



# **Intel® Open Source HD Graphics, Intel Iris™ Graphics, and Intel Iris™ Pro Graphics**

## **Programmer's Reference Manual**

For the 2015 - 2016 Intel Core™ Processors, Celeron™ Processors, and Pentium™ Processors based on the "Skylake" Platform

Volume 2a Addendum: Command Reference: Instructions (Command Opcodes) for the HEVC Micro-Controller (HuC)

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## HUC\_CFG\_STATE

<b>HUC_CFG_STATE</b>		
Source:	VideoCS	
Length Bias:	2	
<p>The HUC is selected with the Media Instruction Opcode "Bh" for all HUC Commands. Each HUC command has assigned a media instruction command as defined in DWord 0, BitField 22:16.</p> <p>The HUC_CFG_STATE command is used to force the P24C (MinuteIA) into a reset condition as well as forcing it out of a reset condition. This command is not normally required since the hardware will handle placing the P24C into a reset condition and releasing it from reset, but there may be conditions that require a forced reset.</p>		
DWord	Bit	Description
0	31:29	<b>Command Type</b>
		Default Value: 3h PARALLEL_VIDEO_PIPE
		Format: OpCode
	28:27	<b>Pipeline Type</b>
		Default Value: 2h
		Format: OpCode
	26:23	<b>Media Instruction Opcode</b>
Default Value: Bh Codec/Engine Name		
Format: OpCode Codec/Engine Name = HUC = Bh		
22:16	<b>Media Instruction Command</b>	
	Default Value: 3h HUC_CFG_STATE	
	Format: OpCode	
15:12	<b>Reserved</b>	
	Format: MBZ	
11:0	<b>Dword Length</b>	
	Format: =n	
	(Excludes Dwords 0, 1).	
	<b>Value</b>	<b>Name</b>
	0h	
1	31:1	<b>Reserved</b>
		Format: MBZ

<b>HUC_CFG_STATE</b>											
	0	<b>P24C (MinuteIA)</b>									
		Format: <span style="float: right;">U1</span>									
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Value</th> <th style="width: 55%;">Name</th> <th style="width: 30%;">Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td>Normal operation</td> <td>No reset.</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Force reset</td> <td></td> </tr> </tbody> </table>	Value	Name	Description	0	Normal operation	No reset.	1	Force reset	
		Value	Name	Description							
0	Normal operation	No reset.									
1	Force reset										

## HUC\_DMEM\_STATE

<b>HUC_DMEM_STATE</b>				
Source:	VideoCS			
Length Bias:	2			
<p>The HUC is selected with the Media Instruction Opcode "Bh" for all HUC Commands. Each HUC command has assigned a media instruction command as defined in DWord 0, BitField 22:16.</p> <p>The HUC_DMEM_STATE command is used to fetch the HUC data from the graphics memory and load it into the HUC 96KB L2 storage RAM. The HUC_DMEM_STATE specifies the data source base address in graphics memory.</p> <p>When the HUC_DMEM_STATE command is received, the data is loaded by the HUC DMA into the 96KB L2 storage RAM at the location provided in the HUC_DMEM_STATE command. This command also specifies the length of the data, which is specified in bytes but must be in increments of 64 byte cache lines.</p>				
DWord	Bit	Description		
0	31:29	<b>Command Type</b>		
		Default Value:	3h PARALLEL_VIDEO_PIPE	
		Format:	OpCode	
	28:27	28:27	<b>Pipeline Type</b>	
			Default Value:	2h
			Format:	OpCode
	26:23	26:23	<b>Media Instruction Opcode</b>	
			Default Value:	Bh Codec/Engine Name
			Format:	OpCode
	Codec/Engine Name = HUC = Bh			
	22:16	22:16	<b>Media Instruction Command</b>	
			Default Value:	2h HUC_DMEM_STATE
			Format:	OpCode
	15:12	15:12	<b>Reserved</b>	
Format:			MBZ	
11:0	11:0	<b>Dword Length</b>		
		Format:	=n	
		(Excludes Dwords 0, 1).		
		<b>Value</b>	<b>Name</b>	
		4h		

