Intel® OpenSource HD Graphics Programmer's Reference Manual (PRM)

Supplement 1 to SNB - Volume 3 Part 3: PCH Display Registers (SandyBridge)

For the 2011 Intel Core Processor Family

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This document supplements the *Intel® OpenSource HD Graphics Programmer's Reference Manual (PRM), Volume 3 Part 3: PCH Display Registers (SandyBridge).*

Section 1.1.4 Register Instances and Address Offsets of the document refers to a missing spreadsheet that contains address offset values for PCH Registers. Below is this spreadsheet that lists all address offset values for all of the PCH registers.

Included are the start and stop address values, along with the Short Name, Format, and Full Name of each register. Please refer to this table when reading section 1.1.4. Subsequent project specifications do include address offset values within each PCH register.

Address Offset Values for SNB PCH Registers

Start Address	Stop Address	Short name	Format	Full Name
0xC4000	0xC4003	SDE_ISR	ISR	South DE Interrupt Status
0xC4004	0xC4007	SDE_IMR	IMR	South DE Interrupt Mask
0xC4008	0xC400B	SDE_IIR	IIR	South DE Interrupt Identity
0xC400C	0xC400F	SDE_IER	IER	South DE Interrupt Enable
0xC4030	0xC4033	SHOTPLUG_CTL	SHOTPLUG_CTL	South Hot Plug control
0xC5010	0xC5027	GPIO_CTL_[0-5]	GPIO_CTL_[0-5]	GPIO Control
0xC5100	0xC5103	GMBUS0	GMBUS0	GMBUS0 Clock/Port Select
0xC5104	0xC5107	GMBUS1	GMBUS1	GMBUS1 Command/Status
0xC5108	0xC510B	GMBUS2	GMBUS2	GMBUS2 Status
0xC510C	0xC510F	GMBUS3	GMBUS3	GMBUS3 Data Buffer
0xC5110	0xC5113	GMBUS4	GMBUS4	GMBUS4 Interrupt Mask
0xC5120	0xC5123	GMBUS5	GMBUS5	GMBUS5 2 Byte Index
0xC6014	0xC6017	DPLL_CTL_A	DPLL_CTL	DPLLA Control
0xC6018	0xC601B	DPLL_CTL_B	DPLL_CTL	DPLLB Control
0xC6040	0xC6043	DPLL_FP0_A	DPLL_FP0	DPLLA Divisor 0
0xC6044	0xC6047	DPLL_FP1_A	DPLL_FP1	DPLLA Divisor 1
0xC6048	0xC604B	DPLL_FP0_B	DPLL_FP0	DPLLB Divisor 0
0xC604C	0xC604F	DPLL_FP1_B	DPLL_FP1	DPLLB Divisor 1
0xC6200	0xC6203	DREF_CTL	DREF_CTL	Display Reference Clock Control
0xC6204	0xC6207	RAWCLK_FREQ	RAWCLK_FREQ	Rawclk Frequency
0xC6210	0xC6213	SSC4_PARMS	SSC4_PARMS	SSC4 Parameters
0xC7000	0xC7003	DPLL_SEL	DPLL_SEL	DPLL Select
0xC7200	0xC7203	PP_STATUS	PP_STATUS	Panel Power Status
0xC7204	0xC7207	PP_CONTROL	PP_CONTROL	Panel Power Control

