



RateMux - No Video Output and the Significance of NIT PID PassThru and CASysID

[TAC Notice: What's Changing on TAC Web](#)

Document ID: 12549

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Introduction

In an MPEG II digital video network that utilizes Motorola Integrated Receiver Transcoder (IRT) equipment and Motorola DigiCipher II based encryption system, it is important that all the relevant components of the network have access to the system clock. Access to the system clock is conveyed by the Network Information Table (NIT) Packet ID (PID).

Additionally, each video program needs to have a special parameter set in its Program Map/Management Table (PMT). This parameter, called the CA SysID, needs to be set to 47 49 (the ASCII codes for the letters G and I in hexadecimal) in order for Motorola IRTs to recognize that the video stream should be processed as part of an encryption function.

If the appropriate equipment does not have proper access to the system clock conveyed by the NIT PID, and if individual programs do not have the CA SysID correctly set, then program encryption or decryption may not occur properly, and loss of video results.

By default, the Cisco RateMux 6920 Advanced MPEG-2 Multiplexer does not pass the NIT PID through from input ports to output ports. This document explains how to configure the RateMux 6920 multiplexer to achieve this. The document also discusses some of the most common pitfalls that can

cause video output to fail on the RateMux multiplexer.

Before You Begin

Conventions

For more information on document conventions, see the [Cisco Technical Tips Conventions](#).

Prerequisites

There are no specific prerequisites for this document.

Components Used

The information in this document is based on the software and hardware versions below.

- Cisco RateMux 6920 Advanced MPEG-2 Multiplexer
- Cisco RateMux Software Build Version 255

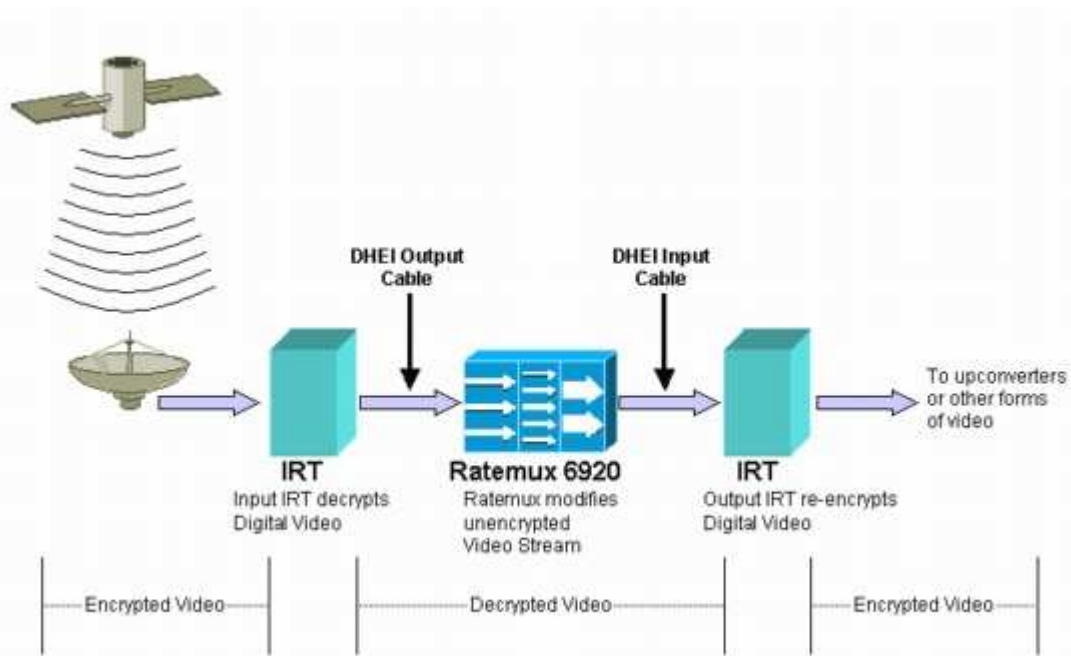
Note: If your RateMux 6920 multiplexer is running an earlier software build than 255, you must upgrade it to build 255 or later by following the instructions in the document [How to Upgrade the Software on the RateMux C6920](#), or by following the instructions in the release notes of the version to which you are upgrading. The procedures in this document do not work properly in software build versions earlier than 255.

