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Application Note

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Subject: How to program the D9858 for Simultaneous HD and SD output

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How to Configure the D9858 for Simultaneous HD & SD Output

July 4, 2012

This procedure will demonstrate how to configure the D9858 so that it will produce both HD and SD versions of the same program. Of course, it is assumed that the receiver is first tuned to an HD (MPEG4 compressed) source. The Transcoding feature of the D9858 will be utilized to provide the two programs.

The typical application here is that a programmer affiliate needs to have both HD and SD versions of the program on his cable system. Usually, it is required that the downstream devices need the programming to be in MPEG2 format.

The procedure presented here will make use of the *Transcoding* feature and the *Digital Program Mapping* feature of the D9858 receiver. Note that using the DPM menus will result in putting the receiver into a DPM output mode, and it is necessary to ensure that no PID conflicts exist.

EXAMPLE:

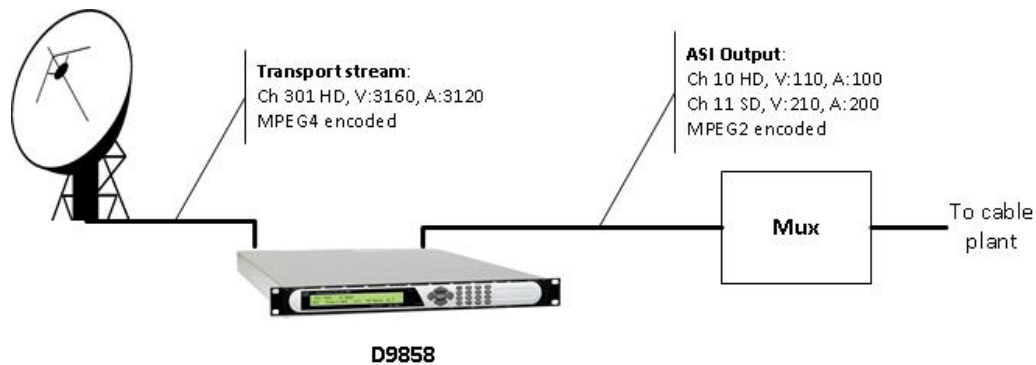
We will assume that the receiver has tuned to the satellite signal properly, and is authorized to view the HD content on channel 301. The signal is carrying the HD program using MPEG4 compression (H.264).

The affiliate can confirm that he is authorized to see the HD program on channel 301, and he has some downstream ASI equipment which he requires to input both an HD and SD version of the program. The downstream groomer needs to see the two programs as follows:

HD: Channel 10, Video PID 110, Audio PID 100

SD: Channel 11, Video PID 210, Audio PID 200

The requirement is that the D9858 must present the two programs as described above in MPEG2 format.



In this example, we see that the satellite signal is carrying the HD program on channel 301. The input video PID is 3160 and the audio PID is 3120. The receiver will decrypt the HD program and provide two program streams for the downstream device. **NOTE:** Instead of using the ASI output, it is also possible to use the MoIP output.

Procedure

The strategy here is as follows:

1. After the receiver has successfully been tuned for RF lock, program the first PE for the HD service.
2. Program the second PE for the same HD service.
3. Confirm that the HD service is in MPEG4 format.
4. Configure the Transcoding menus to output HD on PE1 and SD on PE2.
5. Configure the Digital Program Mapping menus to transcode both outputs with unique PIDs.

