will be least impacted.

For sites that do *not* have interactive applications deployed, you can download the QPSK C65 software and reset a QPSK at any time with little, if any, noticeable impact to subscribers or staging activity.

## Downloading the QPSK C65 Software

To download the QPSK C65 software to the QPSK modulators, complete the following steps.

1. From the DNCS Administrative Console, select the **DNCS** tab.
2. Select the **Element Provisioning** tab.
3. Click **QPSK/CMTS**.  
**Result:** The QPSK List window opens.
4. From the QPSK List window, highlight the QPSK you are upgrading.  
**Important:** Cisco recommends that when you are downloading software to the QPSKs, begin with a test hub or a QPSK with the smallest DHCT population.
5. Select **File** and choose **Reset**.  
**Result:** A confirmation message appears.
6. Click **Yes** on the confirmation message.  
**Result:** A message appears stating that the QPSK modulator has received the reset command.
7. Go to **Verify QPSK C65 Software Downloaded**, next in these instructions.

# Verify QPSK C65 Software Downloaded

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## Verifying Software Download

To verify that the QPSK C65 software downloaded to the DHCTs successfully, complete the following steps.

1. Is the QPSK modulator located at the headend?
  - If **yes**, verify that the new software downloaded successfully by completing the following steps.
    - a) Press the **Options** button on the front panel of the QPSK modulator until the LED displays **OPTION: 302 App Version**. If the LED display includes **A302\_C65** on the bottom line, the software downloaded successfully. Otherwise, repeat the **Download QPSK C65 Software to the QPSK Modulators** procedures earlier in these instructions.
    - b) Press the **Status** button on the front panel of the QPSK demodulators associated with the QPSK modulator until the LED displays **STATUS: Software Version**. If the LED display includes **app\_A62** on the bottom line, the software downloaded successfully. Otherwise, repeat the **Download QPSK C65 Software to the QPSK Modulators** procedures earlier in these instructions.

**Note:** If the software did not download successfully after the second attempt, call Cisco Services.
  - If **no**, go to step 2.
2. From an xterm window on the DNCS, type **ping <IP address>** and press **Enter**.

**Note:** The <IP address> refers to the IP address of the QPSK modulator.

**Result:** A message similar to **Device is alive** appears. This message means the QPSK has reset and is communicating again.
3. Before downloading the QPSK C65 software to the next modulator, go to **Continue to Monitor the DHCT Sign-On Traffic**, next in these instructions.

# Continue to Monitor the DHCT Sign-On Traffic

---

## Introduction

With the signonCount interface displayed, continue to monitor the signonCount utility output to determine the health of your system before downloading the QPSK C65 software to the next QPSK modulator.

## Monitoring the DHCT Sign-On Traffic

To determine when it is safe to download the QPSK C65 software to the next QPSK modulator, complete the following steps.

1. Continue to monitor the DHCT sign-on traffic. Your system is healthy if the following conditions are true:
  - The values in the **Verified Rcvd**, **Verified Sent**, and **DAVIC Made** columns are the same.
  - The values in the **Un-Config Rcvd** and **Un-Config Sent** fields are approximately one fourth of the values in the **DAVIC Made** column.
  - The values in the **Threshold Exceeds Ver** and **Threshold Exceeds UCfg** columns are zero.
  - No QPSK modulators have rebooted.
2. Is your system healthy?
  - If **yes**, go to step 3.
  - If **no**, call Cisco Services. Do not continue with these instructions.

## Continue to Monitor the DHCT Sign-On Traffic, Continued

---

3. Wait approximately 15 minutes before resetting the next QPSK. Then, repeat the procedures in the **Download QPSK C65 Software to the QPSK Modulators** and **Verify QPSK C65 Software Downloaded** sections, earlier in these instructions, for each QPSK modulator you are upgrading.