<b>HUC_DMEM_STATE</b>		
1..2	63:0	<b>HUC Data Source Base Address</b> Format: SplitBaseAddress64ByteAligned Specifies the 64 byte aligned HUC data source base address in graphics memory.
		<b>HUC Data Source</b> Format: MemoryAddressAttributes
4	31:17	<b>Reserved</b> Format: MBZ
	16:6	<b>HUC Data Destination Base Address</b> Format: GraphicsAddress[16:6] Specifies the HUC Data destination base address in the L2 storage RAM. The base address is 64 byte cache aligned.
	5:0	<b>Reserved</b> Format: MBZ
5	31:17	<b>Reserved</b> Format: MBZ
	16:6	<b>HUC Data Length</b> Format: GraphicsAddress[16:6] Specifies the length in bytes of the HUC Data. The length must be in increments of 64 byte cache lines.
	5:0	<b>Reserved</b> Format: MBZ



## HUC\_IMEM\_STATE

<b>HUC_IMEM_STATE</b>			
Source:	VideoCS		
Length Bias:	2		
<p>The HUC is selected with the Media Instruction Opcode "Bh" for all HUC Commands. Each HUC command has assigned a media instruction command as defined in DWord 0, BitField 22:16.</p>			
DWord	Bit	Description	
0	31:29	<b>Command Type</b>	
		Default Value:	3h PARALLEL_VIDEO_PIPE
		Format:	OpCode
	28:27	<b>Pipeline Type</b>	
		Default Value:	2h
		Format:	OpCode
	26:23	<b>Media Instruction Opcode</b>	
		Default Value:	Bh Codec/Engine Name
		Format:	OpCode
		Codec/Engine Name = HUC = Bh	
22:16	<b>Media Instruction Command</b>		
	Default Value:	1h HUC_IMEM_STATE	
	Format:	OpCode	
15:12	<b>Reserved</b>		
	Format:	MBZ	
11:0	<b>Dword Length</b>		
	Format:	=n	
	(Excludes Dwords 0, 1).		
	<b>Value</b>	<b>Name</b>	
	3h		
1	31:0	<b>Reserved</b>	
		Format:	MBZ
2	31:0	<b>Reserved</b>	
		Format:	MBZ
3	31:0	<b>Reserved</b>	
		Format:	MBZ
4	31:8	<b>Reserved</b>	
		Format:	MBZ

<b>HUC_IMEM_STATE</b>													
	7:0	<p><b>HUC Firmware Descriptor</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 70%;">Format:</td> <td style="width: 30%;">U8</td> </tr> </table> <p>This field specifies 1 of 255 firmware descriptors which describe which firmware is be loaded in the L2 storage RAM. If the firmware descriptor is set to zero, the HUC will not load the firmware.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Value</th> <th style="width: 25%;">Name</th> <th style="width: 50%;">Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td></td> <td>Illegal</td> </tr> <tr> <td style="text-align: center;">[1,255]</td> <td></td> <td>Firmware Descriptor</td> </tr> </tbody> </table>	Format:	U8	Value	Name	Description	0		Illegal	[1,255]		Firmware Descriptor
Format:	U8												
Value	Name	Description											
0		Illegal											
[1,255]		Firmware Descriptor											