Procedure

1. Tune receiver (ensure that you have Signal and RF Lock), program PE1 for the HD program (eg. channel 301)
 - From the main status screen, ensure the 'PE1' is indicated in the top left corner. Use the UP and DOWN cursor keys to program PE1 for the required channel (channel 301)
2. Program PE2 for the same program (channel 301)
 - From the main status screen, press the 'ADV' button
 - Press the UP cursor (PE1 should change to PE2)
 - Press the RIGHT cursor key twice (you should see PE2 in the top left corner)
 - Use the UP and DOWN cursor keys to program PE2 for the required channel (channel 301)
3. Confirm the presence of the correct video format on the input signal
 - Go to MAIN MENU - Status - Services - Video
 - Ensure that the video format indicates H264 (MPEG4 encoding)
 - **NOTE:** The video bitrate may be displayed (eg. 8.00 Mbps). This should be noted as you will need to configure the output rates accordingly.
4. Configure the Transcoding menus
 - Go to MAIN MENU - Setup - Outputs - TS Out - Transcode - Transcode
 - For PE1, ensure that the Video Mode is set to 'HD Output'

- For PE2, ensure that the Video Mode is set to 'SD Output'
- Press the MENU button to exit, and SAVE your changes.
- **NOTE:** You may also want to set other parameters, such as video output rates. If the input MPEG4 video bitrate is 8 Mbps, you will need to allocate more bandwidth for the MPEG2 output. You may use a guideline of 2x for the MPEG2 output rate (in this case, if the input MPEG4 video is at 8 Mbps, we should use 16 Mbps) on PE1. We will use 10 Mbps for the SD output on PE2. Of course, the user is free to use whatever values are necessary.

5. Configure the DPM menus

- Go to MAIN MENU – Setup – Outputs – TS Out – ASI (**NOTE:** the same options will be available in the MoIP menus)
- Set the Rate Control to 'User'
- Set the User Rate to a value which will allow both programs to pass. For example, the HD program in MPEG2 format will require 16 Mbps for HD video alone, and 10 Mbps for SD video. We may set this to 28 Mbps in our example.
- Press the DOWN cursor. Change the current Output Mode to 'MAP Svc Chans Only'. **NOTE:** This is temporary and will automatically change after performing the steps below.
- You will be prompted "Resynch All?". Select 'Yes'.
- Press the DOWN cursor again. Insert null packets as required. Null packets may be helpful for downstream devices that cannot handle the bursty nature of the data.
- Press MENU and select the DPM menus. Select ASI. Configuration of these menus will automatically change your **Output Mode** to "Full DPM Control".
- You should see settings for PE1. The Input Channel will be 301 and there will be a PMT PID. The Action should be set to 'XCode'. The Output Channel should be set to '10'. Set the PMT as required eg. '5010'.
- Go to the PID option on the far right, and press Select. A listing of the associated PIDs for channel 10 will be shown.
- The input PCR PID should have some value. This will be re-mapped. Set the output PCR PID to be 110 (should be the same as the Video PID). Press the DOWN cursor.
- The input Video PID should have some value. This will be re-mapped. Set the output Video PID to be 110. Press the DOWN cursor.
- The input Audio PID should have some value. This will be re-mapped. Set the output Audio PID to be 100. Press the DOWN cursor.
- Once you have re-mapped the PID values, press the MENU key, and change the PE to '2'.
- You should see settings for PE2. The Input Channel will be 301 and there will be a PMT PID. The Action should be set to 'XCode'. The Output Channel should be set to '11'. Set the PMT as required eg. '5011'.
- Go to the PID option on the far right, and press Select. A listing of the associated PIDs for channel 11 will be shown.
- The input PCR PID should have some value. This will be re-mapped. Set the output PCR PID to be 210 (should be the same as the Video PID). Press the DOWN cursor.
- The input Video PID should have some value. This will be re-mapped. Set the output Video PID to be 210. Press the DOWN cursor.
- The input Audio PID should should have some value. This will be re-mapped. Set the output Audio PID to be 200. Press the DOWN cursor.
- Once you have re-mapped the PID values, press the MENU key, and change the PE to '1A'.
- Change the Action to 'Drop'
- Change the PE to '2A'.
- Change the Action to 'Drop'
- Press the MENU button to exit from the DPM menus.

