SLG46880-E

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine, Dual Supply, and Extended Temperature Range

Description

The GreenPAK product family is based around Renesas Electronics Corporation's proprietary Zero Static Power ASM (Asynchronous State Machine). This machine is fault tolerant and operates continuously over a wide voltage range with very low latency. The SLG46880-E provides a small, low power component for commonly used Mixed-Signal functions. The user creates their circuit design by programming the one-time Non-Volatile Memory (NVM) to configure the interconnect logic, the IO Pins, and the macrocells of the SLG46880-E. This highly versatile device allows a wide variety of Mixed-Signal functions to be designed within a very small, low power single integrated circuit.

Features

- Two High Speed General Purpose Rail-to-Rail Analog Comparators (ACMPxH)
- Two Low Power General Purpose Rail-to-Rail Analog Comparators (ACMPxL)
- Two Voltage References
  - Two V_{REF} Outputs
- Twelve Combination Function Macrocells
  - One Selectable DFF/LATCH or 2-bit LUT
  - Four Selectable DFF/LATCHES or 3-bit LUTs
  - One Selectable Pipe Delay or Ripple Counter, or 3-bit LUT
  - One Selectable Programmable Pattern Generator or 2-bit LUT
  - Four Selectable 8-bit CNT/DLYs or 3-bit LUTs
  - One Selectable 16-bit CNT/DLY or 4-bit LUT
- Asynchronous State Machine
  - Twelve States
  - Four Dynamic Memory Macrocells
  - f(1) Computation Macrocell with Dedicated ACMP
- Serial Communications
  - I^2C Protocol Interface
- Programmable Delay with Edge Detector Output
- Deglitch Filter or Edge Detector
- Three Oscillators
  - 2.048 kHz Oscillator
  - 2.048 MHz Oscillator
  - 25 MHz Oscillator
- Crystal Oscillator
- Analog Temperature Sensor
- Power-on Reset
- Wide Range Power Supply
  - 2.5 V (±8 %) to 5 V (±10 %) V_{DD}
  - 2.5 V (±8 %) to 5 V (±10 %) V_{DD2} ($V_{DD2} \leq V_{DD}$)
- Ambient Operating Temperature Range: -40 °C to +125 °C
- RoHS Compliant/Halogen-Free
- 32-pin STQFN: 4.0 mm x 4.0 mm x 0.55 mm, 0.4 mm pitch

Applications

- Outdoors Electronics
- Factory Automation
- Servers and Networking Equipment

Contents

Figures

Tables

1. Overview

1.1 Block Diagram

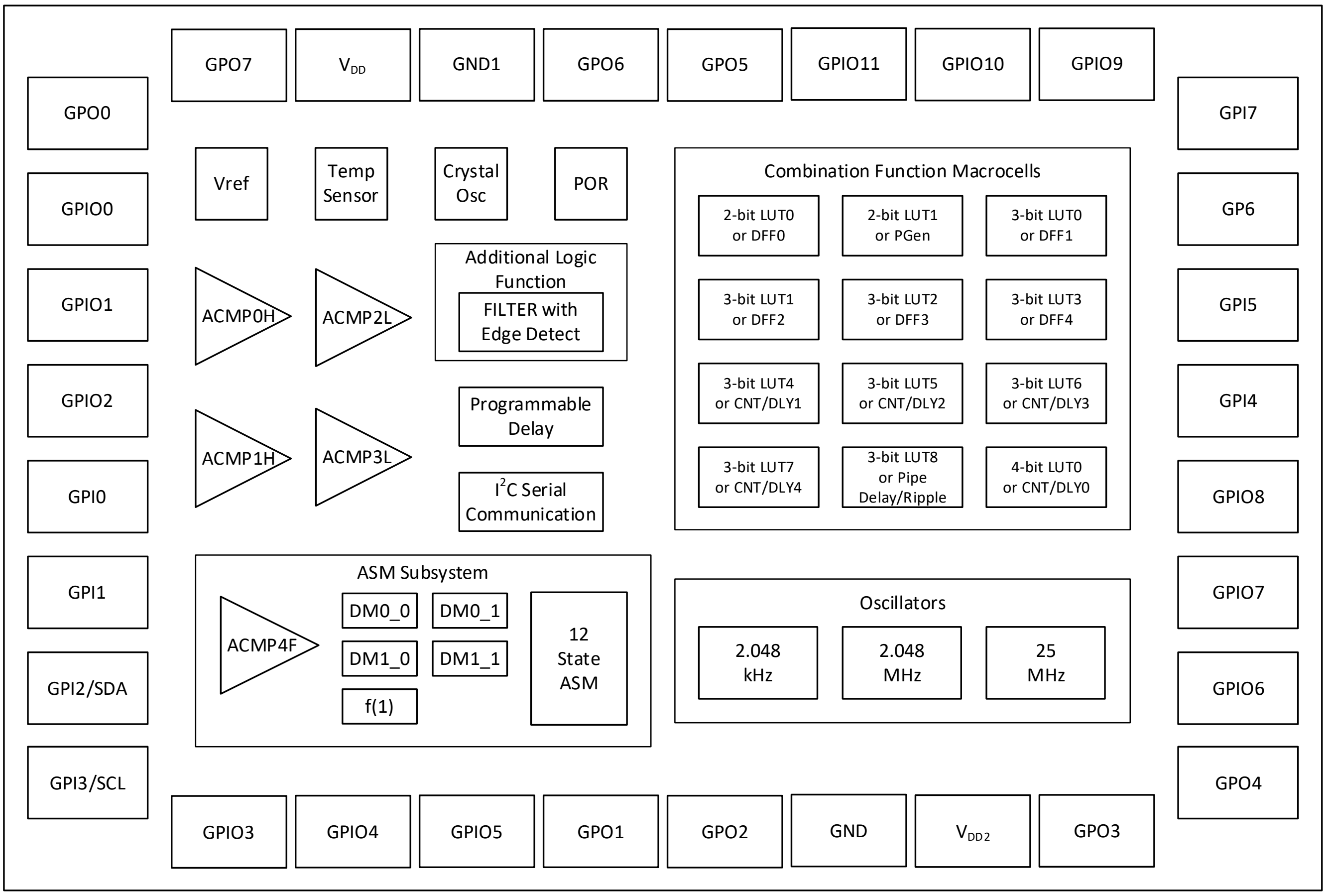


Figure 1. Block Diagram

2. Pin Information

2.1 Pin Assignments

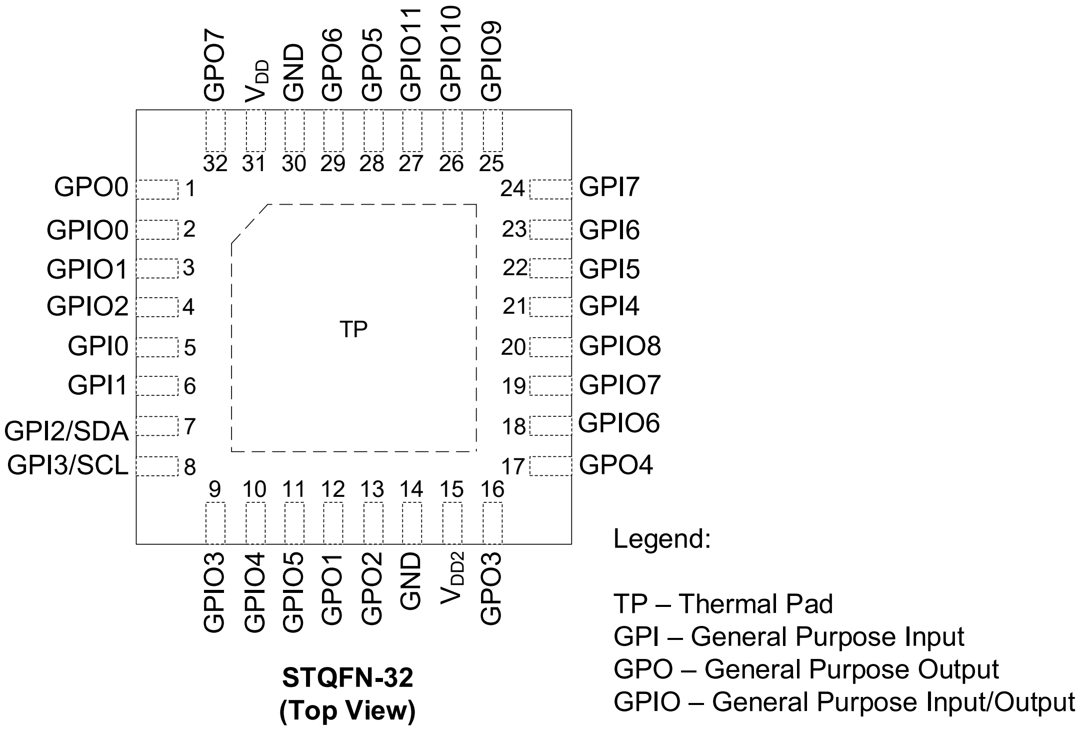


Figure 2. Pin Assignments

2.2 Pin Descriptions

Table 1. Functional Pin Description

STQFN Pin Number	Pin Name	Functions
1	GPO0	General Purpose Output or ACMP4F Input 1 or ASM1 output
2	GPIO0	General Purpose IO or ACMP4F Input 2
3	GPIO1	General Purpose IO or ACMP4F Input 3
4	GPIO2	General Purpose IO or V_{REF}O1 or Din LATCH (en1)
5	GPI0	General Purpose Input or Din LATCH (en0)/EXT_CLK2
6	GPI1	General Purpose Input or Din LATCH (en0)/EXT_CLK1/V_{REF} IN
7	GPI2/SDA	General Purpose Input/I^2C SDA
8	GPI3/SCL	General Purpose Input/I^2C SCL
9	GPIO3	General Purpose IO or Din LATCH (en1)
10	GPIO4	General Purpose IO or I^2C exp0 output
11	GPIO5	General Purpose IO or I^2C exp1 output
12	GPO1	General Purpose Output or ASM2 output
13	GPO2	General Purpose Output or ASM3 output
14	GND	Ground

STQFN Pin Number	Pin Name	Functions
15	V_{DD2}	Power Supply
16	GPO3	General Purpose Output or ASM4 output
17	GPO4	General Purpose Output or ASM5 output
18	GPIO6	General Purpose IO or Din LATCH (en1) or I^2C exp2 output
19	GPIO7	General Purpose IO or Din LATCH (en1) or I^2C exp3 output
20	GPIO8	General Purpose IO or ACMP4F Input 7
21	GPI4	General Purpose Input (XTAL IN) or Din LATCH (en0)/EXT_CLK1
22	GPI5	General Purpose Input (XTAL OUT) or Din LATCH (en0)/EXT_CLK3
23	GPI6	General Purpose Input or ACMP4F Input 4
24	GPI7	General Purpose Input or ACMP4F Input 5
25	GPIO9	General Purpose IO or ACMP4F Input 6 or $V_{REF}O0$
26	GPIO10	General Purpose IO or ACMP0H
27	GPIO11	General Purpose IO or ACMP1H
28	GPO5	General Purpose Output or ACMP2L or ASM6 output
29	GPO6	General Purpose Output or ACMP3L or ASM7 output
30	GND	Ground
31	V_{DD}	Power Supply
32	GPO7	General Purpose Output or ACMP4F Input 0 or ASM0 output
TP	TP	Thermal Pad. Must be connected to GND externally

Table 2. Pin Type Definitions

Pin Type	Description
V_{DD}	Power Supply
GPI	General Purpose Input
GPIO	General Purpose Input/Output
GPO	General Purpose Output
GND	Ground

3. Specifications

3.1 Absolute Maximum Ratings

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, so functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification are not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

Parameter	Min	Max	Unit
Supply Voltage on V_{DD} relative to GND	-0.3	7.0	V
DC Input Voltage	GND - 0.5 V	V_{DD} + 0.5 V	V
Maximum Average or DC Current (Through V_{DD} or GND pin)	-	90	mA
Current at Input Pin	-1.0	1.0	mA
Input Leakage Current (Absolute Value)	-	1000	nA
Storage Temperature Range	-65	150	°C
Junction Temperature	-	150	°C
Moisture Sensitivity Level	1		

3.2 ESD Ratings

Parameter	Min	Max	Unit
ESD Protection (Human Body Model)	2000	-	V
ESD Protection (Charged Device Model)	1300	-	V

3.3 Recommended Operating Conditions

Parameter	Conditions	Min	Max	Unit
Supply Voltage (V_{DD})		2.3	5.5	V
Supply Voltage 2 (V_{DD2})	$V_{DD2} \leq V_{DD}$	2.3	5.5	V
Operating Temperature		-40	+125	°C
Maximal Voltage Applied to any PIN in High Impedance State		-	V_{DD} + 0.3 [1]	V
Capacitor Value at V_{DD}		0.1	-	µF
Analog Input Common Mode Range	Allowable Input Voltage at Analog Pins	0	V_{DD}	V

[1] GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7 are powered from V_{DD} and GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4 are powered from V_{DD2}.

3.4 Electrical Specifications

3.4.1 Logic IO Specifications

V_{DD} = 2.3 V to 5.5 V, T_A = -40 °C to +125 °C, typical values are at T_A = +25 °C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
HIGH-Level Input Voltage	V_{IH}	Logic Input [2]	$0.7xV_{DD}$ [1]	-	V_{DD} + 0.3 [1]	V
		Logic Input with Schmitt Trigger	$0.8xV_{DD}$ [1]	-	V_{DD} + 0.3 [1]	V
		Low-Level Logic Input [2]	1.25	-	V_{DD} + 0.3 [1]	V
LOW-Level Input Voltage	V_{IL}	Logic Input [2]	GND - 0.3	-	$0.3xV_{DD}$ [1]	V
		Logic Input with Schmitt Trigger	GND - 0.3	-	$0.2xV_{DD}$ [1]	V
		Low-Level Logic Input [2]	GND - 0.3	-	0.5	V
Schmitt Trigger Hysteresis Voltage	V_{HYS}	V_{DD} = 2.3 V to 3.0 V	0.28	0.41	0.55	V
		V_{DD} = 3.0 V to 4.0 V	0.31	0.45	0.59	V
		V_{DD} = 4.0 V to 5.5 V	0.37	0.54	0.72	V
HIGH-Level Output Voltage [1]	V_{OH}	Push-pull, I_{OH} = 100 μA, 1x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	2.288	2.593	-	V
		Push-pull, I_{OH} = 3 mA, 1x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	2.696	3.244	-	V
		Push-pull, I_{OH} = 5 mA, 1x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	3.608	4.588	-	V
		Push-pull, I_{OH} = 100 μA, 2x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	2.294	2.596	-	V
		Push-pull, I_{OH} = 3 mA, 2x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	2.854	3.340	-	V
		Push-pull, I_{OH} = 5 mA, 2x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	3.809	4.712	-	V
LOW-Level Output Voltage [1]	V_{OL}	Push-pull, I_{OL} = 100 μA, 1x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	-	0.007	0.009	V
		Push-pull, I_{OL} = 3 mA, 1x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	-	0.161	0.232	V
		Push-pull, I_{OL} = 5 mA, 1x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	-	0.215	0.313	V
		Push-pull, I_{OL} = 100 μA, 2x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	-	0.003	0.005	V
		Push-pull, I_{OL} = 3 mA, 2x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	-	0.080	0.113	V
		Push-pull, I_{OL} = 5 mA, 2x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	-	0.108	0.153	V
		NMOS OD, I_{OL} = 100 μA, 1x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	-	0.003	0.004	V
		NMOS OD, I_{OL} = 3 mA, 1x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	-	0.064	0.090	V
		NMOS OD, I_{OL} = 5 mA, 1x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	-	0.086	0.122	V

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
LOW-Level Output Voltage [1]	V_{OL}	NMOS OD, I_{OL} = 100 µA, 2x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	-	0.001	0.002	V
		NMOS OD, I_{OL} = 3 mA, 2x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	-	0.033	0.046	V
		NMOS OD, I_{OL} = 5 mA, 2x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	-	0.044	0.062	V
HIGH-Level Output Current [1] [3]	I_{OH}	Push-pull, V_{OH} = V_{DD} - 0.2, 1x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	1.49	2.30	-	mA
		Push-pull, V_{OH} = 2.4 V, 1x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	5.28	11.70	-	mA
		Push-pull, V_{OH} = 2.4 V, 1x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	14.59	27.30	-	mA
		Push-pull, V_{OH} = V_{DD} - 0.2, 2x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	2.96	4.50	-	mA
		Push-pull, V_{OH} = 2.4 V, 2x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	10.44	23.20	-	mA
		Push-pull, V_{OH} = 2.4 V, 2x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	28.74	53.70	-	mA
LOW-Level Output Current [1] [3]	I_{OL}	Push-pull, V_{OL} = 0.15 V, 1x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	1.48	2.30	-	mA
		Push-pull, V_{OL} = 0.4 V, 1x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	4.72	7.30	-	mA
		Push-pull, V_{OL} = 0.4 V, 1x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	5.97	9.30	-	mA
		Push-pull, V_{OL} = 0.15 V, 2x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	2.95	4.50	-	mA
		Push-pull, V_{OL} = 0.4 V, 2x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	9.41	14.30	-	mA
		Push-pull, V_{OL} = 0.4 V, 2x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	11.94	18.30	-	mA
		NMOS OD, V_{OL} = 0.15 V, 1x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	3.74	5.70	-	mA
		NMOS OD, V_{OL} = 0.4 V, 1x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	11.85	17.90	-	mA
		NMOS OD, V_{OL} = 0.4 V, 1x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	14.95	22.90	-	mA
		NMOS OD, V_{OL} = 0.15 V, 2x Drive, V_{DD} = V_{DD2} = 2.3 V to 3.0 V	7.30	11.10	-	mA
		NMOS OD, V_{OL} = 0.4 V, 2x Drive, V_{DD} = V_{DD2} = 3.0 V to 4.0 V	23.08	34.90	-	mA
		NMOS OD, V_{OL} = 0.4 V, 2x Drive, V_{DD} = V_{DD2} = 4.0 V to 5.5 V	28.91	44.30	-	mA
Startup Time	T_{SU}	From V_{DD} rising past PON_{THR}	-	1.22	2.09	ms

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
NVM Page Write Time	T_{WR}		-	-	20	ms
NVM Page Erase Time	T_{ER}		-	-	20	ms
Power-On Threshold	PON_{THR}	V_{DD} Level Required to Start Up the Chip	1.64	1.85	2.06	V
Power-Off Threshold	$POFF_{THR}$	V_{DD} Level Required to Switch Off the Chip	0.81	1.26	1.55	V
Pull-up or Pull-down Resistance [1]	R_{PULL}	1 M for Pull-up: V_{IN} = GND; for Pull-down: $V_{IN} = V_{DD}$	-	1	-	MΩ
		100 k for Pull-up: V_{IN} = GND; for Pull-down: $V_{IN} = V_{DD}$	-	100	-	kΩ
		10 k For Pull-up: V_{IN} = GND; for Pull-down: $V_{IN} = V_{DD}$	-	10	-	kΩ
Input Capacitance	C_{IN}		-	4	-	pF

[1] GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7 are powered from V_{DD} and GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4 are powered from V_{DD2}.

[2] No hysteresis.

[3] DC or average current through any pin should not exceed value given in Absolute Maximum Conditions.

3.4.2 I²C Specifications

V_{DD} = 2.3 V to 5.5 V, T_A = -40 °C to +125 °C, typical values are at T_A = +25 °C, unless otherwise specified.

Parameter	Symbol	Conditions	Fast-Mode		Fast-Mode Plus		Unit
			Min	Max	Min	Max	
LOW-level Input Voltage	V_{IL}		-0.5	$0.3xV_{DD}$	-0.5	$0.3xV_{DD}$	V
HIGH-level Input Voltage	V_{IH}		$0.7xV_{DD}$	5.5	$0.7xV_{DD}$	5.5	V
Hysteresis of Schmitt Trigger Inputs	V_{HYS}		$0.05xV_{DD}$	-	$0.05xV_{DD}$	-	V
LOW-Level Output Voltage 1	V_{OL1}	(Open-drain or open collector) at 3 mA sink current, V_{DD} > 2 V	0	0.4	0	0.4	V
LOW-Level Output Voltage 2	V_{OL2}	(Open-drain or open collector) at 2 mA sink current, $V_{DD} \leq 2$ V	0	$0.2xV_{DD}$	0	$0.2xV_{DD}$	V
LOW-Level Output Current [1]	I_{OL}	V_{OL} = 0.4 V, V_{DD} = 2.3 V	3	-	19.3	-	mA
		V_{OL} = 0.4 V, V_{DD} = 3.0 V	3	-	20	-	mA
		V_{OL} = 0.4 V, V_{DD} = 4.5 V	3	-	20	-	mA
		V_{OL}= 0.6 V	6	-	-	-	mA
Output Fall Time from V_{IHmin} to V_{ILmax} [1]	t_{of}		14x (V_{DD}/5.5 V)	250	10x (V_{DD}/5.5 V)	120	ns
Pulse Width of Spikes that must be suppressed by the Input Filter	t_{SP}		0	50	0	50	ns
Input Current each IO Pin	I_i	$0.1xV_{DD} < V_I < 0.9xV_{DDmax}$	-10	+10	-10	+10	mA
Capacitance for each IO Pin	C_i		-	10	-	10	pF

Parameter	Symbol	Conditions	Fast-Mode		Fast-Mode Plus		Unit
			Min	Max	Min	Max	
Timing (see Figure 127 for diagram)							
Clock Frequency, SCL	F_{SCL}		-	400	-	1000	kHz
Clock Pulse Width Low	t_{LOW}		1300	-	500	-	ns
Clock Pulse Width High	t_{HIGH}		600	-	260	-	ns
Data Valid Acknowledge Time	t_{VD_ACK}		-	900	-	450	ns
Bus Free Time between Stop and Start	t_{BUF}		1300	-	500	-	ns
Start Hold Time	t_{HD_STA}		600	-	260	-	ns
Start Set-up Time	t_{SU_STA}		600	-	260	-	ns
Data Hold Time	t_{HD_DAT}		0	-	0	-	ns
Data Set-up Time	t_{SU_DAT}		100	-	50	-	ns
Inputs Rise Time	t_R		-	300	-	120	ns
Inputs Fall Time	t_F		-	300	-	129	ns
Stop Set-up Time	t_{SU_STO}		600	-	260	-	ns
Data Valid Time	t_{VD_DAT}		-	900	-	450	ns

[1] Does not meet standard I^{2}C specifications: t_{of} = 20x(V_{DD}/5.5 V) (min); For Fast-mode Plus I_{OL} = 20 mA (min) at V_{OL} = 0.4 V.
[2] For Fast-mode Plus SDA pin must be configured as NMOS 2x open-drain, see registers [893] in section 0
[3] Registers.

3.4.3 Asynchronous State Machine Specifications

T_A = +25 °C, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Asynchronous State Machine Output Delay Time	$t_{st\_out\_delay}$	V_{DD} = 2.5 V ± 8 %	133	-	277	ns
		V_{DD} = 3.3 V ± 10 %	96	-	190	
		V_{DD} = 5.0 V ± 10 %	70	-	123	
Asynchronous State Machine Output Transition Time	t_{st_out}	V_{DD} = 2.5 V ± 8 %	-	-	165	ns
		V_{DD} = 3.3 V ± 10 %	-	-	70	
		V_{DD} = 5.0 V ± 10 %	-	-	46	
Asynchronous State Machine Input Pulse Acceptance Time	t_{st_pulse}	V_{DD} = 2.5 V ± 8 %	28	-	-	ns
		V_{DD} = 3.3 V ± 10 %	19	-	-	
		V_{DD} = 5.0 V ± 10 %	12	-	-	
Asynchronous State Machine Input Compete Time	t_{st_comp}	V_{DD} = 2.5 V ± 8 %	-	-	10	ns
		V_{DD} = 3.3 V ± 10 %	-	-	7	
		V_{DD} = 5.0 V ± 10 %	-	-	5	
Asynchronous State Machine Sequential Output Delay Time	$t_{st\_sequential\_delay}$	V_{DD} = 2.5 V ± 8 %	229	-	485	ns
		V_{DD} = 3.3 V ± 10 %	162	-	330	
		V_{DD} = 5.0 V ± 10 %	119	-	208	

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Asynchronous State Machine Dynamic Memory Latch Delay	$t_{st\_dmlatch\_delay}$	V_{DD} = 2.5 V ± 8 %	229	-	485	ns
		V_{DD} = 3.3 V ± 10 %	162	-	330	
		V_{DD} = 5.0 V ± 10 %	119	-	208	

3.4.4 Estimated Typical Current of Macrocell Specifications

T_A = -40 °C to +125 °C, unless otherwise specified.

Parameter	Symbol	Conditions	V_{DD} = 2.5 V	V_{DD} = 3.3 V	V_{DD} = 5.0 V	Unit
Current	I_{DD}	Chip Quiescent (I^2C enable)	0.06	0.08	0.13	µA
		Chip Quiescent (I^2C disable)	0.06	0.08	0.13	µA
		$V_{REF}0$ (ACMPxH, 32 mV)	12.46	12.53	12.88	µA
		$V_{REF}1$ (ACMPxL, 32 mV)	6.08	6.13	6.37	µA
		$V_{REF}0$ (Source None)	7.79	7.84	8.05	µA
		$V_{REF}1$ (Source None)	1.41	1.44	1.54	µA
		$V_{REF}0$ (Source Temp Sensor)	7.79	7.84	8.05	µA
		ACMP0H, 100 µA disabled, hysteresis disabled, gain 1 or 0.25, +IN - GPIO10, V_{REF} = 32 mV	22.75	23.16	24.45	µA
		ACMP0H, 100 µA disabled, hysteresis disabled, gain 1, Buffered +IN - GPIO10, V_{REF} = 32 mV	26.37	26.79	28.22	µA
		ACMP0,1H, 100 µA disabled, hysteresis disabled, gain 1, +IN - GPIO10, GPIO11, V_{REF} = 32 mV	37.72	38.48	40.85	µA
		ACMP0,1H 100 µA disabled, ACMP2, 3L, hysteresis disabled, gain 1, +IN - GPIO10, GPIO11, GPO5, GPO6, V_{REF} = 32 mV	39.15	39.91	42.31	µA
		ACMP0H, 100 µA disabled, hysteresis disabled, gain 1, +IN - V_{DD}, V_{REF} = 32 mV	37.48	38.17	40.30	µA
		ACMP0H, 100 µA enabled, hysteresis disabled, gain 1, +IN - GPIO10, V_{REF} = 32 mV	48.22	48.81	50.97	µA
		ACMP2L, hysteresis disabled, gain 1 or 0.25, +IN - GPO5, V_{REF} = 32 mV	1.67	1.70	1.82	µA
		ACMP2,3L, hysteresis disabled, gain 1, +IN - GPO5, GPO6, V_{REF} = 32 mV	1.92	1.96	2.08	µA
		OSC2 25 MHz, pre-divider = 1	132.93	179.43	290.73	µA
		OSC2 25 MHz, pre-divider = 4	54.28	69.38	105.96	µA
		OSC2 25 MHz, pre-divider = 8	40.86	50.64	74.58	µA
		OSC1 2.048 MHz, pre-divider = 1	22.13	23.91	27.74	µA
		OSC1 2.048 MHz, pre-divider = 4	19.04	19.81	21.45	µA
		OSC1 2.048 MHz, pre-divider = 8	18.51	19.09	20.35	µA
		OSC0 2.048 kHz, pre-divider = 1 or 4 or 8	0.33	0.36	0.45	µA
		Push-pull 1x + 4 pF at 25 kHz	28.69	32.86	42.15	µA
		Push-pull 1x + 4 pF at 2 MHz	62.86	77.61	108.86	µA

Parameter	Symbol	Conditions	V_{DD} = 2.5 V	V_{DD} = 3.3 V	V_{DD} = 5.0 V	Unit
Current	I_{DD}	Temperature Sensor, range 0.75 to 1.2, Source Matrix	15.28	15.35	15.76	µA
		Temperature Sensor, range 0.62 to 0.99, Source Matrix or Register	15.15	15.21	15.62	µA
		Temperature Sensor, range 0.62 to 0.99, Source Matrix or GPIO11	15.14	15.21	15.62	µA

3.4.5 Estimated Typical Delay for Each Macrocell

Typical values are at T_A = +25 °C, unless otherwise specified.

Parameter	Symbol	Conditions	V_{DD} = 2.5 V		V_{DD} = 3.3 V		V_{DD} = 5.0 V		Unit
			Rising	Falling	Rising	Falling	Rising	Falling	
Delay	tpd	DFF Q	17	20	14	14	9	10	ns
		DFF nQ	18	19	13	14	9	10	ns
		DFF nRESET Q	-	21	-	15	-	11	ns
		DFF nRESET nQ	19	-	13	-	9	-	ns
		DFF nSET Q	19	-	13	-	9	-	ns
		DFF nSET nQ	-	21	-	15	-	11	ns
		DFF Second Q	16	19	12	14	8	10	ns
		DFF Second nQ	18	18	12	14	9	10	ns
		LATCH Q	16	18	12	13	8	9	ns
		LATCH nQ	17	18	12	13	9	10	ns
		LATCH nRESET Q	21	22	15	16	11	11	ns
		LATCH nRESET nQ	20	23	14	17	10	12	ns
		LATCH nSET Q	18	21	12	15	9	11	ns
		LATCH nSET nQ	19	20	14	14	10	10	ns
		LATCH second Q	18	21	13	15	9	11	ns
		LATCH second nQ	19	20	14	15	10	10	ns
		2-bit LUT	16	15	12	11	8	8	ns
		3-bit LUT	20	22	15	17	10	12	ns
		4-bit LUT	20	22	15	17	11	13	ns
		DM 2-bit LUT IN0	15	16	10	12	7	9	ns
		DM 3-bit LUT IN0 to 2-bit LUT IN0	16	19	12	14	8	10	ns
		DM 3-bit LUT IN0 to CNT One Shot to 2-bit LUT IN1	45	46	33	34	23	24	ns
		DM 3-bit LUT IN1 to 2-bit LUT IN0	16	17	11	13	8	9	ns
		DM 3-bit LUT IN2 to 2-bit LUT IN0	16	18	12	13	8	9	ns
		DM CNT Edge detect to 2-bit LUT IN1	35	35	26	26	18	19	ns

Parameter	Symbol	Conditions	V_{DD} = 2.5 V		V_{DD} = 3.3 V		V_{DD} = 5.0 V		Unit
			Rising	Falling	Rising	Falling	Rising	Falling	
Delay	tpd	DM CNT Frequency detect to 2-bit LUT IN1	45	45	33	34	24	24	ns
		DM CNT One Shot to 2-bit LUT IN1	44	45	33	33	23	23	ns
		DM CNT Delay to 2-bit LUT IN1	37	39	27	28	19	20	ns
		Low Voltage Digital input to PP 1x	29	220	21	150	16	96	ns
		Digital input to with Schmitt Trigger to PP 1x	26	30	19	22	14	16	ns
		Digital input to PP 1x	27	31	19	23	15	17	ns
		Digital input to PP 2x	25	30	18	22	14	16	ns
		Digital input to 1x 3-State (Z to 0)	-	30	-	22	-	16	ns
		Digital input to 1x 3-State (Z to 1)	28	-	20	-	15	-	ns
		Digital input to 2x 3-State (Z to 0)	-	30	-	22	-	16	ns
		Digital input to 2x 3-State (Z to 1)	26	-	18	-	14	-	ns
		Digital input to NMOS 1x	-	28	-	23	-	16	ns
		Digital input to NMOS 2x	-	32	-	20	-	15	ns
		Ripple UP CLK CNT Q0	16	18	12	13	9	10	ns
		Ripple UP CLK CNT Q1	22	25	16	19	11	14	ns
		Ripple UP CLK CNT Q2	25	28	19	20	14	15	ns
		Ripple DOWN CLK CNT Q0	16	18	12	13	9	10	ns
		Ripple DOWN CLK CNT Q1	23	25	17	19	13	13	ns
		Ripple DOWN CLK CNT Q2	26	30	29	22	14	16	ns
		Ripple UP nSET CNT Q0	21	-	15	-	11	-	ns
		Ripple UP nSET CNT Q1	20	-	15	-	11	-	ns
		Ripple UP nSET CNT Q2	21	-	15	-	11	-	ns
		Ripple DOWN nSET CNT Q0	21	-	15	-	11	-	ns
		Ripple DOWN nSET CNT Q1	20	-	15	-	10	-	ns
		Ripple DOWN nSET CNT Q2	21	-	15	-	11	-	ns
		PGen CLK	16	18	11	13	8	9	ns
		PGen nRESET (Z to 0)	-	19	-	14	-	10	ns
		PGen nRESET (Z to 1)	18	-	13	-	9	-	ns
		Pipe Delay Q	20	21	14	16	10	11	ns
		Pipe Delay nQ	20	24	15	18	11	13	ns
		Filter Q	154	137	106	98	67	66	ns
		Filter nQ	136	155	97	108	65	69	ns
		Edge detect	20	20	15	15	11	10	ns
		Edge detect Delayed	225	228	169	177	126	128	ns
Width	tw	Edge detect	204	205	155	155	116	116	ns

3.4.6 Estimated Typical Delay for f(1)

Typical values are at T_A = +25 °C, unless otherwise specified.

Parameter	Symbol	Conditions	V_{DD} = 2.5 V	V_{DD} = 3.3 V	V_{DD} = 5.0 V	Unit
Delay	tpd	Delay 0	147	103	68	ns
		Delay 1	415	358	294	ns
		Delay 10	774	724	687	ns
		Delay 20	1175	1124	1086	ns
		Delay 100	4833	4326	4281	ns
		LOOP without Delay data	136	95	61	ns
		LOOP with 0 Delay data	148	104	69	ns
		LOOP with 1 Delay data	416	359	294	ns
		LOOP with 10 Delay data	775	725	688	ns
		LOOP with 20 Delay data	1186	1123	1071	ns
		LOOP with 100 Delay data	4384	4327	4281	ns
		INV	151	105	68	ns
		AND	150	103	66	ns
		OR	150	103	66	ns
		XOR	150	103	66	ns
		LOADx	302	208	132	ns
		OUTx	153	105	67	ns
		POP	150	103	66	ns
		PUSH0	152	105	67	ns
		RESET (Time for OUT0)	71	50	32	ns
		RESET (Time to f1 init)	83	58	38	ns

3.4.7 Programmable Delay Typical Delays and Widths

Typical values are at T_A = +25 °C, unless otherwise specified.

Parameter	Symbol	Conditions	V_{DD} = 2.5 V	V_{DD} = 3.3 V	V_{DD} = 5.0 V	Unit
Pulse Width, 1 cell	tw	mode: (any) edge detect, edge detect output	200	153	114	ns
Pulse Width, 2 cell	tw	mode: (any) edge detect, edge detect output	402	304	228	ns
Pulse Width, 3 cell	tw	mode: (any) edge detect, edge detect output	605	457	343	ns
Pulse Width, 4 cell	tw	mode: (any) edge detect, edge detect output	806	609	457	ns
Delay, 1 cell	time1	mode: (any) edge detect, edge detect output	23	18	12	ns
Delay, 2 cell	time1	mode: (any) edge detect, edge detect output	23	18	12	ns
Delay, 3 cell	time1	mode: (any) edge detect, edge detect output	23	18	12	ns
Delay, 4 cell	time1	mode: (any) edge detect, edge detect output	23	18	12	ns
Delay, 1 cell	time2	mode: both edge delay, edge detect output	226	171	127	ns
Delay, 2 cell	time2	mode: both edge delay, edge detect output	428	326	242	ns
Delay, 3 cell	time2	mode: both edge delay, edge detect output	631	479	357	ns
Delay, 4 cell	time2	mode: both edge delay, edge detect output	832	632	471	ns

3.4.8 Typical Filter Rejection Pulse Width

Typical Values are at T_A = +25 °C, unless otherwise specified.

Parameter	V_{DD} = 2.5 V	V_{DD} = 3.3 V	V_{DD} = 5.0 V	Unit
Filtered Pulse Width	< 123	< 84	< 52	ns

3.4.9 Typical Counter/Delay Offset

Typical values are at T_A = +25 °C, unless otherwise specified.

Parameter	OSC Frequency	OSC Power	V_{DD} = 2.5 V	V_{DD} = 3.3 V	V_{DD} = 5.0 V	Unit
Power-On time	25 MHz	auto	0.03	0.03	0.02	μs
Power-On time	2.048 MHz	auto	0.47	0.47	0.43	μs
Power-On time	2.048 kHz	auto	666	576	482	μs
frequency settling time	25 MHz	auto	0.3	0.4	0.5	μs
frequency settling time	2.048 MHz	auto	1	1.5	2	μs
frequency settling time	2.048 kHz	auto	488	488	977	μs
variable (CLK period)	25 MHz	forced	0-40	0-40	0-40	ns
variable (CLK period)	2.048 MHz	forced	0-0.5	0-0.5	0-0.5	μs
variable (CLK period)	2.048 kHz	forced	0-488	0-488	0-488	μs
propagation delay (non-delayed edge)	25 MHz/2.048 kHz	either	43	31	23	ns

3.4.10 Oscillator Frequency

V_{DD} = 2.3 V to 5.5 V, unless otherwise specified.

OSC	Temperature Range							
	+25 °C		-40 °C to +85 °C		-40 °C to +105 °C		-40 °C to +125 °C	
	Minimum Value [kHz]	Maximum Value [kHz]	Minimum Value [kHz]	Maximum Value [kHz]	Minimum Value [kHz]	Maximum Value [kHz]	Minimum Value [kHz]	Maximum Value [kHz]
2.048 kHz OSC0	1.991	2.089	1.821	2.116	1.798	2.116	1.600	2.116
2.048 MHz OSC1	2002	2096	-	-	-	-	1922	2110
25 MHz OSC2	24455	25602	-	-	-	-	23467	25713

3.4.11 Oscillator Frequency Error

V_{DD} = 2.3 V to 5.5 V, unless otherwise specified (error calculated relative to nominal value).

OSC	Temperature Range							
	+25 °C		-40 °C to +85 °C		-40 °C to +105 °C		-40 °C to +125 °C	
	Error (%, at Min)	Error (%, at Max)	Error (%, at Min)	Error (%, at Max)	Error (%, at Min)	Error (%, at Max)	Error (%, at Min)	Error (%, at Max)
2.048 kHz OSC0	-2.78	+2.00	-11.08	+3.32	-12.21	+3.32	-21.88	+3.32
2.048 MHz OSC1	-2.25	+2.34	-	-	-	-	-6.15	+3.03
25 MHz OSC2	-2.18	+2.41	-	-	-	-	-6.13	+2.85

3.4.12 Oscillator Power-On Delay

T_A = +25 °C, OSC power mode: "Auto Power-On", unless otherwise specified.

Power Supply Range (V_{DD}) [V]	Oscillator0 2.048 kHz		Oscillator1 2.048 MHz		Oscillator2 25 MHz		Oscillator2 25MHz Start with Delay	
	Typical Value [µs]	Maximum Value [µs]	Typical Value [µs]	Maximum Value [µs]	Typical Value [µs]	Maximum Value [µs]	Typical Value [µs]	Maximum Value [µs]
2.3	709.28	983.01	0.321	0.576	0.043	0.050	0.142	0.155
3.3	575.87	745.60	0.446	0.562	0.027	0.030	0.138	0.152
5.5	448.86	541.03	0.404	0.428	0.020	0.030	0.138	0.154

3.4.13 Analog Comparator Specifications

V_{DD} = 2.3 V to 5.5 V, T_A = -40 °C to +125 °C, typical values are at T_A = +25 °C, unless otherwise specified.

Parameter	Symbol	Note	Conditions	Min	Typ	Max	Unit
ACMP0H, ACMP1H, ACMP2L, ACMP3L Input Voltage Range	V_{ACMP}	Positive Input	V_{DD} = 2.5 V ± 5 %	0	-	V_{DD}	V
		Negative Input		0	-	V_{DD}	V
		Positive Input	V_{DD} = 3.3 V ± 10 %	0	-	V_{DD}	V
		Negative Input		0	-	V_{DD}	V
		Positive Input	V_{DD} = 5.0 V ± 10 %	0	-	V_{DD}	V
		Negative Input		0	-	V_{DD}	V
ACMP0H, ACMP1H Input Offset Voltage	V_{offset}	Vhys = 0 mV, Gain = 1, V_{REF} = 32 mV to 2016 mV		-9.93	-	7.53	mV
ACMP2L, ACMP3L Input Offset Voltage				-7.09	-	4.83	mV
ACMP0H, ACMP1H Start Time	t_{start}	ACMP Power-On delay, Minimal required wake time for the “Wake and Sleep function”		--	26.71	53.34	µs
ACMPxH Start Time with ACMPxL enabled				--	40.21	88.00	µs
ACMP2L, ACMP3L Start Time				--	136.52	283.31	µs
ACMP0H, ACMP1H Built-in Hysteresis	V_{HYS}	V_{HYS} = 32 mV	T_A = +25 °C	24.07	-	36.62	mV
		V_{HYS} = 64 mV	T_A = +25 °C	55.67	-	68.85	mV
		V_{HYS} = 192 mV	T_A = +25 °C	183.74	-	197.01	mV
		V_{HYS} = 32 mV		19.19	-	39.72	mV
		V_{HYS} = 64 mV		50.83	-	72.00	mV
		V_{HYS} = 192 mV		179.47	-	200.85	mV
ACMP2L, ACMP3L Built-in Hysteresis		V_{HYS} = 32 mV	T_A = +25 °C	26.33	-	38.63	mV
		V_{HYS} = 64 mV	T_A = +25 °C	59.19	-	70.20	mV
		V_{HYS} = 192 mV	T_A = +25 °C	186.18	-	198.90	mV
		V_{HYS} = 32 mV		22.73	-	42.18	mV
		V_{HYS} = 64 mV		55.73	-	73.29	mV
		V_{HYS} = 192 mV		180.62	-	201.74	mV

Parameter	Symbol	Note	Conditions	Min	Typ	Max	Unit
Series Input Resistance	R_{sin}	Gain = 1x		-	100.0	-	MΩ
		Gain = 0.5x		-	2.04	-	MΩ
		Gain = 0.33x		-	2.04	-	MΩ
		Gain = 0.25x		-	2.04	-	MΩ
Propagation Delay, Response Time for ACMP0H, ACMP1H	PROP	Gain = 1, V_{REF} = 32 mV to 2016 mV, Overdrive =10 mV	LOW to HIGH	-	1.71	9.13	µs
			HIGH to LOW	-	2.04	6.03	µs
		Gain = 1, V_{REF} = 32 mV to 2016 mV, Overdrive = 100 mV	LOW to HIGH	-	0.58	2.11	µs
			HIGH to LOW	-	0.57	1.15	µs
Propagation Delay, Response Time for ACMP2L, ACMP3L		Gain = 1, V_{REF} = 32 mV to 2016 mV, Overdrive =10 mV	LOW to HIGH	-	54.96	113.68	µs
			HIGH to LOW	-	55.34	112.75	µs
		Gain = 1, V_{REF} = 32 mV to 2016 mV, Overdrive = 100 mV	LOW to HIGH	-	21.24	52.94	µs
			HIGH to LOW	-	23.58	78.33	µs
Gain error (including threshold and internal V_{REF} error)	G	G = 1		-	1	-	
		G = 0.5		0.478	-	0.529	
		G = 0.33		0.319	-	0.353	
		G = 0.25		0.240	-	0.264	
V_{REF}0 Output Capacitance Loading	V_{REF}		Resistance Load = 1 MΩ	-	-	5	pF
			Resistance Load = 560 kΩ	-	-	10	pF
			Resistance Load = 100 kΩ	-	-	40	pF
			Resistance Load = 10 kΩ	-	-	80	pF
			Resistance Load = 2 kΩ	-	-	120	pF
			Resistance Load = 1 kΩ, V_{REF} = 32 mV to 1024 mV	-	-	150	pF
V_{REF}1 Output Capacitance Loading	V_{REF}		Resistance Load = 1 MΩ	-	-	15	pF
			Resistance Load = 560 kΩ	-	-	27	pF
			Resistance Load = 100 kΩ	-	-	64	pF
			Resistance Load = 10 kΩ	-	-	120	pF
			Resistance Load = 2 kΩ	-	-	180	pF
			Resistance Load = 1 kΩ, V_{REF} = 32 mV to 1024 mV	-	-	210	pF
Input Current Source	Is		Vin = V_{DD} - 0.7 V	55.45	106.35	123.59	µA

3.4.14 Analog Temperature Sensor Specifications

Temperature sensor typical nonlinearity is ±1.04 % for output range 1 and ±0.69 % for output range 2 at V_{DD} = 3.3 V.

V_{DD} = 2.5 V to 5.0 V, unless otherwise specified.