Address Offset Values for SNB PCH Registers

Start Address	Stop Address	Short name	Format	Full Name
0xC7208	0xC720B	PP_ON_DELAYS	PP_ON_DELAYS	Panel Power On Sequencing Delays
0xC720C	0xC720F	PP_OFF_DELAYS	PP_OFF_DELAYS	Panel Power Off Sequencing Delays
0xC7210	0xC7213	PP_DIVISOR	PP_DIVISOR	Panel Power Cycle Delay and Reference Divisor
0xC8250	0xC8253	SBLC_PWM_CTL1	SBLC_PWM_CTL1	South BLM Control 1
0xC8254	0xC8257	SBLC_PWM_CTL2	SBLC_PWM_CTL2	South BLM Control 2
0xE0000	0xE0003	TRANS_HTOTAL_A	HTOTAL	Transcoder A Horizontal Total
0xE0004	0xE0007	TRANS_HBLANK_A	HBLANK	Transcoder A Horizontal Blank
0xE0008	0xE000B	TRANS_HSYNC_A	HSYNC	Transcoder A Horizontal Sync
0xE000C	0xE000F	TRANS_VTOTAL_A	VTOTAL	Transcoder A Vertical Total
0xE0010	0xE0013	TRANS_VBLANK_A	VBLANK	Transcoder A Vertical Blank
0xE0014	0xE0017	TRANS_VSYNC_A	VSYNC	Transcoder A Vertical Sync
0xE0028	0xE002B	TRANS_VSYNCSHIFT_A	VSYNCSHIFT	Transcoder A Vertical Sync Shift
0xE0030	0xE0033	TRANS_DATAM1_A	DATAM	Transcoder A Data M value 1
0xE0034	0xE0037	TRANS_DATAN1_A	DATAN	Transcoder A Data N value 1
0xE0038	0xE003B	TRANS_DATAM2_A	DATAM	Transcoder A Data M value 2
0xE003C	0xE003F	TRANS_DATAN2_A	DATAN	Transcoder A Data N value 2
0xE0040	0xE0043	TRANS_LINKM1_A	LINKM	Transcoder A Link M value 1
0xE0044	0xE0047	TRANS_LINKN1_A	LINKN	Transcoder A Link N value 1
0xE0048	0xE004B	TRANS_LINKM2_A	LINKM	Transcoder A Link M value 2
0xE004C	0xE004F	TRANS_LINKN2_A	LINKN	Transcoder A Link N value 2
0xE0200	0xE0203	VIDEO_DIP_CTL_A	VIDEO_DIP_CTL	Transcoder A Video Data Island Packet Control
0xE0208	0xE020B	VIDEO_DIP_DATA_A	VIDEO_DIP_DATA	Transcoder A Video Data Island Packet Data

Address Offset Values for SNB PCH Registers

Start Address	Stop Address	Short name	Format	Full Name
0xE0210	0xE0213	VIDEO_DIP_GCP_A	VIDEO_DIP_GCP	Transcoder A Video Data Island Payload
0xE0300	0xE0303	TRANS_DP_CTL_A	TRANS_DP_CTL	Transcoder A DisplayPort Control
0xE1000	0xE1003	TRANS_HTOTAL_B	HTOTAL	Transcoder B Horizontal Total
0xE1004	0xE1007	TRANS_HBLANK_B	HBLANK	Transcoder B Horizontal Blank
0xE1008	0xE100B	TRANS_HSYNC_B	HSYNC	Transcoder B Horizontal Sync
0xE100C	0xE100F	TRANS_VTOTAL_B	VTOTAL	Transcoder B Vertical Total
0xE1010	0xE1013	TRANS_VBLANK_B	VBLANK	Transcoder B Vertical Blank
0xE1014	0xE1017	TRANS_VSYNC_B	VSYNC	Transcoder B Vertical Sync
0xE1028	0xE102B	TRANS_VSYNCSHIFT_B	VSYNCSHIFT	Transcoder B Vertical Sync Shift
0xE1030	0xE1033	TRANS_DATAM1_B	DATAM	Transcoder B Data M value 1
0xE1034	0xE1037	TRANS_DATAN1_B	DATAN	Transcoder B Data N value 1
0xE1038	0xE103B	TRANS_DATAM2_B	DATAM	Transcoder B Data M value 2
0xE103C	0xE103F	TRANS_DATAN2_B	DATAN	Transcoder B Data N value 2
0xE1040	0xE1043	TRANS_LINKM1_B	LINKM	Transcoder B Link M value 1
0xE1044	0xE1047	TRANS_LINKN1_B	LINKN	Transcoder B Link N value 1
0xE1048	0xE104B	TRANS_LINKM2_B	LINKM	Transcoder B Link M value 2
0xE104C	0xE104F	TRANS_LINKN2_B	LINKN	Transcoder B Link N value 2
0xE1100	0xE1103	DAC_CTL	DAC_CTL	Analog Port CRT DAC Control
0xE1140	0xE1143	HDMI_CTL_B	HDMI_CTL	HDMI Port B Control
0xE1150	0xE1153	HDMI_CTL_C	HDMI_CTL	HDMI Port C Control
0xE1160	0xE1163	HDMI_CTL_D	HDMI_CTL	HDMI Port D Control
0xE1180	0xE1183	LVDS_CTL	LVDS_CTL	LVDS Port Control
0xE1200	0xE1203	VIDEO_DIP_CTL_B	VIDEO_DIP_CTL	Transcoder B Video Data Island Packet Control
0xE1208	0xE120B	VIDEO_DIP_DATA_B	VIDEO_DIP_DATA	Transcoder B Video Data Island Packet Data