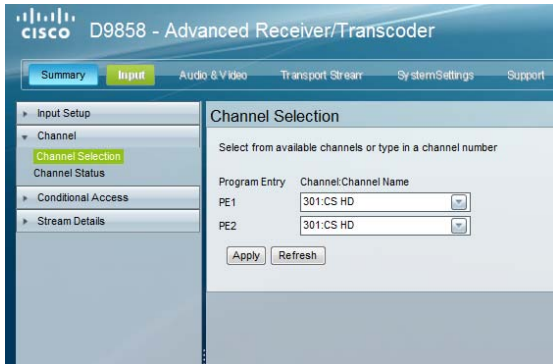
6. SAVE your changes

- Press the MENU button until you see the prompt to Save your changes. Choose 'SAVE'.

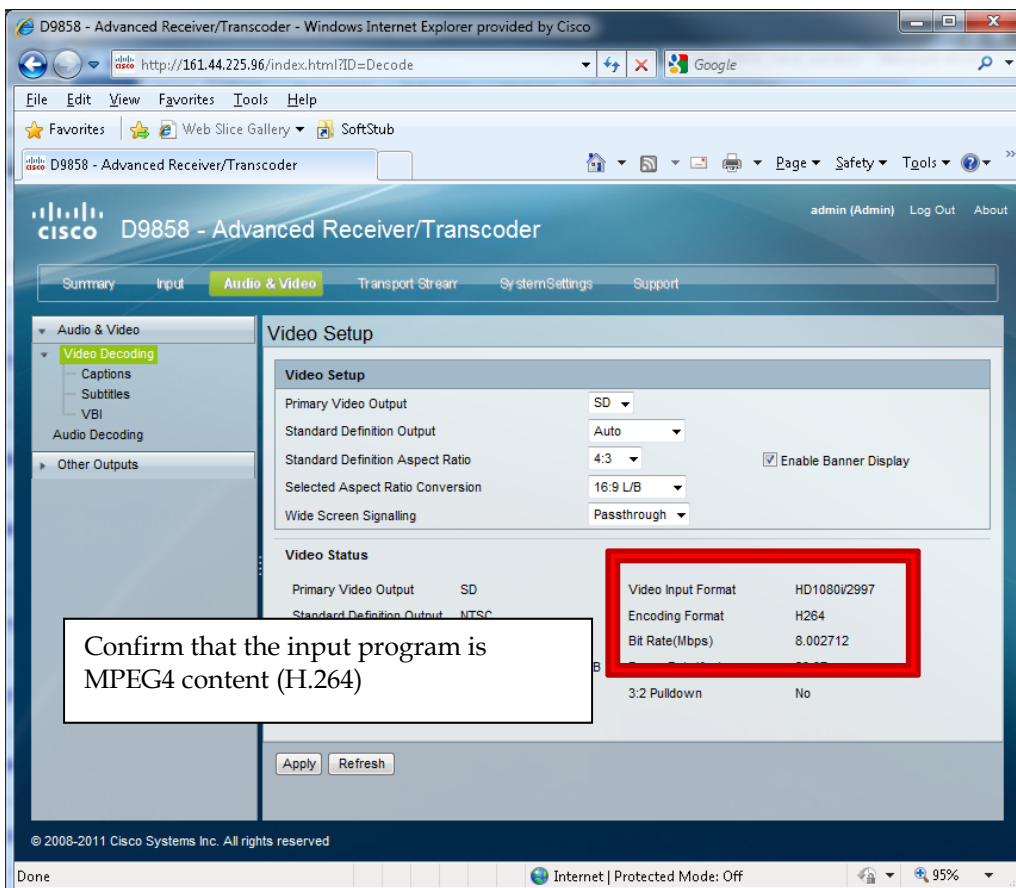
At this point, you should be able to verify the presence of the two services on the ASI output of the receiver. This may be accomplished by using a transport stream analyzer.