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

Why the NIT PID Needs to be Passed Through

When a digital video stream is received at a head end, the stream is typically in an encrypted format. In Motorola-based systems, the proprietary DigiCipher II Encryption System is used as the means of encrypting the Digital Video to guard against unauthorized access to the content in each channel.

The RateMux 6920 multiplexer is unable to perform any remultiplexing or compression on encrypted video streams, so an incoming MPEG video stream from a satellite feed (such as Headends In The Sky (HITS)) must be unencrypted before being fed to the RateMux 6920 multiplexer. This can be done by a Motorola IRT device connected to the input of the RateMux multiplexer. If DigiCable Headend Expansion Interface (DHEI) interfaces are used, then a DHEI output cable must be connected between the output of the Motorola IRT and the input of the RateMux multiplexer.

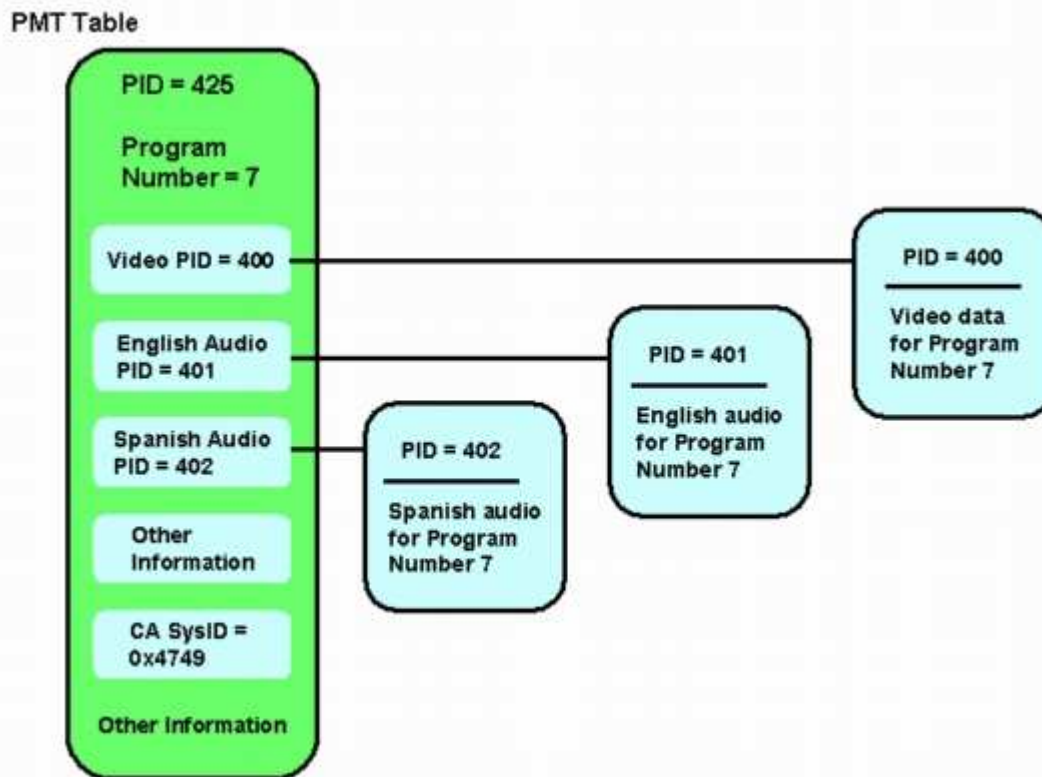


After the RateMux multiplexer performs remultiplexing or compression on the input video streams, the resulting video stream must be re-encrypted so that it can be securely distributed to customers. This re-encryption is normally performed by another Motorola IRT device. If DHEI interfaces are being used between the output of the RateMux multiplexer and the input of the Motorola IRT, then a DHEI input cable should be used.

