Synthesis Report for 'AES_Encrypt'

General Information

Date: Wed Mar 6 12:45:55 2019
Version: 2018.3 (Build 2405991 on Thu Dec 06 23:56:15 MST 2018)
Project: AES_Encrypt
Solution: solution1
Product family: zynq
Target device: xc7z020clg400-1

Performance Estimates

Timing (ns)

Summary

Clock	Target	Estimated	Uncertainty
ap_clk	10.00	9.371	1.25

Latency (clock cycles)

Summary

Latency		Interval		
min	max	min	max	Type
93	93	16	16	function

Detail

Instance

		Latency		Interval		
Instance	Module	min	max	min	max	Type
grp_AddRoundKey_fu_1035	AddRoundKey	1	1	1	1	function
grp_AddRoundKey_fu_1064	AddRoundKey	1	1	1	1	function
grp_MixColumns_fu_1106	MixColumns	1	1	1	1	function
grp_SubBytes_fu_1128	SubBytes	1	1	1	1	function
grp_ShiftRows_fu_1150	ShiftRows	0	0	1	1	function

Loop

N/A

Utilization Estimates

Summary

Name	BRAM_18K	DSP48E	FF	LUT
DSP	-	-	-	-
Expression	-	-	0	336
FIFO	-	-	-	-
Instance	60	-	614	6256
Memory	-	-	-	-
Multiplexer	-	-	-	2755
Register	0	-	10736	3552
Total	60	0	11350	12899
Available	280	220	106400	53200
Utilization (%)	21	0	10	24

Detail

Instance

Instance	Module	BRAM_18K	DSP48E	FF	LUT
AES_Encrypt_Cipher_s_axi_U	AES_Encrypt_Cipher_s_axi	4	0	218	212
grp_AddRoundKey_fu_1035	AddRoundKey	16	0	132	2824
grp_AddRoundKey_fu_1064	AddRoundKey	16	0	132	2824
grp_MixColumns_fu_1106	MixColumns	16	0	130	390
grp_ShiftRows_fu_1150	ShiftRows	0	0	0	0
grp_SubBytes_fu_1128	SubBytes	8	0	2	6
Total	6	60	0	614	6256

DSP48

N/A

Memory

N/A

FIFO

N/A

Expression

Variable Name	Operation	DSP48E	FF	LUT	Bitwidth P0	Bitwidth P1
tmp_s_fu_1957_p2	+	0	0	24	17	2
ap_block_pp0_stage0_11001	and	0	0	2	1	1
ap_predicate_op1028_call_state58_state57	and	0	0	2	1	1
ap_predicate_op1046_call_state59_state58	and	0	0	2	1	1
ap_predicate_op1117_call_state62_state61	and	0	0	2	1	1
ap_predicate_op1135_call_state63_state62	and	0	0	2	1	1
ap_predicate_op1206_call_state66_state65	and	0	0	2	1	1
ap_predicate_op1224_call_state67_state66	and	0	0	2	1	1
ap_predicate_op1260_call_state70_state69	and	0	0	2	1	1
ap_predicate_op1295_call_state71_state70	and	0	0	2	1	1
ap_predicate_op1313_call_state72_state71	and	0	0	2	1	1
ap_predicate_op1384_call_state75_state74	and	0	0	2	1	1
ap_predicate_op1402_call_state76_state75	and	0	0	2	1	1
ap_predicate_op316_call_state24_state23	and	0	0	2	1	1
ap_predicate_op334_call_state25_state24	and	0	0	2	1	1
ap_predicate_op405_call_state28_state27	and	0	0	2	1	1
ap_predicate_op423_call_state29_state28	and	0	0	2	1	1
ap_predicate_op494_call_state32_state31	and	0	0	2	1	1
ap_predicate_op512_call_state33_state32	and	0	0	2	1	1
ap_predicate_op583_call_state37_state36	and	0	0	2	1	1
ap_predicate_op601_call_state38_state37	and	0	0	2	1	1
ap_predicate_op672_call_state41_state40	and	0	0	2	1	1
ap_predicate_op690_call_state42_state41	and	0	0	2	1	1
ap_predicate_op761_call_state45_state44	and	0	0	2	1	1
ap_predicate_op779_call_state46_state45	and	0	0	2	1	1
ap_predicate_op850_call_state49_state48	and	0	0	2	1	1
ap_predicate_op869_call_state51_state50	and	0	0	2	1	1
ap_predicate_op904_call_state53_state52	and	0	0	2	1	1

