



ASI BFS to GigE BFS Conversion Configuration Guide

Overview

Introduction

This document contains the information required to convert an ASI BFS to GigE BFS.

Sites using an RNCS can convert one site at a time. For example, you can change the BFS at the DNCS site to use GigE, while your RNCS sites can continue to use ASI.

Purpose

A BFS QAM modulator receives BFS data from the DNCS, modulates the data onto an RF carrier, and then sends it downstream to all DHCTs (set-tops) on the headend. Each headend in your network must have some type of BFS QAM modulator associated with the network on the DNCS.

Using GigE BFS removes the reliance on expensive ASI cards to deliver in-band BFS data from the DNCS to the QAM modulator, and instead uses the Ethernet port of the QAM modulator to deliver the BFS data.

Audience

This document was written for headend technicians. Field service engineers and Cisco® Services engineers may also find the information in this document helpful.

Document Version

This is the second formal release of this document. In addition to minor text and graphic changes, the following table provides the technical changes to this document.

Description	See Topic
Corrected procedures based on new information	<ul style="list-style-type: none"> ■ <i>GigE BFS Process</i> (on page 3) ■ <i>Making the QAM Modulator BFS Capable</i> (on page 10) ■ <i>Setting Up Multicast and Unicast Sessions for GigE BFS</i> (on page 13)
Added steps to verify the GigE BFS sessions on the GQAM	<ul style="list-style-type: none"> ■ <i>Verifying the GigE BFS Sessions on the GQAM</i> (on page 14)

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Overview

There are four determinations you must make before you set up the ASI to GigE conversion or add a QAM modulator that uses GigE for BFS data.

- 1 You must determine whether your Ethernet network can account for the additional traffic from a GigE delivery mode. This is especially important if you are using the same DNCS interface (dnccsatm) for both inbound and outbound traffic.
Note: This determination is beyond the scope of this document. If you need help determining whether your network can handle the additional traffic, contact Cisco Services.
- 2 You must determine whether you are converting an existing QAM modulator to GigE BFS or whether you are adding a new QAM modulator for GigE BFS.
- 3 You must determine whether you are going to use unicast or multicast sessions for BFS delivery.
- 4 You must determine whether you need to extend your BFS sessions to remote QAM modulators in a distributed BFS environment (non-RNCS).

GigE BFS Process

Be sure to allow yourself adequate time to complete these procedures. You must complete the following tasks in order.

- 1 Are you converting an existing QAM modulator to GigE for BFS?
 - If **yes**, you need to make the QAM modulator BFS capable. Go to *Making the QAM Modulator BFS Capable* (on page 10).
 - If **no** (you are adding a QAM modulator for GigE BFS), you need to set up the QAM modulator basic parameters and connection settings. Go to *Setting Up a New BFS QAM Modulator* (on page 5).
- 2 Stop the in-band carousels. Go to *Stopping the In-Band Carousels* (on page 11).
- 3 Configure the host. Go to *Configuring the Host* (on page 12).
- 4 Set up multicast sessions and/or unicast sessions for BFS delivery and restart the in-band BFS source data pump. Go to *Setting Up Multicast and Unicast Sessions for GigE BFS* (on page 13).
Note: If you are using distributed BFS, we recommend that you use multicast sessions.
- 5 Verify the GigE BFS sessions on the GQAM. Go to *Verifying the GigE BFS Sessions on the GQAM* (on page 14).

Before You Begin

Before you begin, you must have your network map and the following information:

- The current number of ASI BFS sessions built on the GQAM
- The IP address for the GQAM modulator
- The name of the GQAM modulator
- The ID of the GQAM
- The output port of the GQAM
- The input port of the GQAM
- The unicast UDP port numbers and/or multicast IP address for the GQAM modulator output

Note: Most of this information should be recorded on your network map. However, if it is not, contact your system administrator to obtain the information.

Setting Up a New BFS QAM Modulator

Note: Follow these instructions only if you are adding a QAM modulator to transmit the GigE BFS information. If you are converting an existing QAM modulator to transmit the GigE BFS data, follow the instructions beginning with *Making the QAM Modulator BFS Capable* (on page 10).

The first step in adding a BFS QAM modulator is to set up the BFS QAM modulator basic parameters.

- 1 On the DNCS Administrative Console, click the **Network Element Provisioning** tab.
- 2 Click **QAM**. The QAM List window opens.
- 3 Click **Add**. The Add QAM window opens with the Parameters tab in the forefront.
- 4 Complete the fields on the screen as described in the following table.