T_A [°C]	TS Output vs. Temperature (typical) [mV]						Accuracy [%]			
	Output Range 1			Output Range 2			Output Range 1		Output Range 2	
	V_{DD} = 2.5 V	V_{DD} = 3.3 V	V_{DD} = 5.0 V	V_{DD} = 2.5 V	V_{DD} = 3.3 V	V_{DD} = 5.0 V	Min	Max	Min	Max
-40	997	996	996	1201	1200	1203	-1.36	0.72	-0.15	2.16
-30	974	974	974	1178	1177	1177	-1.41	0.78	-0.11	2.27
-20	952	951	951	1151	1149	1149	-1.38	0.82	0.01	2.31
-10	929	928	928	1123	1122	1122	-1.39	0.87	0.08	2.41
0	906	905	905	1096	1094	1094	-1.40	0.88	0.15	2.44
10	883	882	882	1068	1067	1067	-1.45	0.90	0.22	2.49
20	860	860	859	1040	1039	1039	-1.51	0.90	0.28	2.56
30	837	836	836	1012	1011	1011	-1.60	0.81	0.28	2.56
40	814	813	813	984	983	982	-1.66	0.82	0.30	2.60
50	790	790	790	956	954	954	-1.77	0.81	0.28	2.69
60	767	766	766	927	926	926	-1.90	0.77	0.22	2.73
70	743	742	742	898	897	897	-2.08	0.87	0.12	3.00
80	719	718	718	869	868	868	-2.37	0.83	-0.09	2.98
85	707	706	706	855	854	854	-2.52	0.79	-0.19	3.05
90	695	694	694	840	839	839	-2.67	0.77	-0.38	3.02
100	671	670	670	811	810	810	-3.20	0.80	-0.77	3.25
105	659	658	658	796	795	795	-3.33	0.89	-0.91	3.44
110	646	645	645	781	780	780	-3.62	0.83	-1.18	3.37
120	622	621	621	752	751	751	-4.55	1.34	-1.91	4.04
125	611	610	610	738	737	737	-6.50	3.71	-4.01	6.46

4. User Programmability

The SLG46880-E is a user programmable device with a one time programmable (OTP) memory array that is used to configure the 12 state ASM, logic, and Mixed-Signal circuits. Three of the IO Pins provide a connection for the bit patterns into the OTP on board memory. A programming development kit allows the user the ability to create initial devices. Once the design is finalized, the programming code (.gpx file) is forwarded to Renesas Electronics Corporation to integrate into a production process.

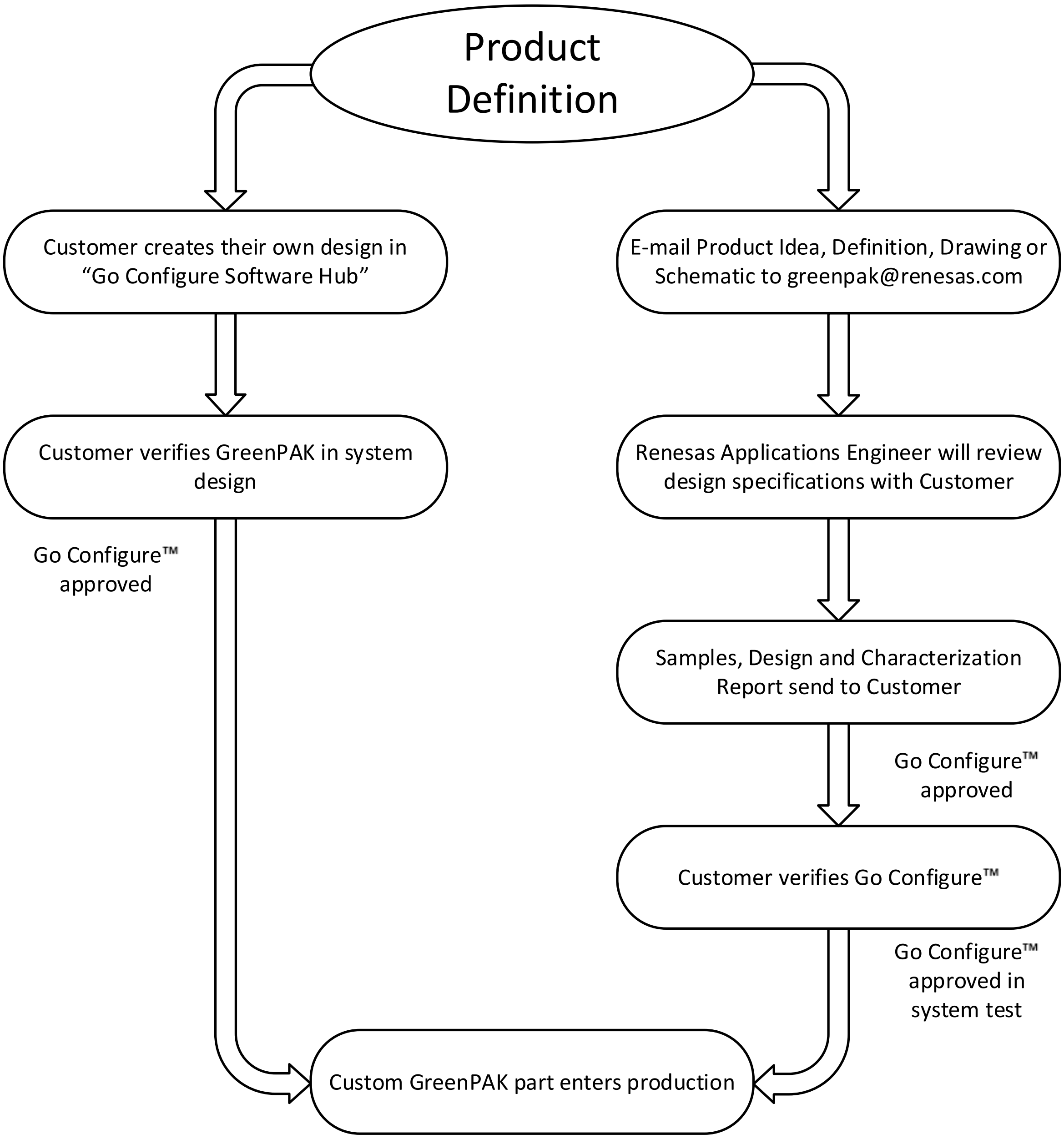


Figure 3. Steps to Create a Custom GreenPAK Device

5. IO Pins

5.1 IO Pins

The SLG46880-E has a total of 12 GPIO, 8 GPI, and 8 GPO pins, which can function either as a user defined Input or Output, or as a special function (such as outputting the voltage reference), as well as a signal for programming of the on-chip Non-Volatile Memory (NVM). Refer to section 2 Pin Information for pin definitions.

GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7 are powered from V_{DD} and GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4 are powered from V_{DD2}. All internal macrocells are powered from V_{DD}. Voltage on V_{DD2} Pin must be less or equal voltage on V_{DD} Pin.

In case V_{DD2} floating and any Pin powered from V_{DD2} is configured as input, ESD pin protection diodes must be considered when applying an input signal to the pin. This will cause a significant current leakage.

In case V_{DD2} floating and any Pin powered from V_{DD2} is configured as Output, the pin will behave as NMOS open-drain.

It is not recommended to connect V_{DD2} to the GND.

5.2 Pull-Up/Down Resistors

All IO Pins have the option of user-selectable resistors that can be connected to the pin structure. The selectable values on these resistors are 10 kΩ, 100 kΩ, and 1 MΩ. The internal resistors can be configured as either Pull-up or Pull-down.

5.3 100 ns Debounce Delay

100 ns debounce can be enabled for GPI0, GPI1, GPI5, and GPI6 by setting registers [536], [537], [538], and [539], respectively.

5.4 Fast Pull-Up/Down during Power-Up

During power-up, IO Pull-up/down resistance will switch to 2.6 kΩ initially and then it will switch to normal setting value. This function is enabled by register [670].

5.5 Digital Input Latch

Digital Input Latch can be enabled for GPI0, GPI1, GPI4, GPI5, GPIO2, GPIO3, GPIO6, GPIO7. For timing diagram refer to Figure 4.

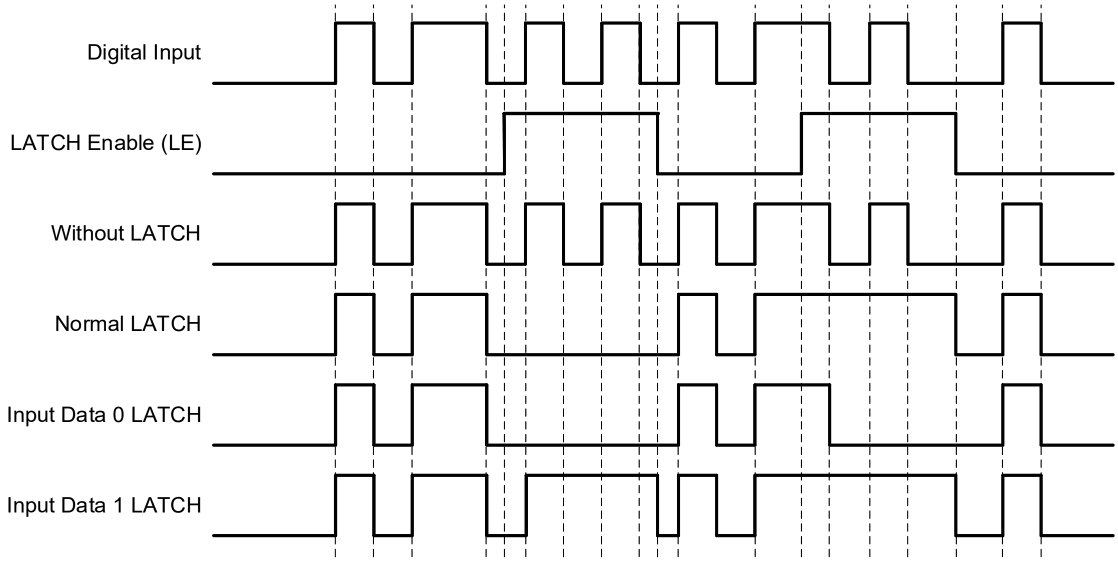


Figure 4. Digital Input Latch Timing Diagram

5.6 GPO Output Skew

Output Skew function can be enabled for GPOs 0 to 7. Once enabled for any GPO (register [671]), Output Skew becomes valid for all GPOs. All eight GPOs are grouped in pairs: GPO0 and GPO7, GPO1 and GPO2, GPO3 and GPO4, GPO5 and GPO6. Output Skew allows to delay each pair before setting HIGH or LOW consequently. See Figure 5.

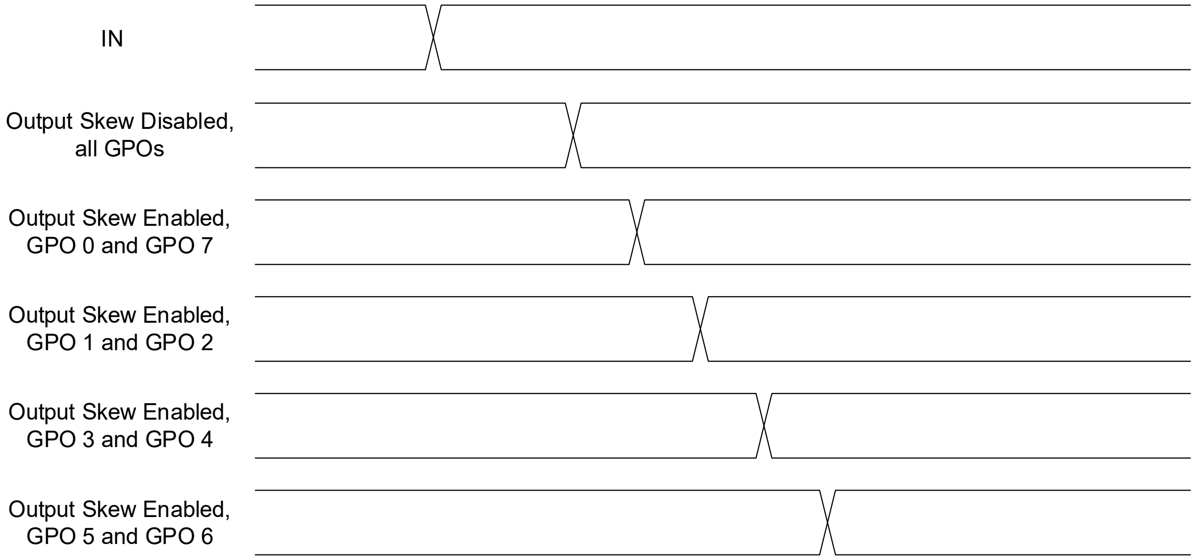


Figure 5. Output Skew Timing Diagram

5.7 GPI IO Structure (V_{DD})

5.7.1 GPI IO Structure (for GPIs 6, 7)

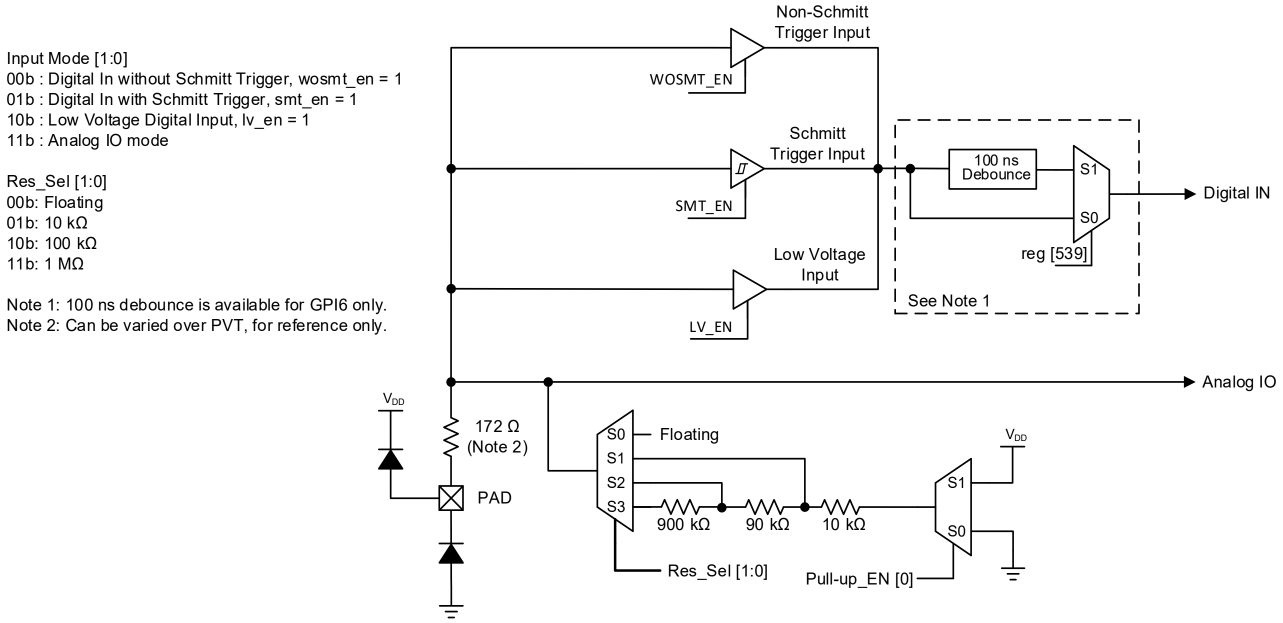


Figure 6. GPI IO Structure Diagram

5.8 GPI with Input LATCH IO Structure (V_{DD})

5.8.1 GPI with Input LATCH IO Structure (for GPIs 0, 1)

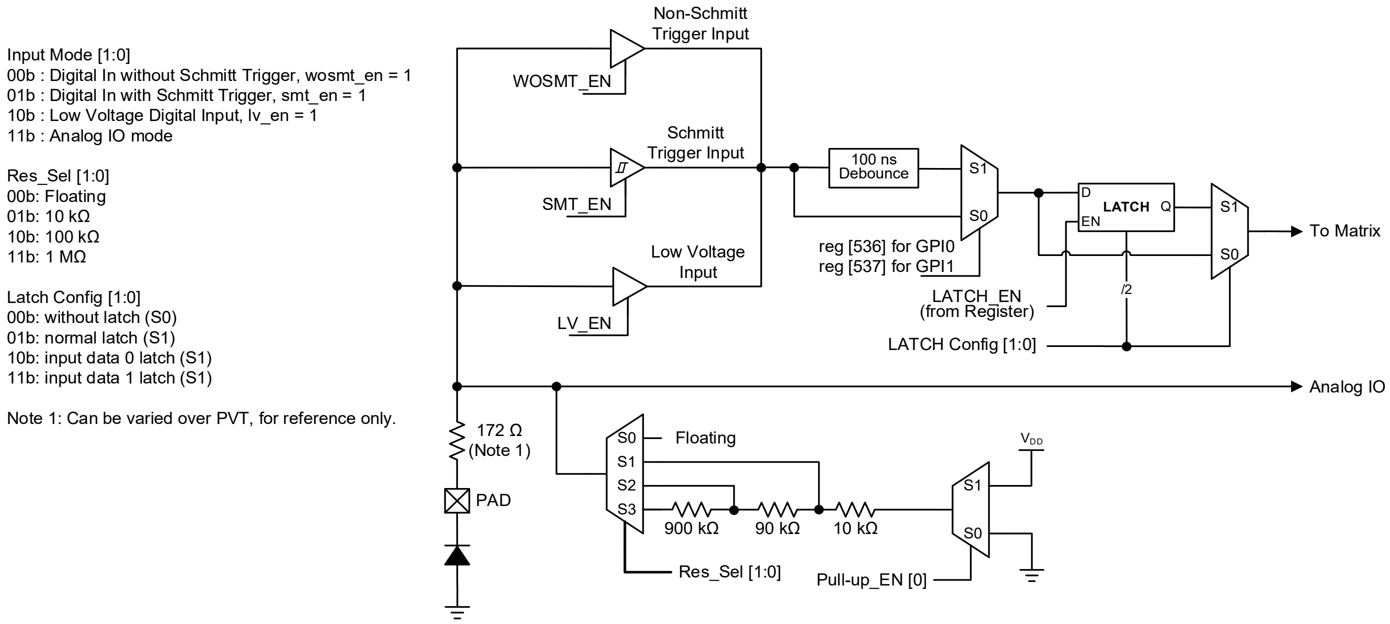


Figure 7. GPI with Input LATCH Structure Diagram

5.9 GPI with I²C Mode IO Structure (V_{DD})

5.9.1 SLG46880 GPI with I²C Mode Structure (for GPIs 2, 3)

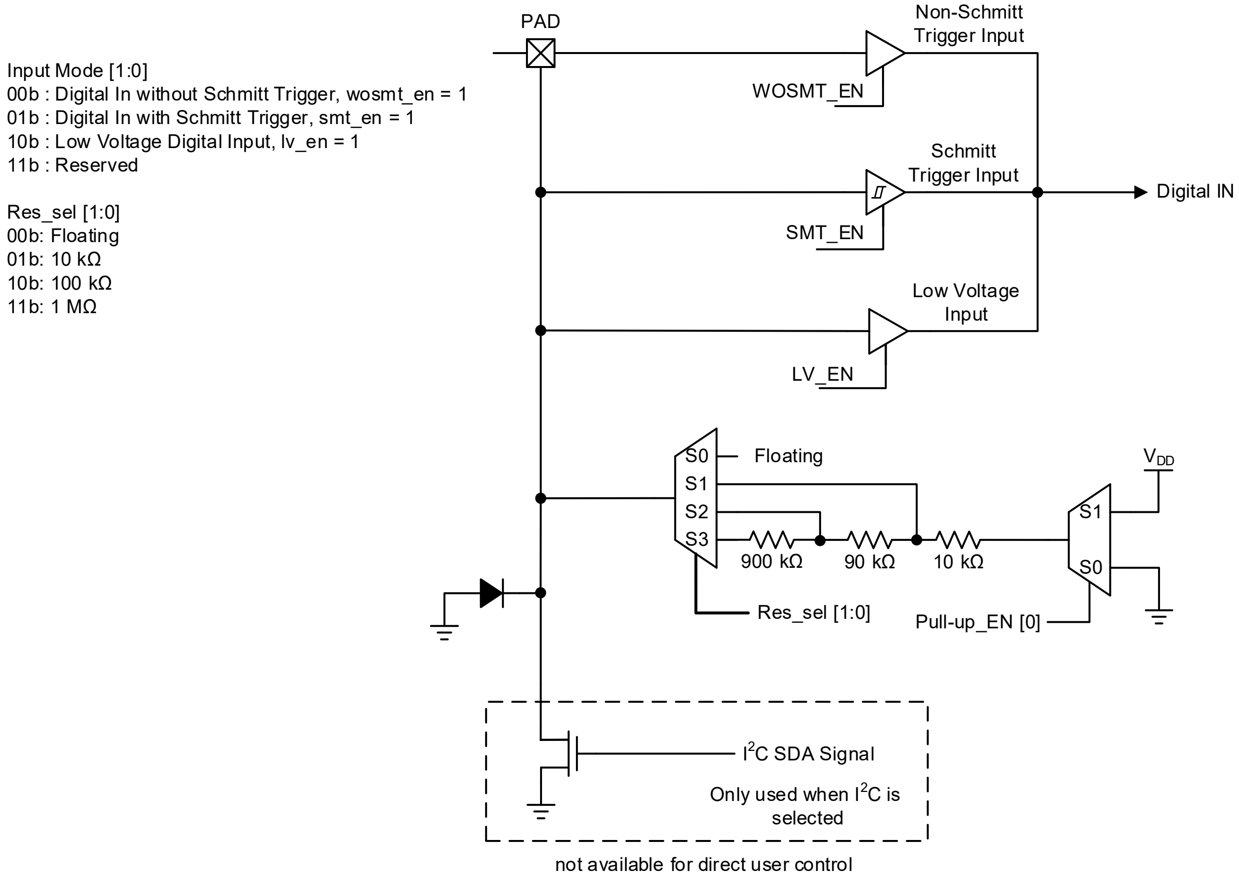


Figure 8. SLG46880 GPI with I²C Mode IO Structure Diagram

5.10 GPIO with Matrix OE IO Structure (V_{DD} or V_{DD2})

5.10.1 GPIO with Matrix OE IO Structure (for GPIOs 0, 1, 8, 9, 10, 11) with V_{DD}, and GPIOs 4, 5 with V_{DD2})

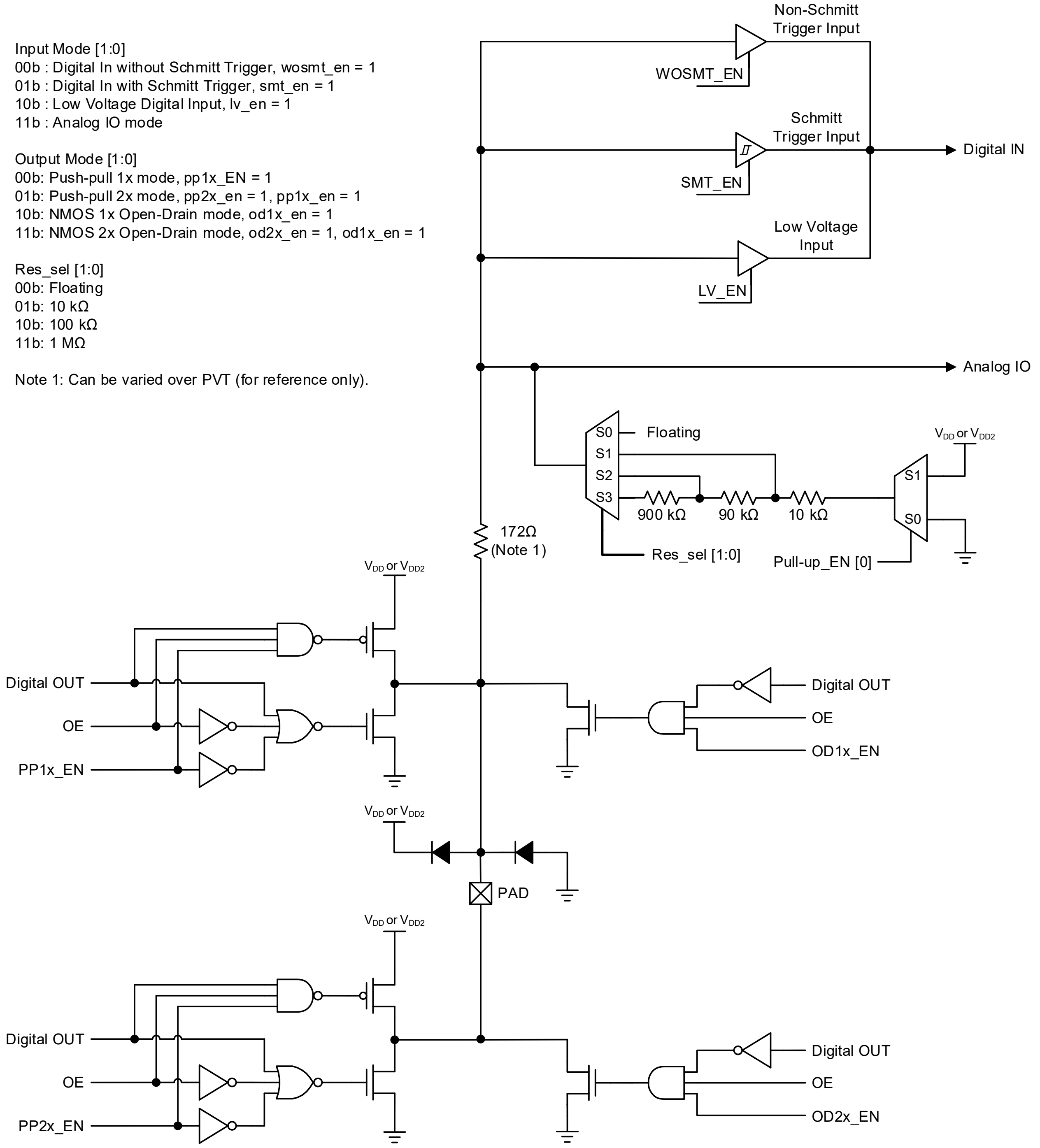


Figure 9. GPIO with Matrix OE IO Structure Diagram

5.11 GPIO with Matrix OE and Input LATCH IO Structure (V_{DD} or V_{DD2})

5.11.1 GPIO with Matrix OE and Input LATCH IO Structure (for GPIOs 2, 3 with V_{DD}, GPIOs 6, 7 with V_{DD2})

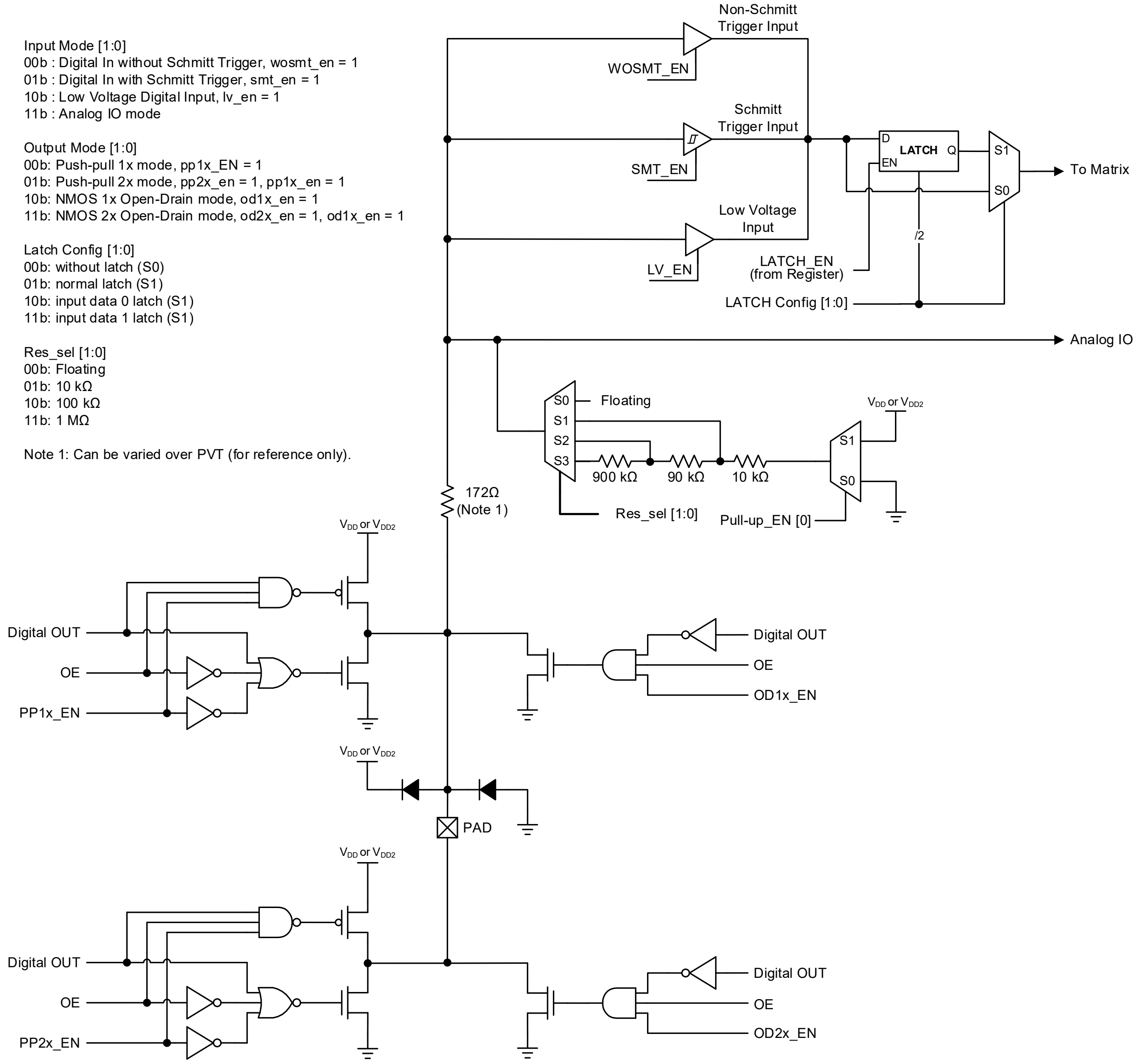


Figure 10. GPIO with Matrix OE and Input LATCH IO Structure Diagram

5.12 GPI with Input LATCH and Crystal Input IO Structure (V_{DD})

5.12.1 GPI with Input LATCH and Crystal Input IO Structure (for GPIs 4, 5)

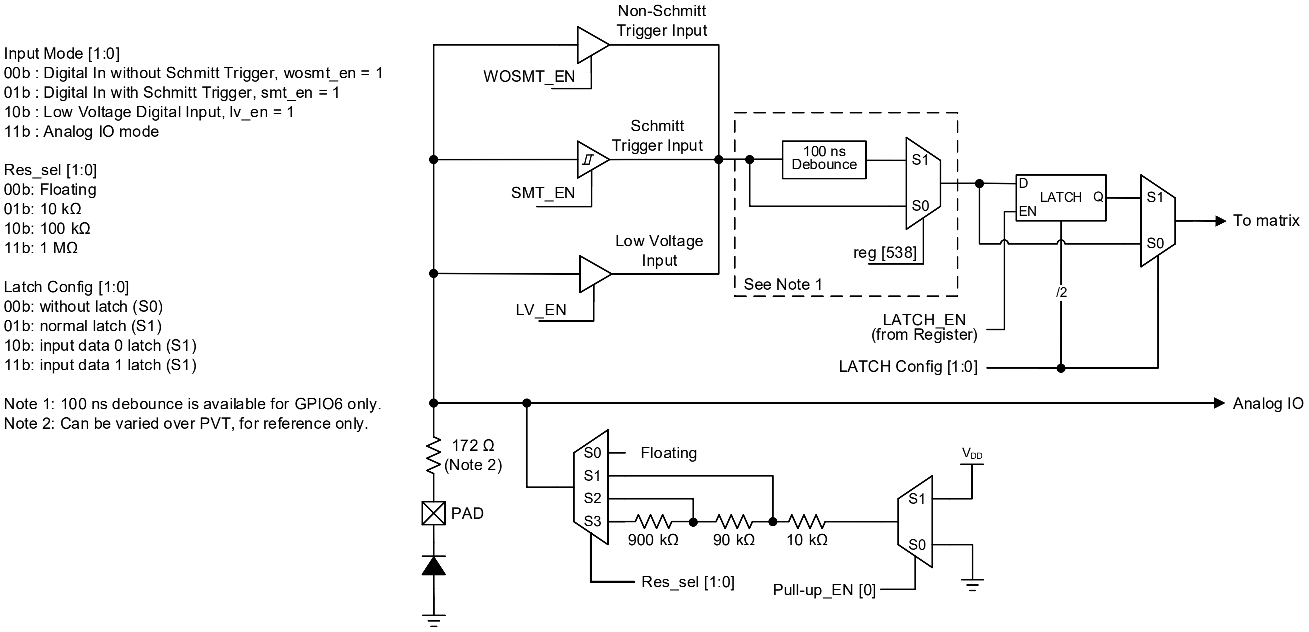


Figure 11. GPI with Input LATCH and Crystal Input IO Structure Diagram

5.13 GPO Register OE IO Structure (V_{DD} or V_{DD2})

5.13.1 GPO Register OE IO Structure (for GPOs 0, 5, 6, 7 for V_{DD}, and GPOs 1, 2, 3, 4 for V_{DD2})

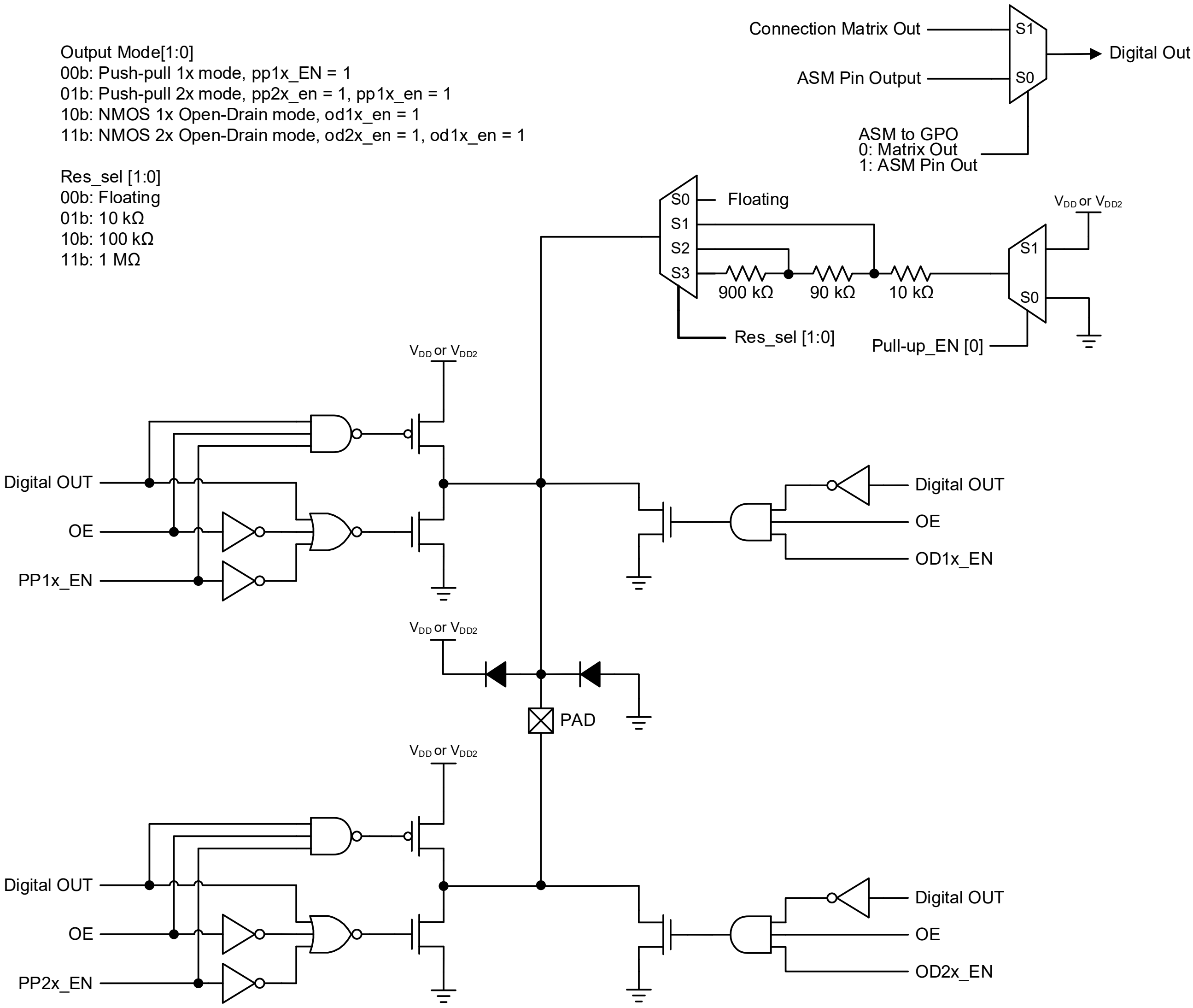


Figure 12. GPO Register OE IO Structure Diagram

5.14 IO Typical Performance

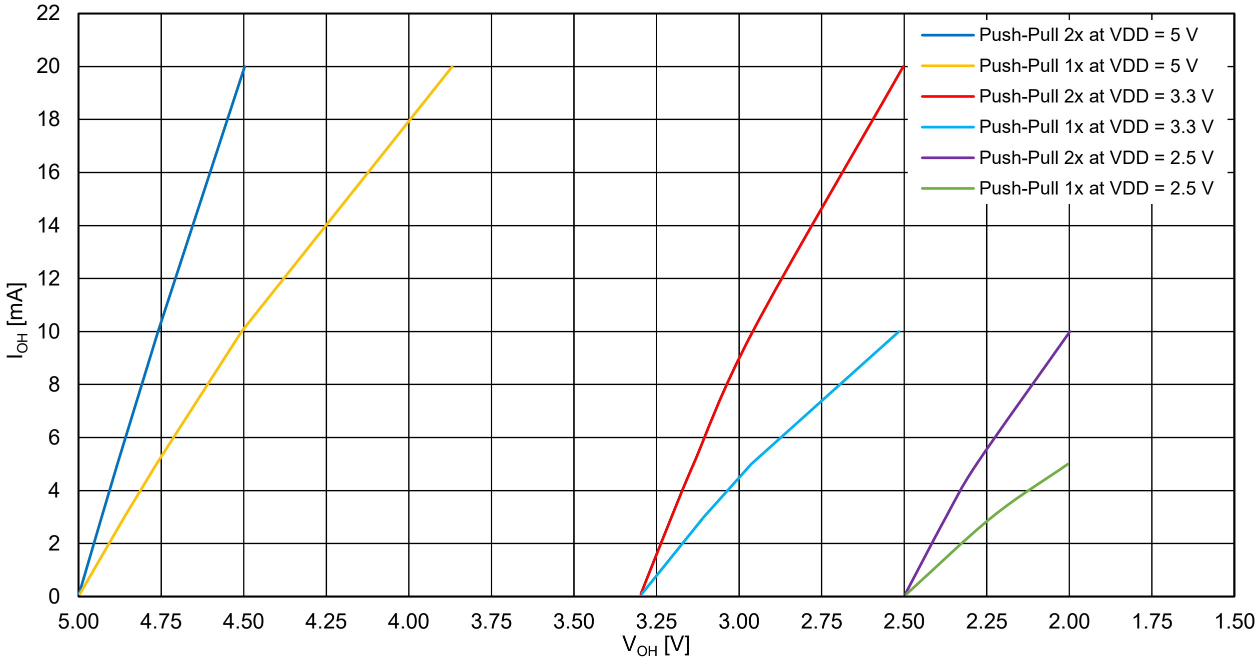


Figure 13. Typical High Level Output Current vs. High Level Output Voltage at T_A = +25 °C

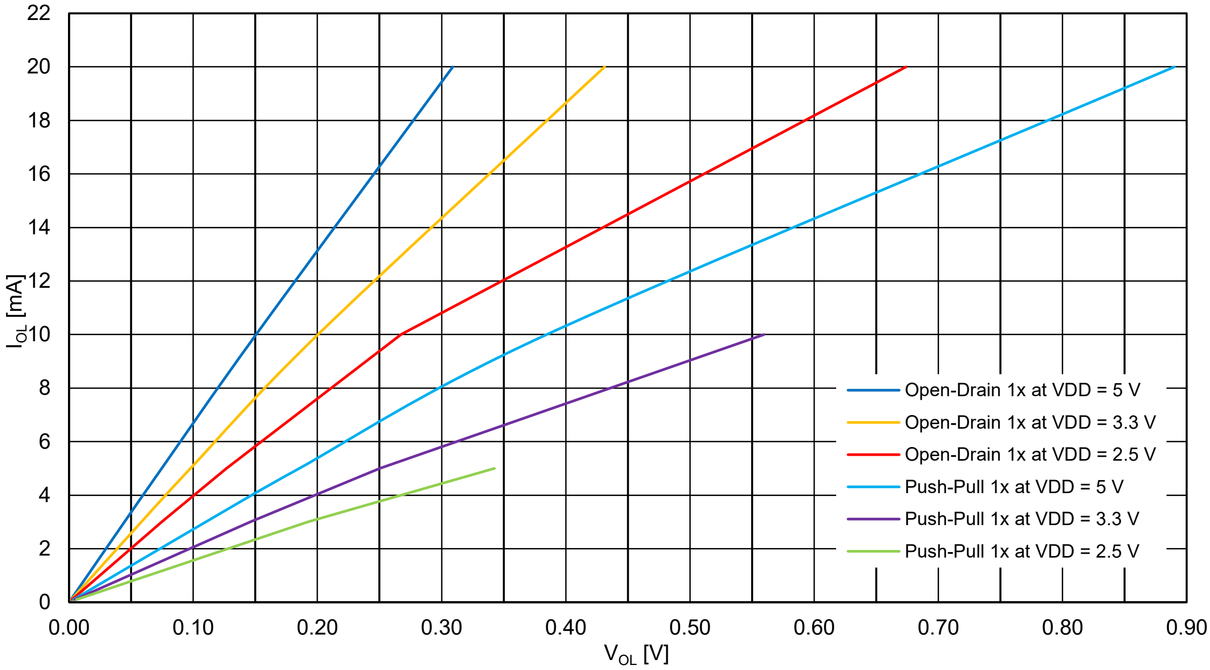


Figure 14. Typical Low Level Output Current vs. Low Level Output Voltage, 1x Drive at T_A = +25 °C

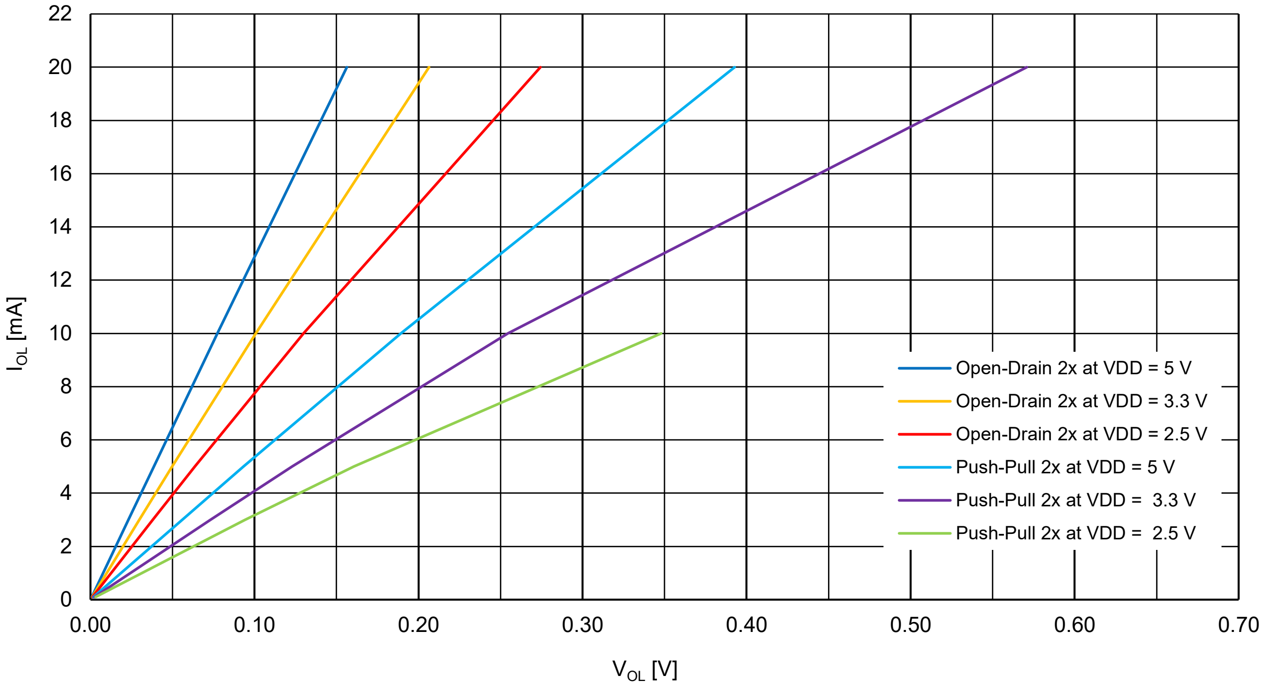


Figure 15. Typical Low Level Output Current vs. Low Level Output Voltage, 2x Drive at T_A = +25 °C

6. Connection Matrix

The Connection Matrix in the SLG46880-E is used to create the internal routing for internal functional macrocells of the device once it is programmed. The registers are programmed from the one-time NVM cell during Test Mode Operation. The output of each functional macrocell within the SLG46880-E has a specific digital bit code assigned to it that is either set to active 'HIGH' or inactive 'LOW', based on the design that is created. Once the 4096 register bits within the SLG46880-E are programmed a fully custom circuit will be created.

The Connection Matrix has 64 inputs, 84 outputs and 17 state dependent outputs. Each of the 64 inputs to the Connection Matrix is hard-wired to the digital output of a particular source macrocell, including IO pins, LUTs, analog comparators, other digital resources, such as V_{DD} and GND. The input to a digital macrocell uses a 6-bit register to select one of these 64 input lines.

For a complete list of the SLG46880-E's register table, see section 21 Registers.