In order to properly perform the re-encryption, the output IRT needs to have access to the correct system clock information. This information is conveyed in the MPEG stream sent by the satellite via the NIT PID. However, by default the RateMux 6920 multiplexer does not pass this NIT PID through from an input port to output ports. This means that the output IRT is unable to re-encrypt the video channels that it receives on its DHEI input port.

Why the CA SysID Needs to be Set to 47 49

The PMT PID is a table that conveys information about which PIDs are associated with a program. The diagram below shows a partial PMT for program number 7.



There are three PIDs associated with this program; one for video, and two for audio. In addition to PID and other information, the PMT also contains a parameter called the Conditional Access System ID (CA SysID). In order for a Motorola IRT device to be able to encrypt an MPEG program, the CA SysID for that program needs to be set to the hexadecimal value 47 49. These values correspond to the ASCII characters G and I, respectively.

Note: There must be a space between the 47 and the 49. In addition, make sure that 47 49 is the ONLY text in the boxes. If there are any dashes (-), extra spaces, or other characters, the setting fails.

Configuring the RateMux to Passthru the NIT PID

The following steps describe configuring the RateMux multiplexer to passthru the NIT PID.

1. Launch the RateMux Manager application by opening a web browser to the IP address associated with the RateMux multiplexer you intend to configure. In following example, the IP address of the RateMux multiplexer is 10.64.2.7. Click the **About** menu to show a page that looks like the one in the diagram below. The first thing that needs to be verified is that your RateMux multiplexer is running software build version 255 or later.

RateMux® Manager

[About](#) [Program Select](#) [Transponder Map](#) [Hardware](#) [Monitor Rate](#) [Advanced](#) [Help](#)

Cisco Systems, Inc.
 170 West Tasman Drive, San Jose, CA 95134-1706
 Phone: 408-526-4000 Fax: 408-526-4100
 http://www.cisco.com

RateMux® Version: 255
IP:10.64.2.7
Ethernet: 00:22:33:44:55:66

Software Modules

Skt	Board	Module	Version	Board Info
0	DSP3	PARAMS	2.4	
		DSPDIAG1	255	
		DSPDIAG2	Invalid	
		DSPDIAG3	255	

- In addition to the software build version being 255 or later, the software versions on each card in the RateMux 6900 multiplexer should be at version 2.4 or later. You must also make sure that the version number on all the RateMux cards are the same.

The software version numbers on each card can be viewed by scrolling down on the About page, as seen in the diagram below.

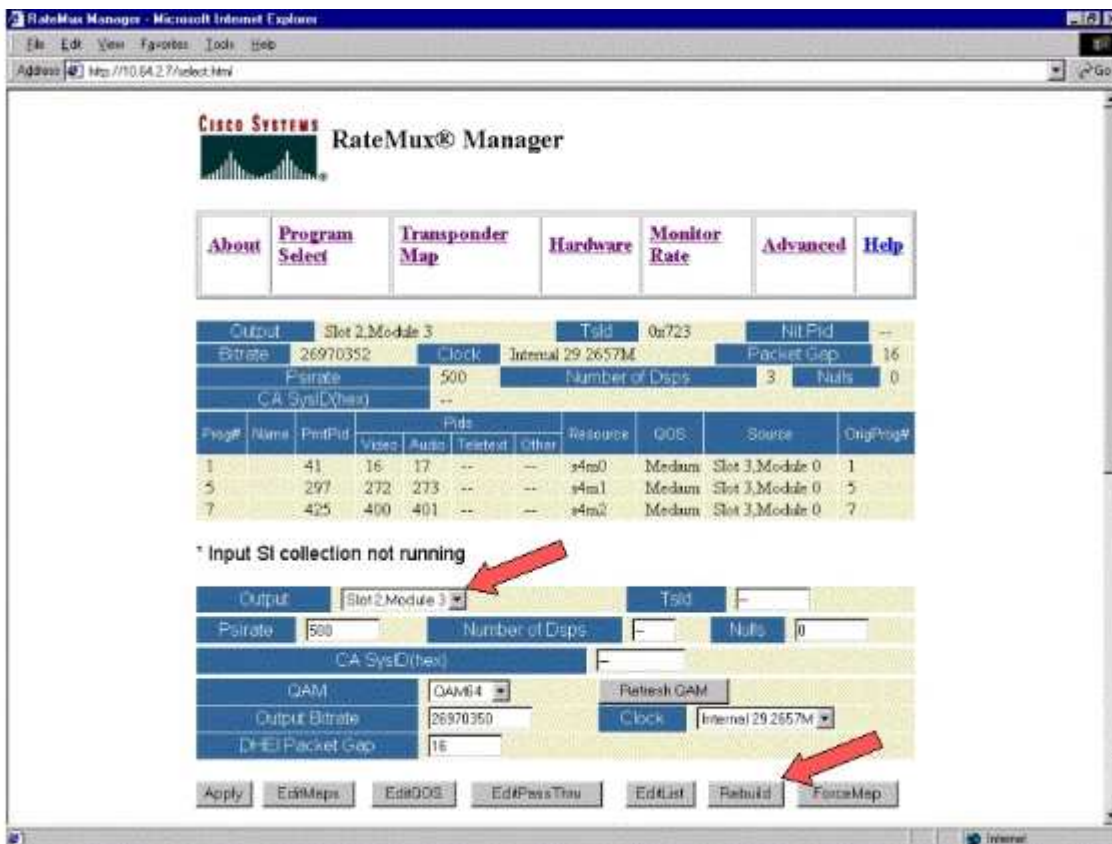
The screenshot shows a web browser window titled "RateMux Manager - Microsoft Internet Explorer" with the address bar displaying "http://10.54.2.7/about.html". The main content area displays a table titled "Software Modules".