Address Offset Values for SNB PCH Registers

Start Address	Stop Address	Short name	Format	Full Name
0xE1210	0xE1213	VIDEO_DIP_GCP_B	VIDEO_DIP_GCP	Transcoder B Video Data Island Payload
0xE1300	0xE1303	TRANS_DP_CTL_B	TRANS_DP_CTL	Transcoder B DisplayPort Control
0xE2000	0xE2003	TRANS_HTOTAL_C	HTOTAL	Transcoder C Horizontal Total
0xE2004	0xE2007	TRANS_HBLANK_C	HBLANK	Transcoder C Horizontal Blank
0xE2008	0xE200B	TRANS_HSYNC_C	HSYNC	Transcoder C Horizontal Sync
0xE200C	0xE200F	TRANS_VTOTAL_C	VTOTAL	Transcoder C Vertical Total
0xE2010	0xE2013	TRANS_VBLANK_C	VBLANK	Transcoder C Vertical Blank
0xE2014	0xE2017	TRANS_VSYNC_C	VSYNC	Transcoder C Vertical Sync
0xE2028	0xE202B	TRANS_VSYNCSHIFT_C	VSYNCSHIFT	Transcoder C Vertical Sync Shift
0xE2030	0xE2033	TRANS_DATAM1_C	DATAM	Transcoder C Data M value 1
0xE2034	0xE2037	TRANS_DATAN1_C	DATAN	Transcoder C Data N value 1
0xE2038	0xE203B	TRANS_DATAM2_C	DATAM	Transcoder C Data M value 2
0xE203C	0xE203F	TRANS_DATAN2_C	DATAN	Transcoder C Data N value 2
0xE2040	0xE2043	TRANS_LINKM1_C	LINKM	Transcoder C Link M value 1
0xE2044	0xE2047	TRANS_LINKN1_C	LINKN	Transcoder C Link N value 1
0xE2048	0xE204B	TRANS_LINKM2_C	LINKM	Transcoder C Link M value 2
0xE204C	0xE204F	TRANS_LINKN2_C	LINKN	Transcoder C Link N value 2
0xE2200	0xE2203	VIDEO_DIP_CTL_C	VIDEO_DIP_CTL	Transcoder C Video Data Island Packet Control
0xE2208	0xE220B	VIDEO_DIP_DATA_C	VIDEO_DIP_DATA	Transcoder C Video Data Island Packet Data
0xE2210	0xE2213	VIDEO_DIP_GCP_C	VIDEO_DIP_GCP	Transcoder C Video Data Island Payload
0xE2300	0xE2303	TRANS_DP_CTL_C	TRANS_DP_CTL	Transcoder C DisplayPort Control
0xE4100	0xE4103	DP_CTL_B	DP_CTL	DisplayPort B Control
0xE4110	0xE4113	DP_AUX_CTL_B	DP_AUX_CTL	DisplayPort B AUX