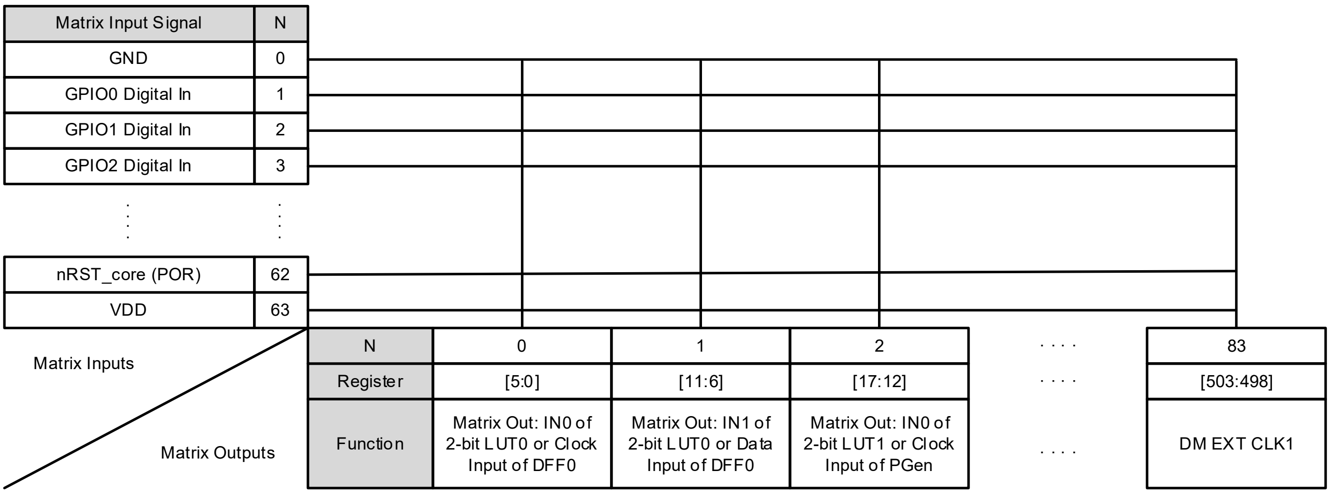


Figure 16. Connection Matrix

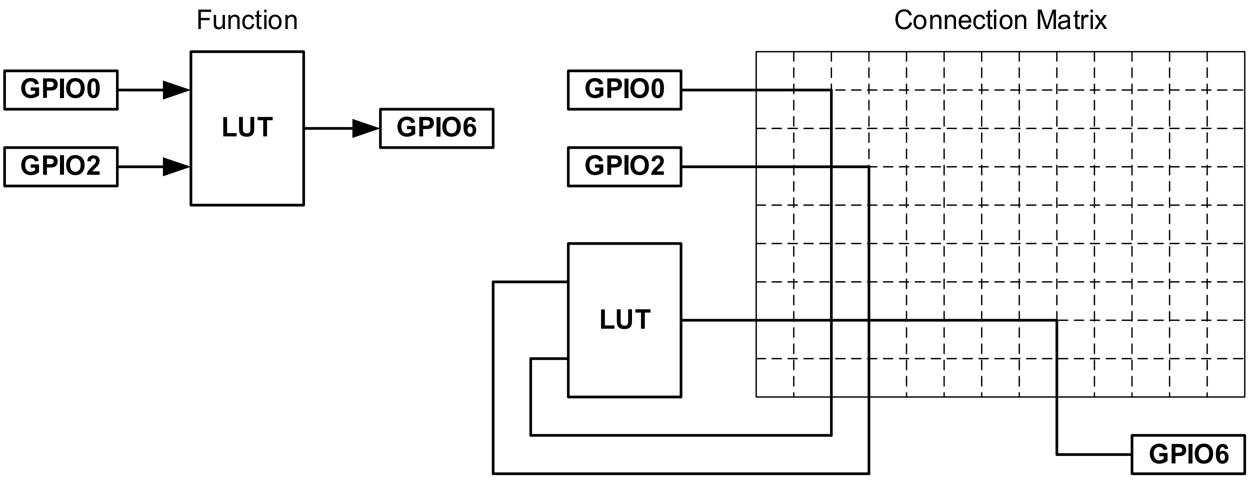


Figure 17. Connection Matrix Example

6.1 Matrix Input Table

Table 3. Matrix Input Table

Matrix Input Number	Matrix Input Signal Function	Matrix Decode					
		5	4	3	2	1	0
0	GND	0	0	0	0	0	0
1	GPIO0 Digital Input	0	0	0	0	0	1
2	GPIO1 Digital Input	0	0	0	0	1	0
3	GPIO2 Digital Input	0	0	0	0	1	1
4	GPI0 Digital Input	0	0	0	1	0	0
5	GPI1 Digital Input	0	0	0	1	0	1
6	GPIO3 Digital Input	0	0	0	1	1	0
7	GPIO4 Digital Input	0	0	0	1	1	1
8	2-bit LUT0/DFF0 Output	0	0	1	0	0	0
9	2-bit LUT1/PGen Output	0	0	1	0	0	1
10	3-bit LUT0/DFF1 Output	0	0	1	0	1	0
11	3-bit LUT1/DFF2 Output	0	0	1	0	1	1
12	3-bit LUT2/DFF3 Output	0	0	1	1	0	0
13	3-bit LUT3/DFF4 Output	0	0	1	1	0	1
14	3-bit LUT4/CNT_DLY1(8bit) Output	0	0	1	1	1	0
15	3-bit LUT5/CNT_DLY2(8bit) Output	0	0	1	1	1	1
16	3-bit LUT6/CNT_DLY3(8bit) Output	0	1	0	0	0	0
17	3-bit LUT7/CNT_DLY4(8bit) Output	0	1	0	0	0	1
18	4-bit LUT0/CNT_DLY0(16bit) Output	0	1	0	0	1	0
19	3-bit LUT8/Pipe Delay Output0/Ripple CNT Output0	0	1	0	0	1	1
20	Pipe Delay Output1/Ripple CNT Output1	0	1	0	1	0	0
21	Internal 2.048 MHz OSC Output	0	1	0	1	0	1
22	Internal 2.048 kHz OSC Output	0	1	0	1	1	0
23	Internal 25 MHz OSC Output	0	1	0	1	1	1
24	Filter/Edge Detect Output/Ripple CNT Output2	0	1	1	0	0	0
25	Programmable Delay with Edge Detector Output	0	1	1	0	0	1
26	f(1) Function Output0	0	1	1	0	1	0
27	f(1) Function Output1	0	1	1	0	1	1
28	f(1) Function Output2	0	1	1	1	0	0
29	DM0_0 Macrocell Output0	0	1	1	1	0	1
30	DM0_0 Macrocell Output1	0	1	1	1	1	0
31	DM0_0 Macrocell Output2	0	1	1	1	1	1
32	GPI2/SDA Digital Input or I^2C_virtual_0 Input	1	0	0	0	0	0

Matrix Input Number	Matrix Input Signal Function	Matrix Decode					
		5	4	3	2	1	0
33	GPI3/SCL Digital Input or I^2C_virtual_1 Input	1	0	0	0	0	1
34	I^2C_virtual_2 Input	1	0	0	0	1	0
35	I^2C_virtual_3 Input	1	0	0	0	1	1
36	I^2C_virtual_4 Input	1	0	0	1	0	0
37	I^2C_virtual_5 Input	1	0	0	1	0	1
38	I^2C_virtual_6 Input	1	0	0	1	1	0
39	I^2C_virtual_7 Input	1	0	0	1	1	1
40	DM0_1 Macrocell Output0	1	0	1	0	0	0
41	DM0_1 Macrocell Output1	1	0	1	0	0	1
42	DM0_1 Macrocell Output2	1	0	1	0	1	0
43	ASM Connection Matrix Output RAM 0	1	0	1	0	1	1
44	ASM Connection Matrix Output RAM 1	1	0	1	1	0	0
45	ASM Connection Matrix Output RAM 2	1	0	1	1	0	1
46	ASM Connection Matrix Output RAM 3	1	0	1	1	1	0
47	GPIO5 Digital Input	1	0	1	1	1	1
48	GPIO6 Digital Input	1	1	0	0	0	0
49	GPIO7 Digital Input	1	1	0	0	0	1
50	GPIO8 Digital Input	1	1	0	0	1	0
51	GPI4 Digital Input/Crystal OSC	1	1	0	0	1	1
52	GPI5 Digital Input	1	1	0	1	0	0
53	GPI6 Digital Input	1	1	0	1	0	1
54	GPI7 Digital Input	1	1	0	1	1	0
55	GPIO9 Digital Input	1	1	0	1	1	1
56	ACMP0H Output	1	1	1	0	0	0
57	ACMP1H Output	1	1	1	0	0	1
58	ACMP2L Output	1	1	1	0	1	0
59	ACMP3L output	1	1	1	0	1	1
60	GPIO10 Digital Input	1	1	1	1	0	0
61	GPIO11 Digital Input	1	1	1	1	0	1
62	nRST_core (POR) as matrix input	1	1	1	1	1	0
63	V_{DD}	1	1	1	1	1	1

6.2 Matrix Output Table

Table 4. Matrix Output Table

Register Bit Address	Matrix Output Signal Function	Matrix Output Number
[5:0]	Matrix Out 0: IN0 of 2-bit LUT0 or Clock Input of DFF0	0
[11:6]	Matrix Out 1: IN1 of 2-bit LUT0 or Data Input of DFF0	1
[17:12]	Matrix Out 2: IN0 of 2-bit LUT1 or Clock Input of PGen	2
[23:18]	Matrix Out 3: IN1 of 2-bit LUT1 or nRST of PGen	3
[29:24]	Matrix Out 4: IN0 of 3-bit LUT0 or Clock Input of DFF1	4
[35:30]	Matrix Out 5: IN1 of 3-bit LUT0 or Data Input of DFF1	5
[41:36]	Matrix Out 6: IN2 of 3-bit LUT0 or nRST (nSET) of DFF1	6
[47:42]	Matrix Out 7: IN0 of 3-bit LUT1 or Clock Input of DFF2	7
[53:48]	Matrix Out 8: IN1 of 3-bit LUT1 or Data Input of DFF2	8
[59:54]	Matrix Out 9: IN2 of 3-bit LUT1 or nRST (nSET) of DFF2	9
[65:60]	Matrix Out 10: IN0 of 3-bit LUT2 or Clock Input of DFF3	10
[71:66]	Matrix Out 11: IN1 of 3-bit LUT2 or Data Input of DFF3	11
[77:72]	Matrix Out 12: IN2 of 3-bit LUT2 or nRST (nSET) of DFF3	12
[83:78]	Matrix Out 13: IN0 of 3-bit LUT3 or Clock Input of DFF4	13
[89:84]	Matrix Out 14: IN1 of 3-bit LUT3 or Data Input of DFF4	14
[95:90]	Matrix Out 15: IN2 of 3-bit LUT3 or nRST (nSET) of DFF4	15
[101:96]	Matrix Out 16:IN0 of 3-bit LUT4 or Delay1 Input (or Counter1 nRST Input)	16
[107:102]	Matrix Out 17:IN1 of 3-bit LUT4 or External Clock1 Input of Delay1 (or Counter1)	17
[113:108]	Matrix Out 18:IN2 of 3-bit LUT4	18
[119:114]	Matrix Out 19:IN0 of 3-bit LUT5 or Delay2 Input (or Counter2 nRST Input)	19
[125:120]	Matrix Out 20:IN1 of 3-bit LUT5 or External Clock1 Input of Delay2 (or Counter2)	20
[131:126]	Matrix Out 21:IN2 of 3-bit LUT5	21
[137:132]	Matrix Out 22:IN0 of 3-bit LUT6 or Delay3 Input (or Counter3 nRST Input)	22
[143:138]	Matrix Out 23:IN1 of 3-bit LUT6 or External Clock1 Input of Delay3 (or Counter3)	23
[149:144]	Matrix Out 24:IN2 of 3-bit LUT6	24
[155:150]	Matrix Out 25:IN0 of 3-bit LUT7 or Delay4 Input (or Counter4 nRST Input)	25
[161:156]	Matrix Out 26:IN1 of 3-bit LUT7 or External Clock1 Input of Delay4 (or Counter4)	26
[167:162]	Matrix Out 27:IN2 of 3-bit LUT7	27
[173:168]	Matrix Out 28:IN0 of 3-bit LUT8 or Input of Pipe Delay	28
[179:174]	Matrix Out 29:IN1 of 3-bit LUT8 or nRST of Pipe Delay	29
[185:180]	Matrix Out 30:IN2 of 3-bit LUT8 or Clock of Pipe Delay	30
[191:186]	Matrix Out 31:IN0 of 4-bit LUT0 or Delay0 Input (or Counter0 nRST Input)	31
[197:192]	Matrix Out 32:IN1 of 4-bit LUT0 or External Clock Input of Delay0 (or Counter0)	32
[203:198]	Matrix Out 33:IN2 of 4-bit LUT0 or UP Input of FSM0	33

Register Bit Address	Matrix Output Signal Function	Matrix Output Number
[209:204]	Matrix Out 34:IN3 of 4-bit LUT0 or KEEP Input of FSM0	34
[215:210]	Matrix Out 35: ACMP0H Power-down	35
[221:216]	Matrix Out 36: ACMP1H Power-down	36
[227:222]	Matrix Out 37: ACMP2L Power-down	37
[233:228]	Matrix Out 38: ACMP3L Power-down	38
[239:234]	Matrix Out 39: GPO7 DOUT	39
[245:240]	Matrix Out 40: GPO0 DOUT	40
[251:246]	Matrix Out 41: GPIO0 DOUT	41
[257:252]	Matrix Out 42: GPIO0 DOUT OE	42
[263:258]	Matrix Out 43: GPIO1 DOUT	43
[269:264]	Matrix Out 44: GPIO1 DOUT OE	44
[275:270]	Matrix Out 45: GPIO2 DOUT	45
[281:276]	Matrix Out 46: GPIO2 DOUT OE	46
[287:282]	Matrix Out 47: GPIO3 DOUT	47
[293:288]	Matrix Out 48: GPIO3 DOUT OE	48
[299:294]	Matrix Out 49: GPIO4 DOUT	49
[305:300]	Matrix Out 50: GPIO4 DOUT OE	50
[311:306]	Matrix Out 51: GPIO5 DOUT	51
[317:312]	Matrix Out 52: GPIO5 DOUT OE	52
[323:318]	Matrix Out 53: GPO1 DOUT	53
[329:324]	Matrix Out 54: GPO2 DOUT	54
[335:330]	Matrix Out 55: GPO3 DOUT	55
[341:336]	Matrix Out 56: GPO4 DOUT	56
[347:342]	Matrix Out 57: GPIO6 DOUT OE	57
[353:348]	Matrix Out 58: GPIO6 DOUT	58
[359:354]	Matrix Out 59: GPIO7 DOUT	59
[365:360]	Matrix Out 60: GPIO7 DOUT OE	60
[371:366]	Matrix Out 61: GPIO8 DOUT OE	61
[377:372]	Matrix Out 62: GPIO8 DOUT	62
[383:378]	Matrix Out 63: GPIO9 DOUT OE	63
[389:384]	Matrix Out 64: GPIO9 DOUT	64
[395:390]	Matrix Out 65: GPIO10 DOUT OE	65
[401:396]	Matrix Out 66: GPIO10 DOUT	66
[407:402]	Matrix Out 67: GPIO11 DOUT OE	67
[413:408]	Matrix Out 68: GPIO11 DOUT	68
[419:414]	Matrix Out 69: GPO5 DOUT	69

Register Bit Address	Matrix Output Signal Function	Matrix Output Number
[425:420]	Matrix Out 70: GPO6 DOUT	70
[431:426]	Matrix Out 71: ASM nRST	71
[437:432]	Matrix Out 72: OSC0 ENABLE	72
[443:438]	Matrix Out 73: OSC1 ENABLE	73
[449:444]	Matrix Out 74: OSC2 ENABLE	74
[455:450]	Matrix Out 75: Filter/Edge detect input	75
[461:456]	Matrix Out 76: F1 interrupt	76
[467:462]	Matrix Out 77: Programmable delay/edge detect input	77
[473:468]	Matrix Out 78: Temp sensor/Crystal OSC/V_{REF} Out_0/V_{REF} Out_1 Power Up	78
[479:474]	Matrix Out 79: GPI LATCH enable	79
[485:480]	Matrix Out 80: GPIO LATCH enable	80
[491:486]	Matrix Out 81: BG enable	81
[497:492]	DM EXT CLK0	82
[503:498]	DM_EXT_CLK1	83
[1] For each address, the two most significant bits are unused.		

6.3 Connection Matrix Virtual Inputs

As mentioned previously, the Connection Matrix inputs come from the outputs of various digital macrocells on the device. Eight of the Connection Matrix inputs have the special characteristic that the state of these signal lines comes from a corresponding data bit written as a register value via I^{2}C. This gives the user the ability to write data via the serial channel, and have this information translated into signals that can be driven into the Connection Matrix and from the Connection Matrix to the digital inputs of other macrocells on the device. The I^{2}C address for reading and writing these register values is at 0x1DB (475).

Six of the eight Connection Matrix Virtual Inputs are dedicated to this virtual input function. An I^{2}C write command to these register bits will set the signal values going into the Connection Matrix to the desired state. A read command to these register bits will read either the original data values coming from the NVM memory bits (that were loaded during the initial device startup), or the values from a previous write command (if that has happened).

Two of the eight Connection Matrix Virtual Inputs are shared with Pin digital inputs (GPI3/SCL Digital Input or I^{2}C_virtual_1 Input), and (GPI2/SDA Digital Input or I^{2}C_virtual_0 Input). If the virtual input mode is selected, an I^{2}C write command to these register bits will set the signal values going into the Connection Matrix to the desired state. A read command to these register bits will read either the original data values coming from the NVM memory bits (that were loaded during the initial device startup), or the values from a previous write command (if that has happened). The I^{2}C disable/enable register bit [4084] selects whether the Connection Matrix input comes from the Pin input or from the virtual register.

- Select SCL and Virtual Input 1 or GPI3/SCL.
- Select SDA and Virtual Input 0 or GPI2/SDA.

See Table 5 for Connection Matrix Virtual Inputs.

Table 5. Connection Matrix Virtual Inputs

Matrix Input Number	Matrix Input Signal Function	Register Bit Addresses (dec)
32	I^2C_virtual_0 Input	[3800]
33	I^2C_virtual_1 Input	[3801]
34	I^2C_virtual_2 Input	[3802]
35	I^2C_virtual_3 Input	[3803]
36	I^2C_virtual_4 Input	[3804]
37	I^2C_virtual_5 Input	[3805]
38	I^2C_virtual_6 Input	[3806]
39	I^2C_virtual_7 Input	[3807]

6.4 Connection Matrix Virtual Outputs

The digital outputs of the various macrocells are routed to the Connection Matrix to enable interconnections to the inputs of other macrocells in the device. At the same time, it is possible to read the state of each of the macrocell outputs as a register value via I^2C. This option, called Connection Matrix Virtual Outputs, allows the user to remotely read the values of each macrocell output. The I^2C addresses for reading these register values are 0x1D7 (471) to 0x1DE (478). Write commands to these same register values will be ignored (with the exception of the Virtual Input register bits at 0x1DB (475)).

7. Combination Function Macrocells

The SLG46880-E has 12 combination function macrocells that can serve more than one logic or timing function. In each case, they can serve as a Look Up Table (LUT), or as another logic or timing function. See the list below for the functions that can be implemented in these macrocells.

- One macrocell that can serve as either 2-bit LUT or as D Flip-Flop.
- Four macrocells that can serve as either 3-bit LUTs or as D Flip-Flops with Set/Reset Input.
- One macrocell that can serve as either 3-bit LUT or as Pipe Delay/Ripple Counter.
- One macrocell that can serve as either 2-bit LUT or as Programmable Pattern Generator (PGen).
- One macrocell that can serve as either 4-bit LUT or as 16-Bit Counter/Delay/FSM.
- Four macrocells that can serve as either 3-bit LUTs or as 8-Bit Counter/Delays.

Inputs/Outputs for the 12 combination function macrocells are configured from the connection matrix with specific logic functions which are defined by the state of NVM bits.

When used as a LUT to implement combinatorial logic functions, the outputs of the LUTs can be configured to any user defined function, including the following standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR). Inputs/Outputs for the 11 combination function macrocells are configured from the connection matrix with specific logic functions being defined by the state of NVM bits.

7.1 2-Bit LUT or D Flip-Flop Macrocells

There is one macrocell that can serve as either 2-bit LUT or as D Flip-Flop. When used to implement LUT functions, the 2-bit LUT takes in two input signals from the connection matrix and produces a single output, which goes back into the connection matrix. When used to implement D Flip-Flop function, the two input signals from the connection matrix go to the data (D) and clock (CLK) inputs for the Flip-Flop, with the output going back to the connection matrix.

The operation of the D Flip-Flop and LATCH will follow the functional descriptions below:

- DFF: CLK is rising edge triggered, then Q = D; otherwise, Q will not change.
- LATCH: when CLK is LOW, then Q = D; otherwise, Q remains its previous value (input D has no effect on the output, when CLK is HIGH).

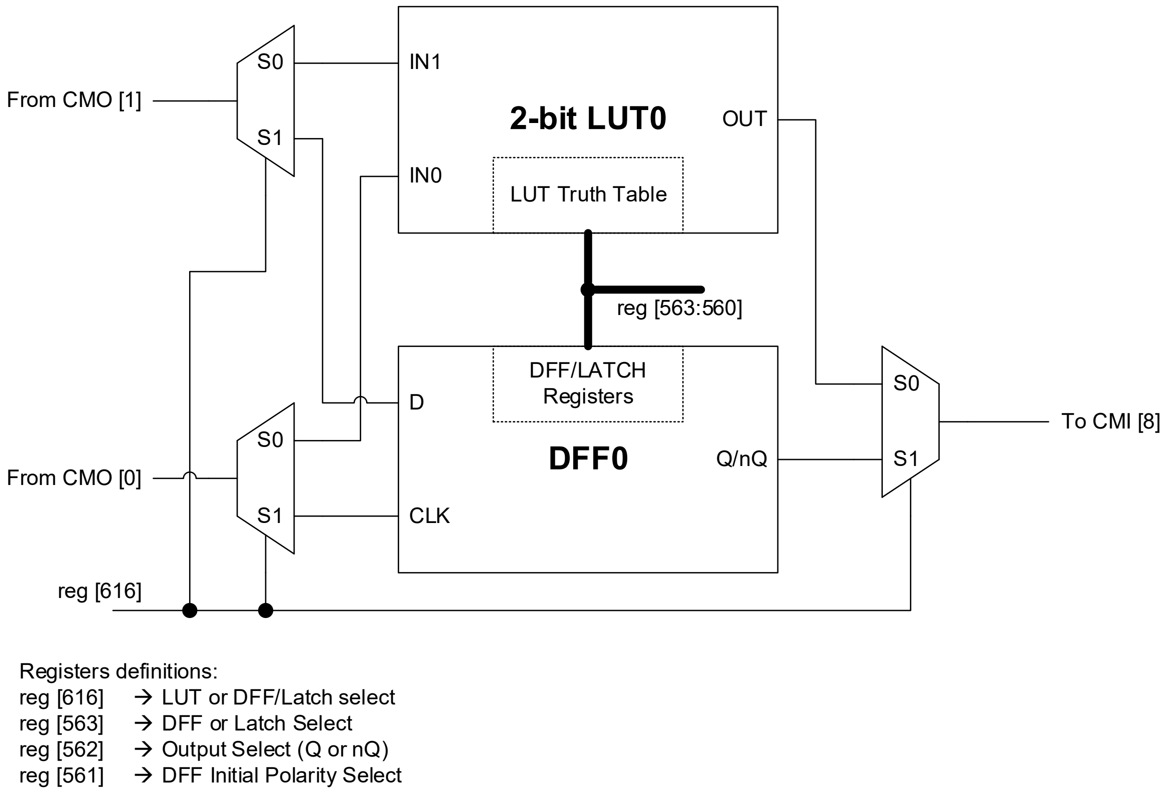


Figure 18. 2-bit LUT0 or DFF0

7.1.1 2-Bit LUT or D Flip-Flop Macrocell Used as 2-Bit LUT

Table 6. 2-bit LUT0 Truth Table

IN1	IN0	OUT	
0	0	register [560]	LSB
0	1	register [561]	
1	0	register [562]	
1	1	register [563]	MSB

This macrocell, when programmed for a LUT function, uses a 4-bit register to define their output function:

- 2-bit LUT0 is defined by registers [563:560].

Table 7 shows the register bits for the standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR) that can be created within each of the 2-bit LUT logic cells.

Table 7. 2-bit LUT Standard Digital Functions

Function	MSB			LSB
AND-2	1	0	0	0
NAND-2	0	1	1	1
OR-2	1	1	1	0
NOR-2	0	0	0	1
XOR-2	0	1	1	0
XNOR-2	1	0	0	1

7.1.2 Initial Polarity Operations

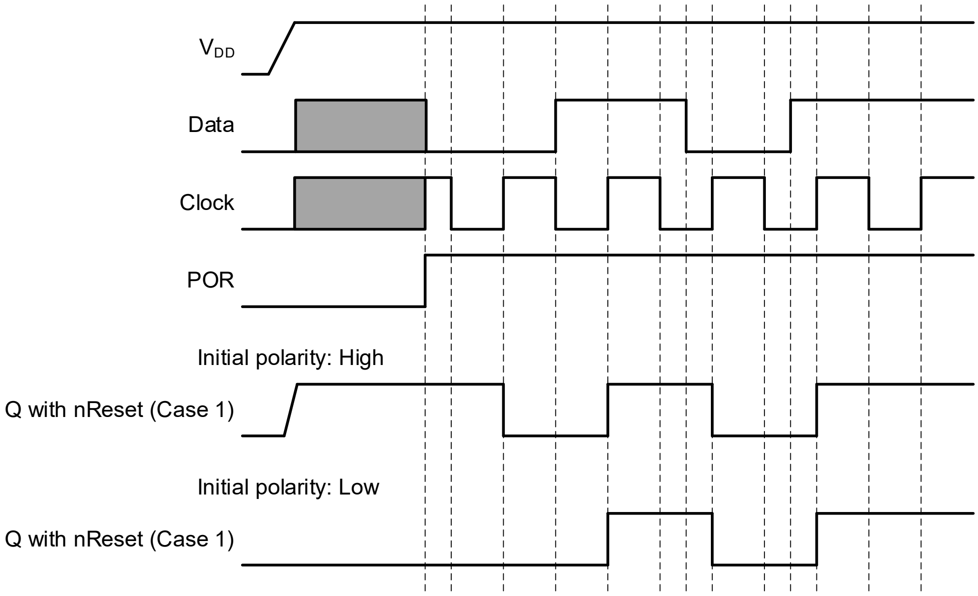


Figure 19. DFF Polarity Operations

7.2 2-bit LUT or Programmable Pattern Generator

The SLG46880-E has one combination function macrocell that can serve as a logic or timing function. This macrocell can serve as a Look Up Table (LUT), or Programmable Pattern Generator (PGen).

When used to implement LUT functions, the 2-bit LUT takes in two input signals from the connection matrix and produces a single output, which goes back into the connection matrix. When used as a LUT to implement combinatorial logic functions, the outputs of the LUT can be configured to any user defined function, including the following standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR). The user can also define the combinatorial relationship between inputs and outputs to be any selectable function.

When operating as a Programmable Pattern Generator, the output of the macrocell with clock out a sequence of two to sixteen bits that are user selectable in their bit values, and user selectable in the number of bits (up to sixteen) that are output before the pattern repeats.

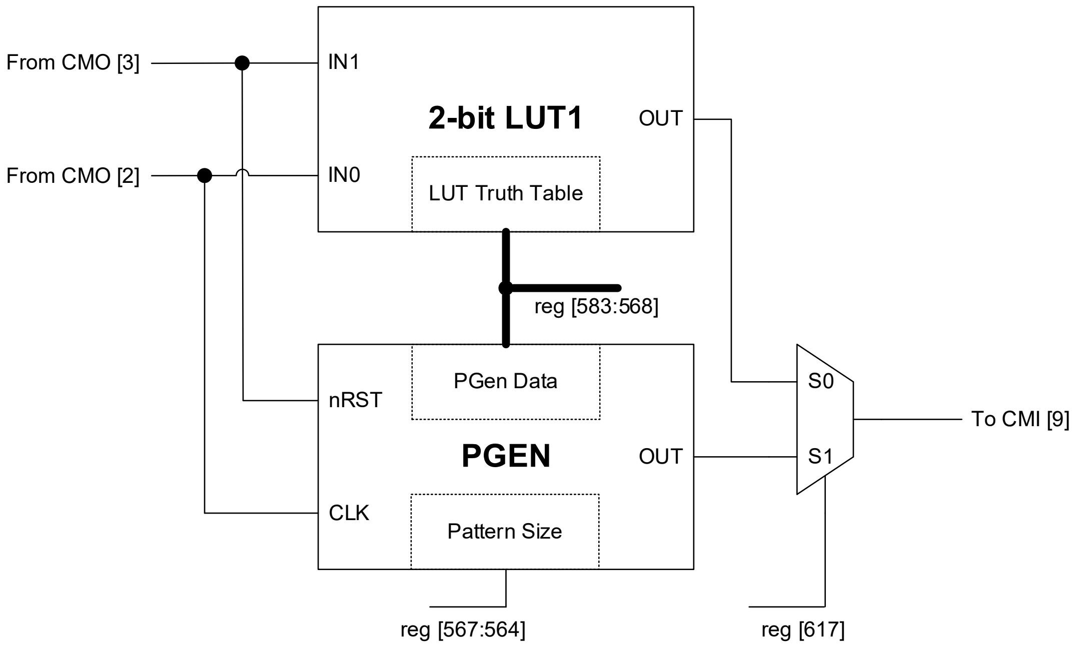


Figure 20. 2-bit LUT1 or PGen

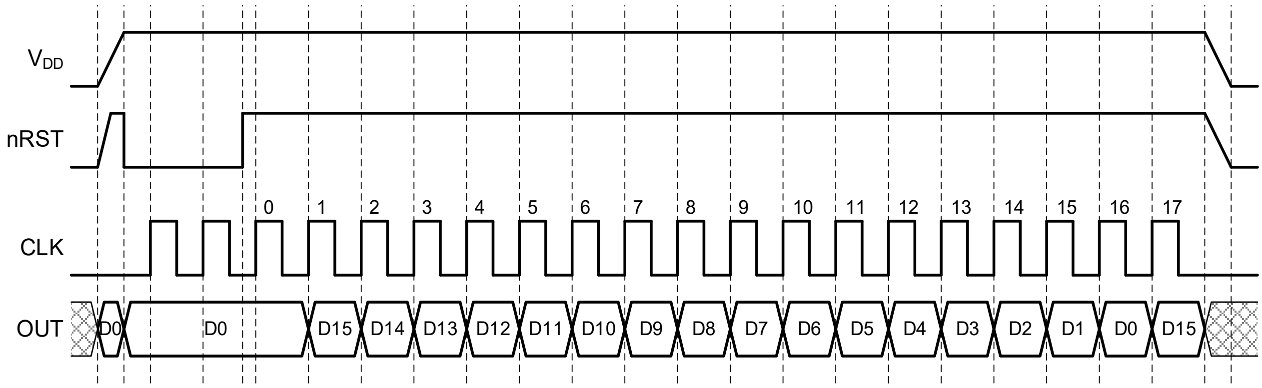


Figure 21. PGen Timing Diagram

7.2.1 2-Bit LUT or PGen Macrocell Used as 2-Bit LUT

Table 8. 2-bit LUT1 Truth Table

IN1	IN0	OUT	
0	0	register [564]	LSB
0	1	register [565]	
1	0	register [566]	
1	1	register [567]	MSB

This macrocell, when programmed for a LUT function, uses a 4-bit register to define their output function:

- 2-bit LUT1 is defined by registers [567:564].

Table 9 shows the register bits for the standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR) that can be created within each of the 2-bit LUT logic cells.

Table 9. 2-bit LUT Standard Digital Functions

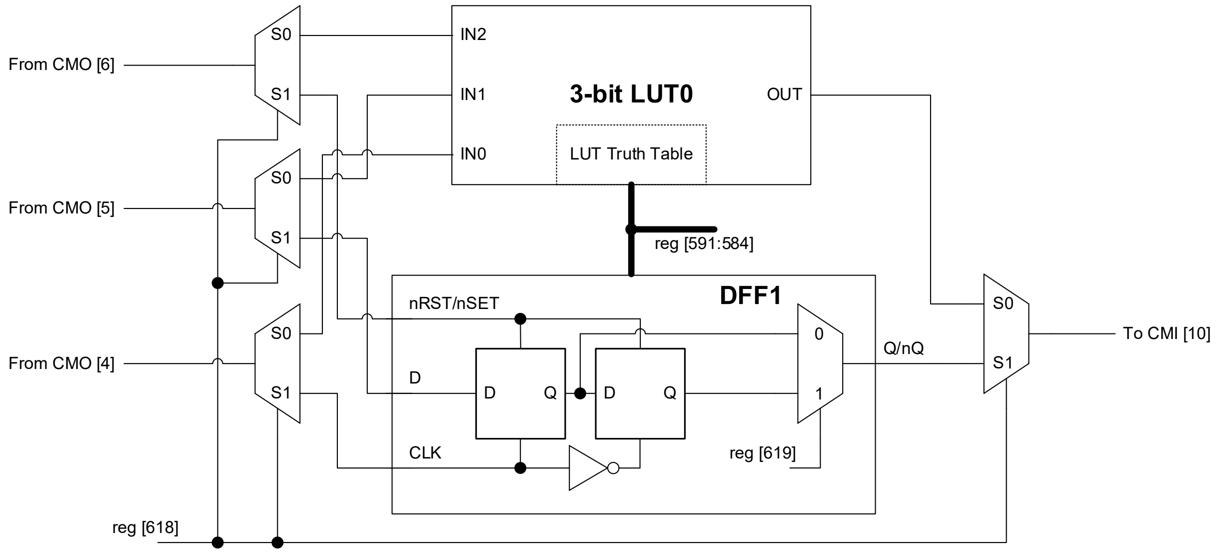
Function	MSB			LSB
AND-2	1	0	0	0
NAND-2	0	1	1	1
OR-2	1	1	1	0
NOR-2	0	0	0	1
XOR-2	0	1	1	0
XNOR-2	1	0	0	1

7.3 3-Bit LUT or D Flip-Flop with Set/Reset Macrocells

There are four macrocells that can serve as either 3-bit LUTs or as D Flip-Flops with Set/Reset inputs. When used to implement LUT functions, the 3-bit LUTs each take in three input signals from the connection matrix and produce a single output, which goes back into the connection matrix. When used to implement D Flip-Flop function, the three input signals from the connection matrix go to the data (D) and clock (CLK), and Reset/Set (nRST/nSET) inputs for the Flip-Flop, with the output going back to the connection matrix.

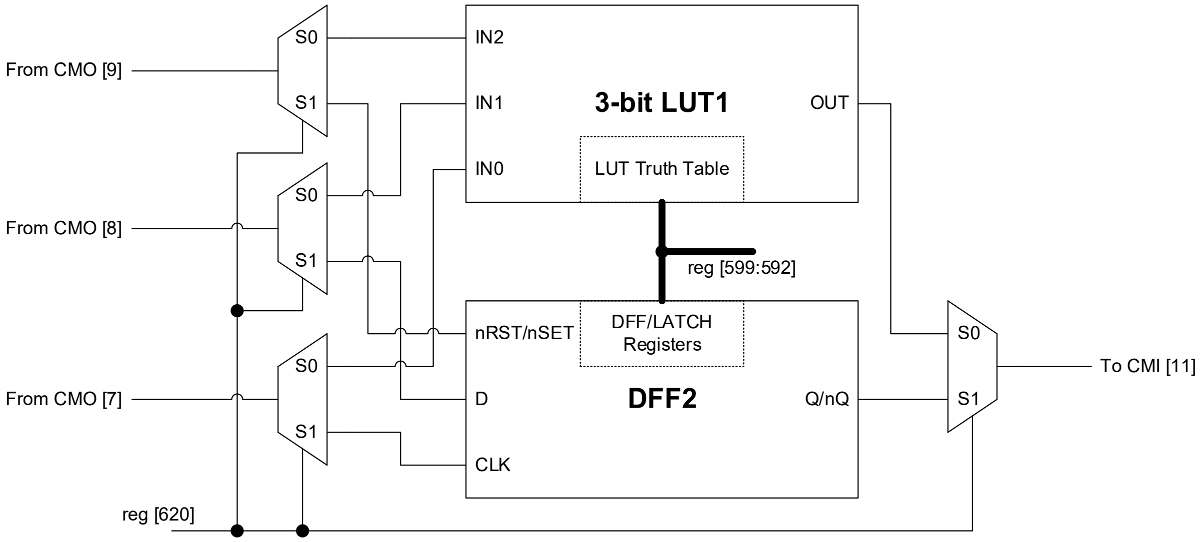
DFF1 operation will flow the functional description below:

- If register [619] = 0, and the CLK is rising edge triggered, then Q = D, otherwise Q will not change.
- If register [619] = 1, then data from D is written into the DFF by the rising edge on CLK and output to Q by the falling edge on CLK.



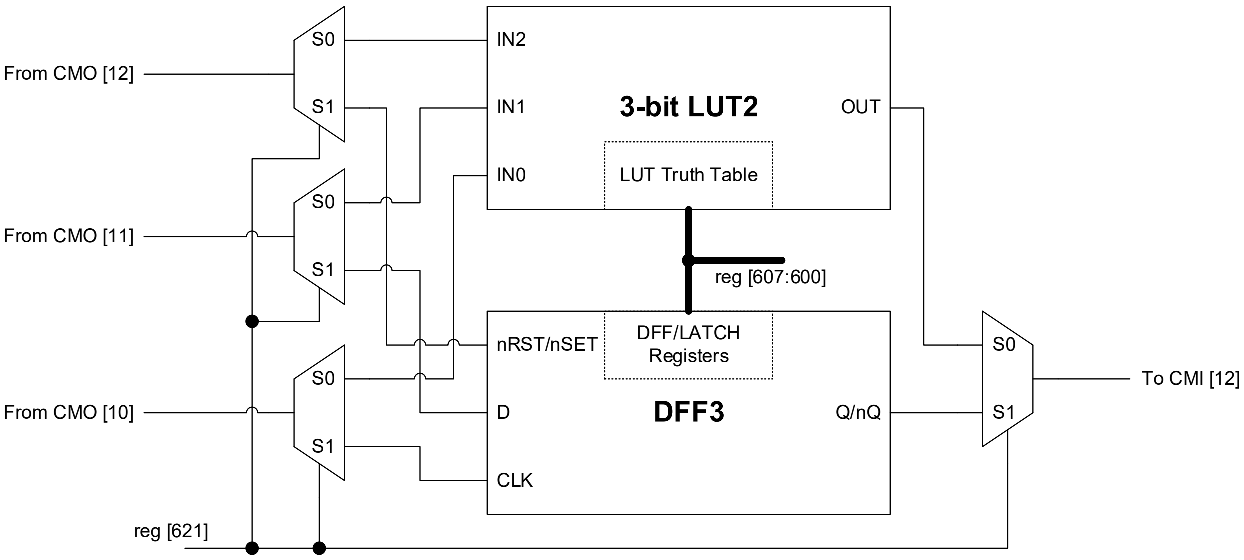
Registers definitions:
reg [618] → LUT or DFF/Latch select
reg [591] → DFF or Latch Select
reg [590] → Output Select (Q or nQ)
reg [589] → DFF nRST or nSET Select
reg [588] → DFF Initial Polarity Select
reg [619] → Selects output from one or two DFF

Figure 22. 3-bit LUT0 or DFF1



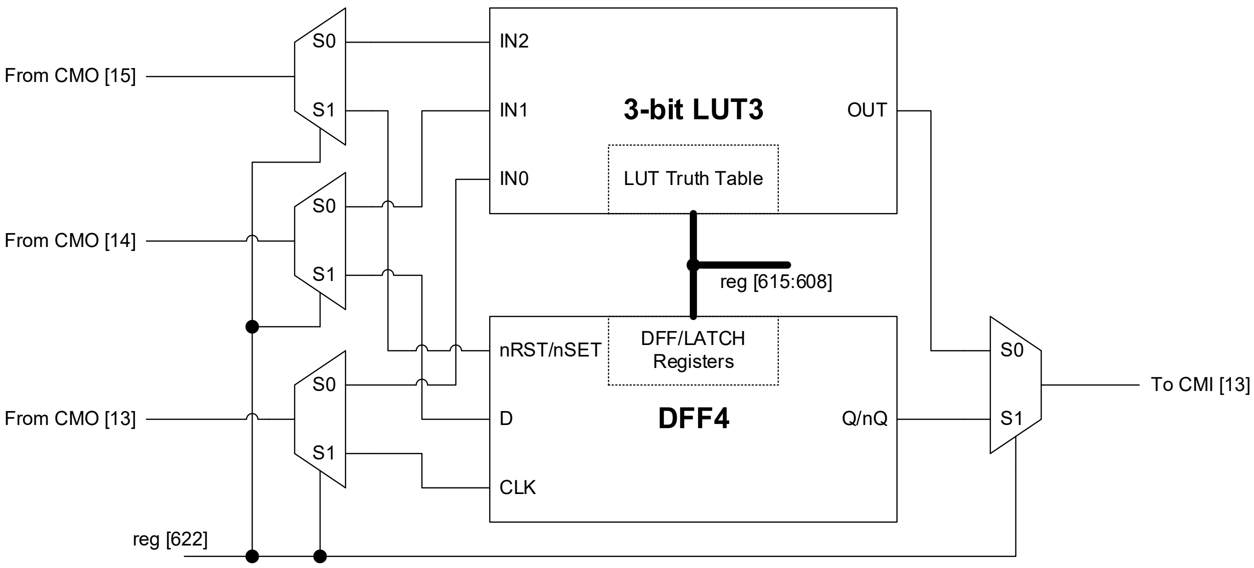
Registers definitions:
reg [620] → LUT or DFF/Latch select
reg [599] → DFF or Latch Select
reg [598] → Output Select (Q or nQ)
reg [597] → DFF nRST or nSET Select
reg [596] → DFF Initial Polarity Select

Figure 23. 3-bit LUT1 or DFF2



Registers definitions:
reg [621] → LUT or DFF/Latch select
reg [607] → DFF or Latch Select
reg [606] → Output Select (Q or nQ)
reg [605] → DFF nRST or nSET Select
reg [604] → DFF Initial Polarity Select

Figure 24. 3-bit LUT2 or DFF3



Registers definitions:
reg [622] → LUT or DFF/Latch select
reg [615] → DFF or Latch Select
reg [614] → Output Select (Q or nQ)
reg [613] → DFF nRST or nSET Select
reg [612] → DFF Initial Polarity Select

Figure 25. 3-bit LUT3 or DFF4

7.3.1 3-Bit LUT or D Flip-Flop Macrocells Used as 3-Bit LUTs

Table 10. 3-bit LUT0 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [584]	LSB
0	0	1	register [585]	
0	1	0	register [586]	
0	1	1	register [587]	
1	0	0	register [588]	
1	0	1	register [589]	
1	1	0	register [590]	
1	1	1	register [591]	MSB

Table 11. 3-bit LUT1 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [592]	LSB
0	0	1	register [593]	
0	1	0	register [594]	
0	1	1	register [595]	
1	0	0	register [596]	
1	0	1	register [597]	
1	1	0	register [598]	
1	1	1	register [599]	MSB

Table 12. 3-bit LUT2 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [600]	LSB
0	0	1	register [601]	
0	1	0	register [602]	
0	1	1	register [603]	
1	0	0	register [604]	
1	0	1	register [605]	
1	1	0	register [606]	
1	1	1	register [607]	MSB

Table 13. 3-bit LUT3 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [608]	LSB
0	0	1	register [609]	
0	1	0	register [610]	
0	1	1	register [611]	
1	0	0	register [612]	
1	0	1	register [613]	
1	1	0	register [614]	
1	1	1	register [615]	MSB

Each macrocell, when programmed for a LUT function, uses an 8-bit register to define their output function:

- 3-bit LUT0 is defined by registers [591:584]
- 3-bit LUT1 is defined by registers [599:592]
- 3-bit LUT2 is defined by registers [607:600]
- 3-bit LUT3 is defined by registers [615:608].

Table 14 shows the register bits for the standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR) that can be created within each of the four 3-bit LUT logic cells.