**Important:**

- After resetting each QPSK modulator, continue to monitor the DHCT sign on traffic. As each QPSK modulator reboots, notice that the values in the signonCount utility interface increases. This is to be expected. Also notice that as DHCTs sign on to the system, the values decrease, and the system returns to its healthy state.
  - After downloading the QPSK C65 software, continue to monitor the DHCT sign-on traffic for 10 to 48 hours. It is not necessary to watch the sign-on traffic continuously, but you should check occasionally during this time to ensure that there are no problems.
  - In the QPSK Reboots column of the signonCount Interface, you may notice that a QPSK modulator reboots automatically. If this occurs, wait 15 minutes before resetting (rebooting) the next QPSK.
4. When you have completed upgrading all QPSK modulators on your system, select **File** from the QPSK List window, and choose **Close**.

**Results:**

- The QPSK List window closes.
  - The QPSK C65 software is loaded and the default setting is 0 km.
5. You have completed the QPSK C65 software installation.

# What Is the QPSK Range Extension Feature?

---

## Introduction

With prior versions of software, the Model D9482 QPSK Modulator was capable of successfully connecting and operating DHCTs within a distance of approximately 128 km round trip (64 km each way when forward and reverse paths are equal).

This distance limitation is mainly due to the width of the ranging slots defined in the Digital Audio-Visual Council (DAVIC) standard for operation over the hybrid fiber-coax (HFC) plant.

The width of the ranging slots limits the maximum distance *between* DHCTs for successful connection and operation. Because the current modulator software assumes that the closest DHCT is at the same location as the QPSK modulator, an unnecessary limit is placed on the farthest distance that a DHCT can be located from that QPSK modulator.

Some cable service providers would prefer to physically locate the QPSK hardware in the headend and extend coverage to DHCTs that are farther from the QPSK modulator than the currently allowable maximum distance.

This optional feature for the Model D9482 QPSK Modulator allows Explorer DHCTs to sign on to the system and operate properly at extended distances from the QPSK modulator. (This feature provides the resolution to CR 6922.)

Using the front panel of the QPSK modulator, you can select one of nine different values of one-way range extension. The front panel displays the extension distance in kilometers.

**Note:** Though it is not possible to extend the maximum distance *between* the DHCTs, which must remain within 64 km, it is possible to delay the timing within the modulator such that the distance to all DHCTs can be extended. This software feature allows you to extend the distance to the closest DHCT from 0 km to 248 km, one way, in steps of 31 km.

## What Is the QPSK Range Extension Feature?, Continued

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### Distance and Delay

The distance that appears on the front panel of the QPSK modulator is approximate and based on fiber with a propagation velocity of 68 percent of the speed of light in a vacuum.

**Note:** The modulator has no way of calculating how much coax or fiber is deployed between and to the DHCTs.

If you anticipate that DHCTs will be deployed near the limits of the distance ranges, Cisco recommends that you use delay numbers and translate the numbers to the actual length of fiber and/or coaxial cable deployed.

The delay numbers used in the modulator are as follows:

- With no extension, the modulator can range DHCTs to a distance corresponding to 628 microseconds round trip.
- Each front-panel step of 31 km (one way) corresponds to a round-trip delay extension of 300 microseconds.

### Distance Between DHCTs

When the range extension mode is activated, the QPSK modulator expects a transmission delay that is equal to or greater than the distance value programmed into the QPSK modulator.