Field	Description
QAM Type	Select the type of QAM you are adding.
Headend Name	Select the headend in which this BFS QAM modulator resides.
Basic Parameters	
QAM Name	The name you will use to identify this BFS QAM modulator. You can use up to 20 alphanumeric characters (for example, HE1BFSQAM). Note: Be sure to use a name that is consistent with the naming scheme used on your network map.
IP Address	The IP address for this QAM modulator.
MAC Address	The MAC address for this QAM modulator.
Subnet Mask	The subnet mask where this QAM modulator resides.
Modulation Type	The type of modulation standard this modulator uses.
Default Gateway	If your system uses a default gateway, enter the IP address of the default gateway. Note: Using a default gateway router speeds up the reconnection process that occurs after a device is rebooted.
Administrative State	Select the option for the administrative state of this QAM modulator: <ul style="list-style-type: none"> ■ Online - The QAM modulator will be active immediately after setting up. ■ Offline - The QAM modulator will not be immediately active. This option is often used for testing. ■ Assigned to an external SRM - The modulator can process the carousels from external SRMs (including GSRM and SDV). Important: Do not place the QAM modulator online until you have set up the connections between the modulator and the source that feeds the modulator.

Field	Description
Advanced Parameters	
Configuration File Name	The location of the QAM configuration file. Click Browse and select the configuration file.
BFS Capable	Select this option (check the box) to give this QAM modulator the ability to send BFS data.
Allow SI	Displays only when you select the BFS Capable option. Select this option to allow the modulator to process SI data.

- Click **Save**. The system saves the QAM modulator information you have entered into the DNCS database.
- Go to *Setting Up the BFS QAM Inputs*, next in this document.

Setting Up the BFS QAM Inputs

- On the Add QAM screen, click the **Input** tab.
- Complete the fields on the screen as described in the following table.

Field	Description
GbE Input Ports	
IP Address	Enter the IP address for the GbE port.
MAC Address	Enter the MAC address for the GbE port.
Subnet Mask	Enter the subnet mask for the GbE port.
Dual GbE Port	Select to enable dual GbE port inputs.
Provision Dual GbE	Click to provision the dual GbE port inputs. Note: When you select this option, the DNCS checks for conflicting ASI and SMDG sessions, adds a second GbE input port data row, and displays the options below.
Switch Mode	Select the option you prefer for switching GbE input ports: <ul style="list-style-type: none"> ■ Manual - You must make the switch manually. ■ Auto - The switch occurs manually, based on the Los Timer. Note: This field only displays if the Provision Dual GbE option is selected.
Initial Port	Select the port that will be the active port when the QAM modulator is activated. Note: This field only displays if the Provision Dual GbE option is selected.
Los Timer	Enter the amount of time (in milliseconds [ms]) that must pass without data being received before the inactive port becomes the active port. The minimum time is 100 ms. Note: This field only displays if the Provision Dual GbE option is selected.
VOD Redundancy Mode	Select this option to enable VOD redundancy mode. Note: When you select this option, the DNCS displays the options below.

Field	Description
QAM Unicast/Multicast IP	Select the IP option for the QAM modulator: <ul style="list-style-type: none"> ■ QAM Unicast IP ■ QAM Multicast IP
VOD Redundancy IP	The IP address of the redundant VOD server.

- 3 Click **Save**. The system saves the QAM modulator information you have entered into the DNCS database.
- 4 Go to *Setting Up the BFS QAM Outputs*, next in this document.

Setting Up the BFS QAM Outputs

- 1 On the Add QAM screen, click the **Output** tab.
- 2 Complete the fields on the screen as described in the following table.

Field	Description
Transport Stream ID	The number that identifies the transport stream the QAM modulator sends to the DHCTs. Type a unique number to identify the transport stream going from this QAM modulator to the DHCTs on your system. You can use up to 5 numeric characters.
Modulation	The type of modulation this QAM modulator uses.
Frequency	The channel frequency that you will use to send system information to set-tops. We recommend that you enter a value in 6 MHz increments from 91 to 867. For assistance, see <i>Recommended Modulator Frequencies</i> (on page 9).
Continuous Wave Mode	Determines whether the QAM produces an unmodulated RF carrier. Enable this option to produce an unmodulated RF carrier, which is useful when performing testing.
Mute RF Output	Determines whether the QAM's RF output port is muted. Enable this option to turn off the RF output for a port. This is helpful when installing the modulator.
Disabled	Determines whether you can set up additional sessions on an RF output port on the QAM. Important: Enable this option to prevent the DNCS from setting up any additional sessions on an RF output port. (Existing sessions are not affected and continue to function as expected.) Enabling this option may be helpful when performing plant maintenance or in the rare event that a port fails.
Interleaver Depth	Select the depth of interleaving that the modulator uses.