Table 14. 3-bit LUT Standard Digital Functions

Function	MSB							LSB
AND-3	1	0	0	0	0	0	0	0
NAND-3	0	1	1	1	1	1	1	1
OR-3	1	1	1	1	1	1	1	0
NOR-3	0	0	0	0	0	0	0	1
XOR-3	1	0	0	1	0	1	1	0
XNOR-3	0	1	1	0	1	0	0	1

7.3.2 Initial Polarity Operations

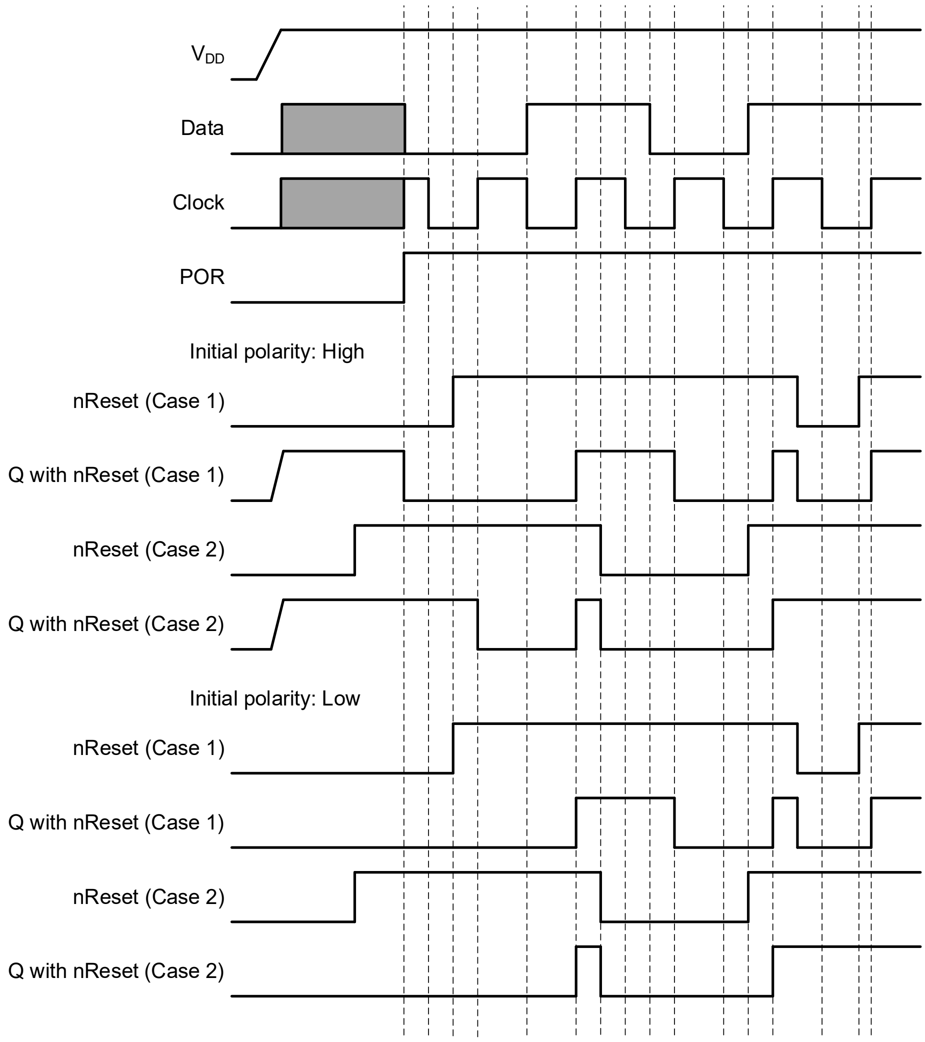


Figure 26. DFF Polarity Operations with nReset

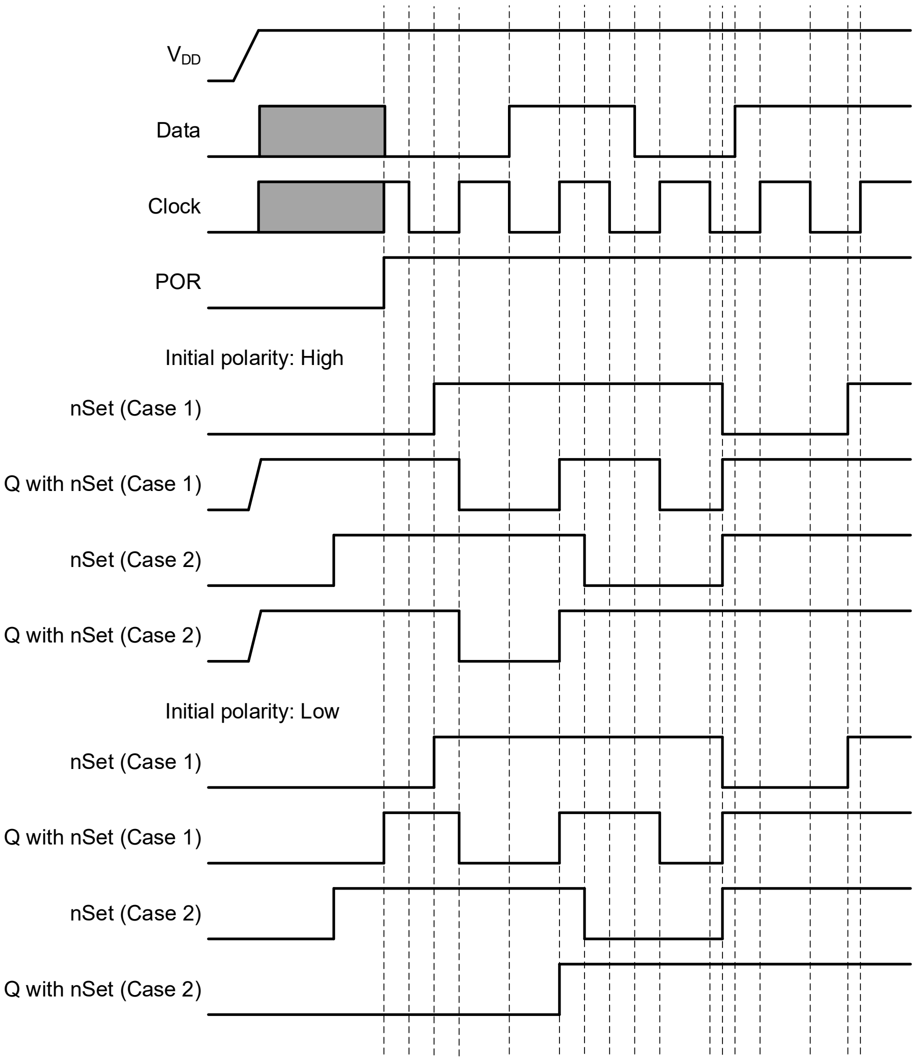


Figure 27. DFF Polarity Operations with nSet

7.4 3-Bit LUT or Pipe Delay/Ripple Counter Macrocell

There is one macrocell that can serve as either a 3-bit LUT or as a Pipe Delay/Ripple Counter.

When used to implement LUT functions, the 3-bit LUT takes in three input signals from the connection matrix and produces a single output, which goes back into the connection matrix.

When used as a Pipe Delay, there are three inputs signals from the matrix, Input (IN), Clock (CLK), and Reset (nRST). The Pipe Delay cell is built from 16 D Flip-Flop logic cells that provide the three delay options, two of which are user selectable. The DFF cells are tied in series where the output (Q) of each delay cell goes to the next DFF cell input (IN). Both of the two outputs (OUT0 and OUT1) provide user selectable options for 1 to 16 stages of delay. There are delay output points for each set of the OUT0 and OUT1 outputs to a 4-input mux that is controlled by registers [547:544] for OUT0 and registers [551:548] for OUT1. The 4-input mux is used to control the selection of the amount of delay.

The overall time of the delay is based on the clock used in the SLG46880-E design. Each DFF cell has a time delay of the inverse of the clock time (either external clock or the Oscillator within the SLG46880-E). The sum of the number of DFF cells used will be the total time delay of the Pipe Delay logic cell. OUT1 Output can be inverted (as selected by register [552]).

In the Ripple Counter mode there are 3 options for setting, which use 7 bits. There are 3 bits to set nSET value (SV) in range from 0 to 7. It is a value, which will be set into the Ripple Counter outputs when nSET input goes LOW. End value (EV) will use 3 bits for setting outputs code, which will be last code in the cycle. After reaching the EV, the Ripple Counter goes to the first code by the rising edge on CLK input. The Functionality mode option uses 1 bit. This setting defines how exactly Ripple Counter will operate.

The user can select one of the functionality modes by register: RANGE or FULL. If the RANGE option is selected, the count starts from SV. If UP input is LOW the count goes down: SV→EV→EV-1 to SV+1→SV, and others (if SV is smaller than EV), or SV→SV-1 to EV+1→EV→SV (if SV is bigger than EV). If UP input is HIGH, count starts from SV up to EV, and others.

In the FULL range configuration the Ripple Counter functions as follows. If UP input is LOW, the count starts from SV and goes down to 0. Then current counter value jumps to EV and goes down to 0, and others.

If UP input is HIGH, count goes up starting from SV. Then current counter value jumps to 0 and counts up to EV, and others. See Ripple Counter functionality example in Figure 29.

Every step is executed by the rising edge on CLK input.

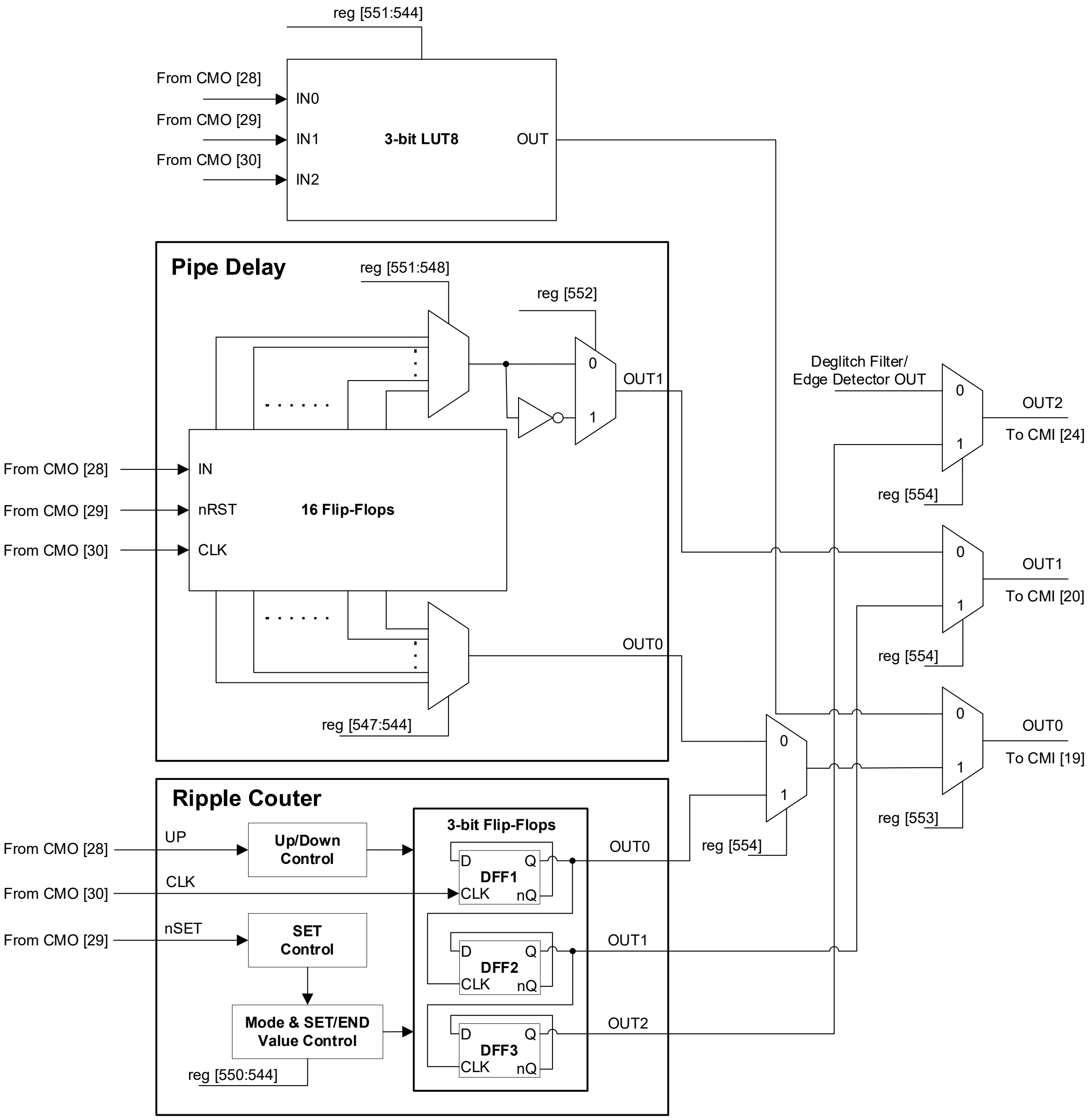


Figure 28. 3-bit LUT8/Pipe Delay/Ripple Counter

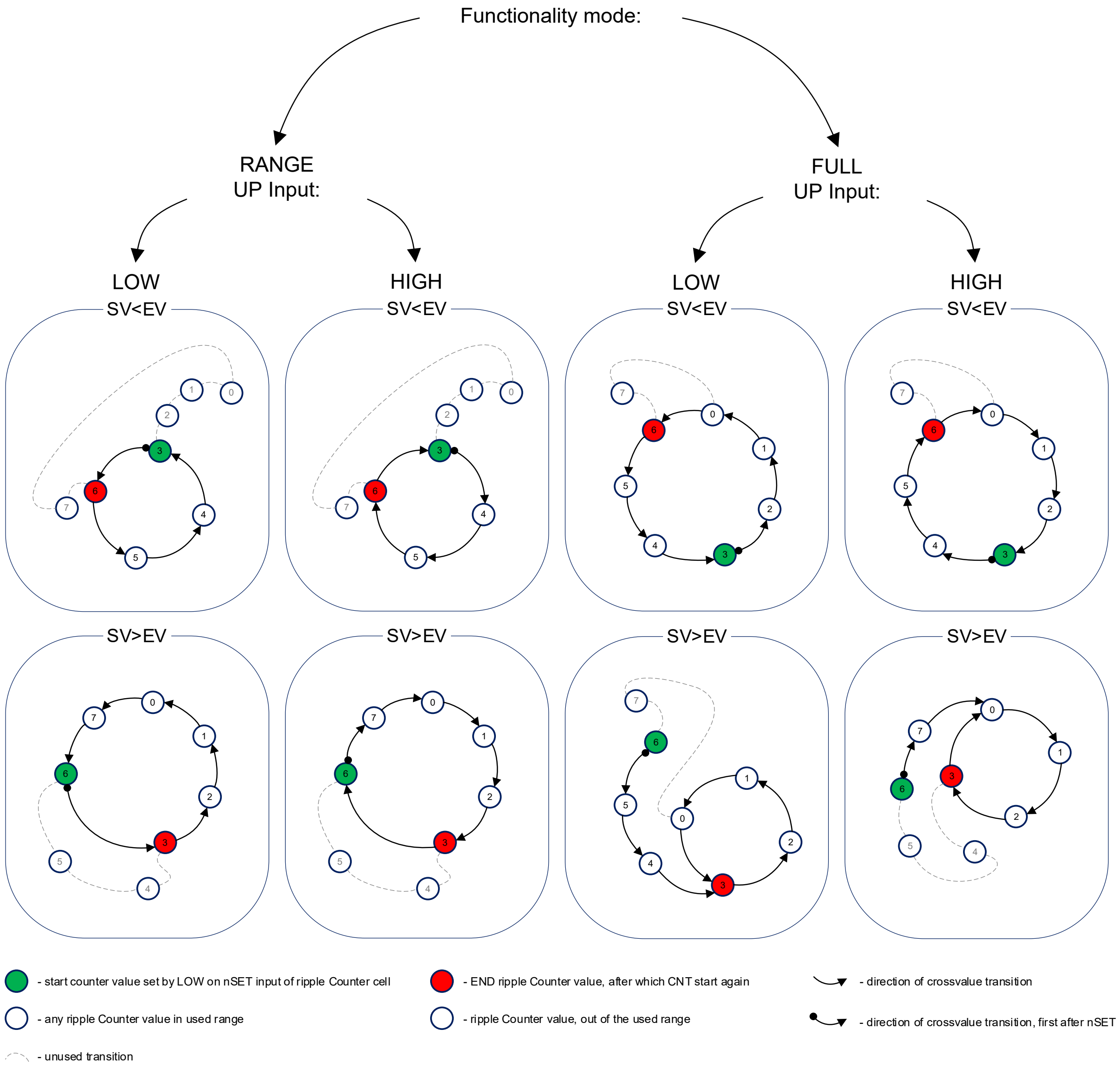


Figure 29. Example: Ripple Counter Functionality

7.4.1 3-Bit LUT or Pipe Delay Macrocells Used as 3-Bit LUT

Table 15. 3-bit LUT8 Truth Table

IN2	IN1	IN0	OUT
0	0	0	register [544]
0	0	1	register [545]
0	1	0	register [546]
0	1	1	register [547]
1	0	0	register [548]
1	0	1	register [549]
1	1	0	register [550]
1	1	1	register [551]

Each macrocell, when programmed for a LUT function, uses an 8-bit register to define their output function:

- 3-bit LUT8 is defined by registers [551:544].

7.5 3-Bit LUT or 8-Bit Counter/Delay Macrocells

There are four macrocells that can serve as either 3-bit LUTs or as Counter/Delays. When used to implement LUT function, the 3-bit LUT takes in three input signals from the connection matrix and produces a single output, which goes back into the connection matrix. When used to implement 8-Bit Counter/Delay function, two of the three input signals from the connection matrix go to the external clock (EXT_CLK) and reset (DLY_IN/CNT Reset) inputs for the Counter/Delay, with the output going back to the connection matrix.

Counter/Delay macrocell has an initial value, which defines its initial value after device is powered up. It is possible to select initial LOW or initial HIGH, as well as initial value defined by a Delay In signal.

For example, in case initial LOW option is used, the rising edge delay will start operation.

These macrocells can also operate in a frequency detection mode.

Delay time and Output Period can be calculated using the following formulas:

- Delay time: [(Counter data + 2)/CLK input frequency – Offset (Note 1)]
- Output Period: [(Counter data + 1)/CLK input frequency – Offset (Note 1)].

One Shot pulse width can be calculated using formula:

- Pulse width = [(Counter Data + 2)/CLK input frequency – Offset (Note 1)].

Note 1: Offset is the asynchronous time offset between the input signal and the first clock pulse.

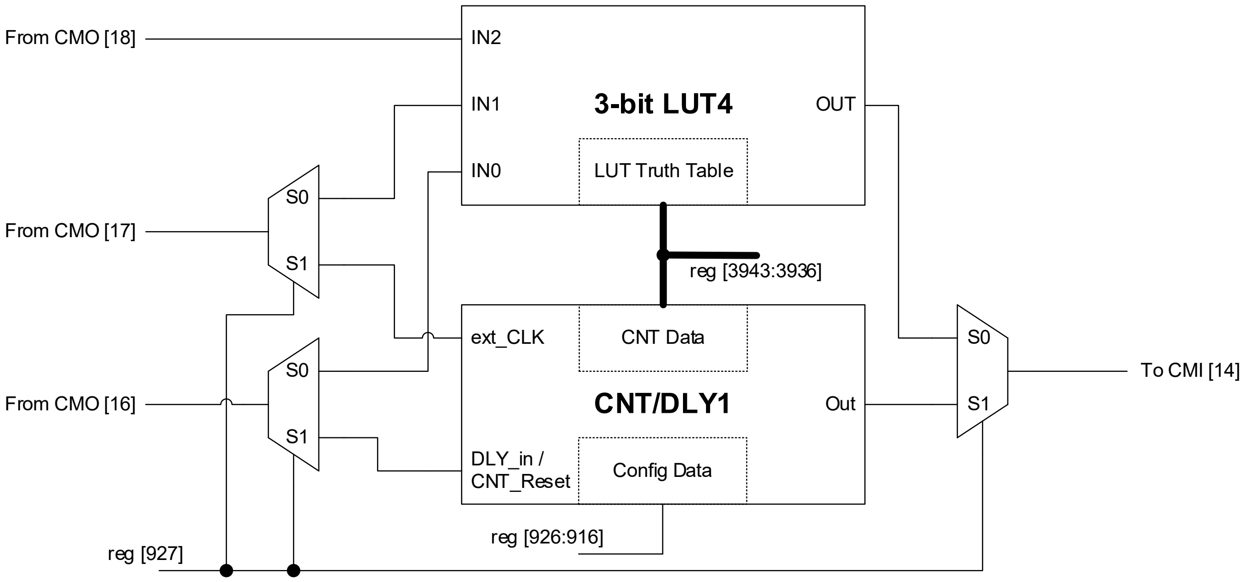
Three of the four macrocells can have their active count value read via I^{2}C (CNT0, CNT2, and CNT4). See section 19.6.1 Reading Counter Data via I2C for further details.

Note 2: After two DFF – counters initialize with counter data = 0 after POR.

Initial state = 1 – counters initialize with counter data = 0 after POR.

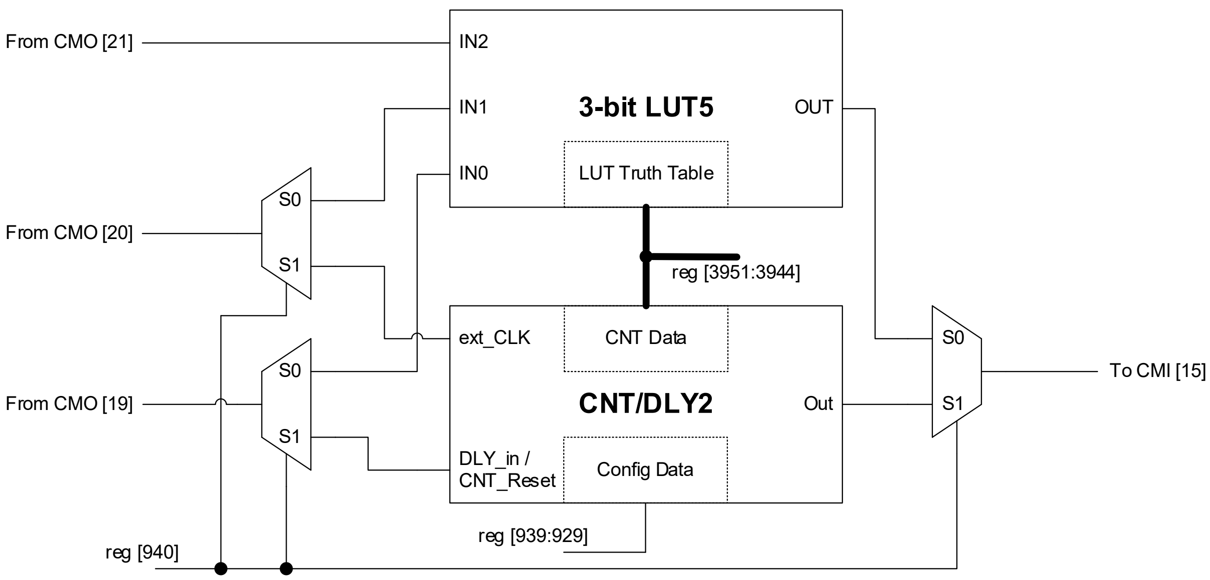
Initial state = 0 And After two DFF is bypass – counters initialize with counter data after POR.

7.5.1 3-Bit LUT or 8-Bit CNT/DLY Block Diagrams



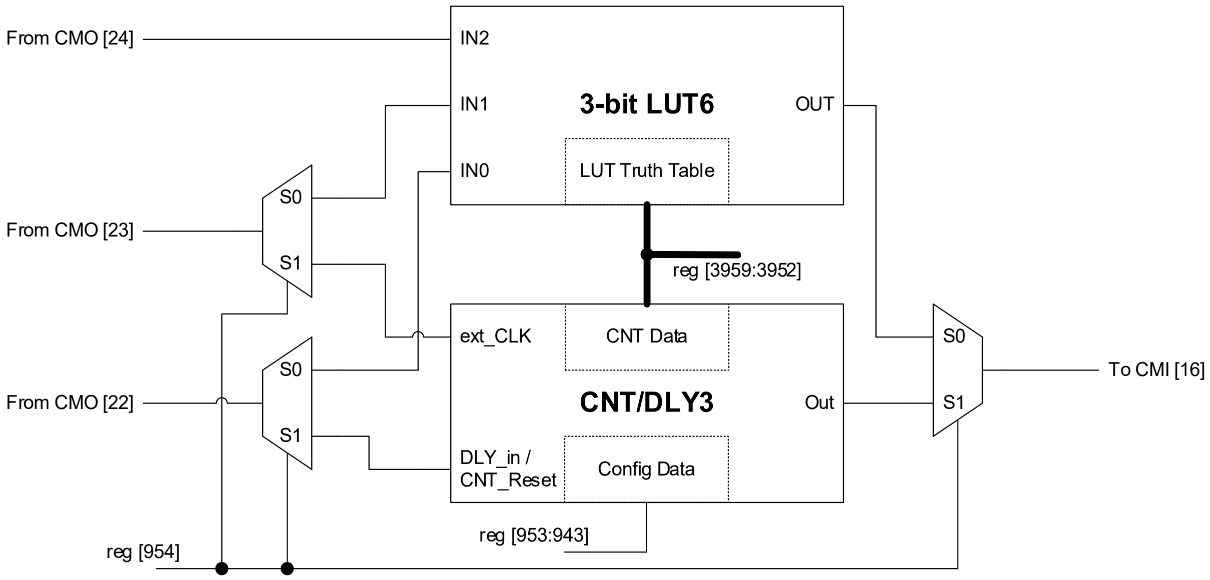
Registers definitions:
reg [927] → LUT3_4 or CNT_1 selection
reg [926] → CNT1 output pol selection
reg [925:922] → CNT1 function and edge mode selection
reg [921:920] → CNT1 initial value selection
reg [919:916] → DLY/CNT1 Clock Source Select

Figure 30. 3-bit LUT4 or CNT/DLY1



Registers definitions:
reg [940] → LUT3_5 or CNT_2 selection
reg [939] → CNT2 output pol selection
reg [938:935] → CNT2 function and edge mode selection
reg [934:933] → CNT2 initial value selection
reg [932:929] → DLY/CNT2 Clock Source Select

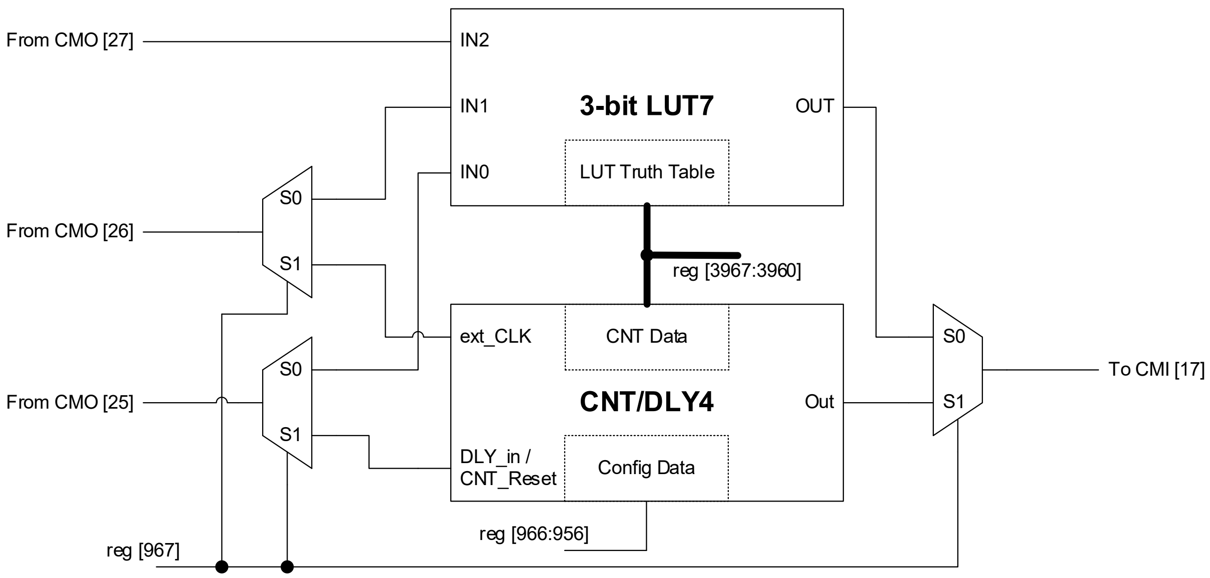
Figure 31. 3-bit LUT5 or CNT/DLY2



Registers definitions:

reg [954]	→ LUT3_6 or CNT_3 selection
reg [953]	→ CNT3 output pol selection
reg [952:949]	→ CNT3 function and edge mode selection
reg [948:947]	→ CNT3 initial value selection
reg [946:943]	→ DLY/CNT3 Clock Source Select

Figure 32. 3-bit LUT6 or CNT/DLY3



Registers definitions:

reg [967]	→ LUT3_7 or CNT_4 selection
reg [966]	→ CNT4 output pol selection
reg [965:962]	→ CNT4 function and edge mode selection
reg [961:960]	→ CNT4 initial value selection
reg [959:956]	→ DLY/CNT4 Clock Source Select

Figure 33. 3-bit LUT7 or CNT/DLY4

7.5.2 3-Bit LUT4 Truth Table

Table 16. 3-bit LUT4 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [3936]	LSB
0	0	1	register [3937]	
0	1	0	register [3938]	
0	1	1	register [3939]	
1	0	0	register [3940]	
1	0	1	register [3941]	
1	1	0	register [3942]	
1	1	1	register [3943]	MSB

Table 17. 3-bit LUT5 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [3944]	LSB
0	0	1	register [3945]	
0	1	0	register [3946]	
0	1	1	register [3947]	
1	0	0	register [3948]	
1	0	1	register [3949]	
1	1	0	register [3950]	
1	1	1	register [3951]	MSB

Table 18. 3-bit LUT6 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [3952]	LSB
0	0	1	register [3953]	
0	1	0	register [3954]	
0	1	1	register [3955]	
1	0	0	register [3956]	
1	0	1	register [3957]	
1	1	0	register [3958]	
1	1	1	register [3959]	MSB

Table 19. 3-bit LUT7 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [3960]	LSB
0	0	1	register [3961]	
0	1	0	register [3962]	
0	1	1	register [3963]	
1	0	0	register [3964]	
1	0	1	register [3965]	
1	1	0	register [3966]	
1	1	1	register [3967]	MSB

Each macrocell, when programmed for a LUT function, uses an 8-bit register to define their output function:

- 3-bit LUT4 is defined by registers [3943:3936]
- 3-bit LUT5 is defined by registers [3951:3944]
- 3-bit LUT6 is defined by registers [3959:3952]
- 3-bit LUT7 is defined by registers [3967:3960].

7.6 CNT/DLY/FSM Timing Diagrams

7.6.1 Delay Mode CNT/DLY0 to CNT/DLY4

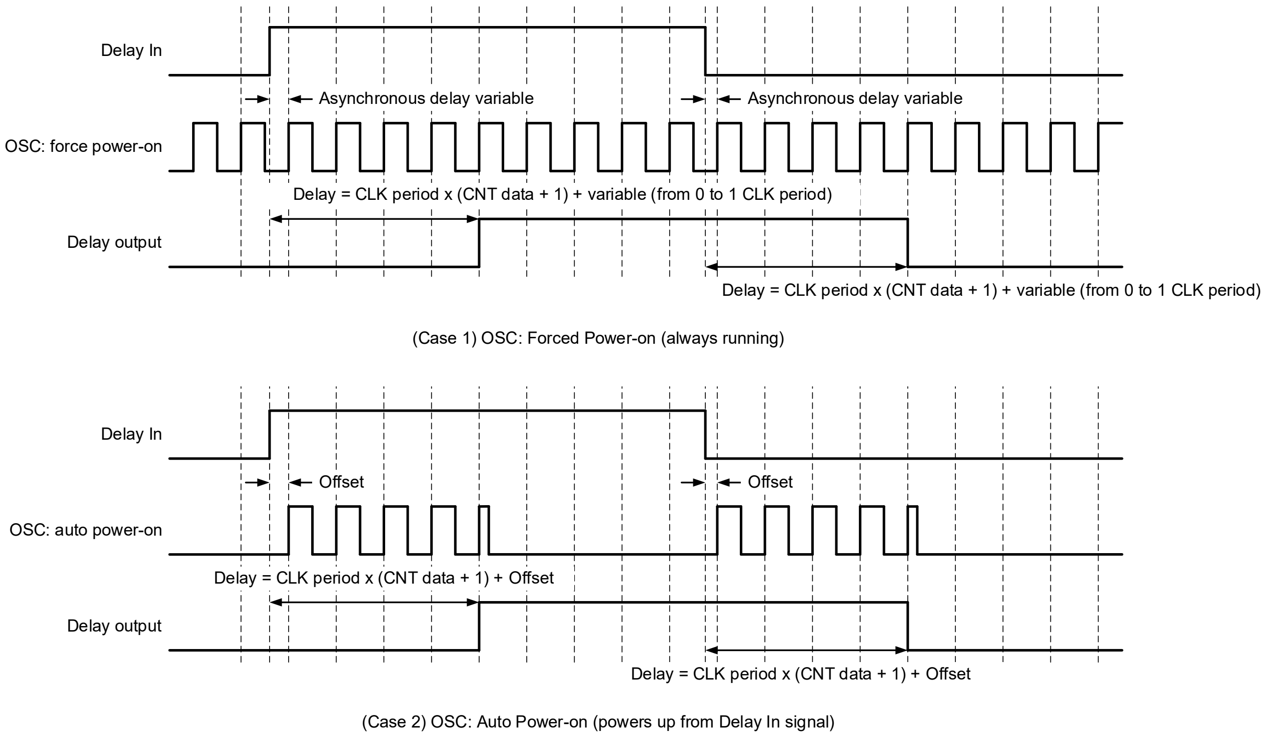


Figure 34. Delay Mode Timing Diagram, Edge Select: Both, Counter Data: 3

The macrocell shifts the respective edge to a set time and restarts by appropriate edge. It works as a filter if the input signal is shorter than the delay time.

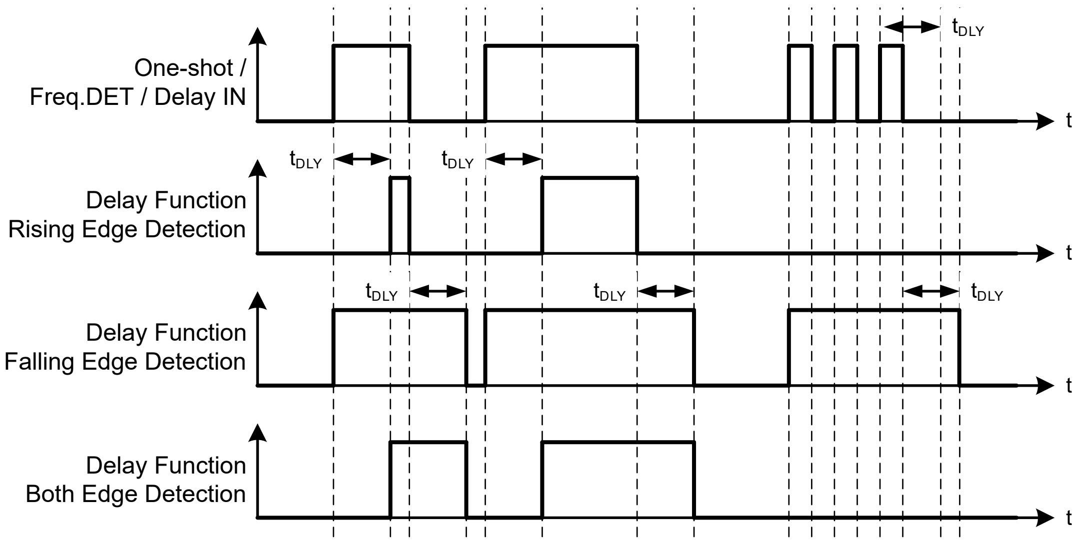


Figure 35. Delay Mode Timing Diagram for Different Edge Select Modes

7.6.2 Count Mode (Count Data: 3), Counter Reset (Rising Edge Detect) CNT/DLY0 to CNT/DLY4

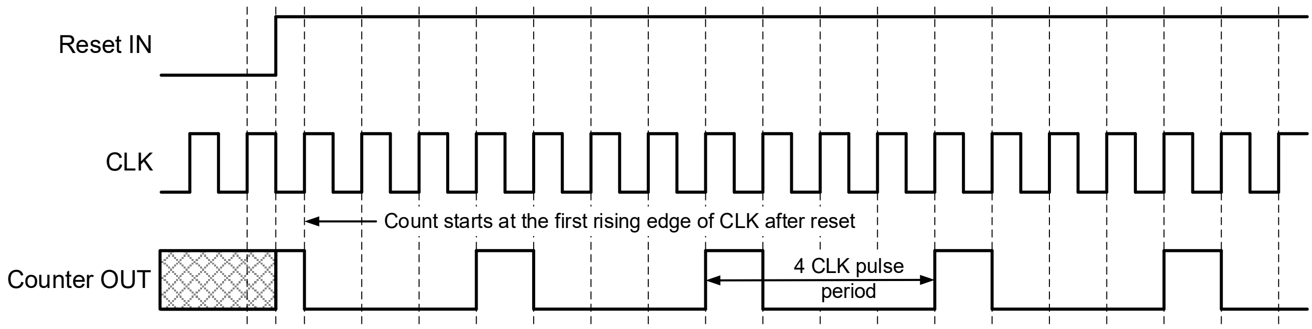


Figure 36. Counter Mode Timing Diagram without Two DFFs Synced Up

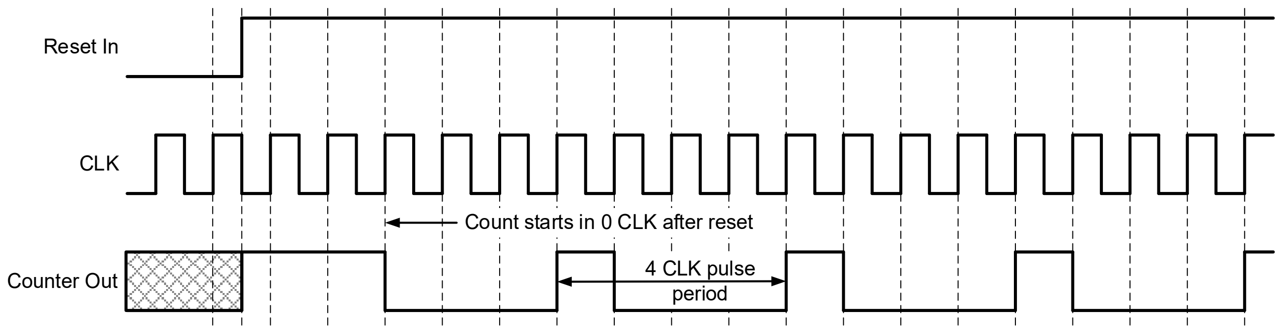


Figure 37. Counter Mode Timing Diagram with Two DFFs Synced Up

7.6.3 One-Shot Mode CNT/DLY0 to CNT/DLY4

This macrocell will generate a pulse whenever a selected edge is detected on its input. Register bits set the edge selection. The pulse width determines by counter data and clock selection properties. The output pulse polarity (non-inverted or inverted) is selected by register bit. Any incoming edges will be ignored during the pulse width generation. The following diagram shows one-shot function for non-inverted output.

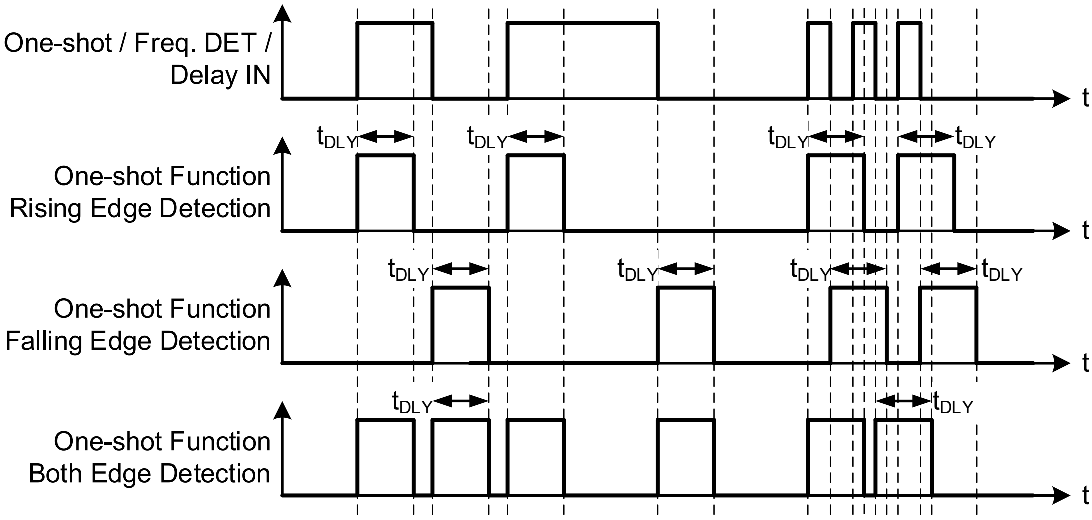


Figure 38. One-Shot Function Timing Diagram

This macrocell generates a HIGH-level pulse with a set width (defined by counter data) when detecting the respective edge. It does not restart while pulse is HIGH.

7.6.4 Frequency Detection Mode CNT/DLY0 to CNT/DLY4

Rising Edge: The output goes HIGH if the time between two successive edges is less than the delay. The output goes LOW if the second rising edge has not come after the last rising edge in specified time.

Falling Edge: The output goes HIGH if the time between two falling edges is less than the set time. The output goes LOW if the second falling edge has not come after the last falling edge in specified time.

Both Edge: The output goes HIGH if the time between the rising and falling edges is less than the set time, which is equivalent to the length of the pulse. The output goes LOW if after the last rising/falling edge and specified time, the second edge has not come.

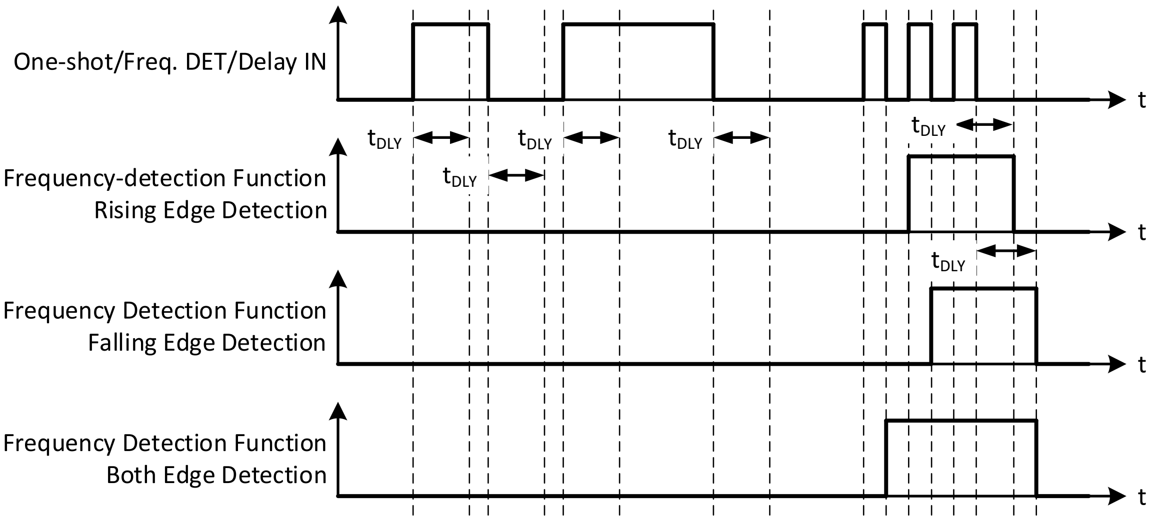


Figure 39. Frequency Detection Mode Timing Diagram

7.6.5 Edge Detection Mode CNT/DLY1 to CNT/DLY4

The macrocell generates HIGH-level short pulse when detecting the respective edge. See section 3.4.7 Programmable Delay Typical Delays and Widths.

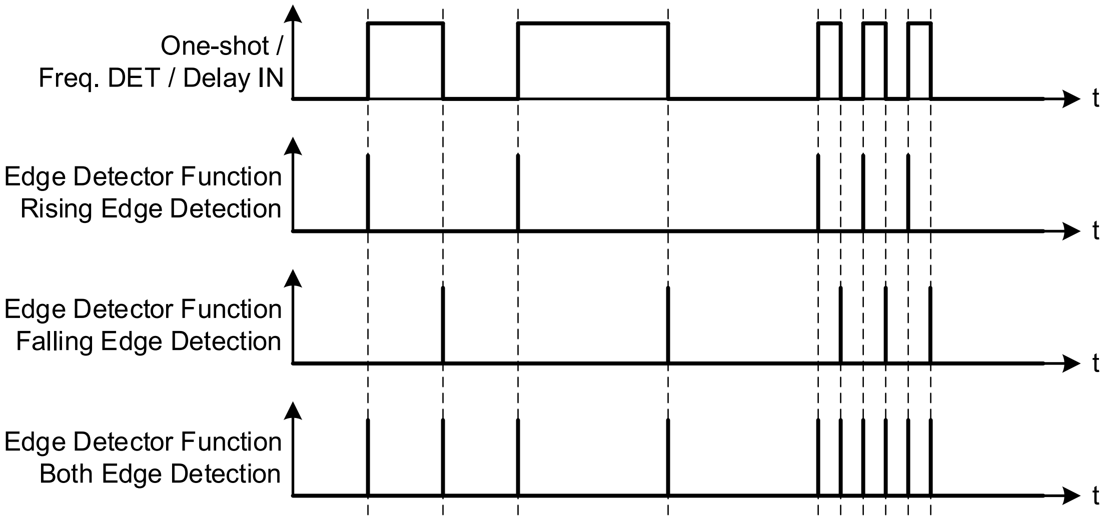


Figure 40. Edge Detection Mode Timing Diagram

7.6.6 Delayed Edge Detection Mode CNT/DLY0 to CNT/DLY4

In Delayed Edge Detection Mode, HIGH-level short pulses are generated on the macrocell output after the configured delay time if the corresponding edge was detected on the input.

If the input signal is changed during the set delay time, the pulse will not be generated. See Figure 41.