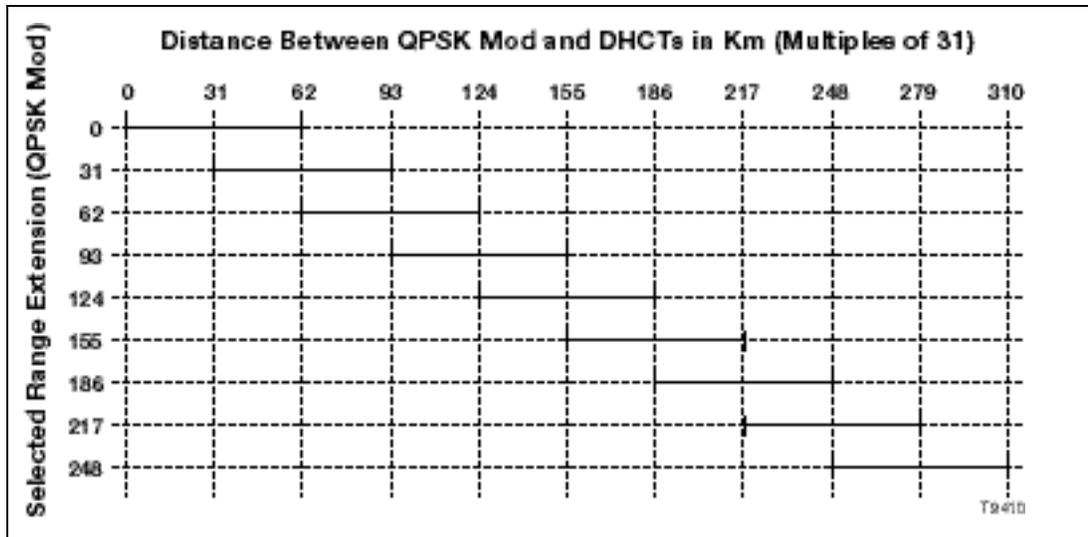
The distance between the closest and the farthest DHCT is still a maximum of 64 km. Thus, the closest a DHCT can be located is the distance programmed on the front panel of the QPSK modulator. The farthest a DHCT can be located from the headend is the sum of the programmed distance plus the 64 km ranging distance.

DHCTs operated outside these bounds may not be able to connect to the system and may also potentially interfere with the transmissions of other DHCTs. The programmed distance applies to all of the demodulators connected to that modulator.

## What Is the QPSK Range Extension Feature?, Continued

### Range Distance Settings Diagram

The following diagram illustrates the correct range distance settings.



**Example:** With 155 km set on the QPSK, the closest distance you could locate a DHCT to a QPSK modulator is 155 km. The farthest distance you could locate a DHCT to a QPSK modulator is 217 km.

### Network Configuration Application Rules

Follow these application rules when configuring the network for the QPSK ranging-distance extension mode.

Rule	Description
1	The QPSK modulator operates normally when no delay value is configured.
2	Only four D9482 QPSK Demodulators can be connected to a QPSK modulator operating in delay mode. These demodulators must be connected to ATM-25 port locations 5, 6, 7, and/or 8. (Ports 1 through 4 may not be used in the range extension mode.) The configuration at the DNCS should reflect this requirement.
3	The programmed delay distance should be less than or equal to the sum of the transport cable to the hub, plus the shortest optical cable distance on any of the attached nodes.

## What Is the QPSK Range Extension Feature?, Continued

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Rule	Description
4	The ranging radius is 0 km to 64 km, with 0 km set at the programmed cable length.
5	Transport distances are in integer multiples of 31 km, to a maximum of 248 km.
6	All four demodulators are delayed by the same value programmed in the QPSK modulator.
7	The distance ranges stated in this document are approximate and based on a velocity of propagation in fiber of 68 percent of the speed of light in a vacuum ( $3 \times 10^8$ meters per second). Corrections to the setting of the QPSKs should be made where these distances do not apply, as in coaxial cable.
8	DHCTs closer than the programmed distance value may not range and may interfere with other DHCTs.
9	The delay distances that appear on the front panel of the QPSK are one-way path distances and assume an equal distance path on the forward and reverse connection. It is not necessary for the forward and reverse path to be the same distance, as long as the total propagation delay matches the equivalent time delay.
10	It will <i>not</i> be possible to use a co-located DHCT directly connected to the QPSK modem as a test device for QPSK link verification when the ranging extension mode is used. This connection violates rule 8. However, you can test for QPSK link verification with a DHCT directly connected to the QPSK as long as the reverse path is not active.

# Activate Range Extension Feature (Optional)

---

## Introduction

This section provides instructions for changing the modulator-to-node distance settings for the QPSK modulators on your system.

## Changing the Distance Settings

If the modulator-to-node distance of the QPSK modulators on your system is more than 64 km, complete these steps to change the distance settings.