## HUC\_IND\_OBJ\_BASE\_ADDR\_STATE

HUC_IND_OBJ_BASE_ADDR_STATE			
Source:	VideoCS		
Length Bias:	2		
<p>The HUC is selected with the Media Instruction Opcode "Bh" for all HUC Commands. Each HUC command has assigned a media instruction command as defined in DWord 0, BitField 22:16.</p> <p>The HUC_IND_OBJ_BASE_ADDR_STATE command is used to define the indirect object base address of the stream in graphics memory. This is a frame level command.</p>			
DWord	Bit	Description	
0	31:29	<b>Command Type</b>	
		Default Value:	3h PARALLEL_VIDEO_PIPE
		Format:	OpCode
	28:27	<b>Pipeline Type</b>	
		Default Value:	2h
	26:23	<b>Media Instruction Opcode</b>	
		Default Value:	Bh Codec/Engine Name
Format:		OpCode	
Codec/Engine Name = HUC = Bh			
22:16	<b>Media Instruction Command</b>		
	Default Value:	5h HUC_IND_OBJ_BASE_ADDR_STATE	
15:12	<b>Reserved</b>		
	Format:	MBZ	
11:0	<b>Dword Length</b>		
	Format:	=n	
	(Excludes Dwords 0, 1).		
	<b>Value</b>	<b>Name</b>	
	9h		
1..2	63:0	<b>HUC Indirect Stream In ObjectBase Address</b>	
		Format:	SplitBaseAddress4KByteAligned
Specifies the 4K-byte aligned memory base address for the read-only indirect data object pointed in the HUC_STREAM_OBJECT command for fetching (reading) the bit stream data.			
3	31:0	<b>HUC Indirect Stream In ObjectBase Attributes</b>	
		Format:	MemoryAddressAttributes
4.5	63:0	<b>HUC Indirect Stream In ObjectAccess Upper Bound</b>	