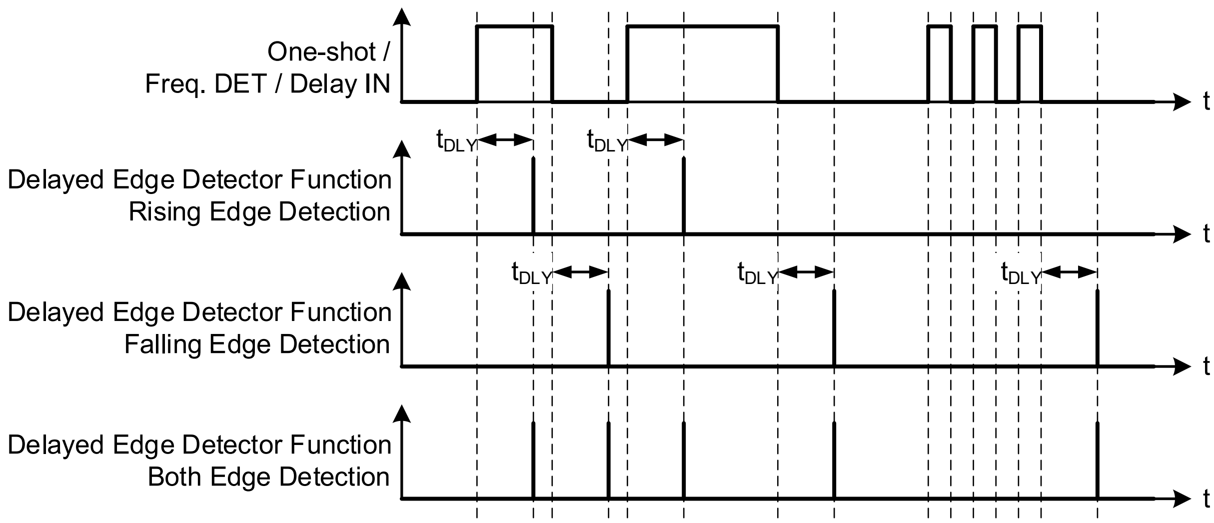


Figure 41. Delayed Edge Detection Mode Timing Diagram

7.6.7 CNT/FSM Mode CNT/DLY0

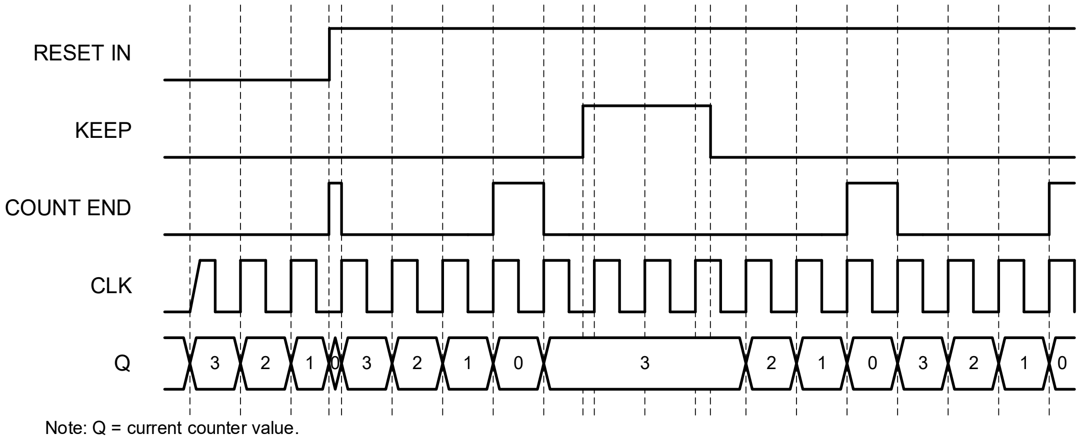


Figure 42. CNT/FSM Timing Diagram (Reset Rising Edge Mode, Oscillator is Forced On, UP = 0) for Counter Data = 3

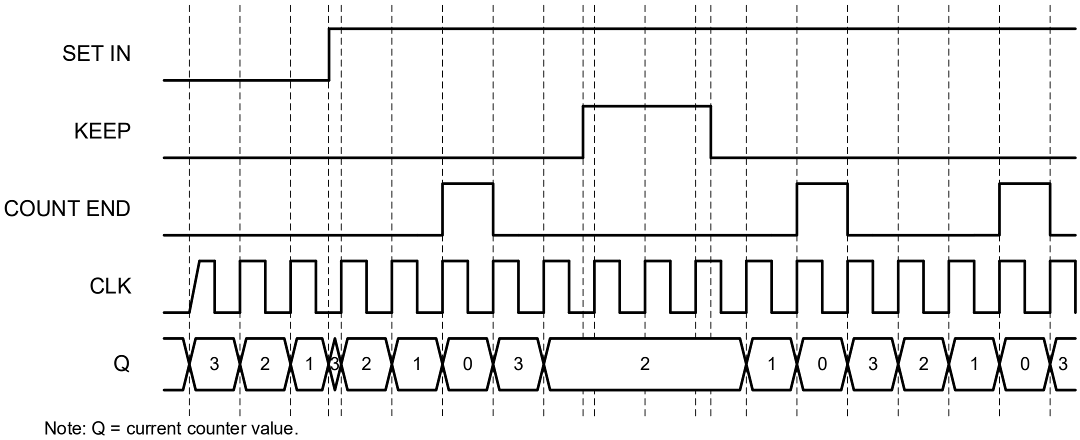


Figure 43. CNT/FSM Timing Diagram (Set Rising Edge Mode, Oscillator is Forced On, UP = 0) for Counter Data = 3

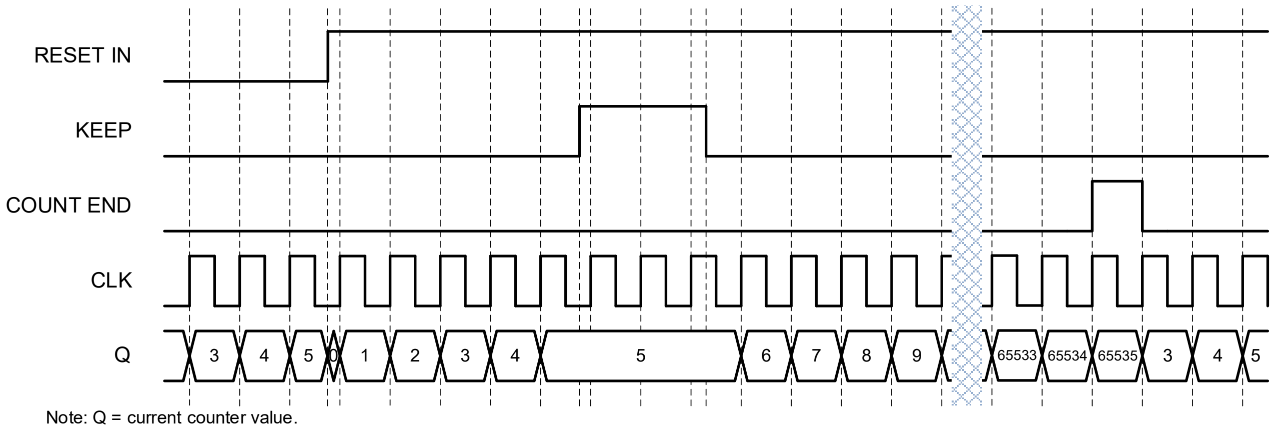


Figure 44. CNT/FSM Timing Diagram (Reset Rising Edge Mode, Oscillator is Forced On, UP = 1) for Counter Data = 3

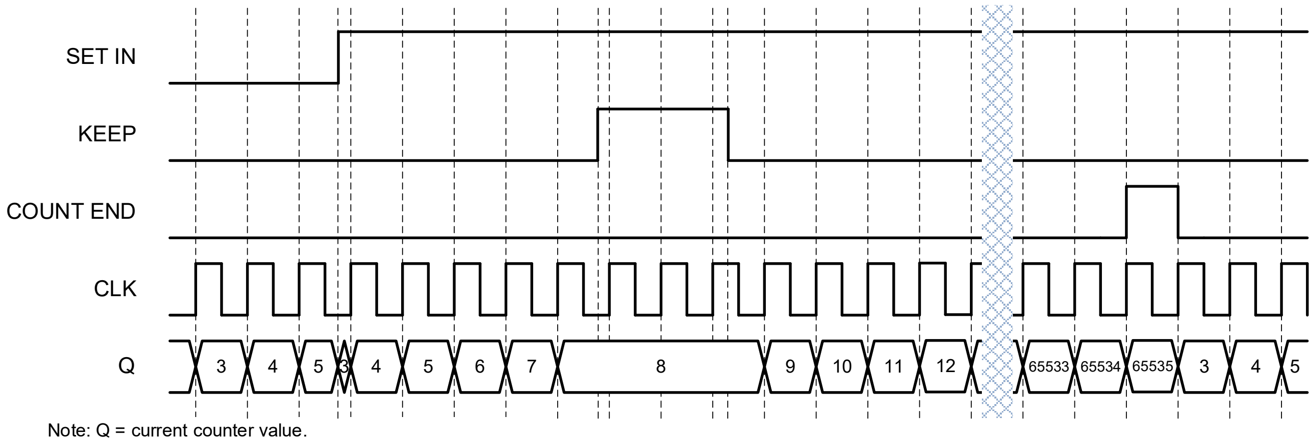


Figure 45. CNT/FSM Timing Diagram (Set Rising Edge Mode, Oscillator is Forced On, UP = 1) for Counter Data = 3

7.6.8 Difference in Counter Value for Counter, Delay, One-Shot, and Frequency Detect Modes

There is a difference in counter value for Counter and Delay/One-Shot/Frequency Detect modes. The counter value is shifted for two rising edges of the clock signal in Delay/One-Shot/Frequency Detect modes compared to Counter mode. See Figure 46.

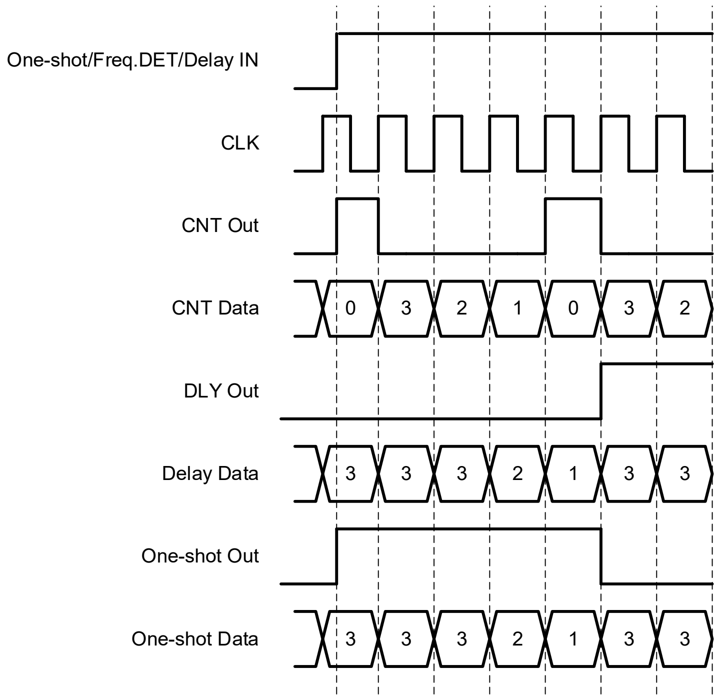


Figure 46. Counter Value, Counter Data = 3

7.7 4-Bit LUT or 16-Bit Counter/Delay Macrocell

There is one macrocell that can serve as either 4-bit LUT or as 16-bit Counter/Delay. When used to implement LUT function, the 4-bit LUT takes in four input signals from the Connection Matrix and produces a single output, which goes back into the Connection Matrix. When used to implement 16-Bit Counter/Delay function, two of the four input signals from the connection matrix go to the external clock (EXT_CLK) and reset (DLY_IN/CNT Reset) for the counter/delay, with the output going back to the connection matrix.

This macrocell has an optional Finite State Machine (FSM) function. There are two additional matrix inputs for Up and Keep to support FSM functionality.

This macrocell can also operate in a one-shot mode, which will generate an output pulse of user-defined width.

This macrocell can also operate in a frequency detection or edge detection mode.

This macrocell can have its active count value read via I²C. See section 19.6.1 Reading Counter Data via I2C for further details.

Note: After two DFF – counters initialize with counter data = 0 after POR.

Initial state = 1 – counters initialize with counter data = 0 after POR.

Initial state = 0 And After two DFF is bypass – counters initialize with counter data after POR.

7.7.1 4-Bit LUT or 16-Bit CNT/DLY Block Diagram

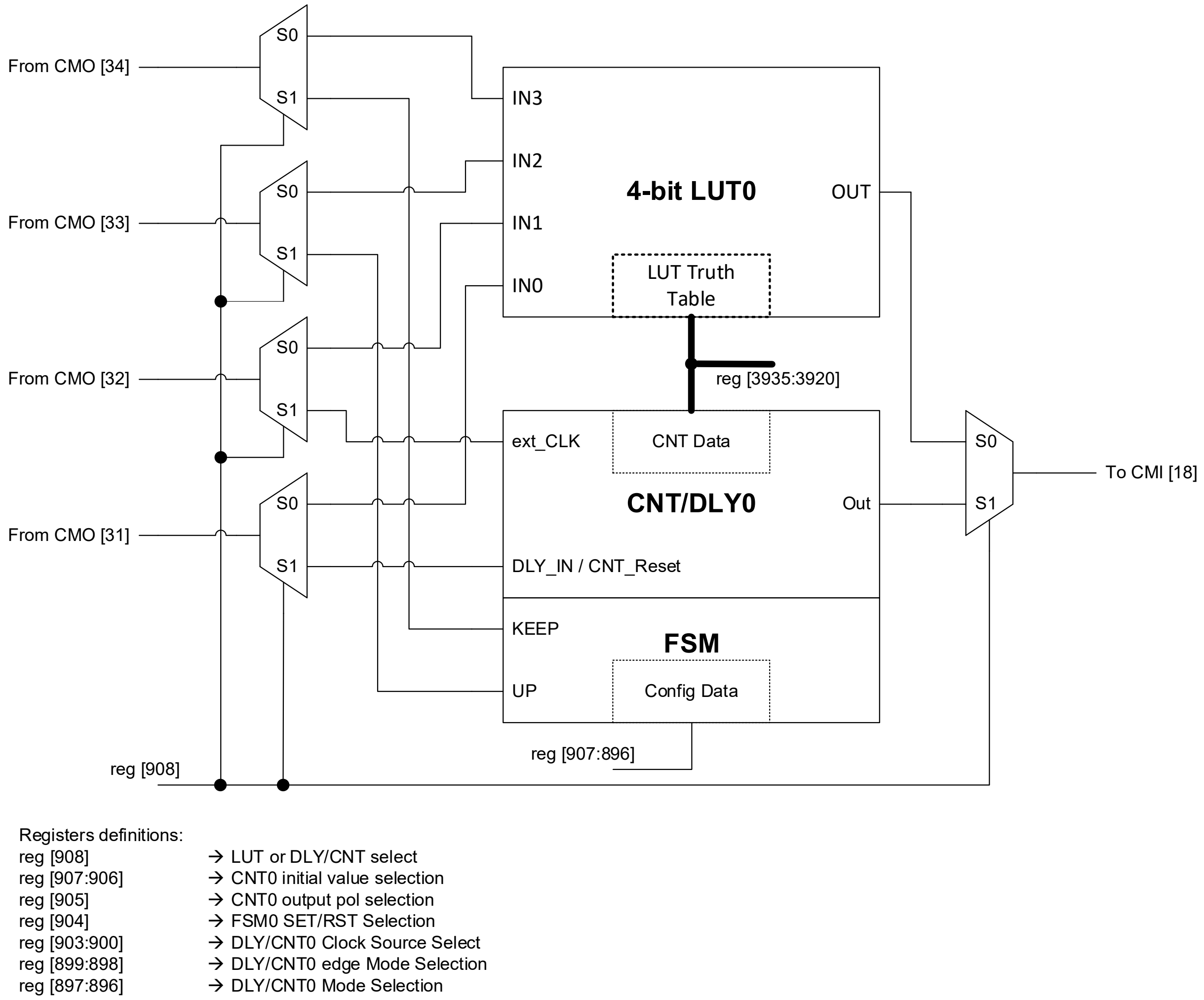


Figure 47. 4-bit LUT0 or CNT/DLY0

7.7.2 4-Bit LUT or 16-Bit Counter/Delay Macrocells Used as 4-Bit LUTs

Table 20. 4-bit LUT0 Truth Table

IN3	IN2	IN1	IN0	OUT	
0	0	0	0	register [3920]	LSB
0	0	0	1	register [3921]	
0	0	1	0	register [3922]	
0	0	1	1	register [3923]	
0	1	0	0	register [3924]	
0	1	0	1	register [3925]	

IN3	IN2	IN1	IN0	OUT	
0	1	1	0	register [3926]	
0	1	1	1	register [3927]	
1	0	0	0	register [3928]	
1	0	0	1	register [3929]	
1	0	1	0	register [3930]	
1	0	1	1	register [3931]	
1	1	0	0	register [3932]	
1	1	0	1	register [3933]	
1	1	1	0	register [3934]	
1	1	1	1	register [3935]	MSB

This macrocell, when programmed for a LUT function, uses a 16-bit register to define their output function:

- 4-bit LUT0 is defined by registers [3935:3920].

Table 21. 4-bit LUT Standard Digital Functions

Function	MSB															LSB
AND-4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NAND-4	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OR-4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
NOR-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
XOR-4	0	1	1	0	1	0	0	1	1	0	0	1	0	1	1	0
XNOR-4	1	0	0	1	0	1	1	0	0	1	1	0	1	0	0	1

7.8 Wake and Sleep Controller

The SLG46880-E has a Wake and Sleep (WS) function for ACMP0H and ACMP1H. The macrocell CNT/DLY0 can be reconfigured for this purpose registers [897:896] = 11 and register [910] = 1. The WS serves for power saving, it allows to switch on and off selected ACMPs on selected bit of 16-bit counter.

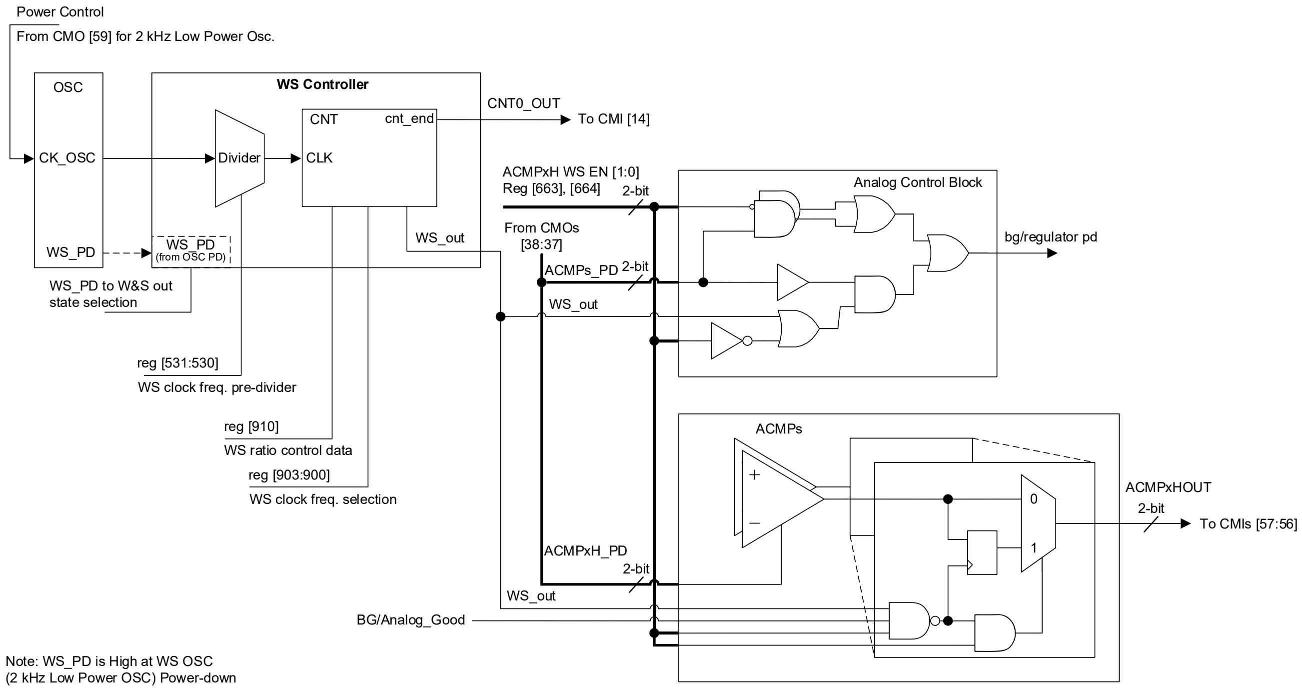
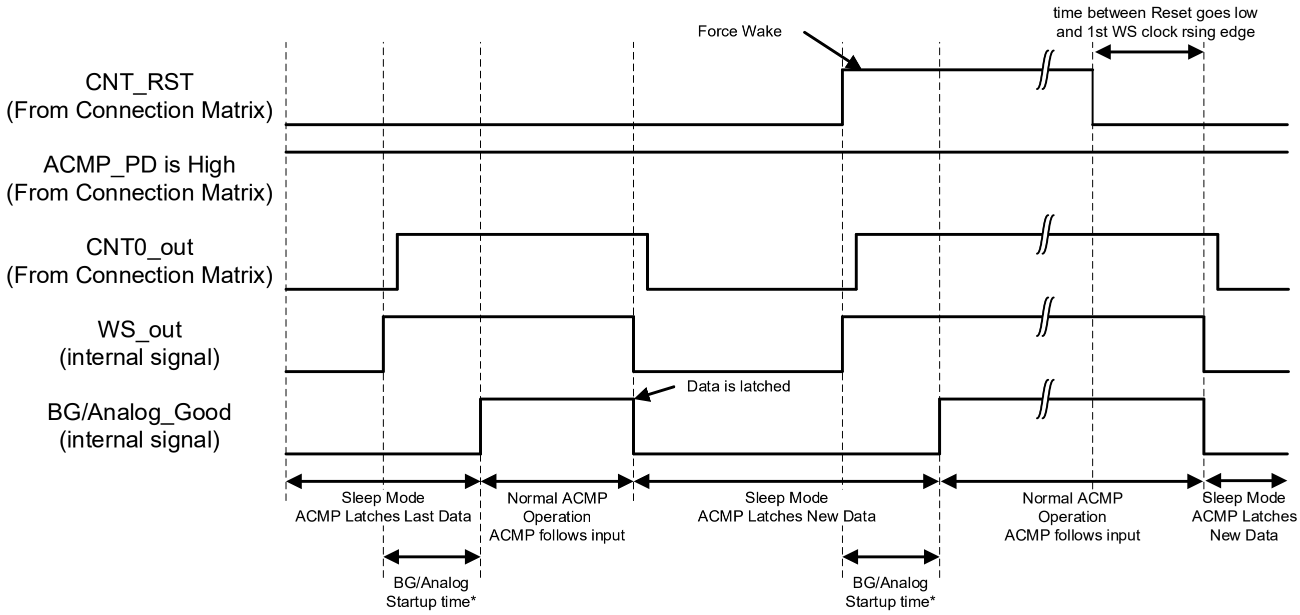
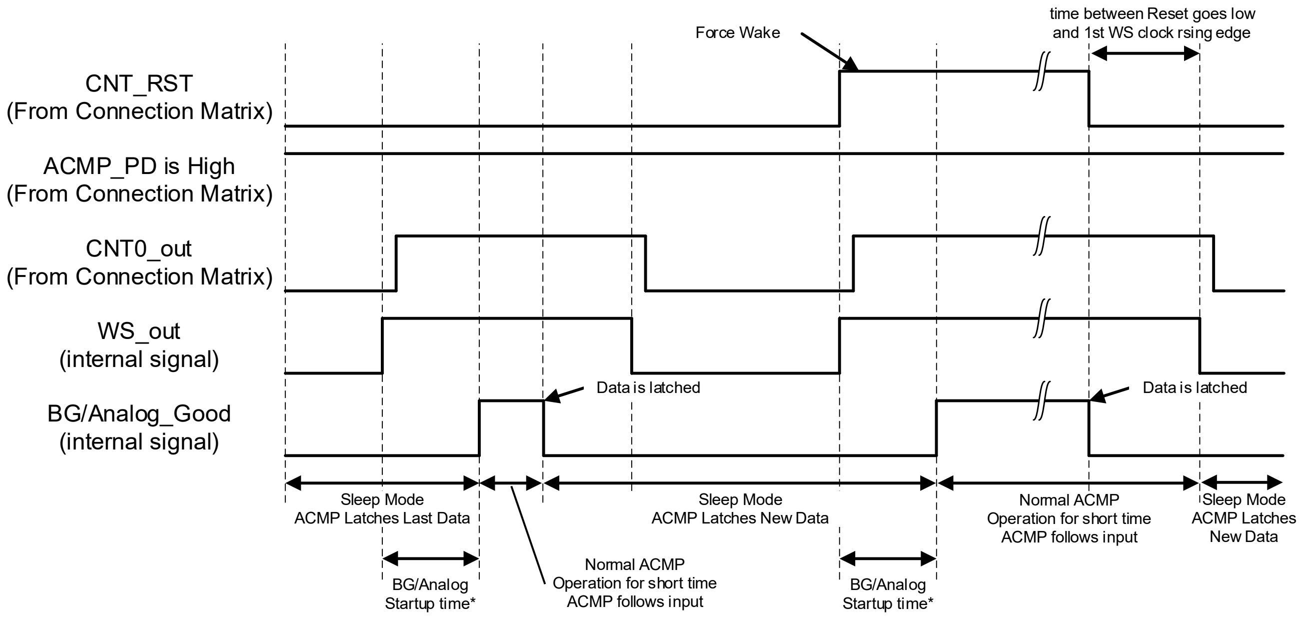


Figure 48. WS Controller



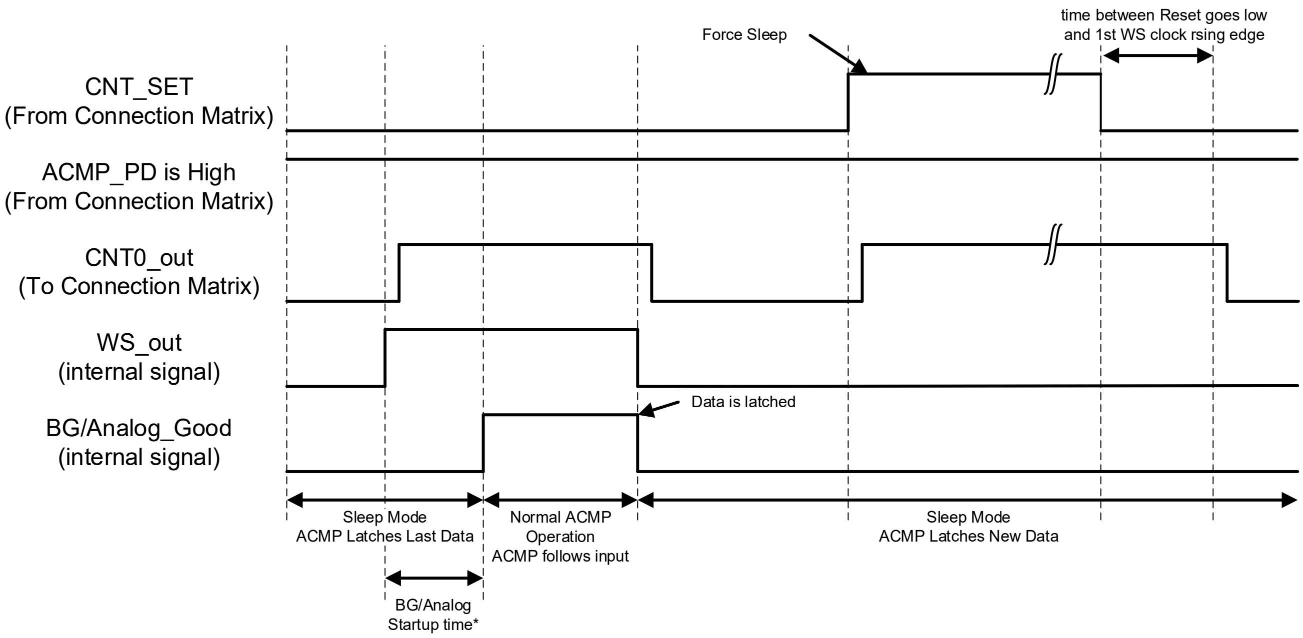
Note: CNT0_out is a delayed WS_out signal for 1us to make sure the data is correct during latch.

Figure 49. Wake/Sleep Timing Diagram, Normal Wake Mode, Counter Reset is Used



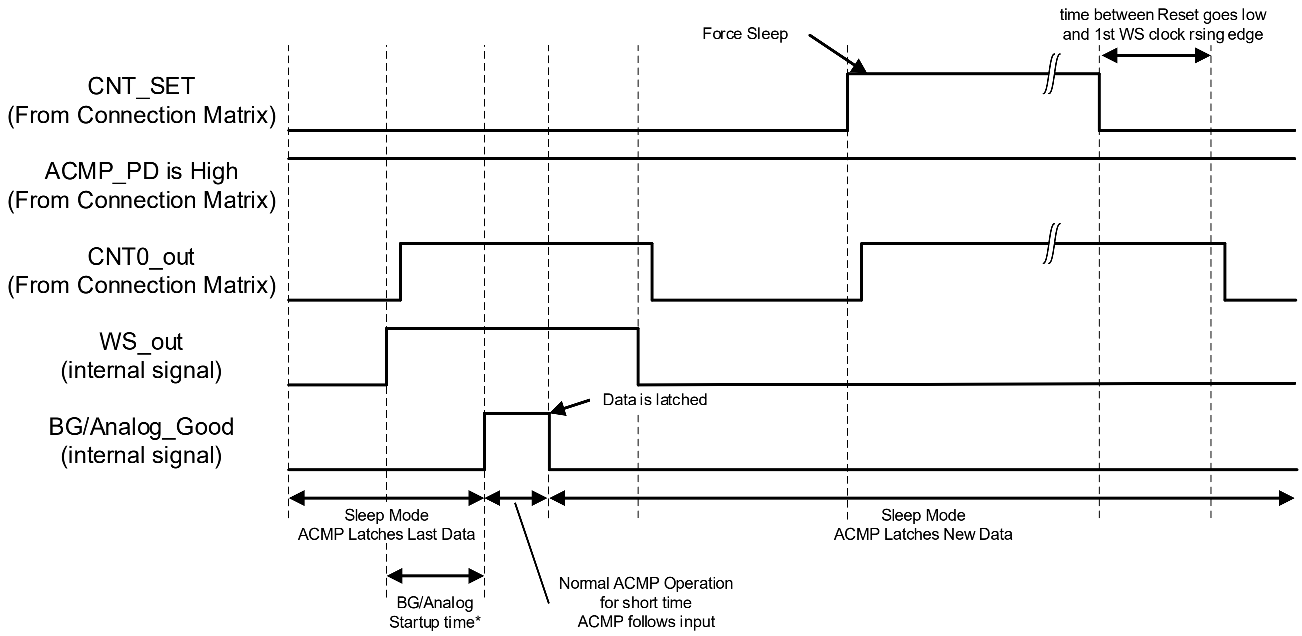
Note: CNT0_out is a delayed WS_out signal for 1us to make sure the data is correct during latch.

Figure 50. Wake/Sleep Timing Diagram, Short Wake Mode, Counter Reset is Used



Note: CNT0_out is a delayed WS_out signal for 1us to make sure the data is correct during latch.

Figure 51. Wake/Sleep Timing Diagram, Normal Wake Mode, Counter Set is Used



Note: CNT0_out is a delayed WS_out signal for 1us to make sure the data is correct during latch.

Figure 52. Wake/Sleep Timing Diagram, Short Wake Mode, Counter Set is Used

Note: If low power BG is powered on/off by WS, the wake time should be longer than 2.1 ms. The BG/analog start up time will take maximal 2 ms. If low power BG is always on, OSC0 period is longer than required wake time. The short wake mode can be used to reduce the current consumption.

To use any ACMPxH under WS controller the following settings must be done:

- ACMPxH Power Up Input from matrix = 1 (for each ACMPxH separately).
- CNT/DLY0 must be set to Wake and Sleep Controller function (for all ACMPxH).
- Register WS → enable (for each ACMPxH separately).
- CNT/DLY0 set/reset input = 0 (for all ACMPxH).

As the OSC any oscillator with any pre-divider can be used. The user can select a period of time while the ACMPxH is sleeping in a range of 1 to 65535 clock cycles. Before they are sent to sleep their outputs are latched, so the ACMPs remain their state (HIGH or LOW) while sleeping.

WS controller has the following settings:

- Wake and Sleep Output State (HIGH/LOW).

  If OSC is powered off (Power-down option is selected; Power-down input = 1) and Wake and Sleep Output State = HIGH, the ACMPxH is continuously on.

  If OSC is powered off (Power-down option is selected; Power-down input = 1) and Wake and Sleep Output State = LOW, the ACMPxH is continuously off.

  Both cases WS function is turned off.
- Counter Data (Range: 1 to 65535).

  User can select wake and sleep ratio of the ACMP; counter data = sleep time, one clock = wake time.
- Q mode - defines the state of WS counter data when Set/Reset signal appears Reset - when active signal appears, the WS counter will reset to zero and HIGH-level signal on its output will turn on the ACMPs. When Reset signal goes out, the WS counter will go LOW and turn off the ACMPxH until the counter counts up to the end. Set - when active signal appears, the WS counter will stop and LOW-level signal on its output will turn off the ACMPxH. When Set signal goes out, the WS counter will go on counting and HIGH-level signal will turn on the ACMPxH while counter is counting up to the end.

Note: The OSC0 matrix power down to control ACMP W/S is not supported for short wait time option.

- Edge Select defines the edge for Q mode.

  HIGH-level Set/Reset - switches mode Set/Reset when level is HIGH.

Note: Q mode operates only in case of "HIGH-Level Set/Reset”.

- Wake time selection - time required for wake signal to turn the ACMPxH on.

  Normal Wake Time - when WS signal is HIGH, it takes BG/analog start up time to turn the ACMPs on. They will stay on until WS signal is LOW again. Wake time is one clock period. It should be longer than BG turn on time and minimal required comparing time of the ACMP.

  Short Wake Time - when WS signal is HIGH, it takes BG/analog start up time to turn the ACMPs on. They will stay on for 1 µs and turn off regardless of WS signal. The WS signal width does not matter.

- Keep - pauses counting while Keep = 1.
- Up - reverses counting.

  If Up = 1, CNT is counting up from user selected value to 65535.

  If Up = 0, CNT is counting down from user selected value to 0.

7.8.1 WS Register Settings

Table 22. WS Register Settings

Signal Function	Register Bit Address	Register Definition
Counter/delay0 Clock Source Select	registers [903:900]	0000: OSC2 0001: OSC2 /4 0010: OSC1 0011: OSC1 /8 0100: OSC1 /64 0101: OSC1 /512 0110: OSC0 0111: OSC0 /8 1000: OSC0 /64 1001: OSC0 /512 1010: OSC0 /4096 1011: OSC0 /32768 1100: OSC0 /262144 1101: CNT4 Overflow 1110: External 1111: Reserved
ACMP0H Wake and Sleep function Enable	register [663]	0: Disable 1: Enable
ACMP1H Wake and Sleep function Enable	register [664]	0: Disable 1: Enable
Wake Sleep Output State When WS Oscillator is Power-down if DLY/CNT0 Mode Selection is "11"	register [909]	0: LOW 1: HIGH
DLY/CNT0 (16bits, [15:0] = [3935:3920]) Control Data	registers [3935:3920]	1 - 65535

8. Analog Comparators

There are four General Purpose Rail-to-Rail Analog Comparator (ACMP) macrocells in the SLG46880-E. For the ACMP cells to be used in a GreenPAK design, the power up signals (ACMP0H PWR UP, ACMP1H PWR UP, ACMP2L PWR UP, and ACMP3L PWR UP) need to be active. By connecting to signals coming from the Connection Matrix, it is possible to have each ACMP be on continuously, off continuously, or muxed on periodically based on a digital signal coming from the Connection Matrix. When ACMP is powered down, output is LOW.

Two of the four General Purpose Rail-to-Rail Analog Comparators are optimized for high-speed operation (ACMP0H and ACMP1H), and two of the four are optimized for low power operation (ACMP2L and ACMP3L).

Each of the ACMP cells has a positive input signal that can be provided by a variety of external sources and can also have a selectable gain stage before connection to the analog comparator. Each of the ACMP cells has a negative input signal that is either created from an internal V_{REF} or provided by way of the external sources.

PWR UP = 1 → ACMP is powered up.

PWR UP = 0 → ACMP is powered down.

During power-up, the ACMP output will remain LOW, and then become valid 51.4 µs (max) after power up signal goes HIGH for ACMP0H and ACMP1H and become valid 326.6 µs (max) after power up signal goes HIGH for ACMP2L and ACMP3L. Input bias current < 1 nA (typ). The Gain divider is unbuffered and consists of 2 MΩ resistors.

Each High Speed ACMP (ACMP0H and ACMP1H) has an optional Rail-to-Rail Input Buffer, which can be used along with the Gain divider to increase ACMP input resistance. However, Input buffer will increase an input offset voltage.

Each cell also has a hysteresis selection, to offer hysteresis of (0, 32, 64, 192) mV. The hysteresis option is available when using an internal V_{REF} only.

The ACMP0H has an additional option of connecting an internal 100 µA current source to its positive input, register [666]. It is also possible to connect the 100 µA current source to each next ACMP via an internal analog MUX.

ACMP0H IN+ options are GPIO10, buffered GPIO10, V_{DD}, 100 mA Current Source.

ACMP1H IN+ options are GPIO11, buffered GPIO11, ACMP0H IN+ MUX output.

ACMP2L IN+ options are GPO5, ACMP0H IN+ MUX output, ACMP1H IN+ MUX output.

ACMP3L IN+ options are GPO6, ACMP2L IN+ MUX output, Temp Sensor OUT.

8.1 ACMP0H Block Diagram

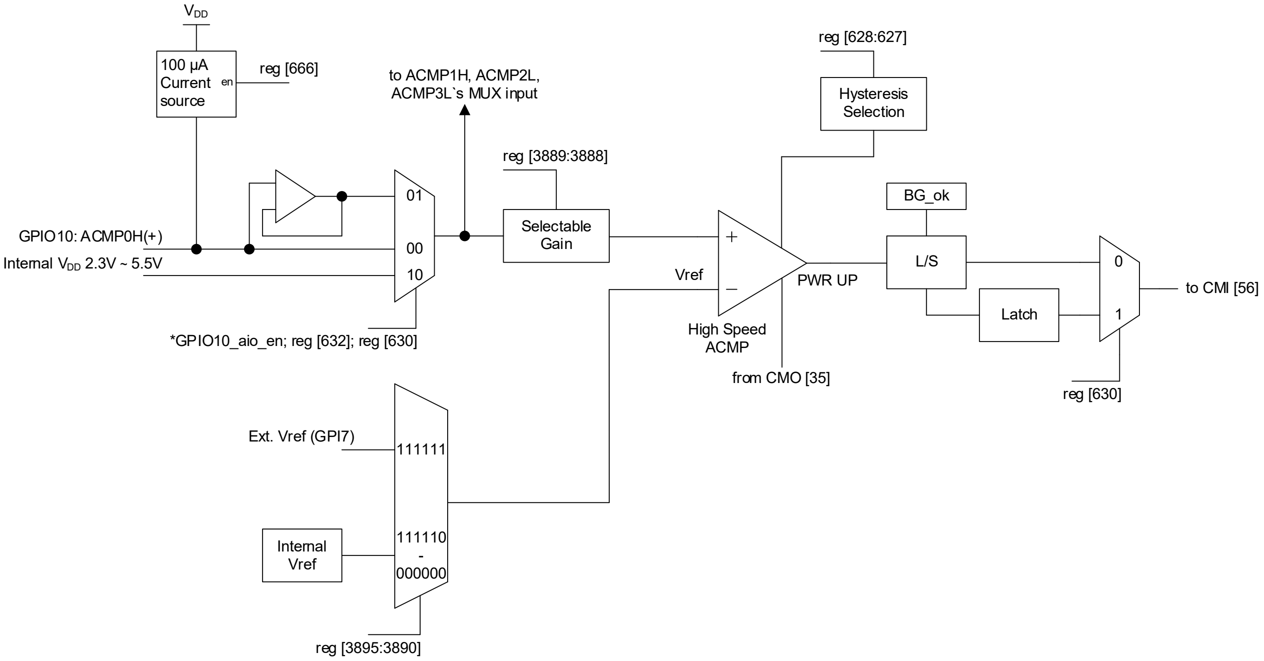


Figure 53. ACMP0H Block Diagram

8.2 ACMP1H Block Diagram

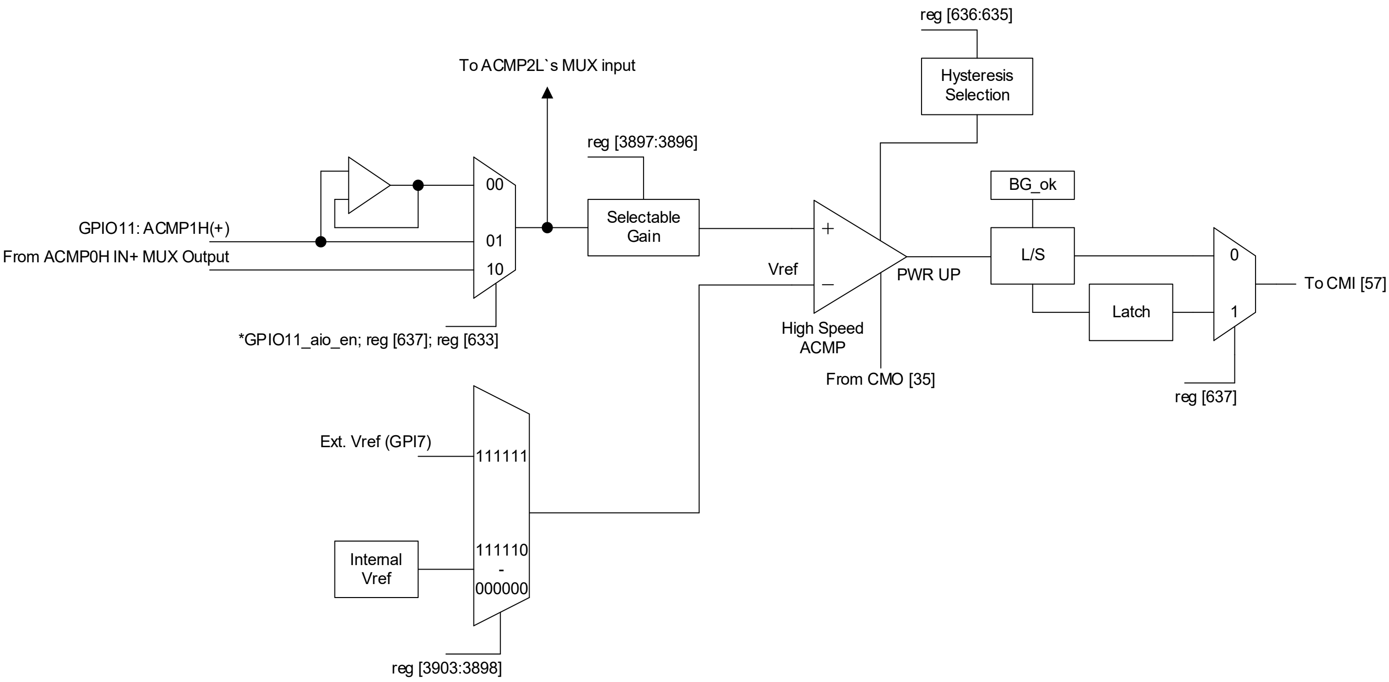


Figure 54. ACMP1H Block Diagram

8.3 ACMP2L Block Diagram

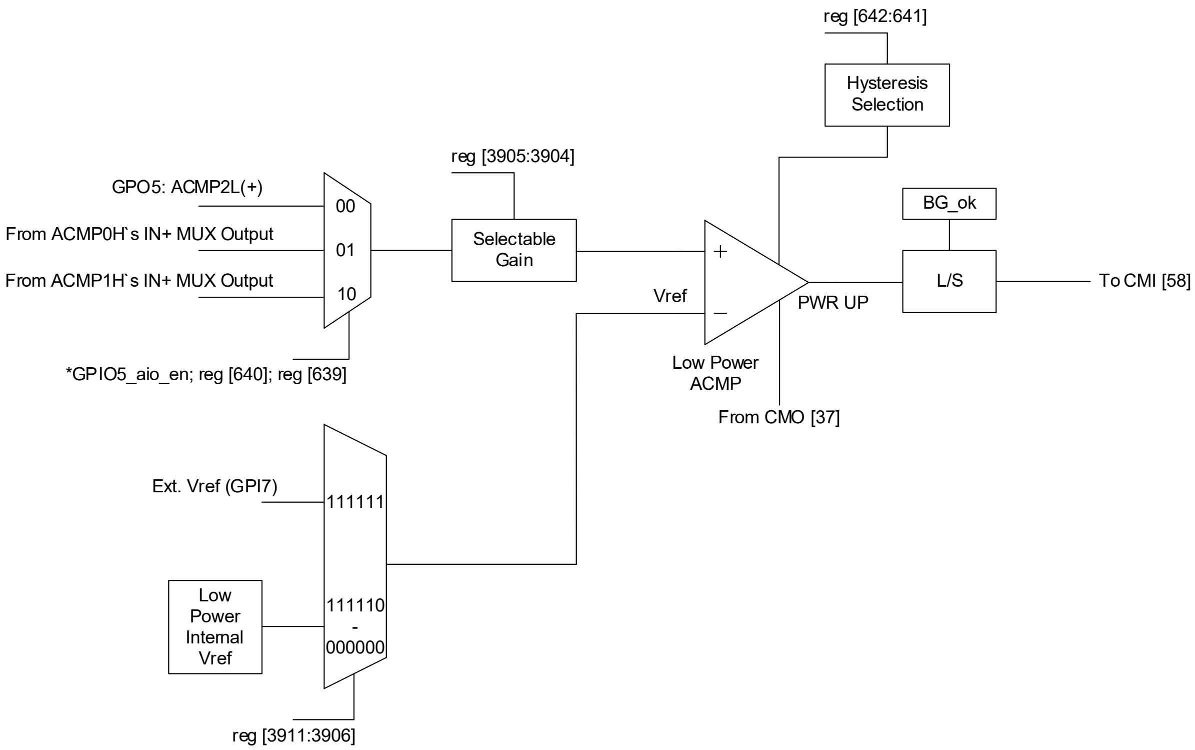


Figure 55. ACMP2L Block Diagram

8.4 ACMP3L Block Diagram

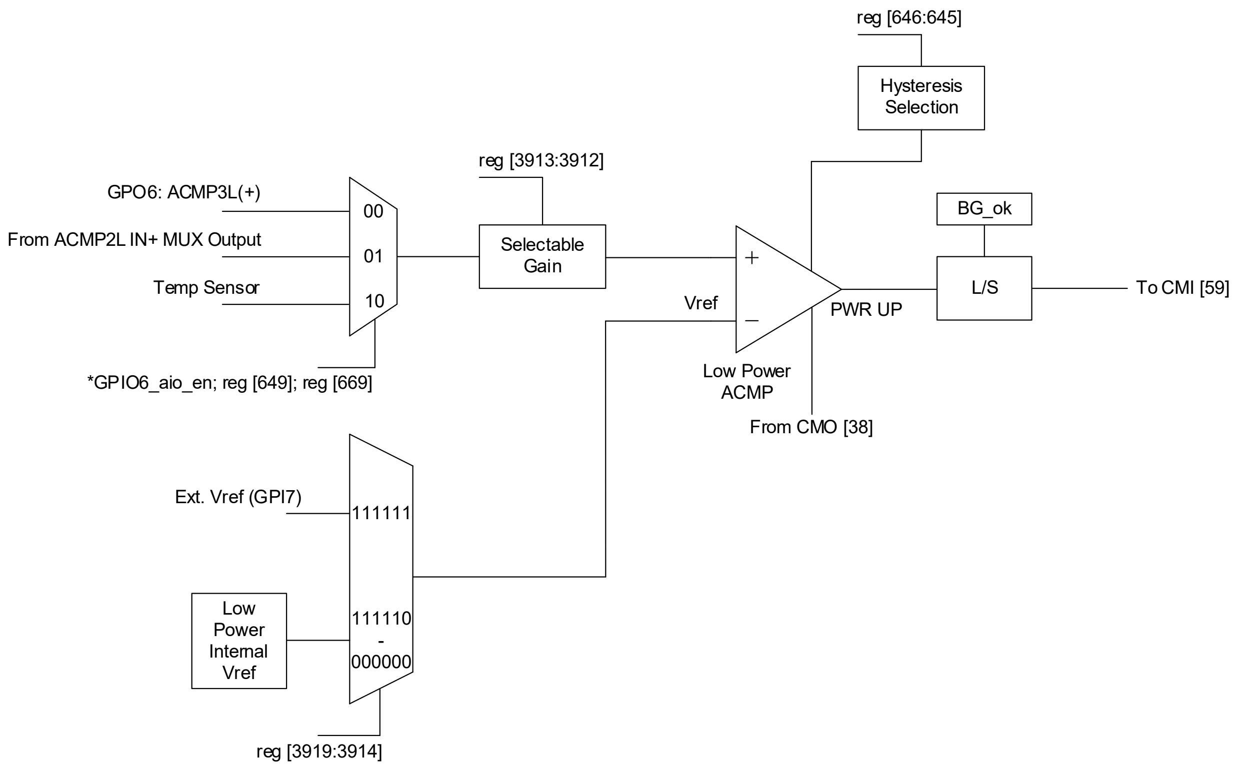


Figure 56. ACMP3L Block Diagram

8.5 ACMP Typical Performance

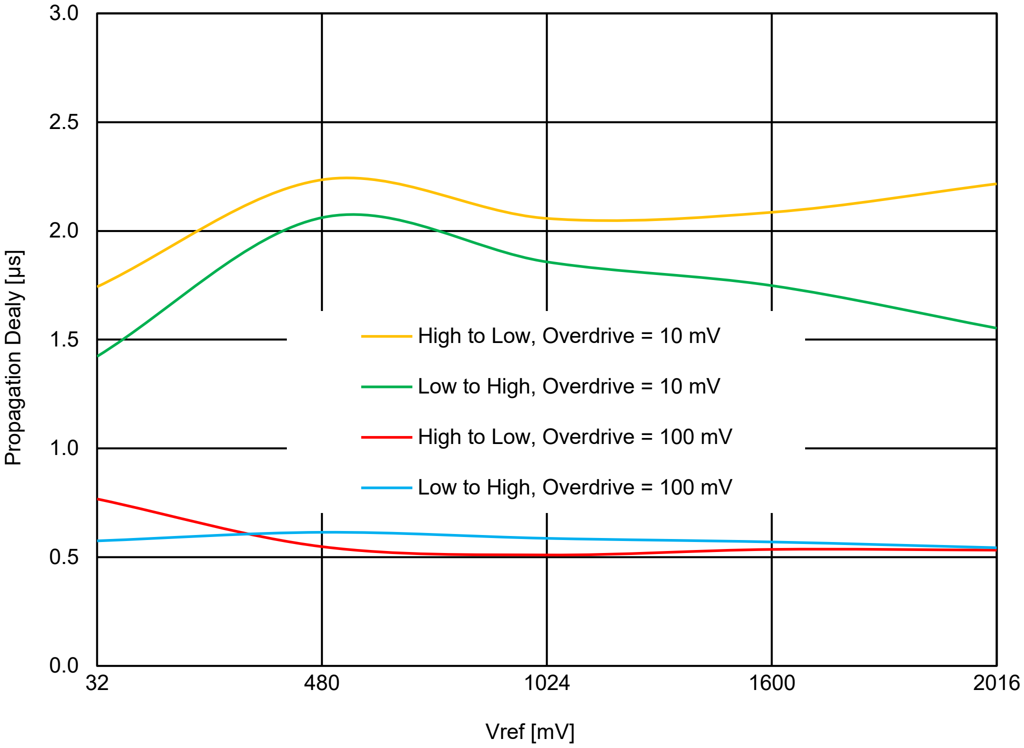


Figure 57. Typical Propagation Delay vs. V_{REF} for ACMPxH at T_A = +25 °C, V_{DD} = 2.3 V to 5.5 V, Gain = 1, Hysteresis = 0