Web Browser Access

If a web browser is available, it may be less complicated to configure:



Tune both PE1 and PE2 to the same HD program (in this example, Channel 301)



D9858 - Advanced Receiver/Transcoder - Windows Internet Explorer provided by Cisco

http://161.44.225.96/index.html?ID=TransportStream/transcoder/setup

File Edit View Favorites Tools Help

Favorites Web Slice Gallery SoftStub

D9858 - Advanced Receiver/Transcoder

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Summary Input Audio & Video **Transport Stream** System Settings Support

Transport Handling

Transcoding

Transcoder Setup

Action on Loss of Input: No Output

Transcoder 1 Output: HD Output

Transcoder 2 Output: SD Output

HD Settings

Transcoder	HRes	Bitrate Mode	Rate (Mbps)	GOP Control	User GOP	3:2 Pull Down
1	Full	VBR	16.0	User GOP(MN)	152	Disabled

SD Settings

Transcoder	HRes	Bitrate Mode	Rate (Mbps)	GOP Control	User GOP	3:2 Pull Down	Output Aspect Ratio	Aspect Ratio Conversion	Closed Caption Packet 1	Closed Caption Packet 2
1	720	CBR	10.0	User GOP(MN)	152	Disabled	16:9	None	CEA 708	None
2	720	CBR	10.0	User GOP(MN)	152	Disabled	16:9	None	CEA 708	None

Apply Refresh Apply Inband Setting

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Done Internet | Protected Mode: Off 95%

PE1: HD Output
PE2: SD Output

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http://161.44.225.96/index.html?ID=TransportStream/asioutput

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Summary Input Audio & Video **Transport Stream** System Settings Support

Transport Handling

ASI Output

ASI Settings

Rate Control: User

User Rate: 28.0 Mbps

Output Mode: Full DPM Control

Descrambled: Descrambled

Null Packet Insertion: Yes

ASI Output Status

Output Rate (Mbps): 27.999999

Free Bandwidth (Mbps): 1.12048

Apply Refresh Cancel

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Internet | Protected Mode: Off 95%

Set output rate to value large enough to pass both services

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http://161.44.225.96/index.html?ID=TransportStream/dpmasi

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Summary Input Audio & Video **Transport Stream** System Settings Support

Transport Handling

- ASI Output
 - Digital Program Mapping
- MPEG over IP Output
 - Digital Program Mapping
- Transcoding

Digital Program Mapping

DPM Program Entry Setup

Program Entry	Chl #	Name	Action	Output Ch#	PMT PID
PE1	301	CS HD	XCode	10	5010
PE2	301	CS HD	XCode	11	5011

Set channel, action and output PMT PID values for both services

DPM General Settings

Remapping Mode: Svc ID & PID
 Duplication Method: Pkt Copy
 Unreferenced Content: Drop
 Service ID Output: Valid Ch
 SI Regeneration Option: SA Std
 PSI Table Output Option: Ch By Table
 PSI Regeneration Option: Always

Apply Refresh Cancel Copy to MOIP

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http://161.44.225.96/index.html?ID=TransportStream/dpmasi

File Edit View Favorites Tools Help

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Summary Input Audio & Video **Transport Stream** System Settings Support

Transport Handling

- ASI Output
 - Digital Program Mapping
- MPEG over IP Output
 - Digital Program Mapping
- Transcoding

Digital Program Mapping

DPM Program Entry Setup

Program Entry	Chl #
PE1	301
PE2	301
PE1A	301

DPM PE PID MAP

Input Channel# 301 Output Channel # 10
 Input PMT PID 5301 Output PMT PID 5010

PE PID MAP

Input Stream	Input PID	Action	Stream Type	Category	Instance	Output PID
PCR	3160	Map	0	PCR	1	110
VD	3160	Map	27	VD	1	110

Edit Resynchronize Resynchronize All

DPM General Settings

Remapping Mode: Svc ID & PID
 Duplication Method: Pkt Copy
 Unreferenced Content: Drop
 Service ID Output: Valid Ch
 SI Regeneration Option: SA Std

Done

Internet | Protected Mode: Off 95%

Edit each service as required. Edit Output PID values and ensure that there are no PID conflicts. Drop PE1A and PE2A.