Slot	Board	Module	Version	Board Info
0	DSP3	PARAMS	2.4	
		DSPDIAG1	255	
		DSPDIAG2	Invalid	
		DSPDIAG3	255	
		DSPDIAG4	255	
		FPGALOAD	255	
1	DSP3	PARAMS	2.4	
		DSPDIAG1	255	
		DSPDIAG2	Invalid	
		DSPDIAG3	255	
		DSPDIAG4	255	
		FPGALOAD	255	
2	DHEI_IO_R3	PARAMS	2.4	
		DSPDIAG1	255	
		DSPDIAG2	255	
		DSPDIAG3	255	
		DSPDIAG4	255	
		FPGALOAD	255	
3	DVB_IO_R2	PARAMS	2.4	
		DSPDIAG1	255	
		DSPDIAG2	255	
		DSPDIAG3	255	
		DSPDIAG4	255	
		FPGALOAD	255	
4	DSP3	PARAMS	2.4	

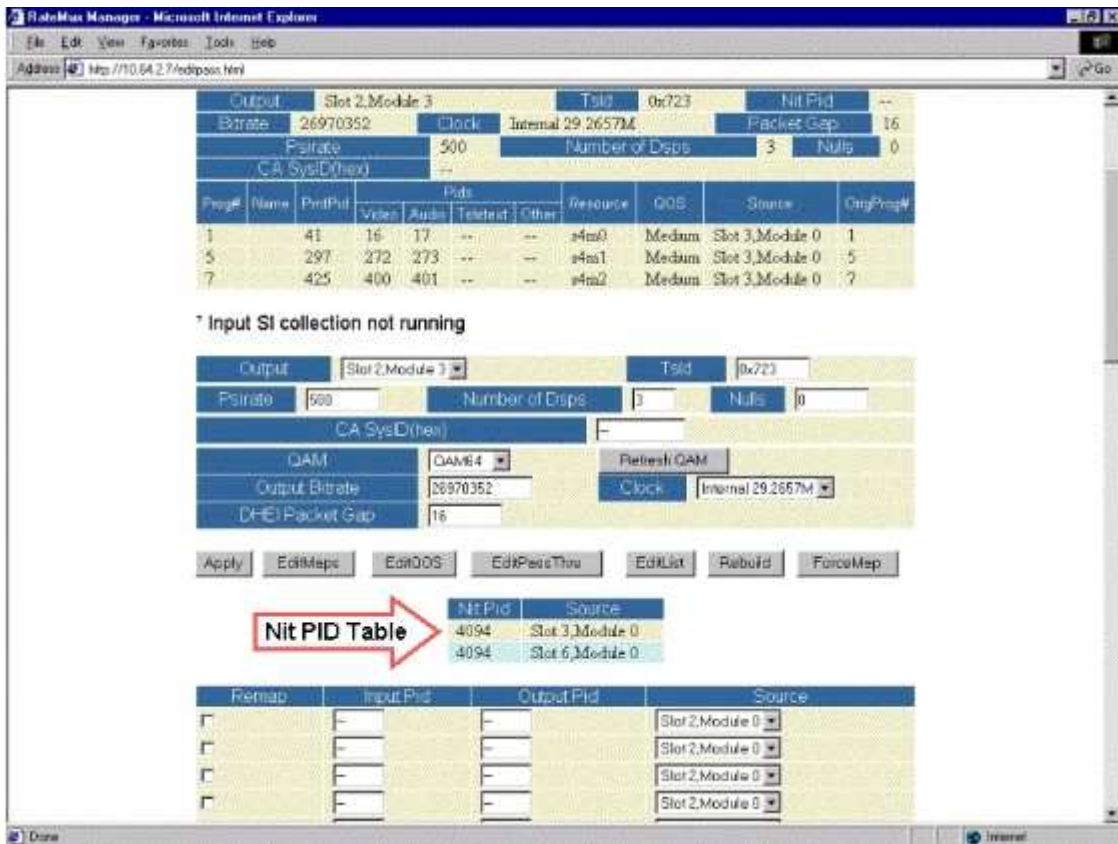
3. Go to the Program Select page. To do this:
 - a. Click **Program Select** at the top of the web page.