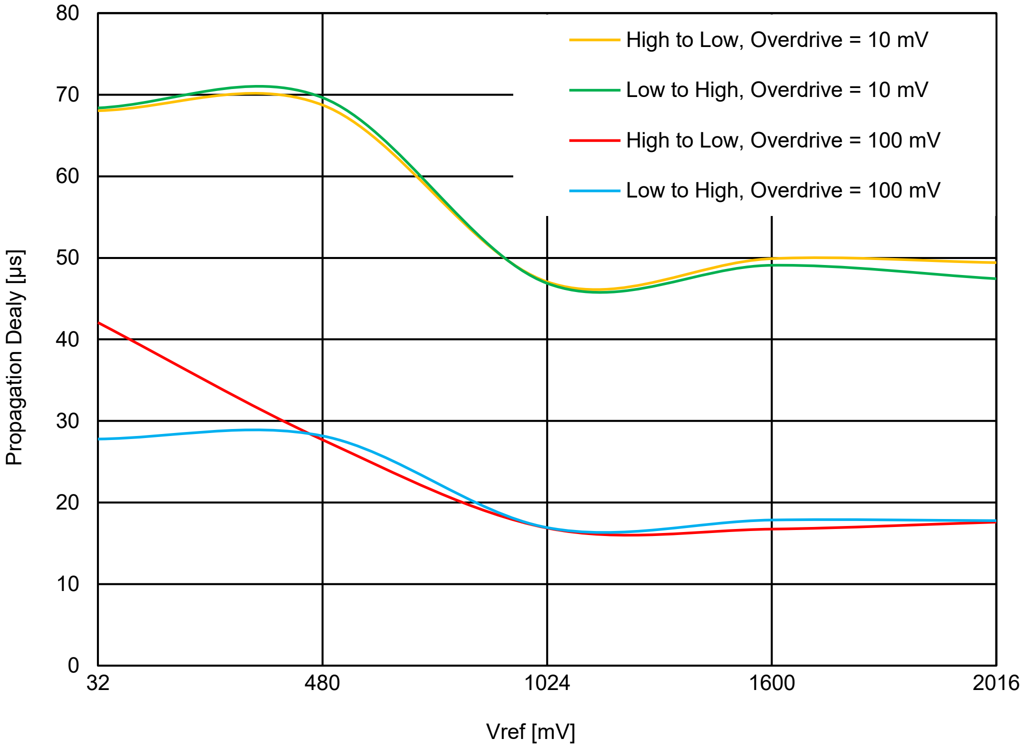


Figure 58. Typical Propagation Delay vs. V_{REF} for ACMPxL at T_A = +25 °C, V_{DD} = 2.3 V to 5.5 V, Gain = 1, Hysteresis = 0

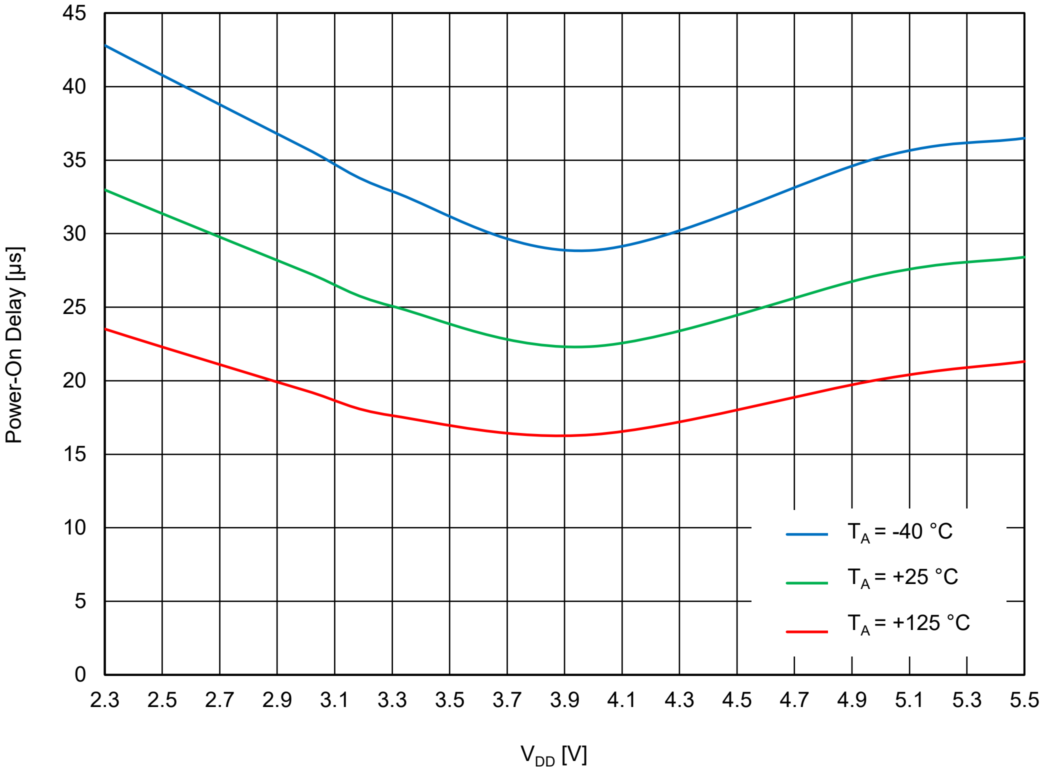


Figure 59. ACMPxH Power-On Delay vs. V_{DD}

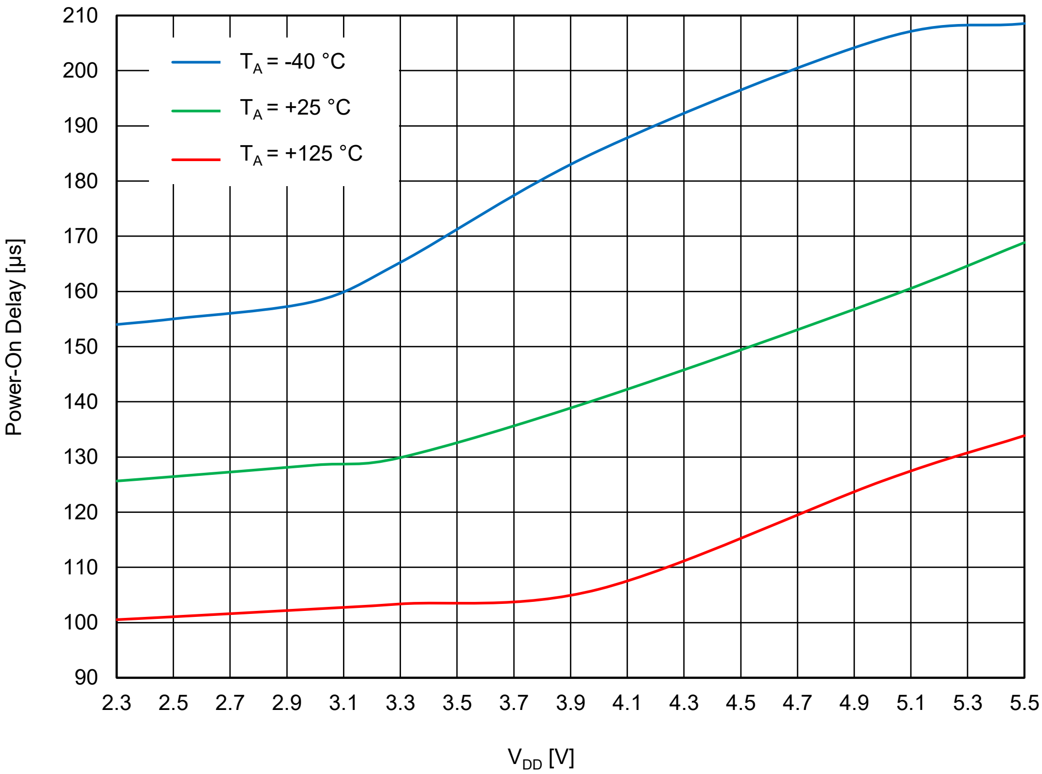


Figure 60. ACMPxL Power-On Delay vs. V_{DD}

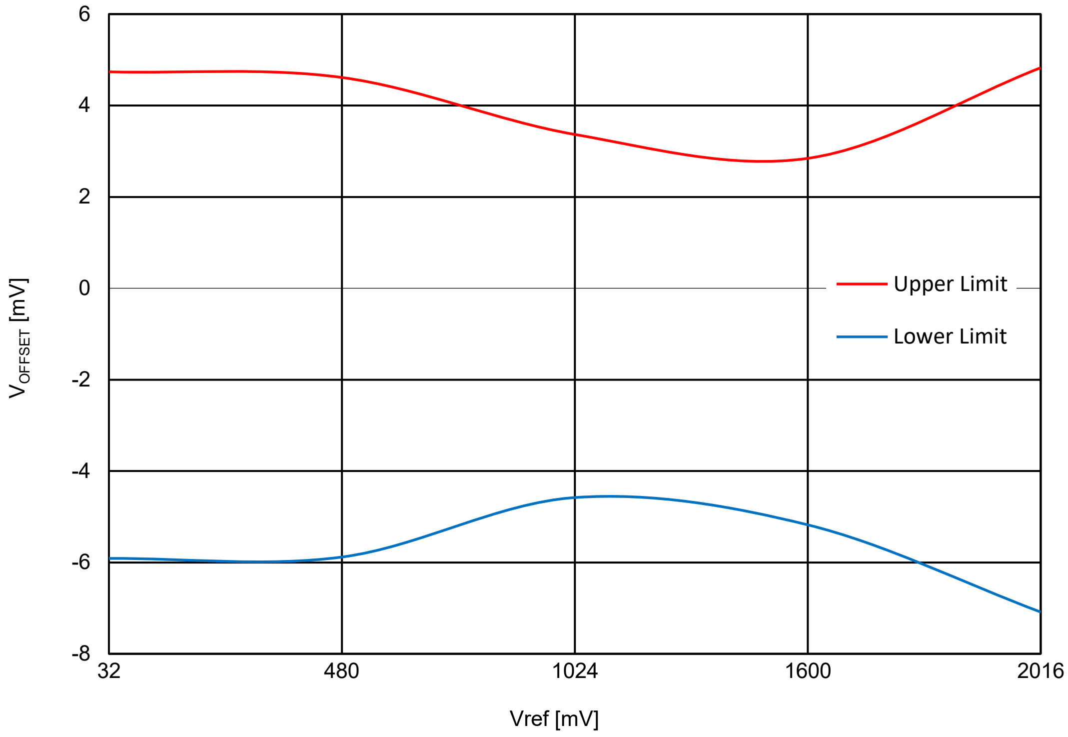


Figure 61. ACMPxH Input Offset Voltage vs. V_{REF} at T_A = -40 °C to +125 °C, Input Buffer Disabled

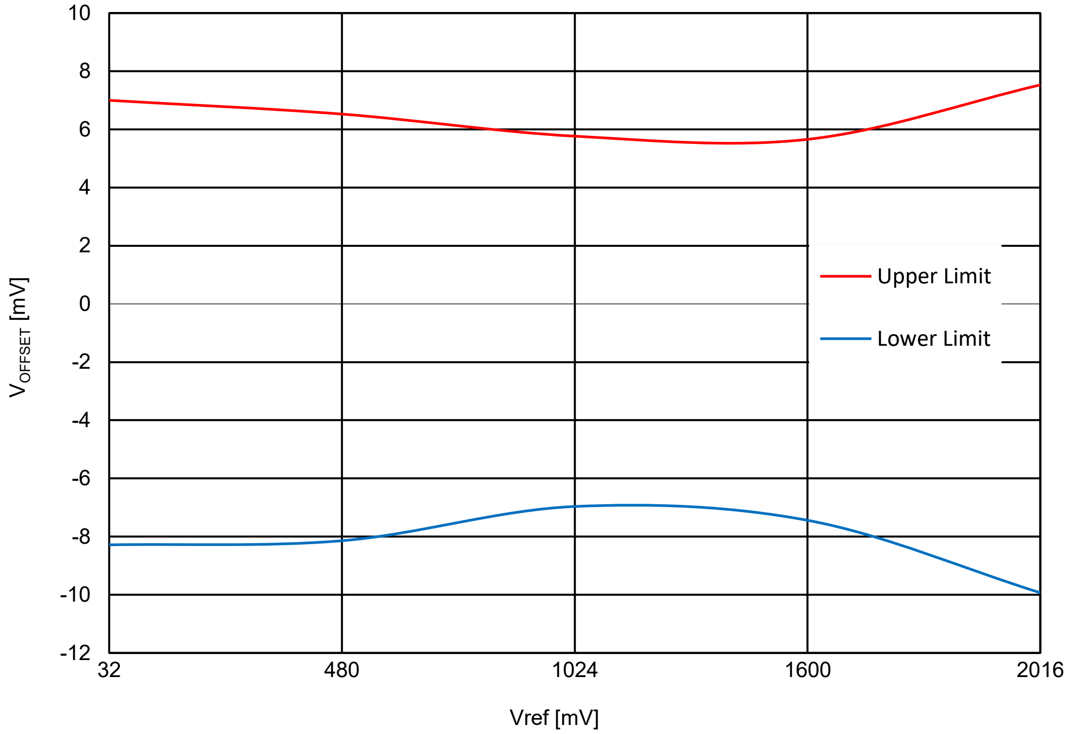


Figure 62. ACMPxL Input Offset Voltage vs. V_{REF} at T_A = -40 °C to +125 °C, Input Buffer Disabled

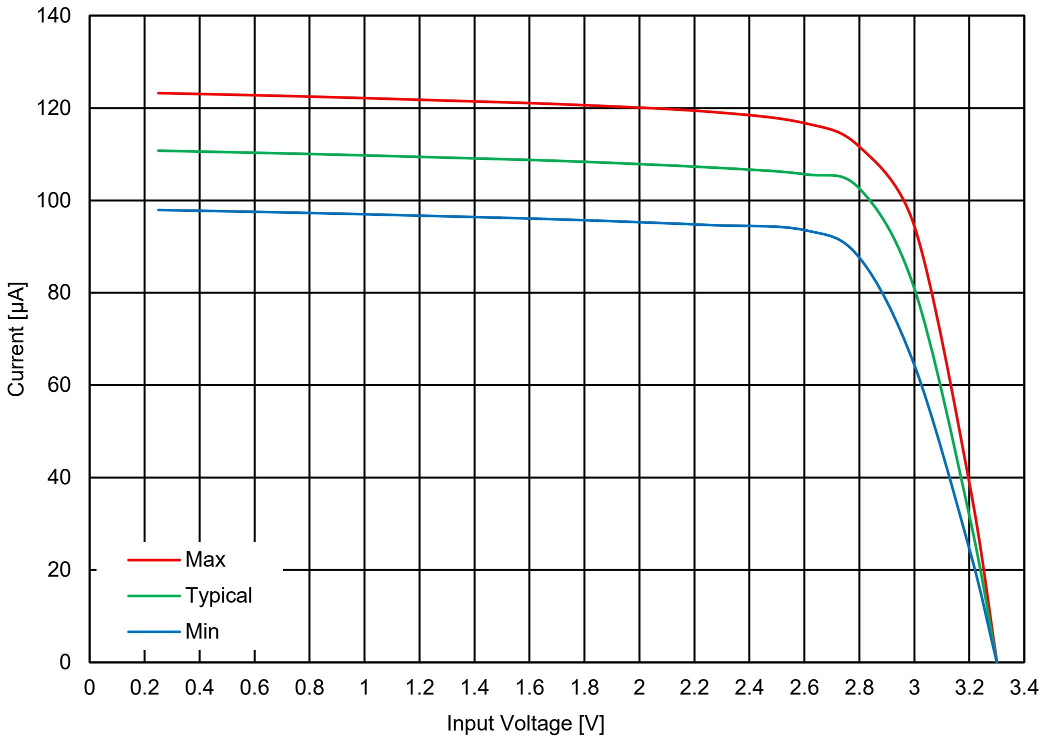


Figure 63. ACMP Input Current Source vs. Input Voltage at T_A = -40 °C to +125 °C, V_{DD} = 3.3 V

9. Programmable Delay/Edge Detector

The SLG46880-E has a programmable time delay logic cell available that can generate a delay that is selectable from one of four timings (time1). The programmable time delay cell can generate one of four different delay patterns, rising edge detection, falling edge detection, both edge detection, and both edge delay. These four patterns can be further modified with the addition of delayed edge detection, which adds an extra unit of delay as well as glitch rejection during the delay period. See Figure 65 for further information.

Note: The input signal must be longer than the delay, otherwise it will be filtered out.

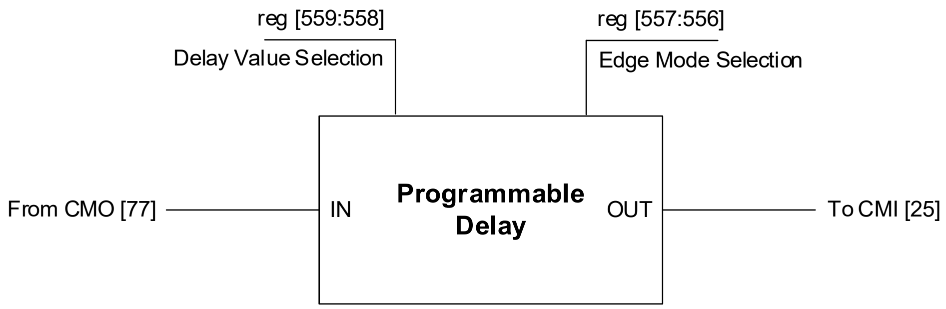


Figure 64. Programmable Delay

9.1 Programmable Delay Timing Diagram - Edge Detector Output

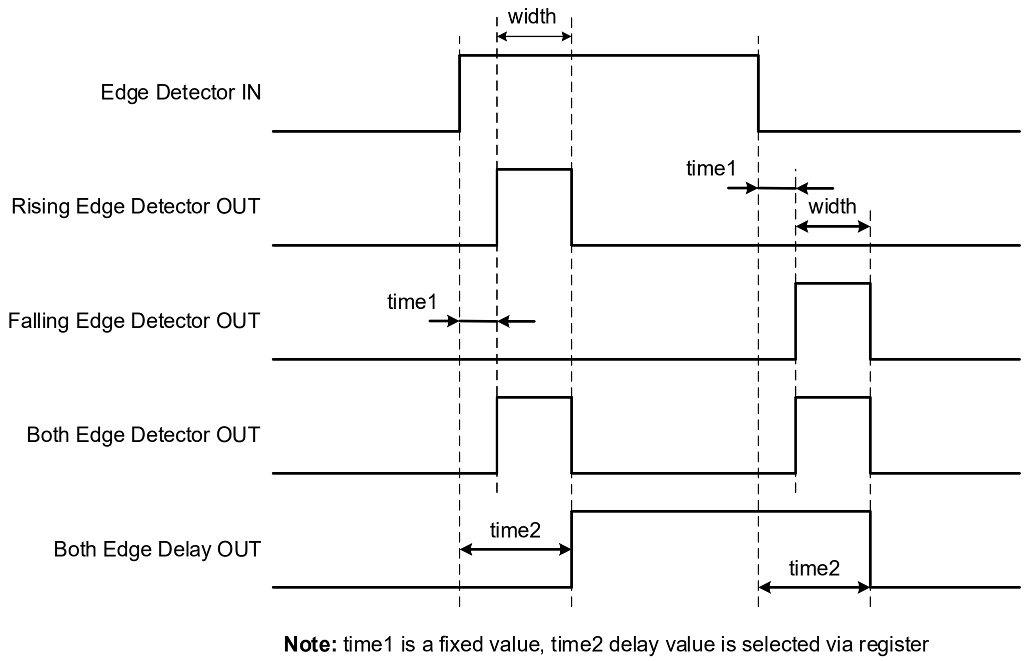


Figure 65. Edge Detector Output

Please refer to section 3.4.7 Programmable Delay Typical Delays and Widths.

10. Additional Logic Function

The SLG46880-E has one additional logic function that is connected directly to the Connection Matrix inputs and outputs. There is one deglitch filter, with edge detector function.

10.1 Deglitch Filter/Edge Detector

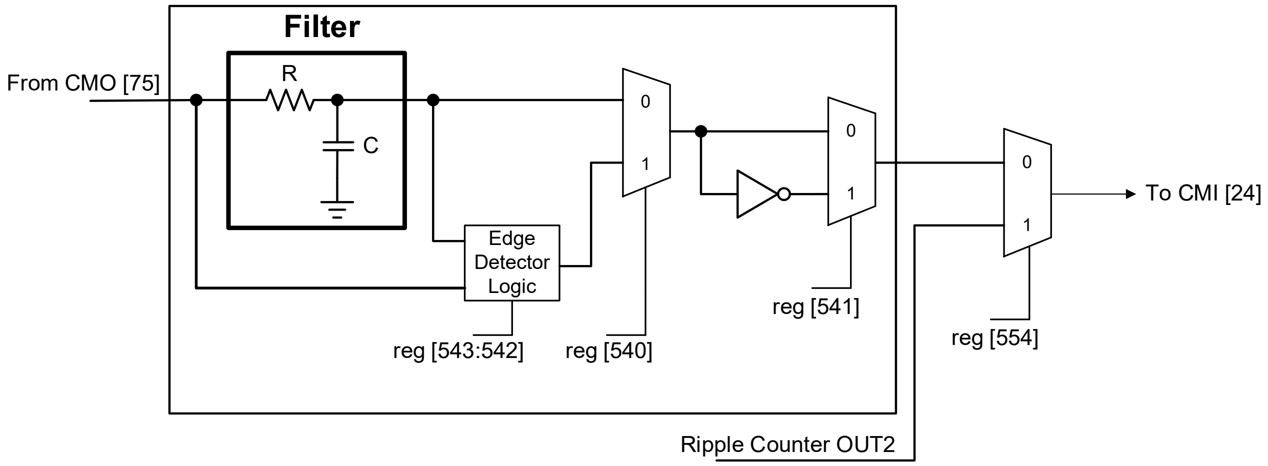


Figure 66. Deglitch Filter/Edge Detector

11. Voltage Reference

11.1 Voltage Reference Overview

The SLG46880-E has a Voltage Reference (V_{REF}) Macrocell to provide references to the four analog comparators. This macrocell can supply a user selection of fixed voltage references, or temperature sensor output. The macrocell also has the option to output reference voltages on GPIO2 and GPIO9. See Table 23 for the available selections for each analog comparator. Also, see Figure 67, which shows the reference output structure.

11.2 V_{REF} Selection Table

Table 23. V_{REF} Selection Table

SEL[5:0]	V_{REF}	SEL[5:0]	V_{REF}
0	0.032	32	1.056
1	0.064	33	1.088
2	0.096	34	1.12
3	0.128	35	1.152
4	0.16	36	1.184
5	0.192	37	1.216
6	0.224	38	1.248
7	0.256	39	1.28
8	0.288	40	1.312
9	0.32	41	1.344
10	0.352	42	1.376
11	0.384	43	1.408
12	0.416	44	1.44
13	0.448	45	1.472
14	0.48	46	1.504
15	0.512	47	1.536
16	0.544	48	1.568
17	0.576	49	1.6
18	0.608	50	1.632
19	0.64	51	1.664
20	0.672	52	1.696
21	0.704	53	1.728
22	0.736	54	1.76
23	0.768	55	1.792
24	0.8	56	1.824
25	0.832	57	1.856
26	0.864	58	1.888
27	0.896	59	1.92
28	0.928	60	1.952
29	0.96	61	1.984
30	0.992	62	2.016
31	1.024	63	External

11.3 Truth Table for V_{REF}0 Buffer and Output Switch Control

Table 24. V_{REF}O0 Truth Table

Function Enable	V_{REF}O0 Source Selection register [655:654]	V_{REF}O0 Buffer Selection register [3261]	V_{REF}O0 Buffer Enable register [653]	Matrix out78	TS PD Selection register [651]	TS PD Register Control register [650]	GPIO9 Analog Mode Enable register [856:855]= 11, means enable	Buffer state	Output switch	Note
None	00	0	0	0	0	0	Disable	Off	Off	V_{REF}O0 is all off
ACMP0H_Vref	01	0	0	0	0	0	Disable	Off	Off	V_{REF}O0 select ACMP0H; output has no buffer; PD comes from register [653]
	01	0	0	0	0	0	Enable	Off	On	
	01	0	1	0	0	0	Disable	On	Off	V_{REF}O0 select ACMP0H; output has buffer; PD comes from register [653]
	01	0	1	0	0	0	Enable	On	On	
	01	1	0	0	0	0	Disable	Off	Off	V_{REF}O0 select ACMP0H; output has no buffer; PD comes from matrix78
	01	1	0	0	0	0	Enable	Off	On	
	01	1	0	1	0	0	Disable	On	Off	V_{REF}O0 select ACMP0H; output has buffer; PD comes from matrix78
	01	1	0	1	0	0	Enable	On	On	
ACMP1H_Vref	10	0	0	0	0	0	Disable	Off	Off	V_{REF}O0 select ACMP1H; output has no buffer; PD comes from register [653]
	10	0	0	0	0	0	Enable	Off	On	
	10	0	1	0	0	0	Disable	On	Off	V_{REF}O0 select ACMP1H; output has buffer; PD comes from register [653]
	10	0	1	0	0	0	Enable	On	On	
	10	1	0	0	0	0	Disable	Off	Off	V_{REF}O0 select ACMP1H; output has no buffer; PD comes from matrix78
	10	1	0	0	0	0	Enable	Off	On	
	10	1	0	1	0	0	Disable	On	Off	V_{REF}O0 select ACMP1H; output has buffer; PD comes from matrix78
	10	1	0	1	0	0	Enable	On	On	

Function Enable	V_{REF}O0 Source Selection register [655:654]	V_{REF}O0 Buffer Selection register [3261]	V_{REF}O0 Buffer Enable register [653]	Matrix out78	TS PD Selection register [651]	TS PD Register Control register [650]	GPIO9 Analog Mode Enable register [856:855]= 11, means enable	Buffer state	Output switch	Note
TS function	11	0	0	0	0	0	Disable	Off	Off	TS enable comes from register [650]
	11	0	0	0	0	0	Enable	Off	Off	
	11	0	0	0	0	1	Disable	On	Off	
	11	0	0	0	0	1	Enable	On	On	
	11	0	0	0	0	0	Disable	Off	Off	TS enable comes from Matrix78
	11	0	0	0	0	0	Enable	Off	Off	
	11	0	0	1	0	0	Disable	On	Off	
	11	0	0	1	0	0	Enable	On	On	

11.4 Truth Table for V_{REF}1 Buffer and Output Switch Control

Table 25. V_{REF}O1 Truth Table

Function Enable	V_{REF}O1 Source Selection register [658:657]	V_{REF}O1 Buffer Selection register [656]	GPIO2 Analog Mode Enable register [708:707]= 11, means enable	Buffer state	Output switch	Note
None	00	0	Disable	Off	Off	V_{REF}O1 is all off
ACMP2L_Vref	01	0	Disable	Off	Off	V_{REF}O1 select ACMP2L; output has no buffer; PD comes from register [656]
	01	0	Enable	Off	On	
	01	1	Disable	On	Off	V_{REF}O1 select ACMP2L; output has buffer; PD comes from register [656]
	01	1	Enable	On	On	
ACMP3L_Vref	10	0	Disable	Off	Off	V_{REF}O1 select ACMP2L; output has no buffer; PD comes from register [656]
	10	0	Enable	Off	On	
	10	1	Disable	On	Off	V_{REF}O1 select ACMP2L; output has buffer; PD comes from register [656]
	10	1	Enable	On	On	

	Valid output mode

11.5 V_{REF} Block Diagram

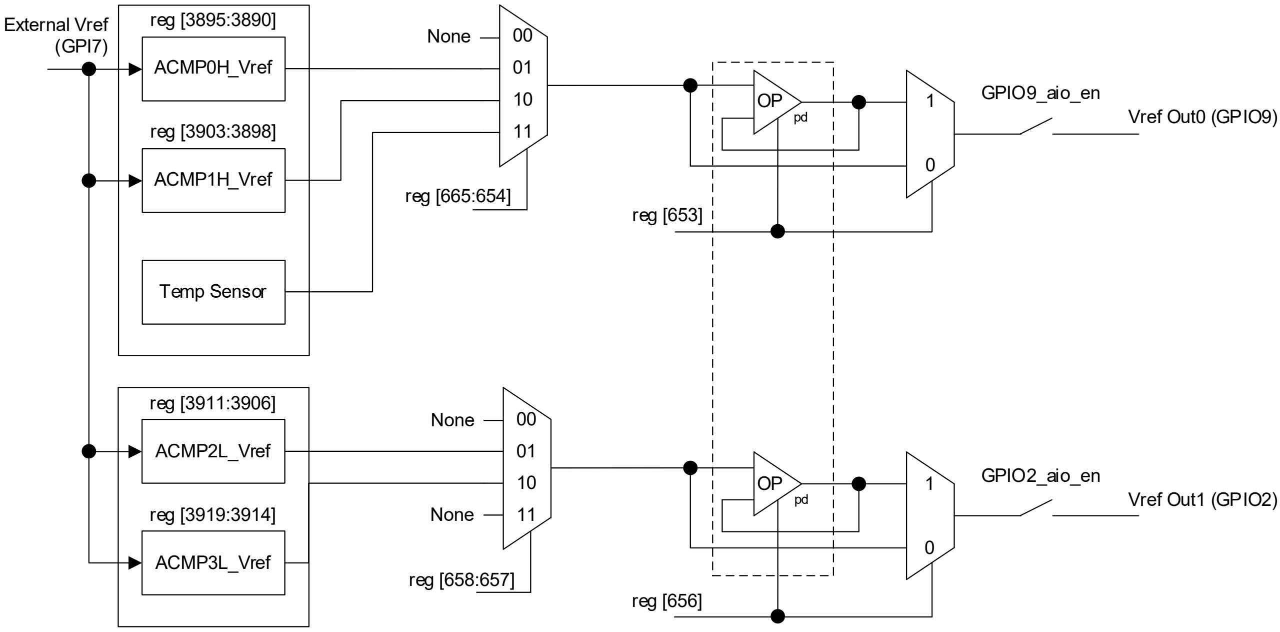


Figure 67. Voltage Reference Block Diagram

11.6 V_{REF} Load Regulation

Note 1: It is not recommended to use V_{REF} connected to external pin without buffer.

Note 2: V_{REF} buffer performance is not guaranteed at V_{DD} < 2.7 V.

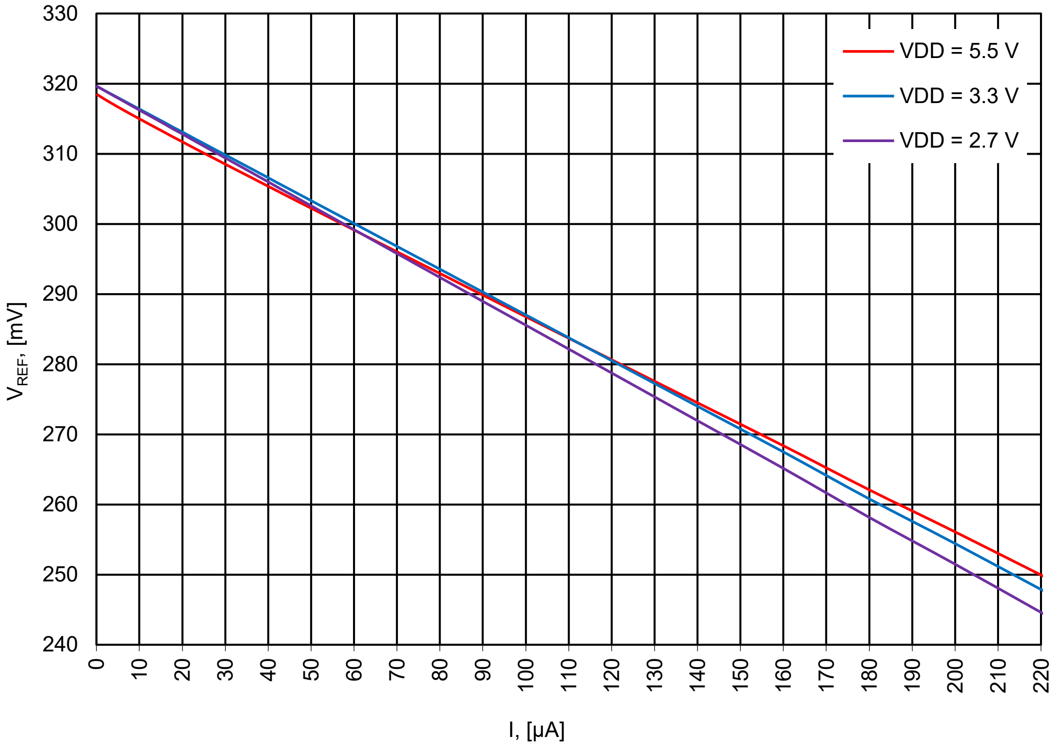


Figure 68. Typical Load Regulation, V_{REF} = 320 mV, T_A = -40 °C to +125 °C, Buffer – Enable

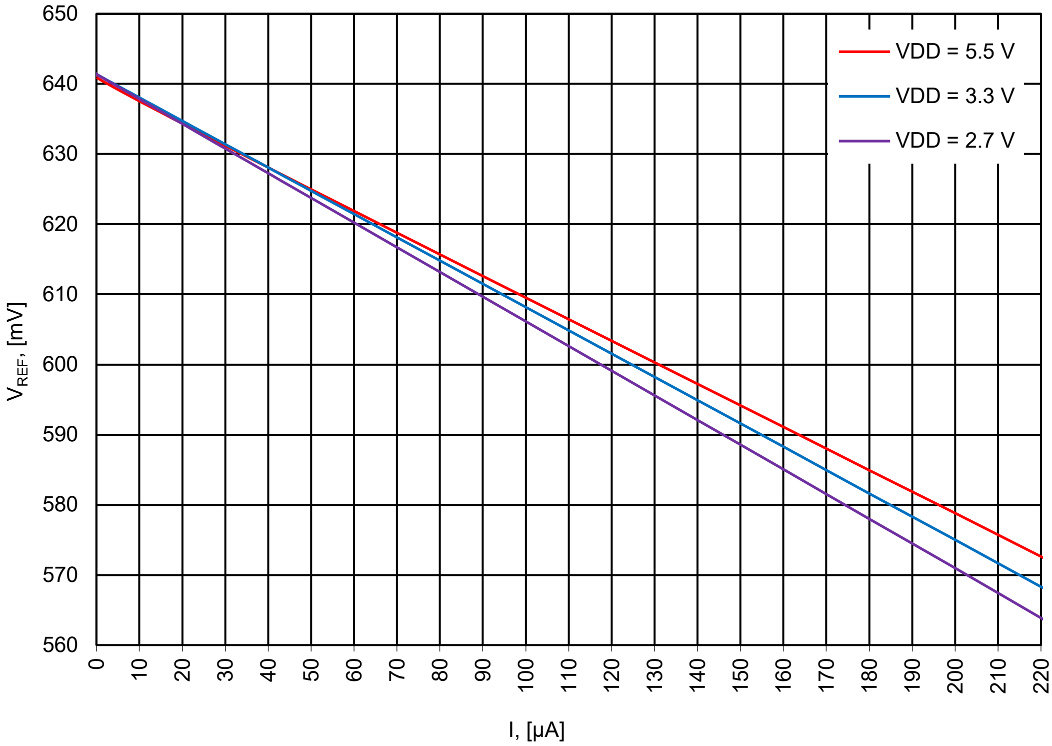


Figure 69. Typical Load Regulation, V_{REF} = 640 mV, T_A = -40 °C to +125 °C, Buffer – Enable

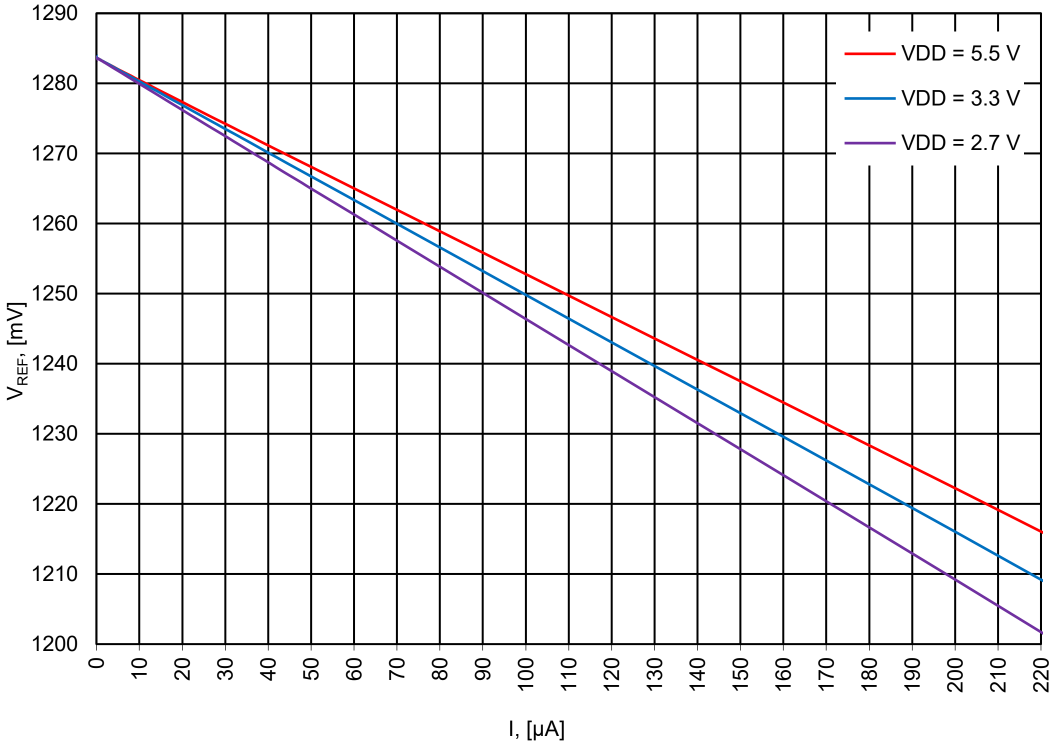


Figure 70. Typical Load Regulation, V_{REF} = 1280 mV, T_A = -40 °C to +125 °C, Buffer – Enable

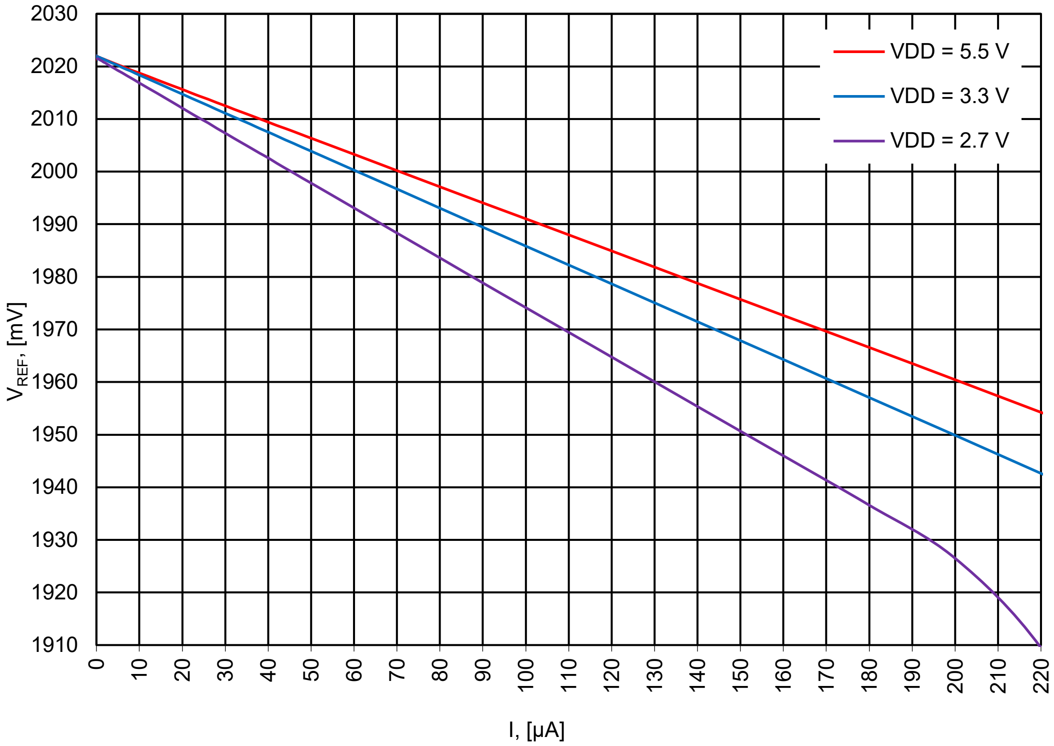


Figure 71. Typical Load Regulation, V_{REF} = 2016 mV, T_A = -40 °C to +125 °C, Buffer – Enable

12. Clocking

12.1 General Description

The SLG46880-E has three internal oscillators to support a variety of applications:

- Oscillator0 (2.048 kHz)
- Oscillator1 (2.048 MHz)
- Oscillator2 (25 MHz)

There are two divider stages for each oscillator that gives the user flexibility for introducing clock signals to connection matrix, as well as various other Macrocells. The pre-divider (first stage) for Oscillator allows the selection of /1, /2, /4 or /8 to divide down frequency from the fundamental. The second stage divider has an input of frequency from the pre-divider, and outputs one of eight different frequencies divided by /1, /2, /3, /4, /8, /12, /24 or /64 on Connection Matrix Input lines [27], [28], and [29]. Please see Figure 75 for more details on the SLG46880-E clock scheme.