ap_predicate_op939_call_state54_state53	and	0	0	2	1	1
ap_predicate_op957_call_state55_state54	and	0	0	2	1	1
tmp_1_fu_1963_p2	icmp	0	0	18	17	1
tmp_76_10_fu_2029_p2	icmp	0	0	18	17	4
tmp_76_11_fu_2035_p2	icmp	0	0	18	17	4
tmp_76_12_fu_2041_p2	icmp	0	0	18	17	4
tmp_76_1_fu_1969_p2	icmp	0	0	18	17	1
tmp_76_2_fu_1975_p2	icmp	0	0	18	17	2
tmp_76_3_fu_1981_p2	icmp	0	0	18	17	2
tmp_76_4_fu_1987_p2	icmp	0	0	18	17	3
tmp_76_5_fu_1993_p2	icmp	0	0	18	17	3
tmp_76_6_fu_1999_p2	icmp	0	0	18	17	3
tmp_76_7_fu_2005_p2	icmp	0	0	18	17	3
tmp_76_8_fu_2011_p2	icmp	0	0	18	17	4
tmp_76_9_fu_2017_p2	icmp	0	0	18	17	4
tmp_76_s_fu_2023_p2	icmp	0	0	18	17	4
ap_enable_pp0	xor	0	0	2	1	2
Total		45	0	0	336	285	75

Multiplexer

Name	LUT	Input Size	Bits	Total Bits
ap_NS_fsm	85	17	1	17
ap_enable_reg_pp0_iter0	9	2	1	2
ap_enable_reg_pp0_iter5	9	2	1	2
ap_phi_reg_pp0_iter4_state_10_77_reg_629	65	16	8	128
ap_phi_reg_pp0_iter4_state_11_76_reg_592	65	16	8	128
ap_phi_reg_pp0_iter4_state_12_75_reg_555	65	16	8	128
ap_phi_reg_pp0_iter4_state_13_74_reg_518	65	16	8	128
ap_phi_reg_pp0_iter4_state_14_73_reg_481	65	16	8	128
ap_phi_reg_pp0_iter4_state_15_72_reg_444	65	16	8	128
ap_phi_reg_pp0_iter4_state_1_86_reg_962	65	16	8	128
ap_phi_reg_pp0_iter4_state_2_85_reg_925	65	16	8	128
ap_phi_reg_pp0_iter4_state_3_84_reg_888	65	16	8	128
ap_phi_reg_pp0_iter4_state_4_83_reg_851	65	16	8	128
ap_phi_reg_pp0_iter4_state_5_82_reg_814	65	16	8	128
ap_phi_reg_pp0_iter4_state_6_81_reg_777	65	16	8	128
ap_phi_reg_pp0_iter4_state_7_80_reg_740	65	16	8	128
ap_phi_reg_pp0_iter4_state_8_79_reg_703	65	16	8	128
ap_phi_reg_pp0_iter4_state_9_78_reg_666	65	16	8	128
ap_phi_reg_pp0_iter4_state_reg_999	65	16	8	128
ciphertext_address0	85	17	4	68
ciphertext_d0	85	17	8	136
grp_AddRoundKey_fu_1035_Nr	27	5	16	80
grp_AddRoundKey_fu_1035_p_read	21	4	8	32
grp_AddRoundKey_fu_1035_p_read1	21	4	8	32
grp_AddRoundKey_fu_1035_p_read10	21	4	8	32
grp_AddRoundKey_fu_1035_p_read11	21	4	8	32
grp_AddRoundKey_fu_1035_p_read12	21	4	8	32