 - b. Make sure that the correct output port is selected in the Output drop down box.
 - c. Click the **Rebuild** button to refresh the configuration page.

Note: It is important that you click **Rebuild** before making any changes to the configuration of the RateMux multiplexer; otherwise, any previous configuration entered is lost.

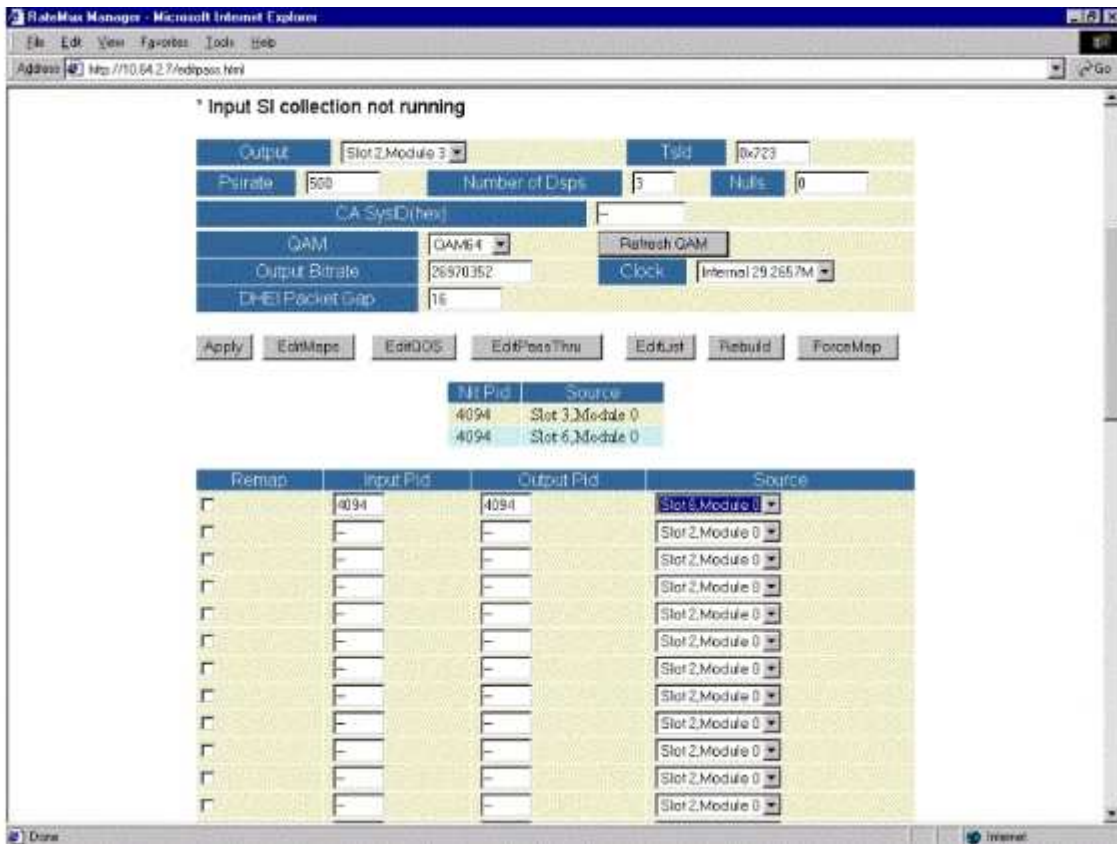
4. If you have already configured the RateMux multiplexer to remap some programs, the display looks similar to the figure below. If you have not yet configured the RateMux multiplexer to remap programs, then refer to the [RateMux Software Release Notes](#) for your running version of software for instructions.