Oscillator2 (25 MHz) has an additional function of 100 ns delayed startup, which can be enabled/disabled by register [525]. This function is recommended to use when analog blocks are used along with the Oscillator.

The Matrix Power-down/Force On function allows switching off or force on the oscillator using an external pin. The Matrix Power-down/Force On (Connection Matrix Output [72], [73], [74]) signal has the highest priority. The OSC operates according to the Table 26.

Table 26. Oscillator Operation Mode Configuration Settings

POR	External Clock	Signal From Connection Matrix	Register: Power-Down or Force On by Matrix Input	Register: Auto Power-On or Force On	OSC Enable Signal from CNT/DLY Macrocells	OSC Operation Mode
0	X	X	X	X	X	OFF
1	1	X	X	X	X	Internal OSC is OFF, logic is ON
1	0	1	0	X	X	OFF
1	0	1	1	X	X	ON
1	0	0	X	1	X	ON
1	0	0	X	0	CNT/DLY requires OSC	ON
1	0	0	X	0	CNT/DLY does not require OSC	OFF

[1] The OSC will run only when any macrocell that uses OSC is powered on.

12.2 Oscillator0 (2.048 kHz)

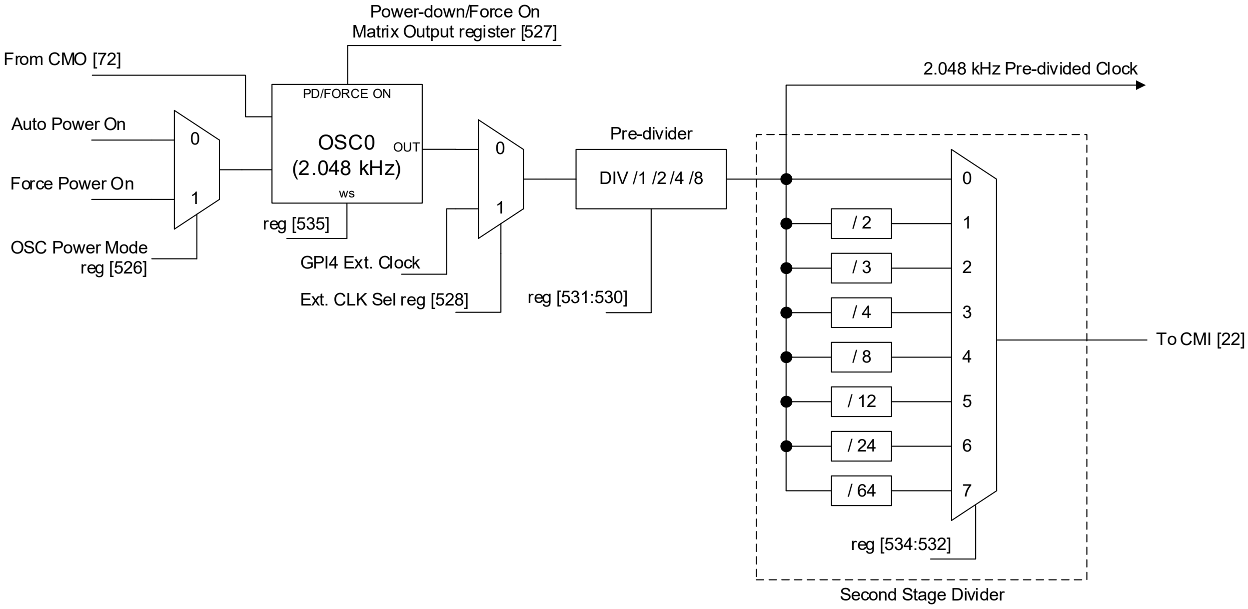


Figure 72. Oscillator0 Block Diagram

12.3 Oscillator1 (2.048 MHz)

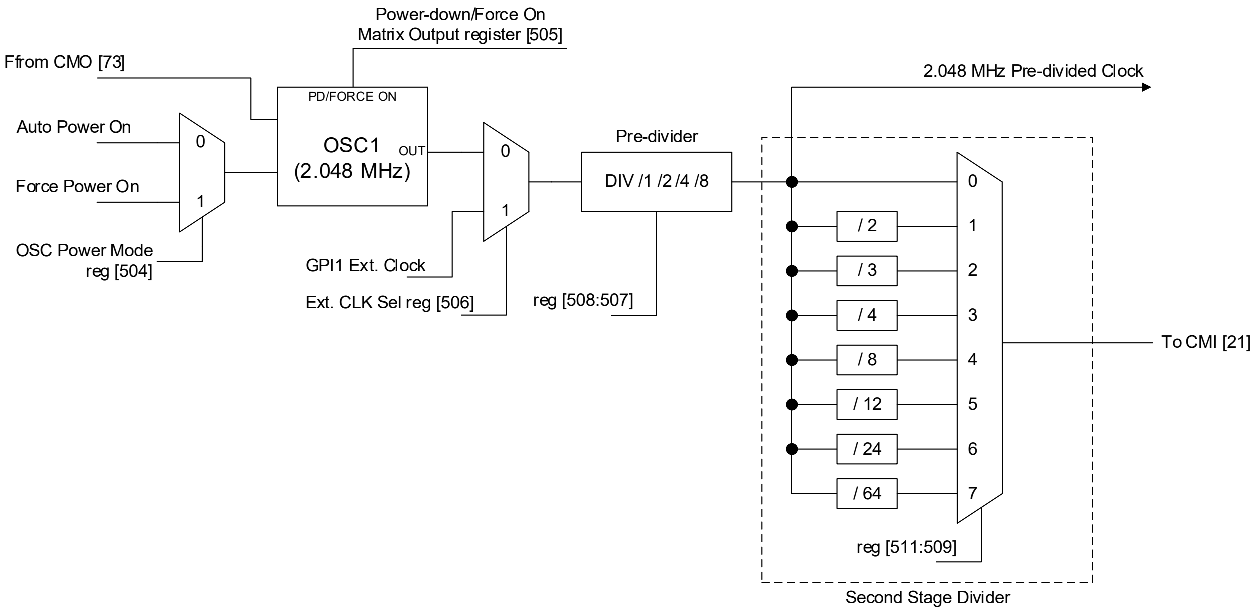


Figure 73. Oscillator1 Block Diagram

12.4 Oscillator2 (25 MHz)

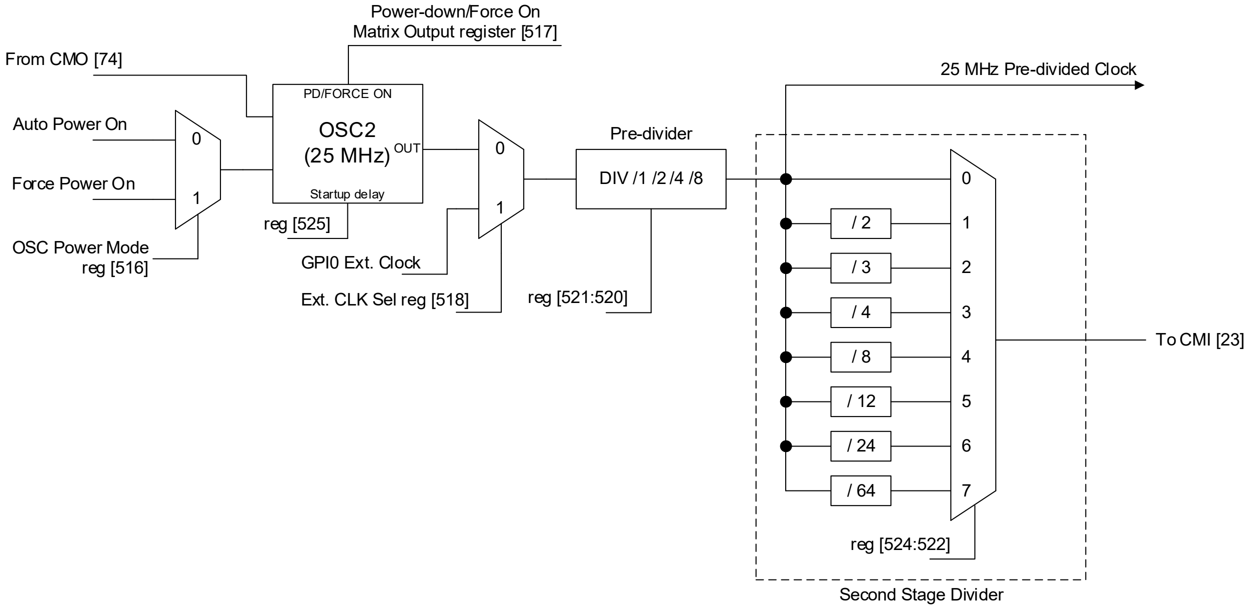


Figure 74. Oscillator2 Block Diagram

12.5 Clock Scheme

Each CNT/DLY within Multi-Function macrocell has its own additional clock divider connected to oscillators pre-divider. Available dividers are:

- OSC0/1, OSC0/8, OSC0/64, OSC0/512, OSC0/4096, OSC0/32768, OSC0/262144
- OSC1/1, OSC1/8, OSC1/64, OSC1/512
- OSC2/1, OSC2/4.

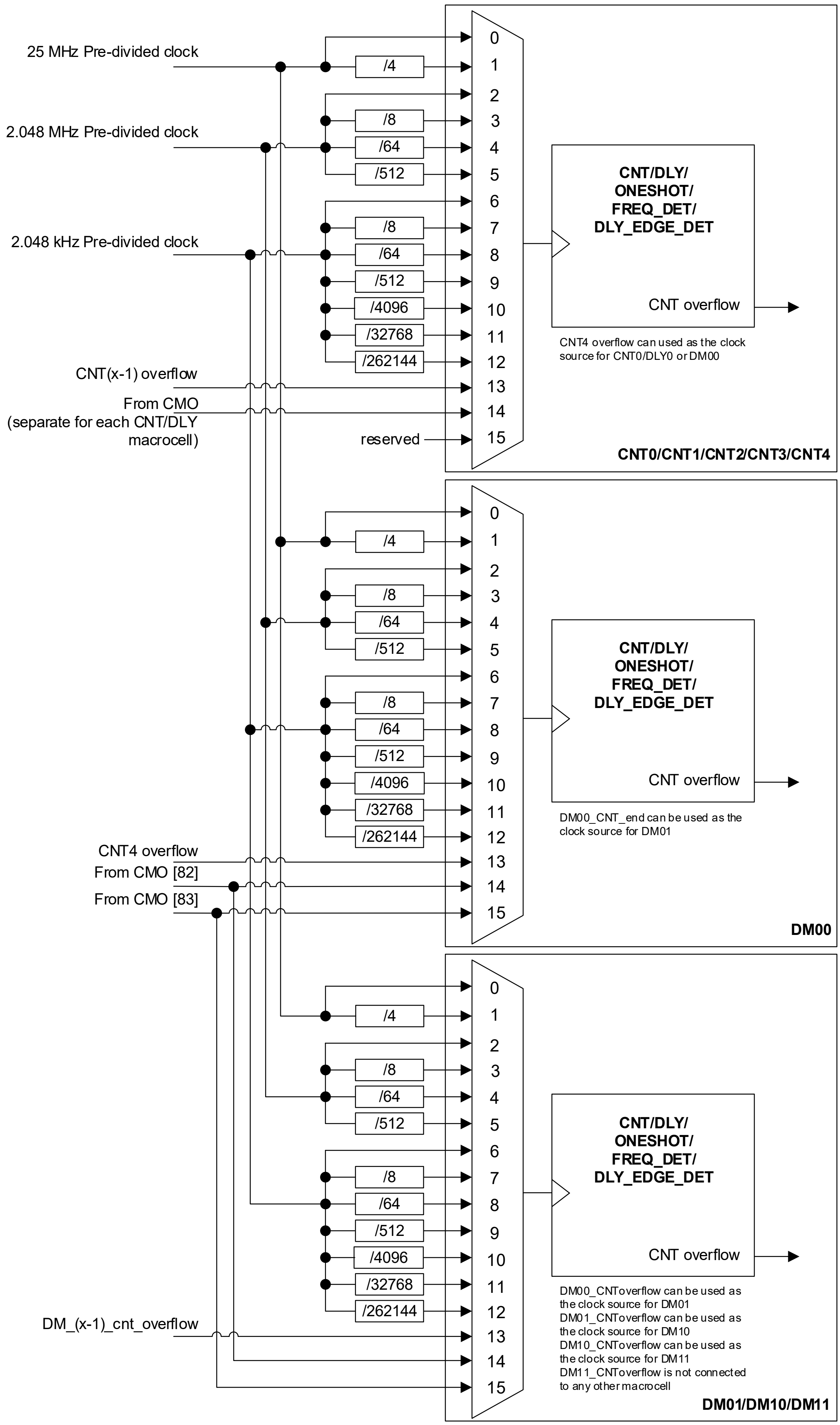


Figure 75. Clock Scheme

12.6 Crystal Oscillator

The Crystal OSC provides high precision and stability of the output frequency. GPI5 and GPI4 are input and output, respectively, of an inverting amplifier which is configured for use as an On-chip Oscillator, as shown in Figure 77. Either a quartz crystal or a ceramic resonator may be used. C1 and C2 should always be equal for both crystals and resonators. The optimal value of the capacitors depends on the crystal or resonator in use, the amount of stray capacitance, and the electromagnetic noise of the environment. Refer to Table 27. For the ceramic resonators, the capacitor values given by the manufacturer should be used. It is possible to use an external clock source, it must be connected to GPI4. In this case no external components are required.

The Power-down Mode is paired with temperature sensor, section 20 Analog Temperature Sensor. If it is enabled for Crystal OSC, it is not available for Temp Sensor and vice versa. However, it is possible to enable Power-down Mode for Crystal OSC and Temp Sensor simultaneously.

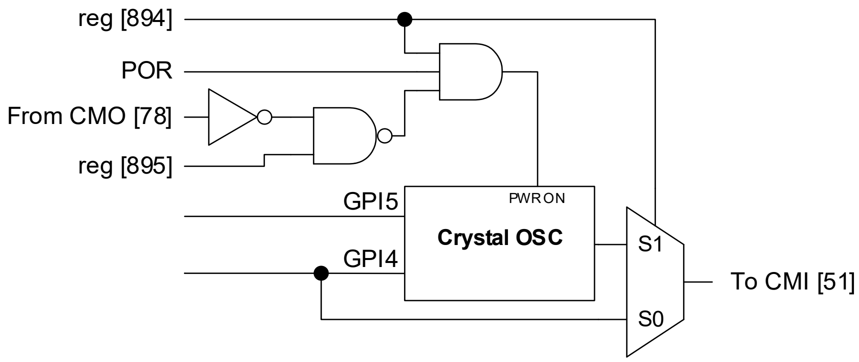


Figure 76. Crystal OSC Block Diagram

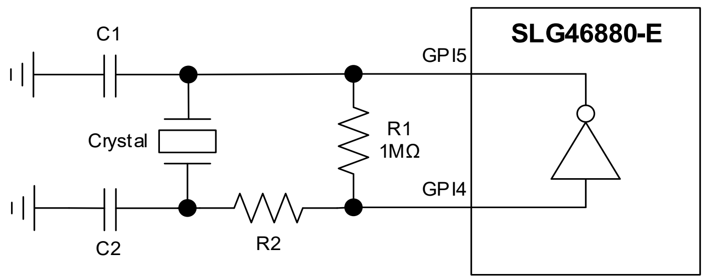


Figure 77. External Crystal Connection

Table 27. External Components Selection Table

f (MHz)	C1, C2	R2
5	33 pF	5 kΩ
10	22 pF	1 kΩ
15	15 pF	500 Ω
20	10 pF	270 Ω

12.7 External Clocking

The SLG46880-E supports several ways to use an external, higher accuracy clock as a reference source for internal operations.

12.7.1 Crystal OSC Mode

When register [1136] is set to '1', an external crystal can be connected to GPI5 and GPI4 for supplying an accurate clock source. See section 12.6 Crystal Oscillator. An external clocking signal on GPI4 can be used in place of the crystal. The high and low limits for crystal frequency that can be selected are 40 MHz and 32.75 kHz.

12.7.2 GPI4 Source for Oscillator0 (2.048 kHz)

When register [528] is set to '1', an external clocking signal on GPI4 will be routed in place of the internal oscillator derived 2.048 kHz clock source. See Figure 72. The high and low limits for external frequency are 0 MHz and 20 MHz.

12.7.3 GPI1 Source for Oscillator1 (2.048 MHz)

When register [506] is set to '1', an external clocking signal on GPI1 will be routed in place of the internal oscillator derived 2.048 MHz clock source. See Figure 73. The high and low limits for external frequency are 0 MHz and 70 MHz.

12.7.4 GPI0 Source for Oscillator2 (25 MHz)

When register [518] is set to '1', an external clocking signal on GPI0 will be routed in place of the internal oscillator derived 25 MHz clock source. See Figure 74. The high and low limits for external frequency are 0 MHz and 80 MHz. When an external clock is selected for OSC2, the oscillator's output signal will be inverted with respect to the GPI0 Input signal.

12.8 Oscillators Power-On Delay

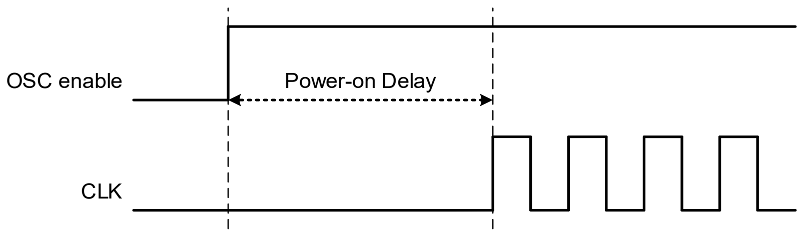


Figure 78. Oscillator Startup Diagram

Note 1: OSC power mode: "Auto Power-On".

Note 2: "OSC enable" signal appears when any macrocell that uses OSC is powered on.

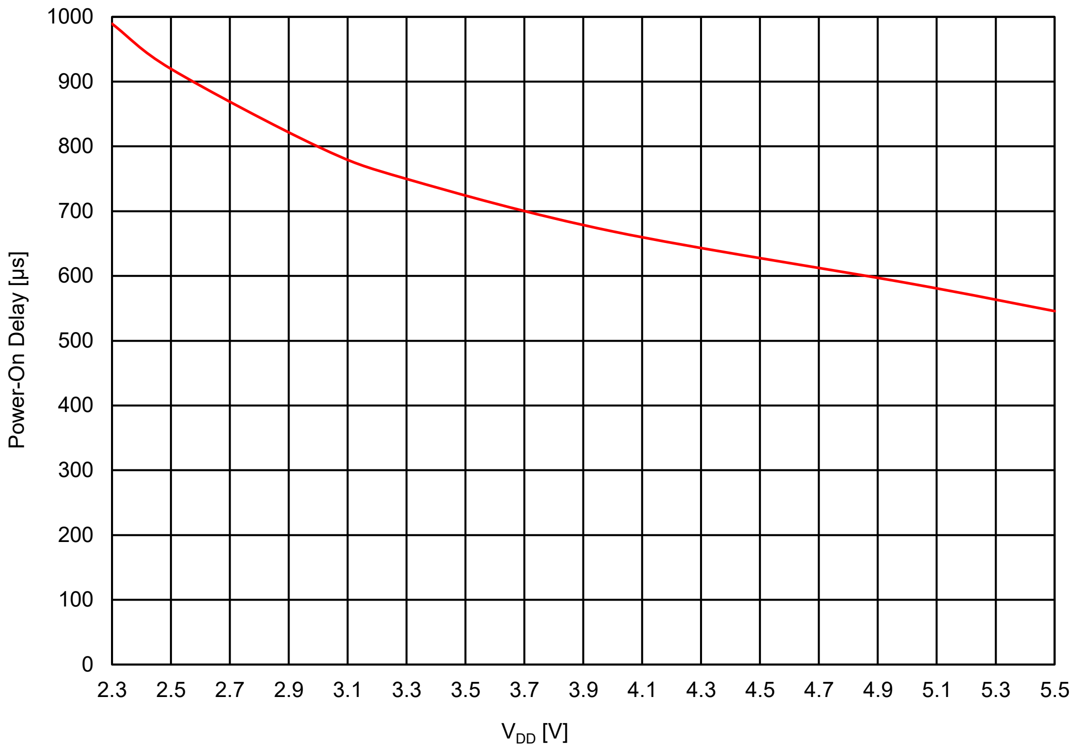


Figure 79. Oscillator0 Maximum Power-On Delay vs. V_{DD} at T_A = +25 °C, OSC0 = 2.048 kHz

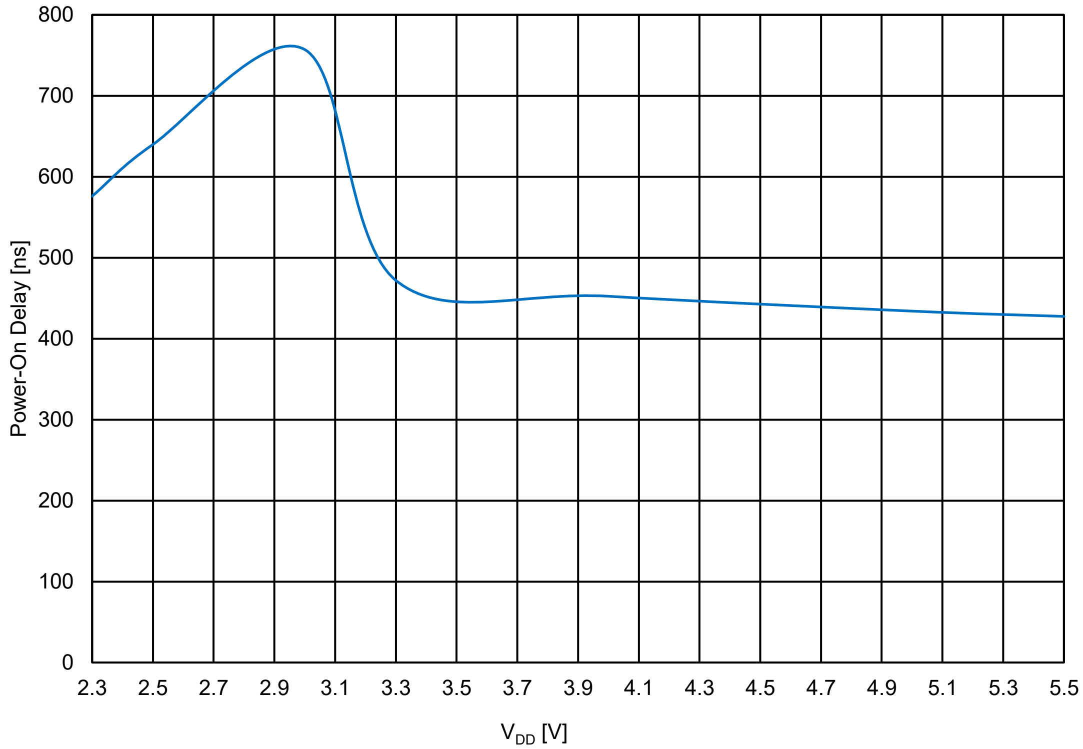


Figure 80. Oscillator1 Maximum Power-On Delay vs. V_{DD} at T_A = +25 °C, OSC1 = 2.048 MHz

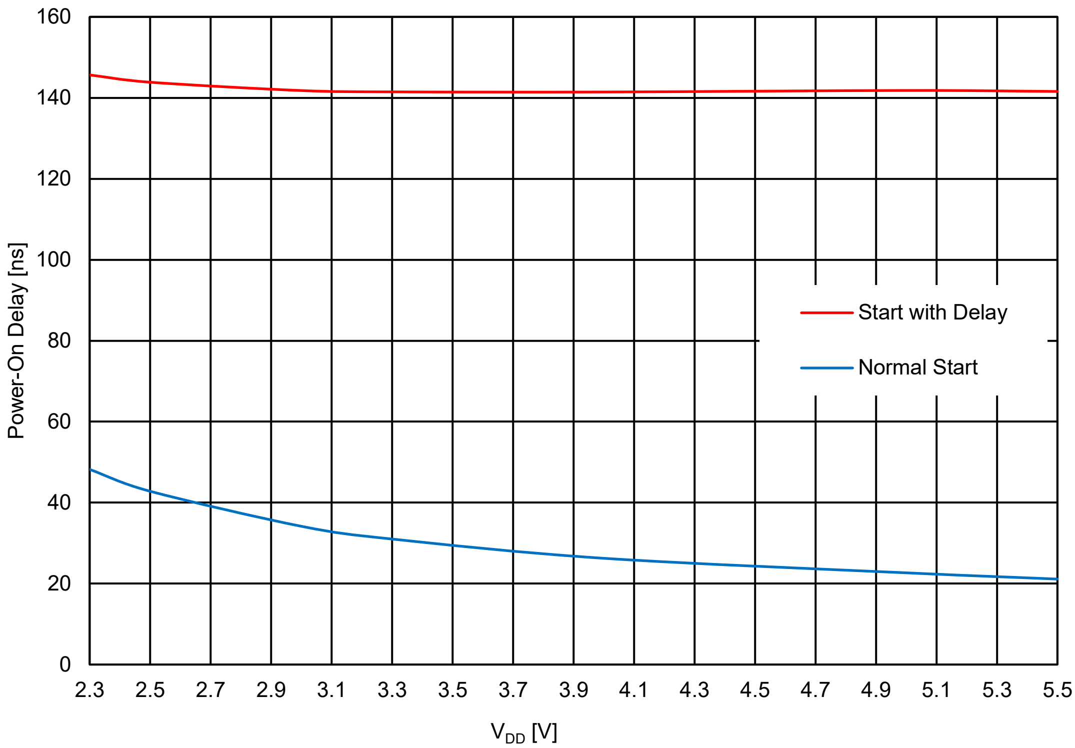


Figure 81. Oscillator2 Maximum Power-On Delay vs. V_{DD} at T_A = +25 °C, OSC2 = 25 MHz

12.9 Oscillators Accuracy

Note 1: OSC power setting: Force Power-On; Clock to matrix input - enable; Bandgap: turn on by register – enable.

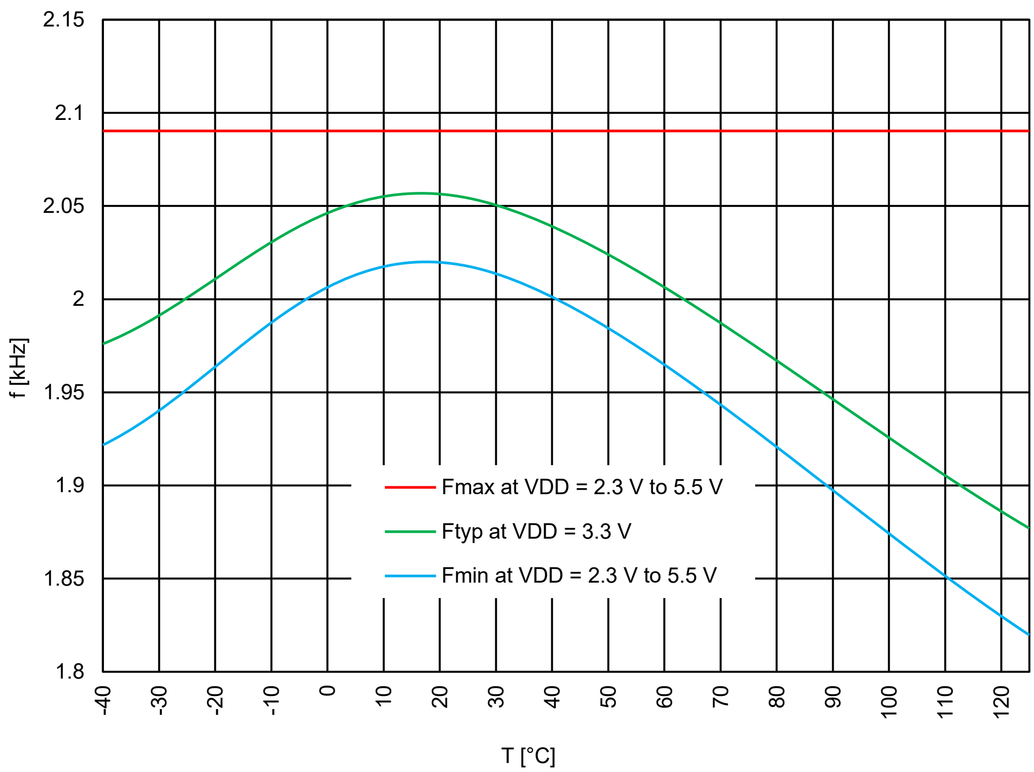


Figure 82. Oscillator0 Frequency vs. Temperature, OSC0 = 2.048 kHz

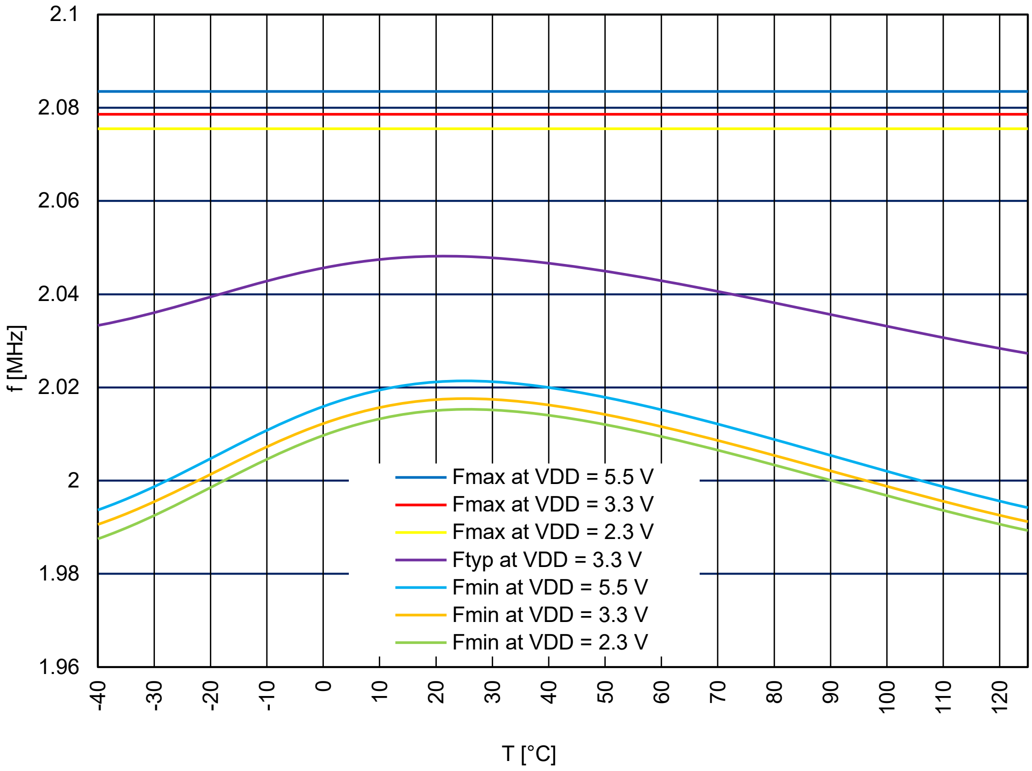


Figure 83. Oscillator1 Frequency vs. Temperature, OSC1 = 2.048 MHz

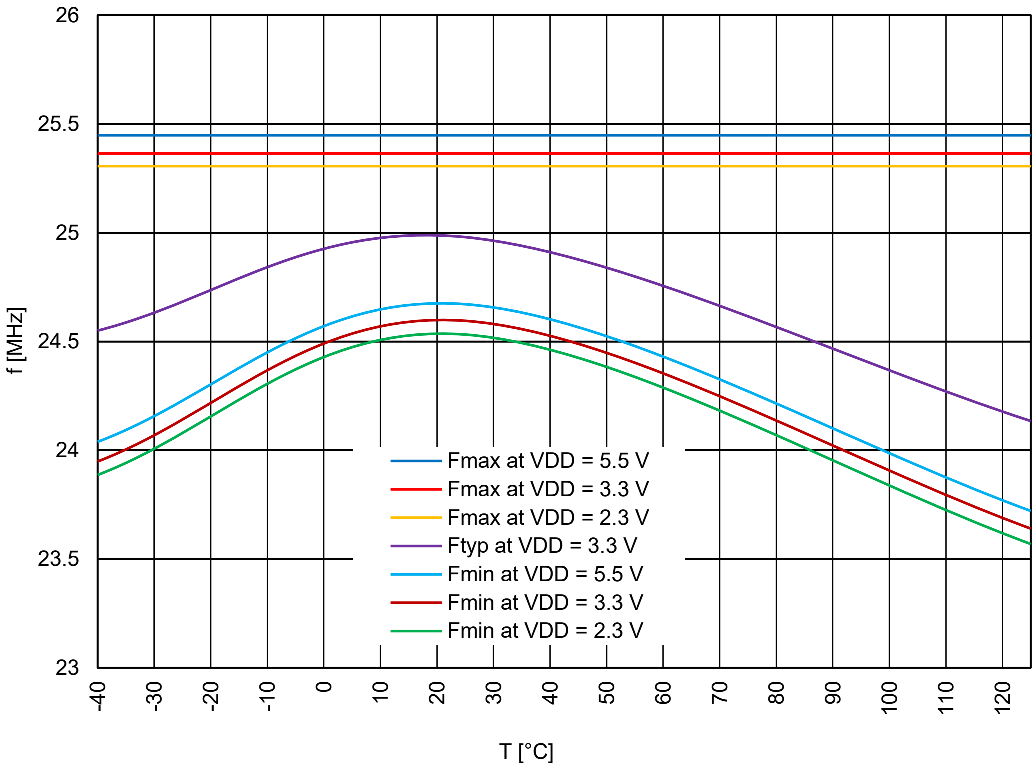


Figure 84. Oscillator2 Frequency vs. Temperature, OSC2 = 25 MHz

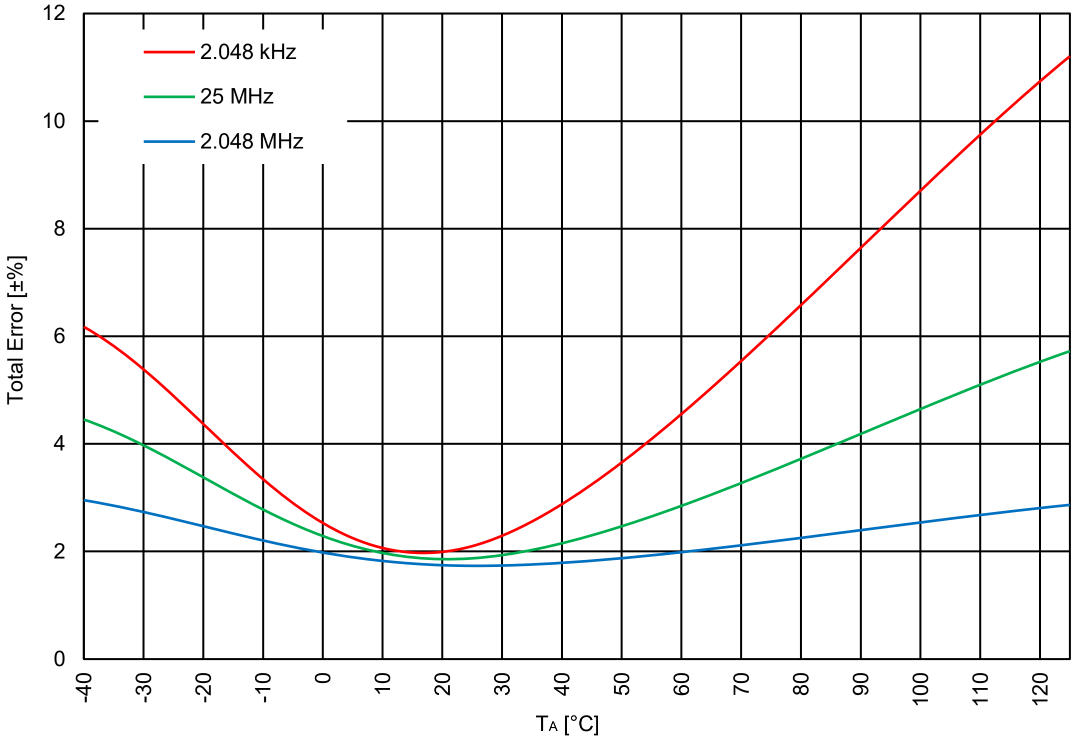


Figure 85. Oscillators Total Error vs. Temperature at V_{DD} = 2.3 V to 5.5 V

Note 2: For more information see sections 3.4.10 Oscillator Frequency, 3.4.11 Oscillator Frequency Error, and 3.4.12 Oscillator Power-On Delay.

13. Power-On Reset

The SLG46880-E has a Power-On Reset (POR) macrocell to ensure correct device initialization and operation of all macrocells in the device. The purpose of the POR circuit is to have consistent behavior and predictable results when the V_{DD} power is first ramping to the device, and also while the V_{DD} is falling during Power-down. To accomplish this goal, the POR drives a defined sequence of internal events that trigger changes to the states of different macrocells inside the device, and finally to the state of the IO pins.

13.1 General Operation

The SLG46880-E is guaranteed to be powered down and non-operational when the V_{DD} voltage (voltage on V_{DD}) is less than Power-Off Threshold (see in section 3.4.1 Logic IO Specifications), but not less than -0.6 V. Another essential condition for the chip to be powered down is that no voltage higher (Note 1) than the V_{DD} voltage is applied to any other PIN. For example, if V_{DD} voltage is 0.3 V, applying a voltage higher than 0.3 V to any other PIN is incorrect, and can lead to incorrect or unexpected device behavior.

Note 1: There is a 0.6 V margin due to forward drop voltage of the ESD protection diodes.

To start the POR sequence in the SLG46880-E, the voltage applied on the V_{DD} should be higher than the Power-On threshold (Note 2). The full operational V_{DD} range for the SLG46880-E is 2.3 V to 5.5 V. This means that the V_{DD} voltage must ramp up to the operational voltage value, but the POR sequence will start earlier, as soon as the V_{DD} voltage rises to the Power-On threshold. After the POR sequence has started, the SLG46880-E will have a typical Startup Time (see in section 3.4.1 Logic IO Specifications) to go through all the steps in the sequence, and will be ready and completely operational after the POR sequence is complete.

Note 2: The Power-On threshold is defined in section 3.4.1 Logic IO Specifications.

To power down the chip the V_{DD} voltage should be lower than the operational and to guarantee that chip is powered down, it should be less than Power-Off Threshold.

All PINs are in high impedance state when the chip is powered down and while the POR sequence is taking place. The last step in the POR sequence releases the IO structures from the high impedance state, at which time the device is operational. The pin configuration at this point in time is defined by the design programmed into the chip. Also, as it was mentioned before, the voltage on PINs can’t be bigger than the V_{DD}, this rule also applies to the case when the chip is powered on.

13.2 POR Sequence

The POR system generates a sequence of signals that enable certain macrocells. The sequence is shown in Figure 86.

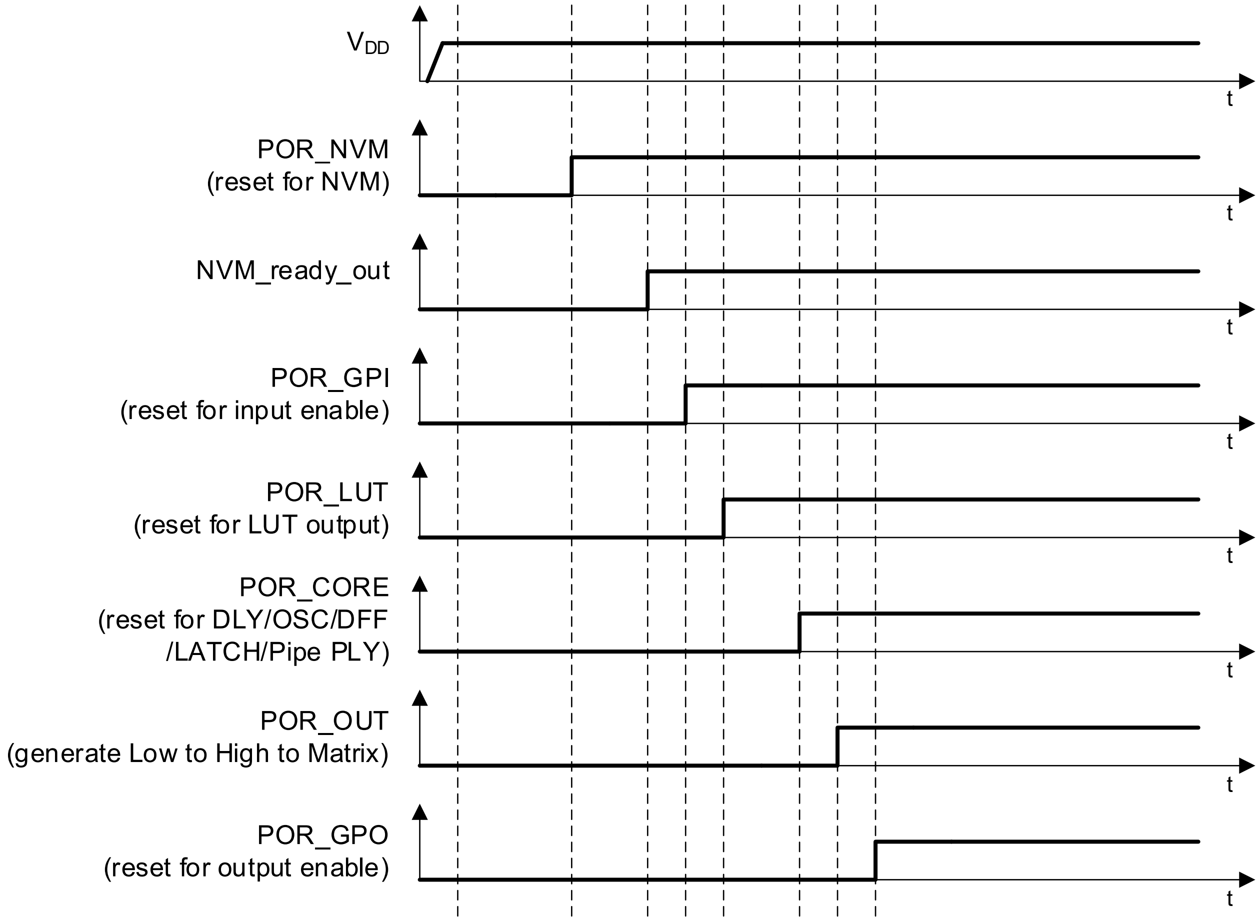


Figure 86. POR Sequence

As can be seen from Figure 86, after the V_{DD} has started ramping up and crossed the Power-On threshold, first, the on-chip NVM memory is reset. Next, the chip reads the data from NVM and transfers this information to a CMOS LATCH that serves to configure each macrocell, and the Connection Matrix which routes signals between macrocells. The third stage causes the reset of the input pins, and then to enable them. After that, the LUTs are reset and become active. After LUTs, the Delay cells, OSCs, DFFs, LATCHES, and Pipe Delay are initialized. Only after all macrocells are initialized, internal POR signal (POR macrocell output) goes from LOW to HIGH (POR_OUT in Figure 86). The last portion of the device to be initialized is the output pins, which transition from high impedance to active at this point.

The typical time that takes to complete the POR sequence varies by device type in the GreenPAK family. It also depends on many environmental factors, such as: slew rate, V_{DD} value, temperature, and even will vary from chip to chip (process influence).

13.3 Macrocells Output States During POR Sequence

To have a full picture of SLG46880-E operation during powering and POR sequence, refer to Figure 87, which describes the macrocell output states during the POR sequence.

First, before the NVM has been reset, all macrocells have their output set to logic LOW (except the output pins which are in high impedance state). On the next step, some of the macrocells start initialization: input pins output state becomes LOW; LUTs also output LOW. After that input pins are enabled. Next, only LUTs are configured. Then, all other macrocells are initialized. After macrocells are initialized, internal POR matrix signal switches from LOW to HIGH. The last are output pins that become active and determined by the input signals.