Address Offset Values for SNB PCH Registers

Start Address	Stop Address	Short name	Format	Full Name
				Channel Control
0xE4114	0xE4127	DP_AUX_DATA_[1-5]_B	DP_AUX_DATA_[1-5]	DisplayPort B AUX Channel Data
0xE4200	0xE4203	DP_CTL_C	DP_CTL	DisplayPort C Control
0xE4210	0xE4213	DP_AUX_CTL_C	DP_AUX_CTL	DisplayPort C AUX Channel Control
0xE4214	0xE4227	DP_AUX_DATA_[1-5]_C	DP_AUX_DATA_[1-5]	DisplayPort C AUX Channel Data
0xE4300	0xE4303	DP_CTL_D	DP_CTL	DisplayPort D Control
0xE4310	0xE4313	DP_AUX_CTL_D	DP_AUX_CTL	DisplayPort D AUX Channel Control
0xE4314	0xE4327	DP_AUX_DATA_[1-5]_D	DP_AUX_DATA_[1-5]	DisplayPort D AUX Channel Data
0xE4F00	0xE4F27	DP_BUFTRANS_[0-9]	DP_BUFTRANS_[0-9]	DP Buffer Translation
0xE5000	0xE5003	AUD_CONFIG_A	AUD_CONFIG	Audio Configuration Transcoder A
0xE5010	0xE5013	AUD_MISC_CTRL_A	AUD_MISC_CTRL	Audio Misc Control Transcoder A
0xE5020	0xE5023	AUD_VID_DID	AUD_VID_DID	Audio Vendor ID / Device ID
0xE5024	0xE5027	AUD_RID	AUD_RID	Audio Revision ID
0xE5028	0xE502B	AUD_CTS_ENABLE_A	AUD_CTS_ENABLE	Audio CTS Programming Enable Transcoder A
0xE504C	0xE504F	AUD_PWRST	AUD_PWRST	Audio Power State
0xE5050	0xE5053	AUD_HDMIW_HDMIEDID_A	AUD_HDMIW_HDMIEDID	Audio HDMI Data EDID Block Transcoder A
0xE5054	0xE5057	AUD_HDMIW_INFOFR_A	AUD_HDMIW_INFOFR	Audio Widget Data Island Packet Transcoder A
0xE507C	0xE507F	AUD_PORT_EN_HD_CFG	AUD_PORT_EN_HD_CFG	Audio Port Enable HDAudio Config
0xE5080	0xE5083	AUD_OUT_DIG_CNVT_A	AUD_OUT_DIG_CNVT	Audio Digital Converter A
0xE5084	0xE5087	AUD_OUT_STR_DESC_A	AUD_OUT_STR_DESC	Audio Stream Descriptor Format Converter A
0xE5088	0xE508B	AUD_OUT_CH_STR	AUD_OUT_CH_STR	Audio Channel ID and Stream ID
0xE50A8	0xE50AB	AUD_PINW_CONNLNG_LIST	AUD_PINW_CONNLNG_LIST	Audio Connection List
0xE50AC	0xE50AF	AUD_PINW_CONNLNG_SEL	AUD_PINW_CONNLNG_SEL	Audio Connection

Address Offset Values for SNB PCH Registers

Start Address	Stop Address	Short name	Format	Full Name
				Select
0xE50B4	0xE50B7	AUD_CNTL_ST_A	AUD_CNTL_ST	Audio Control State Transcoder A
0xE50C0	0xE50C3	AUD_CNTRL_ST2	AUD_CNTRL_ST2	Audio Control State 2
0xE50C4	0xE50C7	AUD_CNTRL_ST3	AUD_CNTRL_ST3	Audio Control State 3
0xE50D4	0xE50D7	AUD_HDMIW_STATUS	AUD_HDMIW_STATUS	Audio HDMI Status
0xE5100	0xE5103	AUD_CONFIG_B	AUD_CONFIG	Audio Configuration Transcoder B
0xE5110	0xE5113	AUD_MISC_CTRL_B	AUD_MISC_CTRL	Audio Misc Control Transcoder B
0xE5128	0xE512B	AUD_CTS_ENABLE_B	AUD_CTS_ENABLE	Audio CTS Programming Enable Transcoder B
0xE5150	0xE5153	AUD_HDMIW_HDMIEDID_B	AUD_HDMIW_HDMIEDID	Audio HDMI Data EDID Block Transcoder B
0xE5154	0xE5157	AUD_HDMIW_INFOFR_B	AUD_HDMIW_INFOFR	Audio Widget Data Island Packet Transcoder B
0xE5180	0xE5183	AUD_OUT_DIG_CNVT_B	AUD_OUT_DIG_CNVT	Audio Digital Converter B
0xE5184	0xE5187	AUD_OUT_STR_DESC_B	AUD_OUT_STR_DESC	Audio Stream Descriptor Format Converter B
0xE51B4	0xE51B7	AUD_CNTL_ST_B	AUD_CNTL_ST	Audio Control State Transcoder B
0xE5200	0xE5203	AUD_CONFIG_C	AUD_CONFIG	Audio Configuration Transcoder B
0xE5210	0xE5213	AUD_MISC_CTRL_C	AUD_MISC_CTRL	Audio Misc Control Transcoder B
0xE5228	0xE522B	AUD_CTS_ENABLE_C	AUD_CTS_ENABLE	Audio CTS Programming Enable Transcoder B
0xE5250	0xE5253	AUD_HDMIW_HDMIEDID_C	AUD_HDMIW_HDMIEDID	Audio HDMI Data EDID Block Transcoder B
0xE5254	0xE5257	AUD_HDMIW_INFOFR_C	AUD_HDMIW_INFOFR	Audio Widget Data Island Packet Transcoder B
0xE5280	0xE5283	AUD_OUT_DIG_CNVT_C	AUD_OUT_DIG_CNVT	Audio Digital Converter B
0xE5284	0xE5287	AUD_OUT_STR_DESC_C	AUD_OUT_STR_DESC	Audio Stream Descriptor Format