- Click the **EditPassThru** button and scroll down to the middle of the displayed web pages. You should see something similar to the following figure:



- Toward the bottom of the page, the RateMux multiplexer shows a table indicating the PID number and input ports on which NIT PIDs are present. In this case, input ports Slot3, Module 0 and Slot 6, Module 0 have NIT PIDs present. The number of the NIT PID is usually 4094.
- At this stage, you must decide which input port to pass the NIT PID from to our selected output port. In the case shown in the diagram below, it has been decided to pass through the NIT PID from Slot 6, Module 0 because the stream coming in from this input port tends to be more reliable. The Input PID and Output PID numbers are the same as those seen in the NIT PID table.



- After the NIT PID has been selected for PassThru, click the **Apply** button and a page similar to the following appears. Now the Passed Thru NIT PID appears at the top of the displayed web page.

- At this point the Output IRT should be receiving the NIT PID. The Output IRT now needs to be reconfigured to accept the DHEI stream coming from the RateMux multiplexer rather than accepting input from the Satellite Stream. This can be done by using the DHEI Control menu on the IRT. The value **DHEI In** field should be changed from *Not Selected* to *Selected*. Doing so allows the IRT to accept Video, Audio, Data, and the NIT stream from the DHEI input port rather than the default K-band satellite input. Refer to the IRT documentation for more information.

Configuring the RateMux to Set the CA SysID to 47 49

The following steps describe configuring the RateMux multiplier to set the CA SysID to 47 49.

- Launch the RateMux Manager application by opening a web browser and browsing to the IP address associated with the RateMux multiplexer you wish to configure. As per the last section, the RateMux multiplexer needs to be running software build 255 or later in order for this procedure to work properly, so use the About page to confirm that the RateMux multiplexer is running the right version of software.

- In order to set the CA SysID, go to the Program Select page and click the **Rebuild** button.

Note: It is important that you click **Rebuild** before making any changes to the configuration of your RateMux multiplexer, otherwise any previous configurations entered is lost.

- In the blank field labeled CA SysID(hex) near the bottom of the page, enter the hexadecimal values 47 49. Your RateMux Manager page should look similar to the one in the diagram below.

Note: There must be a space between the 47 and the 49.

The screenshot shows the RateMux Manager interface with the following configuration details:

- Output: Slot2,Module 3
- Tpid: 0x723
- Psirate: 500
- Number of Disps: 3
- Nulls: 0
- CA SysID(hex): 47 49
- QAM: QAM4
- Refresh QAM button
- Output Bitrate: 26570352
- Clock: Internal 29.2657M
- Packet Gap: 16