Field	Description
Application Support	<p>Defines the application that each RF output carrier provides. Select the application that each RF output carrier provides from the menu:</p> <ul style="list-style-type: none"> ■ Shared - Select this option when the RF carrier is used for VOD, SDV, and Broadcast sessions. ■ VOD Only - Select this option when the RF carrier is used only for VOD sessions. NOT VALID FOR BFS. ■ SDV Only - Select this option when the RF carrier is used only for SDV sessions. NOT VALID FOR BFS. ■ Broadcast Only - Select this option when the RF carrier is used only for broadcast sessions.

- 3 Click **Save**. The system saves the QAM modulator information you have entered into the DNCS database.
- 4 Do you need to set up third-party parameters for this QAM modulator?
 - If **yes**, go to *Setting Up the BFS QAM Third-Party Parameters (Optional)*, next in this document.
 - If **no**, go to *Configuring the Host* (on page 12).

Setting Up the BFS QAM Third-Party Parameters (Optional)

- 1 Click the **Third Party Parameters** tab.
- 2 Complete the fields on the screen as described in the following table.

Field	Description
Core Encryption	<p>Select the core encryption method for this QAM modulator:</p> <ul style="list-style-type: none"> ■ PowerKEY ■ DVB CSA <p>Note: Your options might be different, based on your specific installation.</p>
Conditional Access	<p>Select the conditional access method for this QAM modulator:</p> <ul style="list-style-type: none"> ■ PowerKEY ■ Open CA <p>Note: Your options might be different, based on your specific installation.</p>

- 3 Click **Save**. The system saves the QAM modulator information you have entered into the DNCS database.
- 4 Click the **Parameters** tab.
- 5 At the **Administrative State** field, click the **Online** option.
- 6 Click **Save**. The QAM List window updates to include the new QAM modulator.
- 7 Add the new BFS QAM modulator to your network map.
- 8 Go to *Configuring the Host* (on page 12).

Recommended Modulator Frequencies

Use the center frequencies shown in the following table to send data from your QAM modulators to the set-tops on your system. Notice that these frequencies are separated by increments of 6 MHz.

Note: If you are experiencing signal interference, try offsetting your modulator frequencies by 250 kHz from the frequencies shown in the table.

153	159	165	171	177	183	189	195	201	207
213	219	225	231	237	243	249	255	261	267
273	279	285	291	297	303	309	315	321	327
333	339	345	351	357	363	369	375	381	387
393	399	405	411	417	423	429	435	441	447
453	459	465	471	477	483	489	495	501	507
513	519	525	531	537	543	549	555	561	567
573	579	585	591	597	603	609	615	621	627
633	639	645	651	657	663	669	675	681	687
693	699	705	711	717	723	729	735	741	747

Making the QAM Modulator BFS Capable

Note: Only follow these instructions if you are modifying an existing QAM modulator for GigE BFS. If you are setting up a new QAM modulator for the GigE BFS, go to *Setting Up a New BFS QAM Modulator* (on page 5).

- 1 On the DNCS Administrative Console, click the **Network Element Provisioning** tab.
- 2 Click **QAM**. The QAM list opens.
- 3 In the Filter area, click **By Field** and select **QAM Type**.
- 4 Click **By Value** and select **GQAM**.
- 5 Click **Show**.
- 6 Select the QAM modulator you want to make BFS capable and click **Edit**. The Edit QAM window opens with the Parameters tab in the forefront.
- 7 Scroll down to the **Advanced Parameters** section of the screen.
- 8 Select the **BFS Capable** option (so that a check appears in the box).
- 9 Click **Save**.
- 10 Are you using our RNCS solution?
 - If **yes**, repeat this procedure for each RNCS you are converting from ASI to GigE BFS.
 - If **no**, go to the next step.
- 11 Go to *Stopping the In-Band Carousels* (on page 11).

Stopping the In-Band Carousels

- 1 On the DNCS Administrative Console, click the **Application Interface Modules** tab.
- 2 Click **BFS Admin**. One of the following windows opens:
 - If you are using an RNCS, the Site Selection window opens. Go to the next step.
 - If you are not using an RNCS, the BFS Hosts window opens. Go to step 4.
- 3 Select the DNCS site and click **Select**. The BFS Hosts window opens.
- 4 Click the **BFS Sources** tab.
- 5 Click the **Source ID** column heading to sort the IDs in reverse numerical order (largest on top).
- 6 Select the first enabled in-band source in the list.
- 7 Click **Edit**. The Edit BFS Source window opens.
- 8 Under **Data Pump**, select the **stop** option.
- 9 Click **Save**. The source carousel stops.
- 10 Select the next enabled in-band source in the list.
- 11 Repeat this procedure from step 7 for each enabled in-band source under this host.
- 12 Are you using our RNCS solution?
 - If **yes**, repeat this procedure for each RNCS you are converting from ASI to GigE BFS.
 - If **no**, you are finished with this procedure.