Frequently Asked Questions

Q: *Will this procedure work with the D9858-1?*

A: No. You must have a D9858 because it has the ability to program two PE's. You need two PE's to create a second program stream.

Q: *I keep getting an error message that there is some type of programming conflict. How do I proceed?*

A: A common problem is that the Digital Program Mapping windows are accessed and modified. Once the receiver is in DPM output mode, the assumption is that the user knows how each service and PID is to be mapped to the output. If a subsequent conflict is created (eg. programming the same PID twice, creating the same service channel, etc.), the receiver will indicate that there is a conflict and may not allow the changes to be saved. The normal solution is to find the conflict and remove it (ie. re-programming the PID, changing the channel number, etc.). However, the easiest solution may be to perform a factory reset (Main Menu - Setup - Admin), and starting again. Also, you may be able to resolve this issue by simply changing the output mode (eg. MAP Service Channels Only), and resynching the outputs, and then attempt re-programming as shown in this procedure.

Q: *Is it possible to output both HD and SD programs in MPEG4 format?*

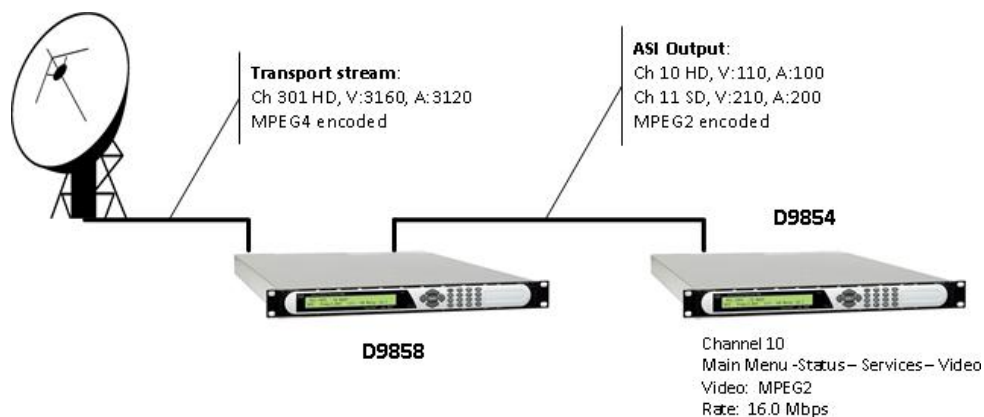
A: No. The only way HD may be converted to SD is via the Transcoding feature. Once you activate the Transcoding feature, the output of that service will be in MPEG2 format. It is possible to use 'Map' instead of 'Xcode', which allows the stream to remain in MPEG4 format, but you cannot convert from HD to SD without the Transcode feature.

Q: *How about creating two HD outputs --- one MPEG4 and the other MPEG2?*

A: Yes, this would be possible. The above procedure demonstrates how to use the 'Xcode' action to map the services through. Instead of choosing 'Xcode', you may choose to use the 'Pass' action on one of the services, which will allow the program to pass through with the original MPEG4 compression. Using the 'Pass' option will pass the original stream through --- PIDs and all. If you need to change the PID values, use the 'Map' option instead.

Q: *I don't have a transport stream analyzer. Is there an easy way for me to check the ASI output for the two programs?*

A: If you have another receiver capable of decoding HD (eg. D9854, D9858, D9824), then you may use the **ASI input** of the receiver to display the services available on the ASI of the first receiver. Go to Main Menu - Status - Services - Video, to determine the video format and bandwidth of each service. Go to Main Menu - Status - TS Input - Program PIDs, to determine if the PID values are as expected.



Q: *I cannot see any programming. I have confirmed that I am using the Transcode feature and there are no alarms. What is wrong?*

A: Confirm that the original program is not encoded in MPEG2 format. You cannot transcode an MPEG2 stream.