Address Offset Values for SNB PCH Registers

Start Address	Stop Address	Short name	Format	Full Name
				Converter B
0xE52B4	0xE52B7	AUD_CNTL_ST_C	AUD_CNTL_ST	Audio Control State Transcoder B
0xF0008	0xF000B	TRANS_CONF_A	TRANS_CONF	Transcoder A Config
0xF000C	0xF000F	FDI_RX_CTL_A	FDI_RX_CTL	FDI A RX Control
0xF0010	0xF0013	FDI_RX_MISC_A	FDI_RX_MISC	FDI A RX Miscellaneous
0xF0014	0xF0017	FDI_RX_IIR_A	FDI_RX_IIR	FDI A RX Interrupt Identity
0xF0018	0xF001B	FDI_RX_IMR_A	FDI_RX_IMR	FDI A RX Interrupt Mask
0xF0030	0xF0033	FDI_RX_TUSIZE_1_A	FDI_RX_TUSIZE	FDI A RX TU Size 1
0xF0038	0xF003B	FDI_RX_TUSIZE_2_A	FDI_RX_TUSIZE	FDI A RX TU Size 2
0xF1008	0xF100B	TRANS_CONF_B	TRANS_CONF	Transcoder B Config
0xF100C	0xF100F	FDI_RX_CTL_B	FDI_RX_CTL	FDI B RX Control
0xF1010	0xF1013	FDI_RX_MISC_B	FDI_RX_MISC	FDI B RX Miscellaneous
0xF1014	0xF1017	FDI_RX_IIR_B	FDI_RX_IIR	FDI B RX Interrupt Identity
0xF1018	0xF101B	FDI_RX_IMR_B	FDI_RX_IMR	FDI B RX Interrupt Mask
0xF1030	0xF1033	FDI_RX_TUSIZE_1_B	FDI_RX_TUSIZE	FDI B RX TU Size 1
0xF1038	0xF103B	FDI_RX_TUSIZE_2_B	FDI_RX_TUSIZE	FDI B RX TU Size 2
0xF2008	0xF200B	TRANS_CONF_C	TRANS_CONF	Transcoder C Config
0xF200C	0xF200F	FDI_RX_CTL_C	FDI_RX_CTL	FDI C RX Control
0xF2010	0xF2013	FDI_RX_MISC_C	FDI_RX_MISC	FDI C RX Miscellaneous
0xF2014	0xF2017	FDI_RX_IIR_C	FDI_RX_IIR	FDI C RX Interrupt Identity
0xF2018	0xF201B	FDI_RX_IMR_C	FDI_RX_IMR	FDI C RX Interrupt Mask
0xF2030	0xF2033	FDI_RX_TUSIZE_1_C	FDI_RX_TUSIZE	FDI C RX TU Size 1
0xF2038	0xF203B	FDI_RX_TUSIZE_2_C	FDI_RX_TUSIZE	FDI C RX TU Size 2