Configuring the Host

You need to configure the host for Ethernet and for the correct MTU value.

- 1 On the DNCS Administrative Console, select the **Application Interface Modules** tab.
- 2 Click **BFS Admin**. The BFS Administration window opens.
- 3 Are you using an RNCS?
 - If **yes**, select the site to which you are adding the GigE BFS.
 - If **no**, go to step 5.
- 4 Click **Select**. The BFS Hosts window opens.
- 5 Select the **dnccsatm** host.
- 6 Click **Edit**. The Edit BFS Host window opens.
- 7 For **BFS In-Band Mode**, select **Ethernet**. The window changes to reflect the Ethernet options.
- 8 In the space next to **UDP Max Datagram Size (1024-1450)**, enter **1450** (recommended) or another value that is a multiple of 188 in the range of 1024 to 1450 bytes.
- 9 Leave the **DNCS Host** option at its default value (unchecked).
- 10 Click **Save**. Keep the Edit BFS Host window open.
- 11 Are you using our RNCS solution?
 - If **yes**, repeat this procedure for each RNCS you are converting from ASI to GigE BFS.
 - If **no**, you are finished with this procedure.

Setting Up Multicast and Unicast Sessions for GigE BFS

You should still have the Edit BFS Host window open from the previous procedure.

- 1 Click the **BFS Sources** tab.
- 2 Click the **Source ID** column heading to sort the IDs in numerical order (lowest on top).
- 3 Select the first source in the list that will be used as a multicast source.
- 4 Click **Edit**. The Edit BFS Source window opens.
- 5 Under **Data Pump**, select the **run** option.
- 6 Scroll down to the **Available Local BFS Qams** section and select the QAM modulator and the port you want to use for the multicast session.
- 7 Click Multicast and enter a site-unique **Multicast Destination IP** address for the session.
Note: The Qam Ethernet Input Port will automatically be set based on the output TSID.
- 8 Click **Save**.
- 9 Repeat this procedure from step 2 for each BFS session you are enabling.
- 10 Do you need to set up unicast sessions for the BFS ports?
 - If yes, continue with the next step.
 - If no, you are finished with this procedure.**Note:** This part of the procedure might not be necessary if you are migrating an existing QAM modulator that was already connected to the GigE input for regular video processing.
- 11 Select the QAM modulator output port for the unicast session.
- 12 Scroll down and select **Unicast** as the session type. The system will fill in the correct IP address (which should be the GbE unicast address of the BFS QAM modulator).
- 13 Enter a site-unique **Unicast UDP Port** in the range of 1025-65535. This port must be unique for each BFS source at the site.
- 14 Click **Save**.
- 15 Repeat this procedure for each source under this host.
- 16 Are you using our RNCS solution?
 - If **yes**, repeat this procedure for each RNCS you are converting from ASI to GigE BFS.
 - If **no**, you are finished with this procedure.

Verifying the GigE BFS Sessions on the GQAM

- 1 On the GQAM, press the **OPTION** button until you see the **CH1 Session Count** on the display.
- 2 Press the **RF SEL** button until you see the channel where you built the GigE BFS sessions.
- 3 Does the channel display the same number of sessions you recorded before you began the process?
 - If **yes**, go to the next step.
 - If **no**, troubleshoot the issue. Contact Cisco Services if you require assistance.
- 4 Open an xterm window on the DNCS and log in as the dncs user.
- 5 Type the following command and press **Enter**:

```
auditQam -query [GQAM IP address] [GQAM port number]
```

Note: Replace [GQAM IP address] and [GQAM port number] with the GQAM IP address and port number specified when you started the BFS source. In the following example, the IP address is **172.16.4.19** and the port number is **1**. Do not type the brackets in the command.

Example: `auditQam -query 172.16.4.19 1`

Result: A list of QAM sessions displays, similar to the following:

```
Number of Sessions = 13
    Session 1: 00:00:00:00:00:00/2
    Session 2: 00:00:00:00:00:00/4
    Session 3: 00:00:00:00:00:00/6
    Session 4: 00:00:00:00:00:00/8
    Session 5: 00:00:00:00:00:00/10
    Session 6: 00:00:00:00:00:00/12
    Session 7: 00:00:00:00:00:00/14
    Session 8: 00:00:00:00:00:00/16
    Session 9: 00:00:00:00:00:00/18
    Session 10:00:00:00:00:00:00/20
    Session 11:00:00:00:00:00:00/22
    Session 12:00:00:00:00:00:00/24
    Session 13:00:00:00:00:00:00/199
```

Note: This example only shows the number of sessions and the sessions themselves. You will also see other, extraneous information in the list.