Buttons: Apply, EditMaps, EditQOS, EditPassThru, EditList, Rebuild, ForceMap

Select	Prog#	Name	PmtPid	Pids				PcrPid	EcmPid	Source
				Video	Audio	Teletext	Other			
<input checked="" type="checkbox"/>	1		41	16	17	--	--	16	41	Slot 3,Module 0
<input type="checkbox"/>	2		105	80	81	--	--	80	105	Slot 3,Module 0
<input type="checkbox"/>	3		169	144	145	--	--	144	169	Slot 3,Module 0
<input type="checkbox"/>	4		233	208	209	--	--	208	233	Slot 3,Module 0
<input checked="" type="checkbox"/>	5		297	272	273	--	--	272	297	Slot 3,Module 0
<input type="checkbox"/>	6		361	336	337	--	--	336	361	Slot 3,Module 0
<input checked="" type="checkbox"/>	7		425	400	401	--	--	400	425	Slot 3,Module 0

- At this stage click **Apply** to save the change. The RateMux Manager should now show the CA SysID set to 47 49 in the top part of the display.

- The CA SysID is now being set to 47 49 (GI) by the RateMux multiplexer on the output MPEG stream. You may also need to power cycle the Output (transmit) IRT if there is no Video output.

Troubleshooting FAQs

I have tried to pass through the NIT PID and set the CA SysID to 47 49; however, I am still unable to receive any video channels from this RateMux. What should I do?

- Confirm that you can see the desired video channels in the Program Select page in the RateMux Manager.
- Confirm that you are running software build 255 or later.
- Confirm that your output IRT is set to accept input from the input DHEI port rather than the K-band Satellite input.
- Make sure that you use a DHEI Input cable to connect the output of the RateMux multiplexer to the INPUT port of the transmit IRT and a DHEI Output cable to connect the input of the RateMux multiplexer to the OUTPUT port of the receive IRT.
- You may also need to power cycle the Output (transmit) IRT if all the above fails.

Note: If, after power cycling the Output IRT there is still no video output, try reseating those video cards.



Caution: Make sure you power off the RateMux multiplexer before pulling out or inserting any cards, as the cards are not hot-swappable.

When I passed through the NIT PID, or set the CA SysID to 47 49, all my programs disappeared from the RateMux configuration. What should I do?

You may have forgotten to click the **Rebuild** button before making a configuration change. At this stage you must manually re-enter your programs and mappings back into the RateMux multiplexer.

You may also need to power cycle the Output (transmit) IRT if all the above fails.

I cannot see any NIT PIDs to pass through on the Edit Pass Thru screen. What should I do?

If you cannot see any NIT PIDs displayed on the Edit Pass Thru page, then confirm that you are running software build 255 or later, and that the provider sending you a feed is sending a NIT PID with system clock through your video feed.

You may also need to power cycle the Output (transmit) IRT if all the above fails.

Which component is responsible for providing the clock?

There are a number of different, normally asynchronous clocks that are part of the transport stream. They are:

- **The transport stream clock**
 - For DHEI output, the transport stream clock must be sourced from the DHEI IO card for 256 Quadrature Amplitude Modulation (QAM) output.
 - For DHEI output at 64 QAM, the transport stream clock may be sourced by a DHEI input transport stream to the RateMux multiplexer, or maybe sourced by the DHEI IO card if this is being output by a DHEI-I/O-C card. This is selectable at the GUI.
 - For ASI output the transport stream clock is sourced by the RateMux multiplexer.
- **The PCR clock**—The PCR clock is passed through by the RateMux multiplexer and normally is sourced by the MPEG encoder. The RateMux multiplexer does adjust PCR time stamps while remultiplexing transport streams.

Note: The PCR is used to lock the reference 27MHz clock at the MPEG decoder to the 27MHz clock at the MPEG encoder.

- **The time of day clock**—When the output of the RateMux multiplexer is connected to a transmit IRT, the RateMux multiplexer must be configured to pass through a NIT PID from one of the input bitstreams (as explained in this document). This NIT PID contains time-of-day info that the IRT needs for authorization.
- **The 270Mbps ASI clock (ASI streams)**—This clock is sourced by the ASI I card.

Related Information

- [Cisco 6920 RateMux Documentation Root and Release Notes](#)
 - [How to Upgrade the Software on the RateMux C6920](#)
 - [Technical Support - Cisco Systems](#)
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Updated: Oct 04, 2005

Document ID: 12549