grp_AddRoundKey_fu_1035_p_read13	21	4	8	32
grp_AddRoundKey_fu_1035_p_read14	21	4	8	32
grp_AddRoundKey_fu_1035_p_read15	21	4	8	32
grp_AddRoundKey_fu_1035_p_read2	21	4	8	32
grp_AddRoundKey_fu_1035_p_read3	21	4	8	32
grp_AddRoundKey_fu_1035_p_read4	21	4	8	32
grp_AddRoundKey_fu_1035_p_read5	21	4	8	32
grp_AddRoundKey_fu_1035_p_read6	21	4	8	32
grp_AddRoundKey_fu_1035_p_read7	21	4	8	32
grp_AddRoundKey_fu_1035_p_read8	21	4	8	32
grp_AddRoundKey_fu_1035_p_read9	21	4	8	32
grp_AddRoundKey_fu_1035_round	59	14	5	70
grp_AddRoundKey_fu_1064_Nr	21	4	16	64
grp_AddRoundKey_fu_1064_p_read	21	4	8	32
grp_AddRoundKey_fu_1064_p_read1	21	4	8	32
grp_AddRoundKey_fu_1064_p_read10	21	4	8	32
grp_AddRoundKey_fu_1064_p_read11	21	4	8	32
grp_AddRoundKey_fu_1064_p_read12	21	4	8	32
grp_AddRoundKey_fu_1064_p_read13	21	4	8	32
grp_AddRoundKey_fu_1064_p_read14	21	4	8	32
grp_AddRoundKey_fu_1064_p_read15	21	4	8	32
grp_AddRoundKey_fu_1064_p_read2	21	4	8	32
grp_AddRoundKey_fu_1064_p_read3	21	4	8	32
grp_AddRoundKey_fu_1064_p_read4	21	4	8	32
grp_AddRoundKey_fu_1064_p_read5	21	4	8	32
grp_AddRoundKey_fu_1064_p_read6	21	4	8	32
grp_AddRoundKey_fu_1064_p_read7	21	4	8	32
grp_AddRoundKey_fu_1064_p_read8	21	4	8	32
grp_AddRoundKey_fu_1064_p_read9	21	4	8	32
grp_AddRoundKey_fu_1064_round	50	11	5	55
grp_SubBytes_fu_1128_state_0_read	33	6	8	48
grp_SubBytes_fu_1128_state_10_read	33	6	8	48
grp_SubBytes_fu_1128_state_11_read	33	6	8	48
grp_SubBytes_fu_1128_state_1213_read	33	6	8	48
grp_SubBytes_fu_1128_state_13_read	33	6	8	48
grp_SubBytes_fu_1128_state_14_read	33	6	8	48
grp_SubBytes_fu_1128_state_15_read	33	6	8	48
grp_SubBytes_fu_1128_state_1_read	33	6	8	48
grp_SubBytes_fu_1128_state_2_read	33	6	8	48
grp_SubBytes_fu_1128_state_3_read	33	6	8	48
grp_SubBytes_fu_1128_state_4_read	33	6	8	48
grp_SubBytes_fu_1128_state_5_read	33	6	8	48
grp_SubBytes_fu_1128_state_6_read	33	6	8	48
grp_SubBytes_fu_1128_state_7_read	33	6	8	48
grp_SubBytes_fu_1128_state_8_read	33	6	8	48
grp_SubBytes_fu_1128_state_9_read	33	6	8	48
plaintext_address0	85	17	4	68
Total	2755	586	573	4402