- 6 Does the number of sessions show the correct number of BFS sessions started?
 - If **yes**, go to the next step.
 - If **no**, troubleshoot the problem. Contact Cisco Services if you require assistance.
- 7 Type the following command and press **Enter** to log into the BFS GQAM:

```
telnet [GQAM IP address]
```

Example: `telnet 172.16.4.19`

Result: The User prompt displays.
 Trying 172.16.4.19...
 Connected to 172.16.4.19.
 Escape character is '^]'.

 Press Ctrl-C to terminate telnet session

User:

- 8 Type the user name **Gqam** and press **Enter**.
- 9 Type the password **Gqam** and press **Enter**.
- 10 Do you see a double strike?
 - If **yes**, follow these steps:
 - a Press **Ctrl +]** (control and right bracket). You should see the telnet> prompt.
 - b Type mod ch and press **Enter** twice. You should see the GQAM> prompt.
 - If **no**, go to the next step.
- 11 Type session and press **Enter**. The screen displays the number of sessions on each of the GQAM's ports.

Example: D9479 GQAM>session

Result: You should see a list similar to the following:

OUTPUT PORT	ACTIVE SESSIONS	ENCRYPTED SESSIONS	SDV SESSIONS
0	13	0	0
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0

Totals:	13	0	0

- 12** Does the output show the correct number of sessions built on the correct output?
- If **yes**, go to the next step.
 - If **no**, troubleshoot the issue. If you are unable to resolve the issue, contact Cisco Services for assistance.

Note: The GQAM output ports are numbered from 1 - 16 when you use the auditQam utility. When you telnet into the GQAM, the ports are numbered from 0 - 15.

- 13** Type `print_session_status [port #]` and press **Enter**. The screen displays the detailed information about each session on the port. Verify that each session status shows a status of Active, similar to the following example.

Example: `print_session_status 0`

Result: You should see an output similar to the following:

```
Session create counter = 13
Session delete counter = 0
Sessionless ECM counter = 0
Total ECM error counter = 0
Total last ECM error = 0x0 (no error)
Sessionless ISK counter = 0
Total ISK error counter = 0
Total last ISK error = 0x0 (no error)
Total bad states seen = 0
Total last bad state seen = 0x0
Sessionless SK counter = 0
```

```
Sessions outstanding per input port: 0 0 0 0
```

```
-----Sessions on output port 0-----
```

```
Session index = 0
Session state = ACTIVE
Session ID = 00 00 00 00 00 00 00 00 00 00 18
Input port number = 4
Output port number = 0
Input program number = 0x96
Output program number = 0x96
Session rate = 500000
Encryption flag = 0
RPC Version = 2
PMT update cnt = 0
SK cnt = 0
ISK cnt = 0
ISK error counter = 0
Last ISK error = 0x0 (no error)
ECM cnt = 0
```



```

ECM encrypt to clr cnt = 0
ECM clr to encrypt cnt = 0
First ECM seen = None seen
Last ECM seen = None seen
Last deliverECM ptr = 0x0
ECM error counter = 0
Last ECM error = 0x0 (no error)
PID blocking param ptr = 0x0
Session Type = Continous Broadcast Session
Pid Remapping = On
Giga Ethernet Type = qIP_multicast_gqam_2
Giga Ethernet Type Value = 232.200.1.24
Mcast Ip = 232.200.1.24
Source Ip = 10.253.0.1
Source Ip = 0.0.0.0
Source Ip = 0.0.0.0
Mcount = 1
Giga Ethernet Type Value 1 = 0
Session Priority = 0
Create Session IP = 10.253.0.1

```

- 14 Do the number of sessions from steps 5, 11, and 13 match the number of sessions from step 3?
 - If **yes**, press the **OPTION** button on the GQAM front panel and verify the number of sessions actually shown on the GQAM.
 - If **no**, troubleshoot the problem. Contact Cisco Services if you require assistance.
- 15 Press **Ctrl +]** (control and the right bracket simultaneously). The telnet prompt is displayed.
- 16 Type **quit** and press **Enter**. This logs you out of the GQAM.
- 17 Are you using our RNCS solution?
 - If **yes**, repeat this procedure for each RNCS you are converting from ASI to GigE BFS.
 - If **no**, you are finished with this procedure.

For 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.



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