<b>HUC_IND_OBJ_BASE_ADDR_STATE</b>							
	<table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>SplitBaseAddress4KByteAligned</td> </tr> <tr> <td colspan="2"> <p>This field specifies the 4K-byte aligned maximum memory address access by the indirect data object in the HUC_STREAM_OBJECT command for the input bit stream. Indirect data accessed at this address or greater will cause the HUC to stop issuing requests to the GAC.</p> <p>Setting this field to 0 will cause this range to be ignored by the HUC.</p> </td> </tr> </table>	Format:	SplitBaseAddress4KByteAligned	<p>This field specifies the 4K-byte aligned maximum memory address access by the indirect data object in the HUC_STREAM_OBJECT command for the input bit stream. Indirect data accessed at this address or greater will cause the HUC to stop issuing requests to the GAC.</p> <p>Setting this field to 0 will cause this range to be ignored by the HUC.</p>			
Format:	SplitBaseAddress4KByteAligned						
<p>This field specifies the 4K-byte aligned maximum memory address access by the indirect data object in the HUC_STREAM_OBJECT command for the input bit stream. Indirect data accessed at this address or greater will cause the HUC to stop issuing requests to the GAC.</p> <p>Setting this field to 0 will cause this range to be ignored by the HUC.</p>							
6..7	<table border="1" style="width: 100%;"> <tr> <td style="width: 10%;"><b>63:0</b></td> <td> <p><b>HUC Indirect Stream Out ObjectBase Address</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>SplitBaseAddress4KByteAligned</td> </tr> <tr> <td colspan="2"> <p>Specifies the 4K-byte aligned memory base address for the indirect data object pointed in the HUC_STREAM_OBJECT command for writing the bit stream data.</p> </td> </tr> </table> </td> </tr> </table>	<b>63:0</b>	<p><b>HUC Indirect Stream Out ObjectBase Address</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>SplitBaseAddress4KByteAligned</td> </tr> <tr> <td colspan="2"> <p>Specifies the 4K-byte aligned memory base address for the indirect data object pointed in the HUC_STREAM_OBJECT command for writing the bit stream data.</p> </td> </tr> </table>	Format:	SplitBaseAddress4KByteAligned	<p>Specifies the 4K-byte aligned memory base address for the indirect data object pointed in the HUC_STREAM_OBJECT command for writing the bit stream data.</p>	
<b>63:0</b>	<p><b>HUC Indirect Stream Out ObjectBase Address</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>SplitBaseAddress4KByteAligned</td> </tr> <tr> <td colspan="2"> <p>Specifies the 4K-byte aligned memory base address for the indirect data object pointed in the HUC_STREAM_OBJECT command for writing the bit stream data.</p> </td> </tr> </table>	Format:	SplitBaseAddress4KByteAligned	<p>Specifies the 4K-byte aligned memory base address for the indirect data object pointed in the HUC_STREAM_OBJECT command for writing the bit stream data.</p>			
Format:	SplitBaseAddress4KByteAligned						
<p>Specifies the 4K-byte aligned memory base address for the indirect data object pointed in the HUC_STREAM_OBJECT command for writing the bit stream data.</p>							
8	<table border="1" style="width: 100%;"> <tr> <td style="width: 10%;"><b>31:0</b></td> <td> <p><b>HUC Indirect Stream Out ObjectBase Attributes</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>MemoryAddressAttributes</td> </tr> </table> </td> </tr> </table>	<b>31:0</b>	<p><b>HUC Indirect Stream Out ObjectBase Attributes</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>MemoryAddressAttributes</td> </tr> </table>	Format:	MemoryAddressAttributes		
<b>31:0</b>	<p><b>HUC Indirect Stream Out ObjectBase Attributes</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>MemoryAddressAttributes</td> </tr> </table>	Format:	MemoryAddressAttributes				
Format:	MemoryAddressAttributes						
9..10	<table border="1" style="width: 100%;"> <tr> <td style="width: 10%;"><b>63:0</b></td> <td> <p><b>HUC Indirect Stream Out ObjectAccess Upper Bound</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>SplitBaseAddress4KByteAligned</td> </tr> <tr> <td colspan="2"> <p>This field specifies the 4K-byte aligned maximum memory address access by the indirect data object in the HUC_STREAM_OBJECT command for the output bit stream. Indirect data accessed at this address or greater will cause the HUC to stop issuing requests to the GAC.</p> <p>Setting this field to 0 will cause this range to be ignored by the HUC.</p> </td> </tr> </table> </td> </tr> </table>	<b>63:0</b>	<p><b>HUC Indirect Stream Out ObjectAccess Upper Bound</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>SplitBaseAddress4KByteAligned</td> </tr> <tr> <td colspan="2"> <p>This field specifies the 4K-byte aligned maximum memory address access by the indirect data object in the HUC_STREAM_OBJECT command for the output bit stream. Indirect data accessed at this address or greater will cause the HUC to stop issuing requests to the GAC.</p> <p>Setting this field to 0 will cause this range to be ignored by the HUC.</p> </td> </tr> </table>	Format:	SplitBaseAddress4KByteAligned	<p>This field specifies the 4K-byte aligned maximum memory address access by the indirect data object in the HUC_STREAM_OBJECT command for the output bit stream. Indirect data accessed at this address or greater will cause the HUC to stop issuing requests to the GAC.</p> <p>Setting this field to 0 will cause this range to be ignored by the HUC.</p>	
<b>63:0</b>	<p><b>HUC Indirect Stream Out ObjectAccess Upper Bound</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Format:</td> <td>SplitBaseAddress4KByteAligned</td> </tr> <tr> <td colspan="2"> <p>This field specifies the 4K-byte aligned maximum memory address access by the indirect data object in the HUC_STREAM_OBJECT command for the output bit stream. Indirect data accessed at this address or greater will cause the HUC to stop issuing requests to the GAC.</p> <p>Setting this field to 0 will cause this range to be ignored by the HUC.</p> </td> </tr> </table>	Format:	SplitBaseAddress4KByteAligned	<p>This field specifies the 4K-byte aligned maximum memory address access by the indirect data object in the HUC_STREAM_OBJECT command for the output bit stream. Indirect data accessed at this address or greater will cause the HUC to stop issuing requests to the GAC.</p> <p>Setting this field to 0 will cause this range to be ignored by the HUC.</p>			
Format:	SplitBaseAddress4KByteAligned						
<p>This field specifies the 4K-byte aligned maximum memory address access by the indirect data object in the HUC_STREAM_OBJECT command for the output bit stream. Indirect data accessed at this address or greater will cause the HUC to stop issuing requests to the GAC.</p> <p>Setting this field to 0 will cause this range to be ignored by the HUC.</p>							