Register

Name
Nr_read_reg_2202
ap_CS_fsm
ap_enable_reg_pp0_iter0_reg
ap_enable_reg_pp0_iter1
ap_enable_reg_pp0_iter2
ap_enable_reg_pp0_iter3
ap_enable_reg_pp0_iter4
ap_enable_reg_pp0_iter5
ap_phi_reg_pp0_iter1_state_10_77_reg_629
ap_phi_reg_pp0_iter1_state_11_76_reg_592
ap_phi_reg_pp0_iter1_state_12_75_reg_555
ap_phi_reg_pp0_iter1_state_13_74_reg_518
ap_phi_reg_pp0_iter1_state_14_73_reg_481
ap_phi_reg_pp0_iter1_state_15_72_reg_444
ap_phi_reg_pp0_iter1_state_1_86_reg_962
ap_phi_reg_pp0_iter1_state_2_85_reg_925
ap_phi_reg_pp0_iter1_state_3_84_reg_888
ap_phi_reg_pp0_iter1_state_4_83_reg_851
ap_phi_reg_pp0_iter1_state_5_82_reg_814
ap_phi_reg_pp0_iter1_state_6_81_reg_777
ap_phi_reg_pp0_iter1_state_7_80_reg_740
ap_phi_reg_pp0_iter1_state_8_79_reg_703
ap_phi_reg_pp0_iter1_state_9_78_reg_666
ap_phi_reg_pp0_iter1_state_reg_999
ap_phi_reg_pp0_iter2_state_10_77_reg_629
ap_phi_reg_pp0_iter2_state_11_76_reg_592
ap_phi_reg_pp0_iter2_state_12_75_reg_555
ap_phi_reg_pp0_iter2_state_13_74_reg_518
ap_phi_reg_pp0_iter2_state_14_73_reg_481
ap_phi_reg_pp0_iter2_state_15_72_reg_444
ap_phi_reg_pp0_iter2_state_1_86_reg_962
ap_phi_reg_pp0_iter2_state_2_85_reg_925
ap_phi_reg_pp0_iter2_state_3_84_reg_888
ap_phi_reg_pp0_iter2_state_4_83_reg_851
ap_phi_reg_pp0_iter2_state_5_82_reg_814
ap_phi_reg_pp0_iter2_state_6_81_reg_777
ap_phi_reg_pp0_iter2_state_7_80_reg_740
ap_phi_reg_pp0_iter2_state_8_79_reg_703
ap_phi_reg_pp0_iter2_state_9_78_reg_666
ap_phi_reg_pp0_iter2_state_reg_999
ap_phi_reg_pp0_iter3_state_10_77_reg_629
ap_phi_reg_pp0_iter3_state_11_76_reg_592
ap_phi_reg_pp0_iter3_state_12_75_reg_555
ap_phi_reg_pp0_iter3_state_13_74_reg_518
ap_phi_reg_pp0_iter3_state_14_73_reg_481
ap_phi_reg_pp0_iter3_state_15_72_reg_444
ap_phi_reg_pp0_iter3_state_1_86_reg_962
ap_phi_reg_pp0_iter3_state_2_85_reg_925

ap_phi_reg_pp0_iter3_state_3_84_reg_888
ap_phi_reg_pp0_iter3_state_4_83_reg_851
ap_phi_reg_pp0_iter3_state_5_82_reg_814
ap_phi_reg_pp0_iter3_state_6_81_reg_777

Interface

Summary

RTL Ports	Dir	Bits	Protocol	Source Object	C Type
s_axi_Cipher_AWVALID	in	1	s_axi	Cipher	array
s_axi_Cipher_AWREADY	out	1	s_axi	Cipher	array
s_axi_Cipher_AWADDR	in	6	s_axi	Cipher	array
s_axi_Cipher_WVALID	in	1	s_axi	Cipher	array
s_axi_Cipher_WREADY	out	1	s_axi	Cipher	array
s_axi_Cipher_WDATA	in	32	s_axi	Cipher	array
s_axi_Cipher_WSTRB	in	4	s_axi	Cipher	array
s_axi_Cipher_ARVALID	in	1	s_axi	Cipher	array
s_axi_Cipher_ARREADY	out	1	s_axi	Cipher	array
s_axi_Cipher_ARADDR	in	6	s_axi	Cipher	array
s_axi_Cipher_RVALID	out	1	s_axi	Cipher	array
s_axi_Cipher_RREADY	in	1	s_axi	Cipher	array
s_axi_Cipher_RDATA	out	32	s_axi	Cipher	array
s_axi_Cipher_RRESP	out	2	s_axi	Cipher	array
s_axi_Cipher_BVALID	out	1	s_axi	Cipher	array
s_axi_Cipher_BREADY	in	1	s_axi	Cipher	array
s_axi_Cipher_BRESP	out	2	s_axi	Cipher	array
ap_clk	in	1	ap_ctrl_hs	AES_Encrypt	return value
ap_rst_n	in	1	ap_ctrl_hs	AES_Encrypt	return value
interrupt	out	1	ap_ctrl_hs	AES_Encrypt	return value

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