1. If the hub you are configuring supports existing customers, disconnect the **modulator RF output cable** for 15 minutes. Otherwise, go to step 2.  
**Note:** While the QPSK is disconnected, the DHCTs on the hub are not fully functional.
2. See the **Range Distance Settings Diagram**, in the **What Is the QPSK Range Extension Feature** section, earlier in these instructions, to determine the QPSK range distance settings appropriate for your system setup. Then, complete the following steps to set the modulator-to-node distances.
  - a) On the front panel of the QPSK modulator, press the **Options** button until the Mod-Node Dist option appears.
  - b) Select a value of **optical fiber length** that is less than or equal to the sum of the actual optical cable length used for distribution to the remote hub, plus the minimum optical cable length used in the HFC network from the hub.
  - c) Adjust the setting if the cable propagation velocity factor is not equal to 68 percent of the speed of light in a vacuum.
  - d) Press the **up** and **down** buttons to choose the desired one-way fiber delay and then press **Enter**.**Results:**
  - The first time you change the modulator-to-node distance setting from 0 (zero) to xx, the QPSK will reboot.
  - The modified code is downloaded to the QPSK modulator and demodulator.
3. Reconnect the **cable** to force all DHCTs on the hub to reestablish a DAVIC connection with the appropriate time offsets.
4. Place a DHCT at the closest possible location to where the HFC network transitions from optics to cable; then, boot the DHCT and press the **Power** button.

## Activate Range Extension Feature (Optional), Continued

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5. Check the delay time on the DHCT diagnostic screen by choosing one of the following options:
  - For sites using SARA, look at the RF Statistical Information diagnostic screen, and choose one of the following options:
    - If the delay value is *less* than 761, the delay time is correct. Go to step 6.
    - If the delay value is *more* than 761, the DHCT is “too close.” Repeat step 2 and lower the modulator-to-node distance. Then, reboot the QPSK modulator.
  - For sites using the Pioneer resident application, call Pioneer for assistance in determining the current time delay.
6. Place a DHCT in the location with the maximum possible cable distance from the QPSK.
7. Again, check the delay time in the DHCT diagnostic screen by choosing one of the following options:
  - For sites using SARA, choose one of the following options from the RF Statistical Information diagnostic screen:
    - If the delay values fall within the 134 and 761 microsecond delay-time bound, the programmed delay values are correct.
    - If the delay value is less than 134 microseconds, the overall delay between DHCTs is “too far.” Call Cisco Services for assistance.
  - For sites using the Pioneer resident application, call Pioneer for assistance in determining the current time delay.

# Rollback Procedures

---

## Introduction

After loading the QPSK C65 software, if you notice that the system is reacting adversely, call Cisco Services. If they determine it is necessary to roll back the procedure, complete the steps in this section to restore the `qpsk.config` file and to deactivate the `signonCount` utility.

**Important:** Do not initiate these rollback procedures before contacting Cisco Services.

## Restoring the `qpsk.config` Files

To restore the `qpsk.config` files, insert the CD with the previous version of QPSK software, and follow the instructions that came with the CD. If you do not have a CD with the previous version of QPSK software and you need to expedite the restoration of the `qpsk.config` files, call Cisco Services for assistance.

## Deactivating the `signonCount` Utility

Deactivating the `signonCount` utility stops it from running in the background. To stop the `signonCount` utility, deactivate it by completing the following steps.

1. Check if the `signonCount` utility is currently running. From an xterm window on the DNCS, type **`ps -ef | grep sign`** and press **Enter**.

**Result:** If the `signonCount` utility is currently running, a message appears similar to the following:

```
/bin/ksh /dvs/dncc/bin/signonCount.ksh
```

If the message does not appear, then `signonCount` is not running. You do not need to perform step 2.

2. If the `signonCount` utility is running in the background and you want to deactivate it, from an xterm window on the DNCS, type **`signonCount uninstall`** and press **Enter**.

**Result:** The following message appears: “`SignonCount`” has been removed as a background process.

## For Information

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### If You Have Questions

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



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