## HUC\_PIPE\_MODE\_SELECT

HUC_PIPE_MODE_SELECT			
Source:	VideoCS		
Length Bias:	2		
<p>The HUC is selected with the Media Instruction Opcode "Bh" for all HUC Commands. Each HUC command has assigned a media instruction command as defined in DWord 0, BitField 22:16.</p> <p>The HUC_PIPE_MODE_SELECT command is responsible for general pipeline level configuration that would normally be set once for a single stream decode and would not be modified on a frame workload basis.</p>			
DWord	Bit	Description	
0	31:29	<b>Command Type</b>	
		Default Value:	3h PARALLEL_VIDEO_PIPE
		Format:	OpCode
	28:27	<b>Pipeline Type</b>	
		Default Value:	2h
		Format:	OpCode
	26:23	<b>Media Instruction Opcode</b>	
Default Value:		Bh Codec/Engine Name	
Format:		OpCode	
Codec/Engine Name = HUP = Bh			
22:16	<b>Media Instruction Command</b>		
	Default Value:	0h HUC_PIPE_MODE_SELECT	
	Format:	OpCode	
15:12	<b>Reserved</b>		
	Format:	MBZ	
11:0	<b>DWord Length</b>		
	Format:	=n	
	(Excludes Dwords 0, 1).		
	<b>Value</b>	<b>Name</b>	
	1h		
1	31:5	<b>Reserved</b>	
		Format:	MBZ

<b>HUC_PIPE_MODE_SELECT</b>						
4	<b>Indirect Stream Out Enable</b>					
	Format: <span style="float: right;">Enable</span>					
	Enables the bitstream to be written out to memory. The memory buffer is addressed through the HuC Indirect Stream Out ObjectBase Address.					
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Value</th> <th style="text-align: center;">Name</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0h</td> <td>Disable Indirect Stream Out</td> </tr> <tr> <td style="text-align: center;">1h</td> <td>Enable Indirect Stream Out</td> </tr> </tbody> </table>	Value	Name	0h	Disable Indirect Stream Out	1h
Value	Name					
0h	Disable Indirect Stream Out					
1h	Enable Indirect Stream Out					
3:0	<b>Reserved</b>					
	Format: <span style="float: right;">MBZ</span>					
2	31:0 <b>Media Soft Reset Counter (per 1000 clocks)</b>					
	Format: <span style="float: right;">U32</span>					
	In decoder modes, this counter value specifies the number of clocks (per 1000) of GAC inactivity before a media soft-reset is applied to the HCP and HuC. If counter value is set to 0, the media soft-reset feature is disabled and no reset will occur.					
	In encoder modes, this counter must be set to 0 to disable media soft reset. This feature is not supported for the encoder.					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Value</th> <th style="text-align: center;">Name</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td>Disable</td> </tr> </tbody> </table>		Value	Name	0	Disable	
Value	Name					
0	Disable					

# HUC\_START

<b>HUC_START</b>			
Source:	VideoCS		
Length Bias:	2		
Description			
The HUC is selected with the Media Instruction Opcode "Bh" for all HUC Commands. Each HUC command has assigned a media instruction command as defined in DWord 0, BitField 22:16.			
DWord	Bit	Description	
0	31:29	<b>Command Type</b>	
		Default Value:	3h PARALLEL_VIDEO_PIPE
		Format:	OpCode
	28:27	<b>Pipeline Type</b>	
		Default Value:	2h
		Format:	OpCode
	26:23	<b>Media Instruction Opcode</b>	
Default Value:		Bh Codec/Engine Name	
Format:		OpCode	
Codec/Engine Name = HUC = Bh			
22:16	<b>Media Instruction Command</b>		
	Default Value:	21h HUC_START	
	Format:	OpCode	
15:12	<b>Reserved</b>		
	Format:	MBZ	
11:0	<b>Dword Length</b>		
	Format:	=n	
	(Excludes Dwords 0, 1).		
	<b>Value</b>	<b>Name</b>	
	0h		
1	31:3	<b>Reserved</b>	
		Format:	MBZ
	2:1	<b>Reserved</b>	

<b>HUC_START</b>											
	0	<b>LastStreamObject</b>									
		Format: <span style="float: right;">U1</span>									
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Value</th> <th style="text-align: center;">Name</th> <th style="text-align: center;">Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>LastStreamObject</td> <td>Last stream object in the workload.</td> </tr> <tr> <td style="text-align: center;">0</td> <td>NotLastStreamObject</td> <td>Not the last stream object in the workload.</td> </tr> </tbody> </table>	Value	Name	Description	1	LastStreamObject	Last stream object in the workload.	0	NotLastStreamObject	Not the last stream object in the workload.
		Value	Name	Description							
1	LastStreamObject	Last stream object in the workload.									
0	NotLastStreamObject	Not the last stream object in the workload.									



## HUC\_STREAM\_OBJECT

HUC_STREAM_OBJECT							
Source:	VideoCS						
Length Bias:	2						
<p>The HUC is selected with the Media Instruction Opcode "Bh" for all HUC Commands. Each HUC command has assigned a media instruction command as defined in DWord 0, BitField 22:16.</p> <p>The HUC_STREAM_OBJECT command is used to define the bit stream address offset to the Stream Indirect Object base Address and the length of the bit stream. The bitstream buffer the HUC operates upon is specified through indirect addressing.</p>							
DWord	Bit	Description					
0	31:29	<b>Command Type</b>					
		Default Value:	3h PARALLEL_VIDEO_PIPE				
		Format:	OpCode				
	28:27	<b>Pipeline Type</b>					
		Default Value:	2h				
		Format:	OpCode				
	26:23	<b>Media Instruction Opcode</b>					
		Default Value:	Bh Codec/Engine Name				
		Format:	OpCode				
		Codec/Engine Name = HUC = Bh					
22:16	<b>Media Instruction Command</b>						
	Default Value:	20h HUC_STREAM_OBJECT					
	Format:	OpCode					
15:12	<b>Reserved</b>						
	Format:	MBZ					
11:0	<b>Dword Length</b>						
	Format:	=n					
	(Excludes Dwords 0, 1).						
		<table border="1"> <thead> <tr> <th>Value</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>3h</td> <td></td> </tr> </tbody> </table>	Value	Name	3h		
Value	Name						
3h							
1	31:0	<b>Indirect Stream In Data Length</b>					
		Format:	U32				
	Specifies the length in bytes of the bit stream input data.						
		<table border="1"> <thead> <tr> <th>Value</th> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>[0,268435455]</td> <td>Data_Length_with_28_bits_only</td> <td>Valid range is only from 0 to 268435455, which is corresponding to lower 28 bits.</td> </tr> </tbody> </table>	Value	Name	Description	[0,268435455]	Data_Length_with_28_bits_only
Value	Name	Description					
[0,268435455]	Data_Length_with_28_bits_only	Valid range is only from 0 to 268435455, which is corresponding to lower 28 bits.					
2	31	<b>Reserved</b>					

<b>HUC_STREAM_OBJECT</b>																
	30:29	<b>Reserved</b> Format: _____ MBZ														
	28:0	<b>Indirect Stream In Start Address</b> Format: _____ U29 Specifies the byte-aligned graphics memory starting address of the input bit stream relative to the <b>HUC Indirect Stream In ObjectBase Address [31:12]</b> .														
3	31:29	<b>Reserved</b> Format: _____ MBZ														
	28:0	<b>Indirect Stream Out Start Address</b> Format: _____ U29 Specifies the byte-aligned graphics memory starting address of the output bit stream relative to the <b>HUC Indirect Stream Out ObjectBase Address [31:12]</b> .														
4	31:30	<b>Reserved</b> Format: _____ MBZ														
	29	<b>HuC Bitstream Enable</b> Format: _____ Enable Enables the bitstream to be sent to the HuC <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Value</th> <th style="width: 50%;">Name</th> </tr> </thead> <tbody> <tr> <td>0h</td> <td>Disable</td> </tr> <tr> <td>1h</td> <td>Enable</td> </tr> </tbody> </table>	Value	Name	0h	Disable	1h	Enable								
	Value	Name														
	0h	Disable														
1h	Enable															
28:27	<b>Length Mode</b> Format: _____ U2 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Value</th> <th style="width: 20%;">Name</th> <th style="width: 65%;">Description</th> </tr> </thead> <tbody> <tr> <td>00b</td> <td>Start Code Mode</td> <td>Stops on a start code</td> </tr> <tr> <td>01b</td> <td>Length Mode</td> <td>Stops after a number of bytes are reached in the length counter</td> </tr> <tr> <td>10b</td> <td>Reserved</td> <td></td> </tr> <tr> <td>11b</td> <td>Reserved</td> <td></td> </tr> </tbody> </table>	Value	Name	Description	00b	Start Code Mode	Stops on a start code	01b	Length Mode	Stops after a number of bytes are reached in the length counter	10b	Reserved		11b	Reserved	
Value	Name	Description														
00b	Start Code Mode	Stops on a start code														
01b	Length Mode	Stops after a number of bytes are reached in the length counter														
10b	Reserved															
11b	Reserved															
25	<b>Emulation Prevention Byte Removal</b> Format: _____ Enable <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Value</th> <th style="width: 15%;">Name</th> <th style="width: 75%;">Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Disable</td> <td>Bypass Emulation Prevention Byte Removal.</td> </tr> <tr> <td>1</td> <td>Enable</td> <td>Emulation prevention bytes will be removed after the start code search engine.</td> </tr> </tbody> </table>	Value	Name	Description	0	Disable	Bypass Emulation Prevention Byte Removal.	1	Enable	Emulation prevention bytes will be removed after the start code search engine.						
Value	Name	Description														
0	Disable	Bypass Emulation Prevention Byte Removal.														
1	Enable	Emulation prevention bytes will be removed after the start code search engine.														

<b>HUC_STREAM_OBJECT</b>		
24	<b>Start Code Search Engine</b>	
	Format:	Enable
	<b>Value</b>	<b>Name</b>
	<b>Description</b>	
	0	Disable Bypass Start Code Search Engine
	1	Enable Enables the start code search engine to stop on every third byte start code defined by <b>Start Code Byte [2:0]</b> defined in this DWord.
23:16	<b>Start Code Byte [2]</b>	
	Format:	U8
Third byte of the start code		
15:8	<b>Start Code Byte [1]</b>	
	Format:	U8
Second byte of the start code		
7:0	<b>Start Code Byte [0]</b>	
	Format:	U8
First byte of the start code		

## HUC\_VIRTUAL\_ADDR\_STATE

HUC_VIRTUAL_ADDR_STATE			
Source:	VideoCS		
Length Bias:	2		
<p>HUC is selected with the Media Instruction Opcode "Bh" for all HUC Commands. Each HUC command has assigned a media instruction command as defined in DWord 0, BitField 22:16.</p> <p>The HUC_VIRTUAL_ADDR_STATE command is used to define the 48-bit HUC Surface Base Address and HUC Surface for each region.</p>			
DWord	Bit	Description	
0	31:29	<b>Command Type</b>	
		Default Value:	3h PARALLEL_VIDEO_PIPE
		Format:	OpCode
	28:27	<b>Pipeline Type</b>	
		Default Value:	2h
	26:23	<b>Media Instruction Opcode</b>	
		Default Value:	Bh Codec/Engine Name
		Format:	OpCode
			Codec/Engine Name = HUC = Bh
	22:16	<b>Media Instruction Command</b>	
Default Value:		4h HUC_VIRTUAL_ADDR_STATE	
15:12	<b>Reserved</b>		
	Format:	MBZ	
11:0	<b>Dword Length</b>		
	Format:	=n	
	(Excludes Dwords 0, 1).		
1..48	95:64	<b>HUC Surface (VirtualAddrRegion[0-15])</b>	
		Format:	MemoryAddressAttributes
1..48	63:0	<b>HUC Surface Base Address (VirtualAddrRegion[0-15])</b>	
		Format:	SplitBaseAddress4KByteAligned
		HUC surface base address for each virtual address region [0-15].	