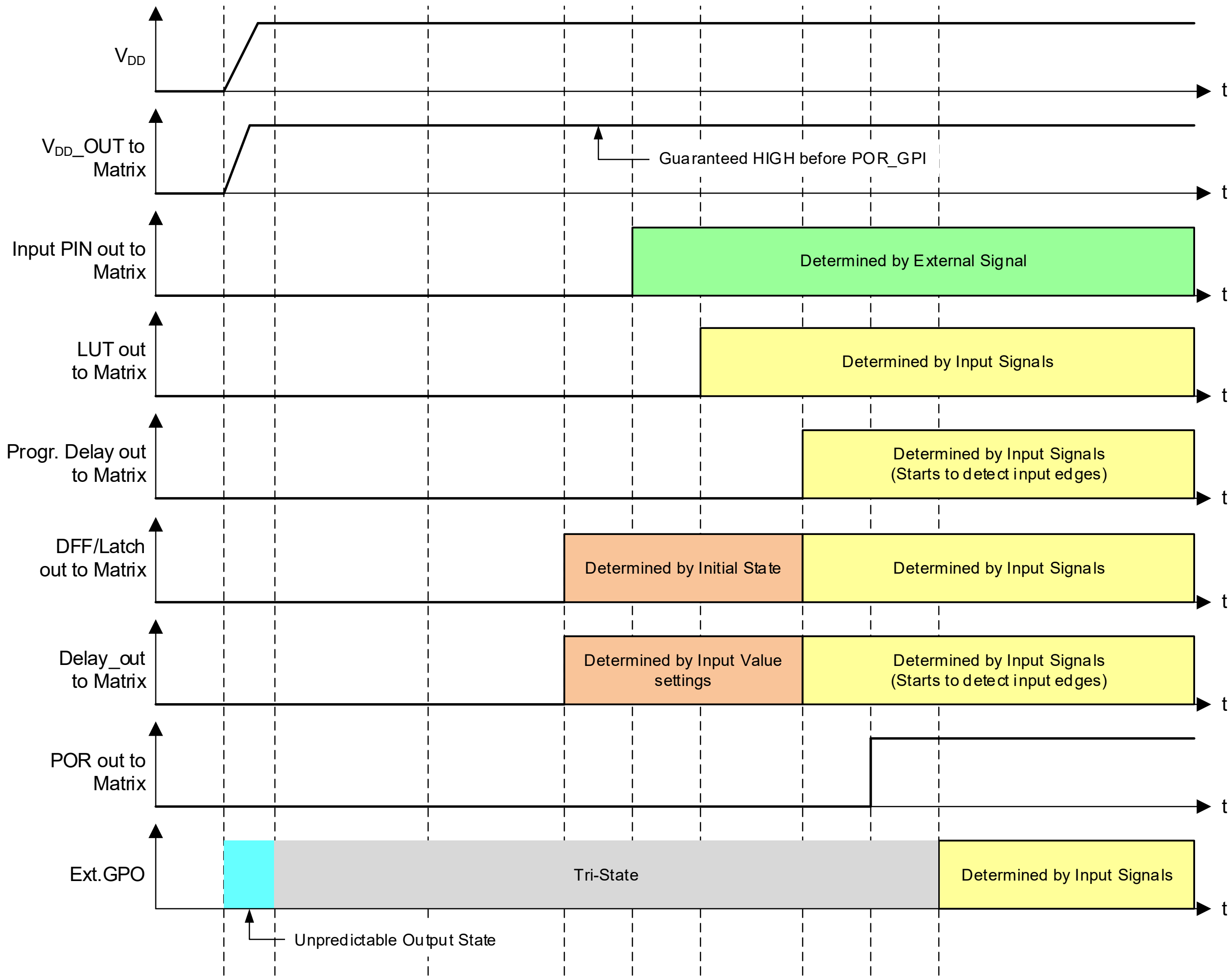


Figure 87. Internal Macrocell States during POR Sequence

13.3.1 Initialization

All internal macrocells by default have initial LOW level. Starting from indicated power-up time of 1.64 V to 2.06 V, macrocells in SLG46880-E are powered on while forced to the reset state. All outputs are in Hi-Z and chip starts loading data from NVM. Then the reset signal is released for internal macrocells and they start to initialize according to the following sequence:

1. Input pins, Pull-up/down.
2. LUTs.
3. DFFs, Delays/Counters, Pipe Delay, OSCs, ACMPs.
4. POR output to matrix.
5. Output pin corresponds to the internal logic.

The V_{REF} output pin driving signal can precede POR output signal going HIGH by 3 ms to 5 ms. The POR signal going HIGH indicates the mentioned power-up sequence is complete.

Note: The maximum voltage applied to any pin should not be higher than the V_{DD} level. There are ESD Diodes between pin → V_{DD} and pin → GND on each pin. Exceeding V_{DD} results in leakage current on the input pin, and V_{DD} will be pulled up, following the voltage on the input pin.

13.3.2 Power-Down

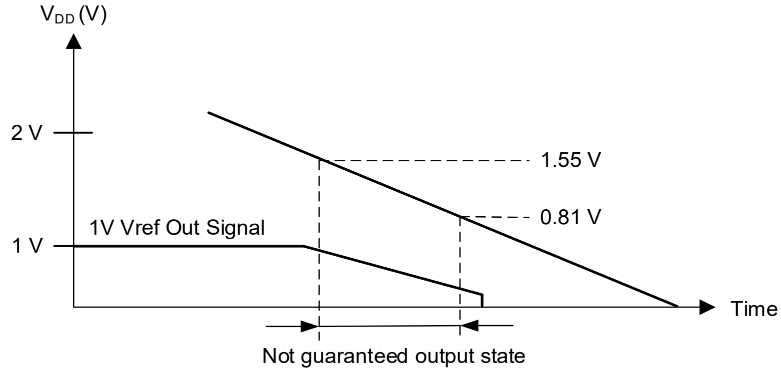


Figure 88. Power-Down

During power-down, macrocells in SLG46880-E are powered off after V_{DD} falling down below Power-Off Threshold. Please note that during a slow ramp down, outputs can possibly switch state.

14. Asynchronous State Machine Subsystem

14.1 ASM Subsystem Overview

The Asynchronous State Machine (ASM) Subsystem is designed to allow the user to create state machines with between 2 to 12 states. The user has flexibility to define the available states, the available state transitions, and the input signals (a, b, c …) that will cause transitions from one state to another state, as shown in Figure 89.

The ASM Subsystem can persist in 1 of 12 states at any given time and the ASM Current State can be read via I^2C. See section 19.6.2 Reading ASM Current State via I2C for details.

The ASM Subsystem includes several discrete macrocells, including the ASM macrocell, four Dynamic Memory (DMx_x) macrocells, three Matrix Interface (MIx) macrocells, and one f(1) Computation Macrocell. These macrocells are designed to work as a system for building user defined state machines. More information on each of these various macrocells can be found in the following chapters:

- ASM Macrocell – section 15 Asynchronous State Machine Macrocell.
- Dynamic Memory (DM) Macrocells – section 16 Dynamic Memory Macrocell.
- f(1) Computation Macrocell – section 17 f(1) Computation Macrocell.
- Matrix Interface (MI) Macrocells section 18 Matrix Interface Macrocells.

The ASM Subsystem has a total of 25 digital input signal lines, as shown in Figure 90, which all come from the Connection Matrix outputs. Of these 25 digital input signals, 3 are user selectable inputs going directly from the Connection Matrix to the three Matrix Interface (MI) macrocells. There are a total of 16 input signals that go to the DMx_x macrocell, four per macrocell. There is 1 ASM_nReset input that is for driving a state transition in both the ASM macrocell and the f(1) Computation Macrocell to an Initial/Reset state. It is possible to use one macrocell only (MI or DM) for state-to-state transitions. There are 4 digital input signals coming from the Connection Matrix to the f(1) Computation Macrocell. There is also 1 dedicated Interrupt input signal to the f(1) Computation Macrocell that will halt any active operations and transfer control back to the ASM macrocell.

There are a total of 8 analog inputs coming from various pins which can be muxed into the positive input for the f(1) Analog Comparator inside the f(1) Computation Macrocell. The f(1) Analog Comparator can be re-programmed for analog input source and negative input reference settings. The user selections for both positive input signal and negative reference are included as part of the information stored in the f(1) Command Register Table. This allows the user to make different analog measurements that are state dependent in their analog sources and reference settings.

The ASM Subsystem has a total of 21 digital output signal lines, as shown in Figure 90. There are a total of 4 output signals which go to the Connections Matrix inputs, and from there can be routed to other internal macrocells or pins. The 4 outputs are user defined for each of the possible 12 states. There are a total of 8 output signals which go directly to the 8 GPOs. The 8 outputs are user defined for each of the possible 12 states. Each of the three macrocells, DM0_0, DM0_1 and f(1) have three output signals that go to the Connection Matrix.

In using this macrocell, the user must take into consideration the critical timing required on all input and output signals. The timing waveforms and timing specifications for this macrocell are all measured relative to the input signals (which come into the macrocell on the Connection Matrix outputs) and on the outputs from the macrocell (which are direct connections to Connection Matrix inputs). The user must consider any delays from other logic and internal chip connections, including IO delays, to ensure that signals are properly processed, and state transitions are deterministic.

It is also important to note that the timing for the ASM Subsystem will change based on changes in temperature and system voltage. The user design that implements a state machine function must take into consideration and be tolerant of this variation.

The Go Configure Software Hub development tools support user designs for the ASM Subsystem at both the physical level and logic level. Figure 89 is a representation of the user design at the logical level, and Figure 90 shows the physical resources inside the various macrocells in the ASM Subsystem. To best utilize this subsystem, the user must develop a logical representation of their desired state machine, as well as a physical mapping of the input and outputs required for the desired functionality.

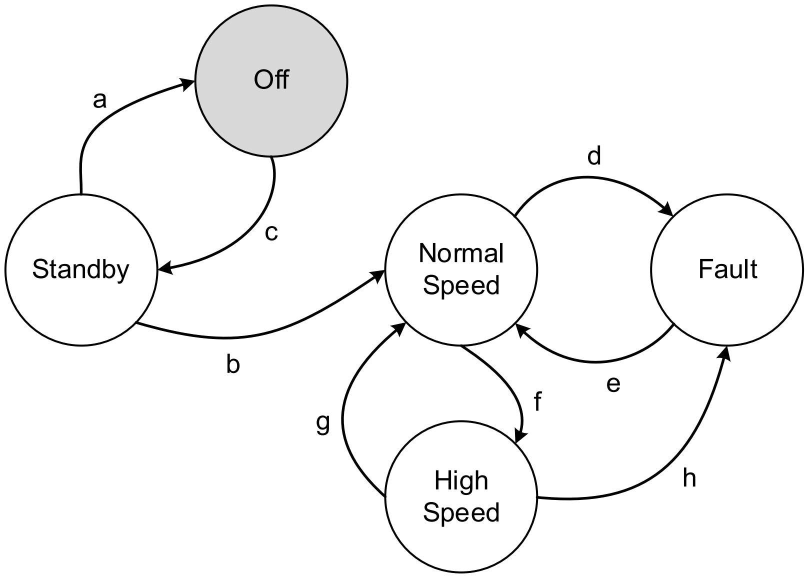


Figure 89. Asynchronous State Machine State Transitions

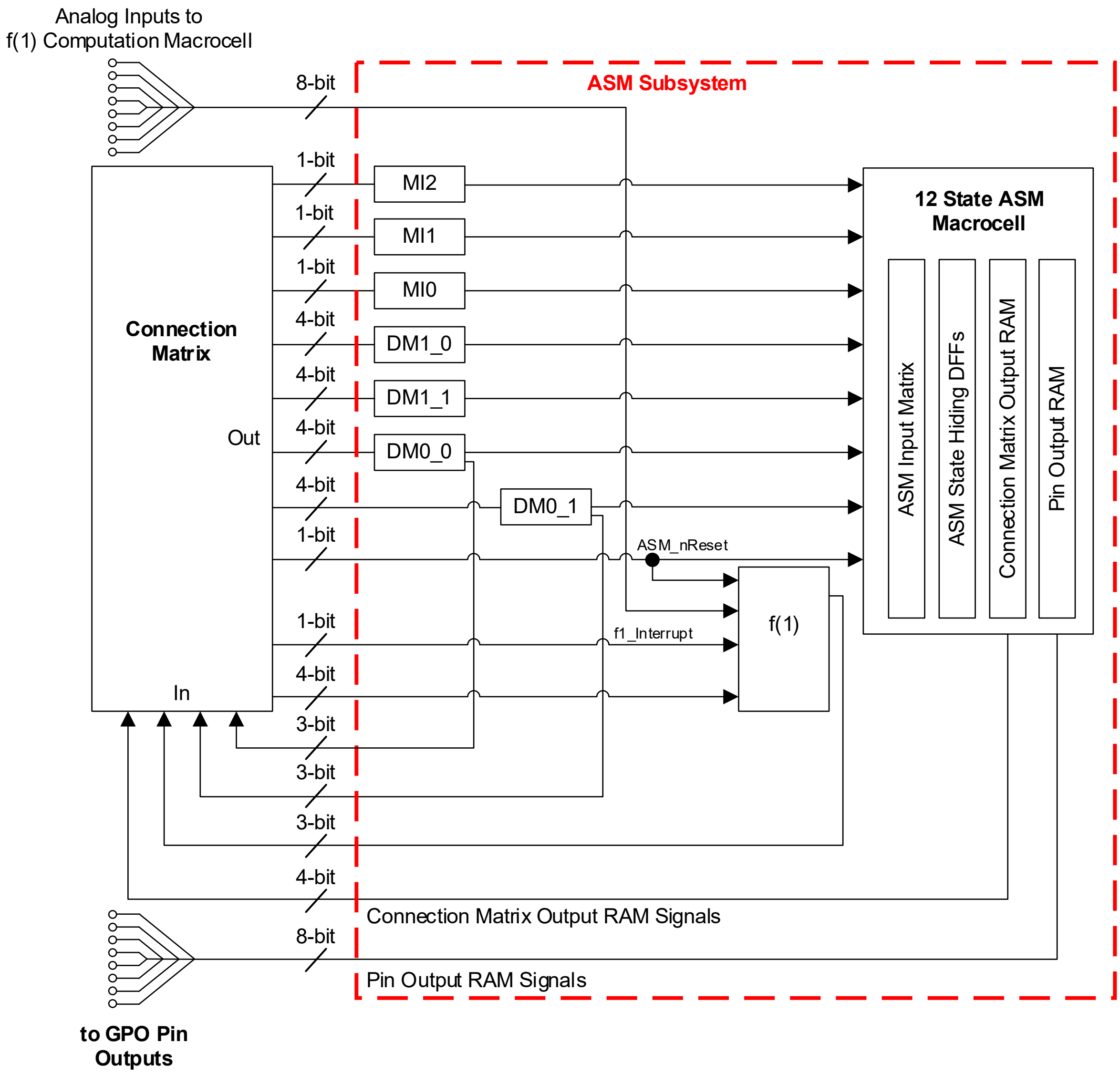


Figure 90. Connection Matrix to ASM Subsystem

14.2 ASM Subsystem Input Signals

The ASM Subsystem has a total of 25 digital input signal lines, as shown in Figure 91, which all come from the Connection Matrix outputs. Of these 25 input signals, 3 are user selectable inputs going directly from the Connection Matrix to the three Matrix Interface (MI) macrocells. There are a total of 16 input signals that go to the DMx_x macrocell, four per macrocell. There is 1 ASM_nReset input that is for driving a state transition in both the ASM macrocell and the f(1) Computation Macrocell to an Initial/Reset state. There are 4 digital input signals coming from the Connection Matrix to the f(1) Computation Macrocell. There is also 1 dedicated Interrupt input to the f(1) Computation Macrocell that will halt any active operations and transfer control back to the ASM macrocell. Each of the 25 input signals are level sensitive.

There are a total of 16 digital input signals to the ASM Subsystem which are inputs directly to the DM macrocells. These 16 signals are shown in Figure 91, highlighted in blue. While there are 4 input signals coming from the Connection Matrix and going to each DMx_x macrocell, there is only 1 output signal from each of these macrocells, which goes directly to the ASM macrocell. There are also 3 signal lines that come directly from the Connection Matrix and go to the three Matrix Interface (MI) macrocells which can drive state transitions. These signals are shown in Figure 91, highlighted in green. This sets an upper bound on the number of transitions that the user can select going out of a particular state to be 7, shown in Figure 92. There is no limitation on the number of unique transitions that can be supported going into a particular state, the user can select to have transitions going from a state to all other states, shown in Figure 93. Each of these input signals to the ASM macrocell is level sensitive, and active HIGH. A HIGH-level input will trigger a state transition.

There are a total of 8 analog inputs coming from various pins which can be muxed into the positive input for the f(1) Analog Comparator inside the f(1) Computation Macrocell. These 8 signals are shown in Figure 91, highlighted in pink. The f(1) Analog Comparator can be re-programmed for analog input source and negative input reference settings. The user selections for both positive input signal and negative reference are included as part of the information stored in the f(1) Command Register Table. This allows the user to make different analog measurements that are state dependent in their analog sources and reference settings.

Also, there are 4 digital inputs that can be connected with any Connection Matrix output by the f(1) Computational Macrocell commands. These 4 signals are shown in highlighted in light blue.

The ASM macrocell also has an ASM_nReset input. This input to the ASM macrocell is level sensitive and active LOW. This signal is shown in Figure 91, highlighted in yellow. An active signal on this input will drive an immediate state transition to the user-defined Initial/Reset state. The user can choose which state within the ASM Editor inside Go Configure Software Hub will be the reset state.

There is also 1 dedicated f1_Interrupt input to the f(1) Computation Macrocell that will halt any active operations and transfer control back to the ASM macrocell. This signal is shown in Figure 91, also highlighted in yellow.

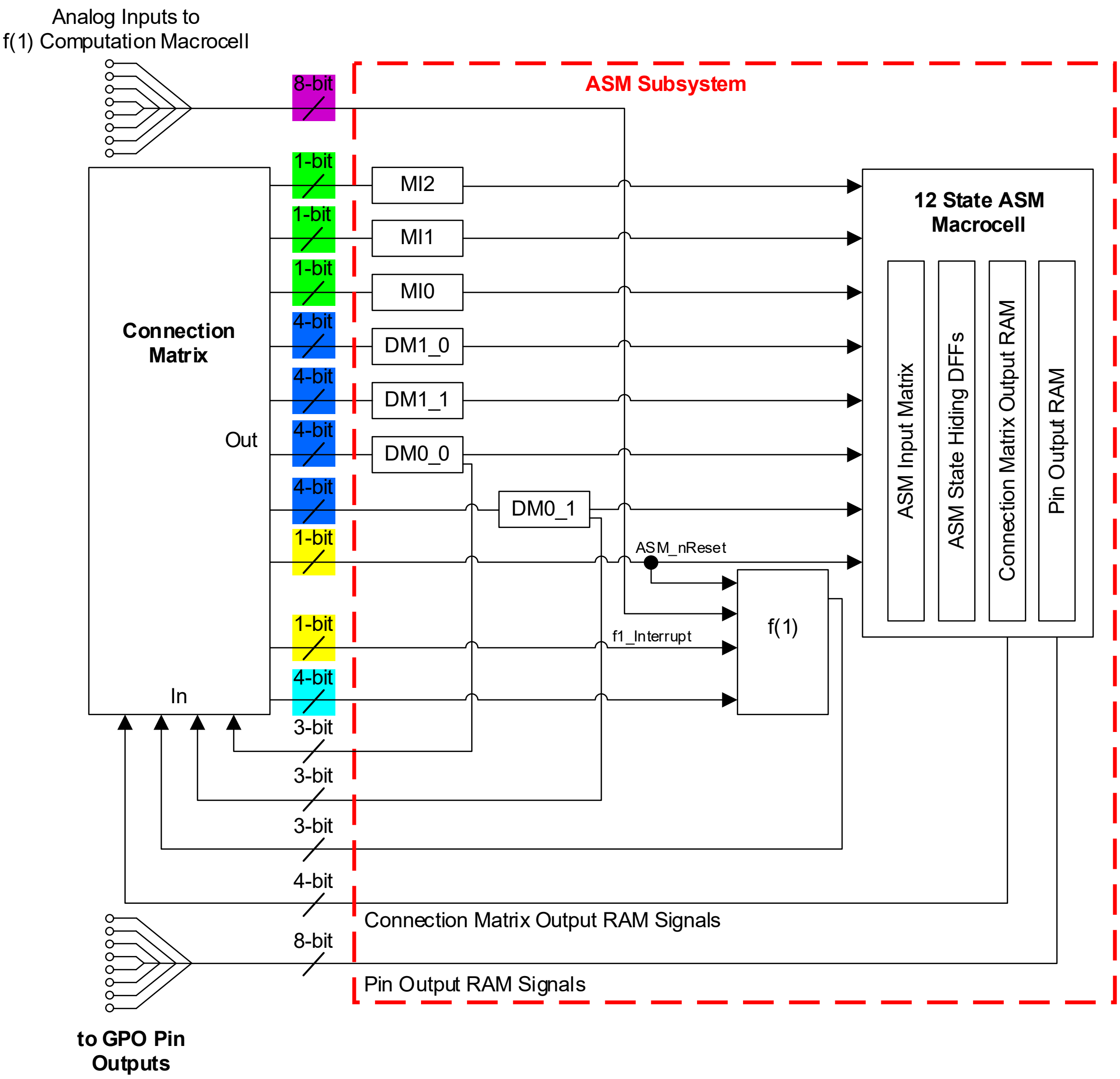


Figure 91. ASM Subsystem Input Signals

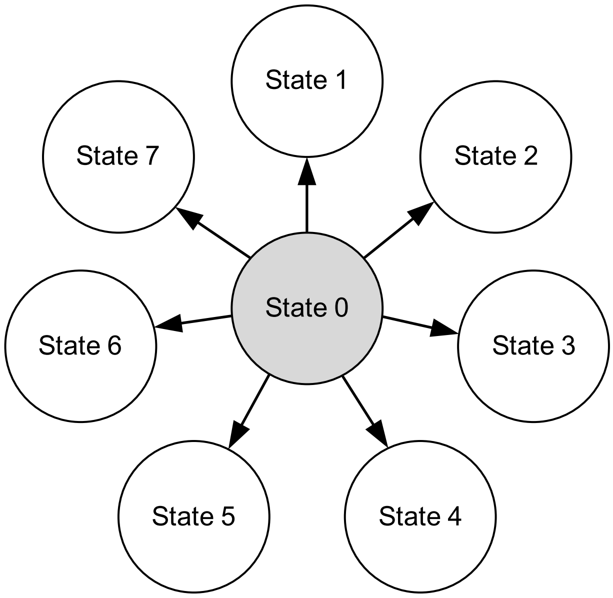


Figure 92. Maximum 7 State Transitions out of a Given State

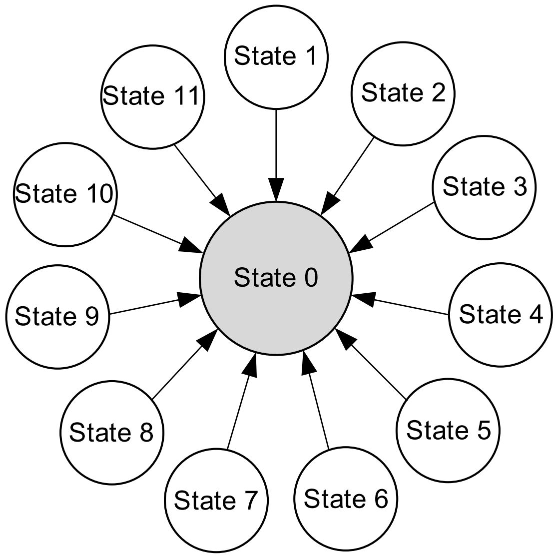


Figure 93. Maximum 11 State Transitions into Given State

14.3 ASM Subsystem Output Signals

The ASM subsystem has a total of 21 output signal lines, as shown in Figure 94.

There are a total of 4 output signals from the ASM macrocell which go to the Connections Matrix inputs and from there can be routed to other internal macrocells or pins. These signals are shown in Figure 94, highlighted in green. The 4 outputs are user defined for each of the possible 12 states. The user selection for the output states is held in the Connection Matrix Output RAM.

There are a total of 8 output signals from the ASM macrocell which go directly to the 8 GPOs. These signals are shown in Figure 94, highlighted in blue. The 8 outputs are user defined for each of the possible 12 states. The user selection for the output states is held in the Pin Output RAM. Each of these GPOs has a single selection bit which defines the GPO input source as either the ASM Output RAM signal or the Connection Matrix signal.

Two of the Dynamic Memory macrocells, DM0_0 and DM0_1, can be used as either a resource for generating input signals for driving state transitions in the ASM macrocell, or to generate signals for use in other parts of the user design. When used to generate signals for purposes other than ASM state transitions, each of these macrocells has three output signals that go to the Connection Matrix, and from there can be routed to other internal macrocells or pins. Each of these macrocells has a total of 3 output signals of this type. These signals are shown in Figure 94, highlighted in yellow.

The f(1) Computation Macrocell has 3 output signals that go to the Connection Matrix, and from there can be routed to other internal macrocells or pins. These signals are shown in Figure 94, highlighted in pink.

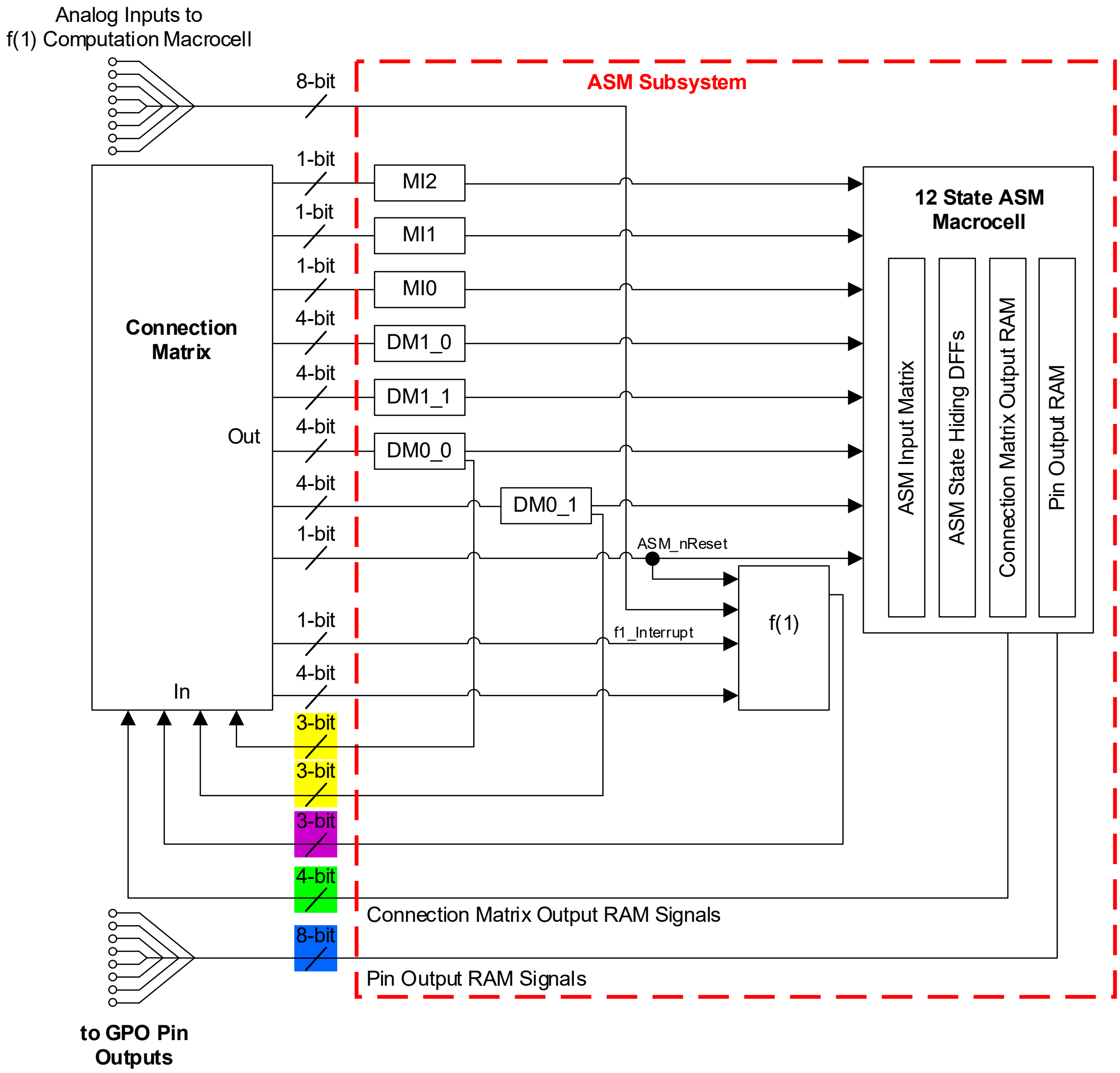


Figure 94. ASM Subsystem Input Signals

14.4 Basic ASM Subsystem Timing

The basic state transition timing from input on one of 19 state transition input lines (4 going into each DMx_x and 3 from Connection Matrix going directly to the ASM macrocell) to the time when the 4 Connection Matrix Output RAM signals and 8 Pin Output RAM signals change is shown in Figure 95 and Figure 96. The time from a valid input signal to the time that there is a valid change of state, and valid signals on the 4 Connection Matrix Output RAM signals and 8 Pin Output RAM signals is State Machine Output Delay Time ($T_{st\_out\_delay}$).

At the point in time that the Connection Matrix Output RAM signals and Pin Output RAM signals are changing, the f(1) Computation Macrocell is prepared for executing commands coded for the new state, if the user has coded commands to execute. Based on the chosen commands, the f(1) Computation Macrocell outputs can change a number of times before the f(1) finishes for the new state. The ASM Subsystem will not be ready for the next state transition until the f(1) Computation Macrocell has completed the commands for the new state, or until it is reset by asserting the f1_Interrupt input from the Connection Matrix. The time period between the input on one of the 7 inputs to the ASM macrocell and the ASM subsystem being ready for the next state transition input is State Machine Sequential Delay Time ($T_{st\_sequential\_delay}$).

From the input on one of 19 state transition input lines, there is a delay before the outputs are latched from the DM0_0 and DM0_1 macrocells, noted as DM Connection Matrix Output Delay Time ($T_{st\_dmlatch\_delay}$).

During state transitions, there will be no change in output levels on other states than the one state going active → inactive and the other state going inactive → active.

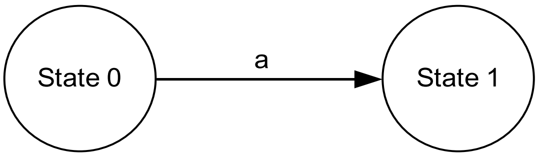


Figure 95. State Transition

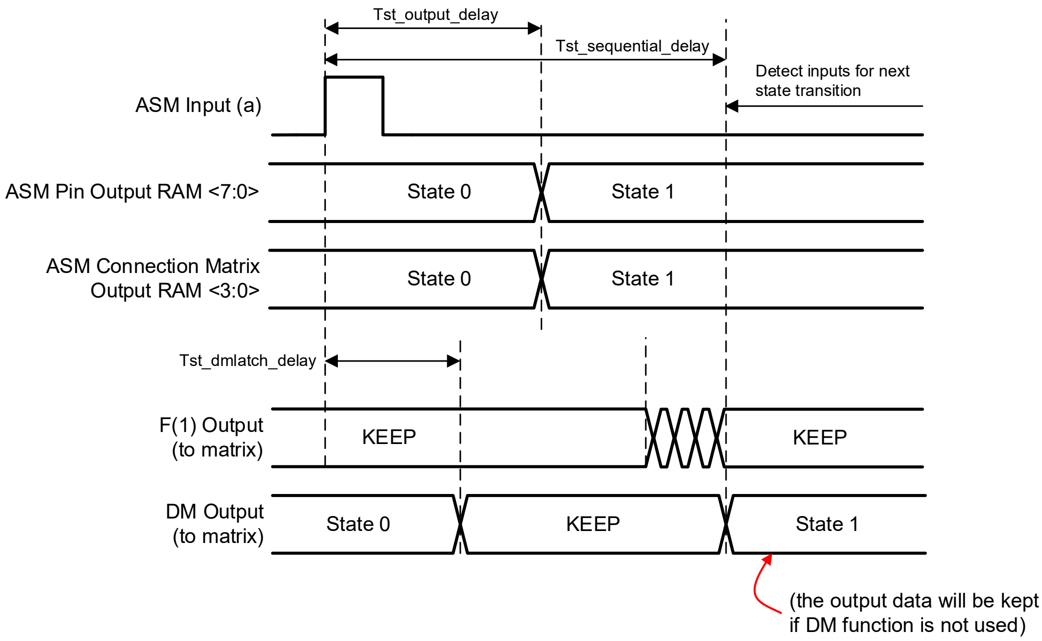


Figure 96. State Transition Timing

14.5 ASM Power Considerations

A benefit of the asynchronous nature of this macrocell is that it will consume power only during state transitions. Shown in Figure 97 and Figure 98, the current consumption of the macrocell will be a fraction of a μA between state transitions, and will rise only during state transitions. This is assuming that the DLY/CNT inside each DMx_x macrocells are also in-active. See section 3.4.3 Asynchronous State Machine Specifications to find average current during state transitions.

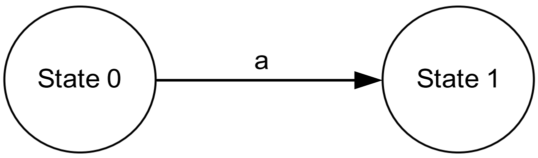


Figure 97. State Transition

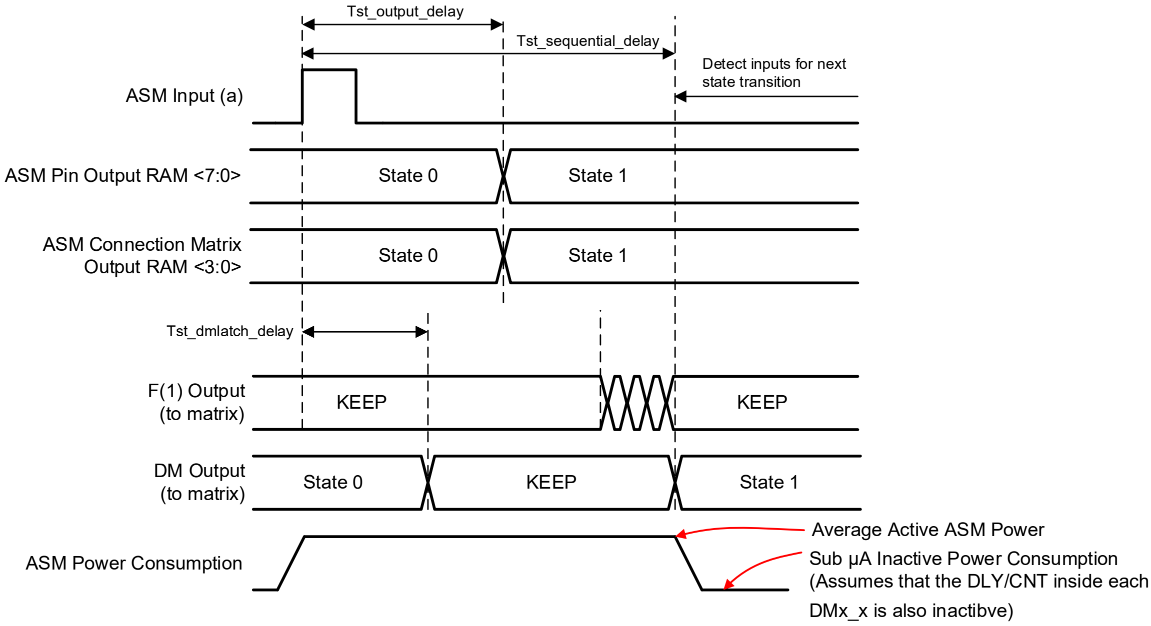


Figure 98. State Transition Timing and Power Consumption

14.6 Asynchronous State Machines vs. Synchronous State Machines

It is important to note that this macrocell is designed for asynchronous operation, which means the following:

1. No clock source is needed, it reacts only to input signals.
2. The input signals do not have to be synchronized to each other, the macrocell will react to the earliest valid signal for state transition.
3. This macrocell does not have traditional set-up and hold time specifications which are related to incoming clock, as this macrocell has no clock source.
4. The macrocell only consumes power while in state transition.

14.7 ASM Special Case Timing Considerations

14.7.1 State Transition Pulse Input Timing

All inputs to the ASM macrocell are level sensitive. If the input to the state machine macrocell for a state transition is a pulse, there is a minimum pulse width on the input to the state machine macrocell (as measured at the matrix input to the macrocell) which is guaranteed to result in a state transition shown in Figure 99 and Figure 100. This pulse width is defined by the State Machine Input Pulse Acceptance Time (T_{st_pulse}). If a pulse width that is shorter than T_{st_pulse} is input to the state machine macrocell, it is indeterminate whether the state transition will happen or not. If a pulse that is rejected (invalid due to the pulse width being narrower than the guaranteed minimum of T_{st_pulse}), this will not stop a valid pulse on another state transition input that does meet minimum pulse width.

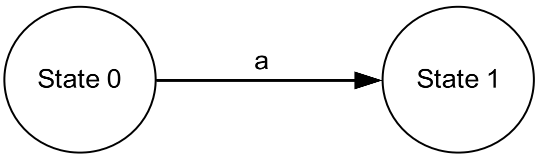


Figure 99. State Transition

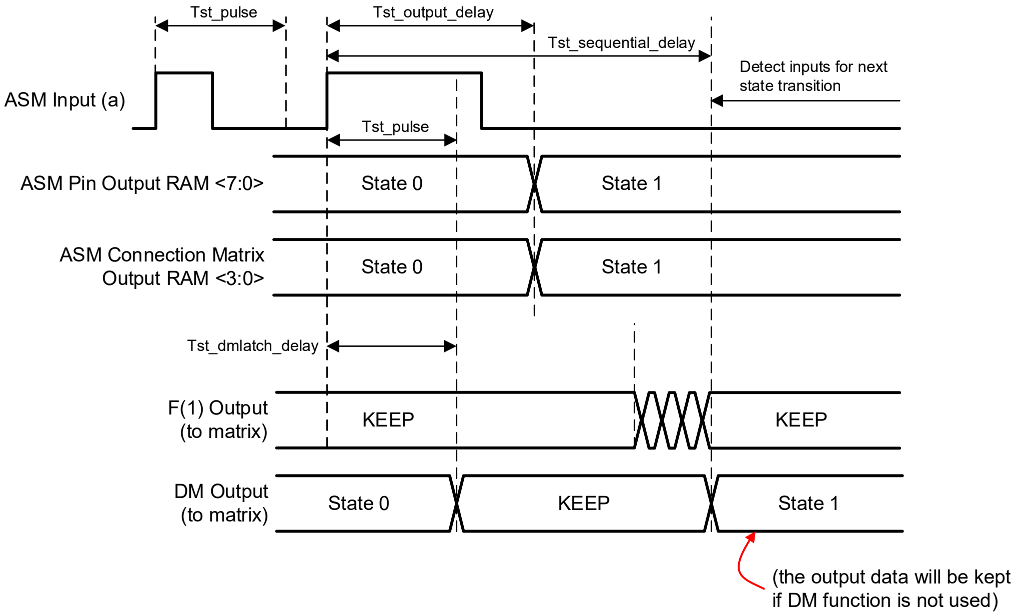


Figure 100. State Transition Pulse Input Timing

14.7.2 State Transition Competing Input Timing

There will be situations where two input signals can be valid inputs that will drive two different state transitions from a given state. In that sense, the two signals are “competing” (signals a and b in Figure 101), and the signal that arrives sooner should drive the state transition that will “win”, or drive the state transition. If one signal arrives T_{st_comp} before the other one, it is guaranteed to win, and the state transition that it codes for will be taken, as shown in Figure 102. If the two signals arrive within T_{st_comp} of each other, it will be indeterminate which state transition will win, but one of the transitions will take place as long as the winning signal satisfies the pulse width criteria described in the paragraph above, as shown in Figure 103.

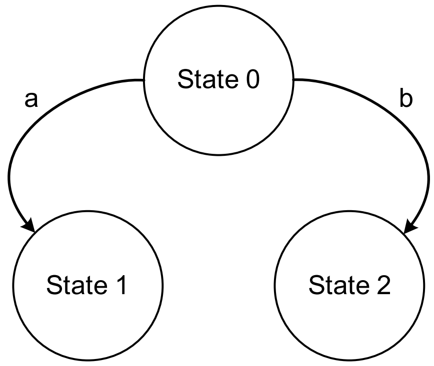


Figure 101. State Transition - Competing Inputs

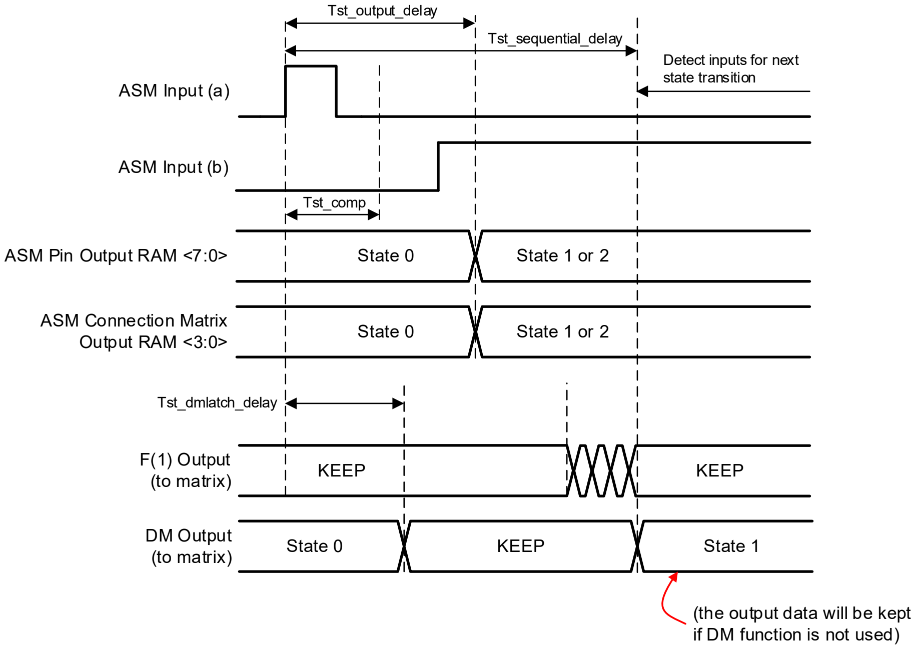


Figure 102. State Transition Timing - Competing Inputs Determinate

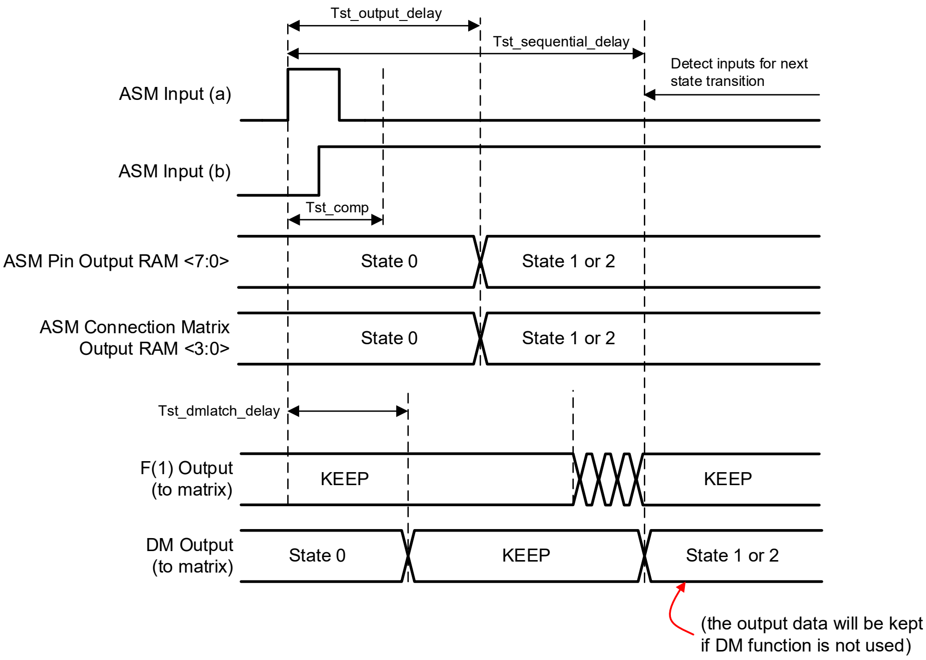


Figure 103. State Transition Timing - Competing Inputs Indeterminte

14.7.3 ASM State Transition Sequential Timing

It is possible to have a valid input signal for a transition out from a particular state be active before the state is active. If this is the case, the macrocell will only stay in that particular state for $T_{st\_sequential\_delay}$ time before making the transition to the next state. An example of this sequential behavior is shown in Figure 104 and the associated timing is shown in Figure 105.

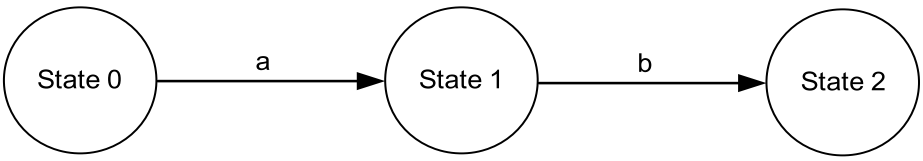


Figure 104. State Transition – Sequential

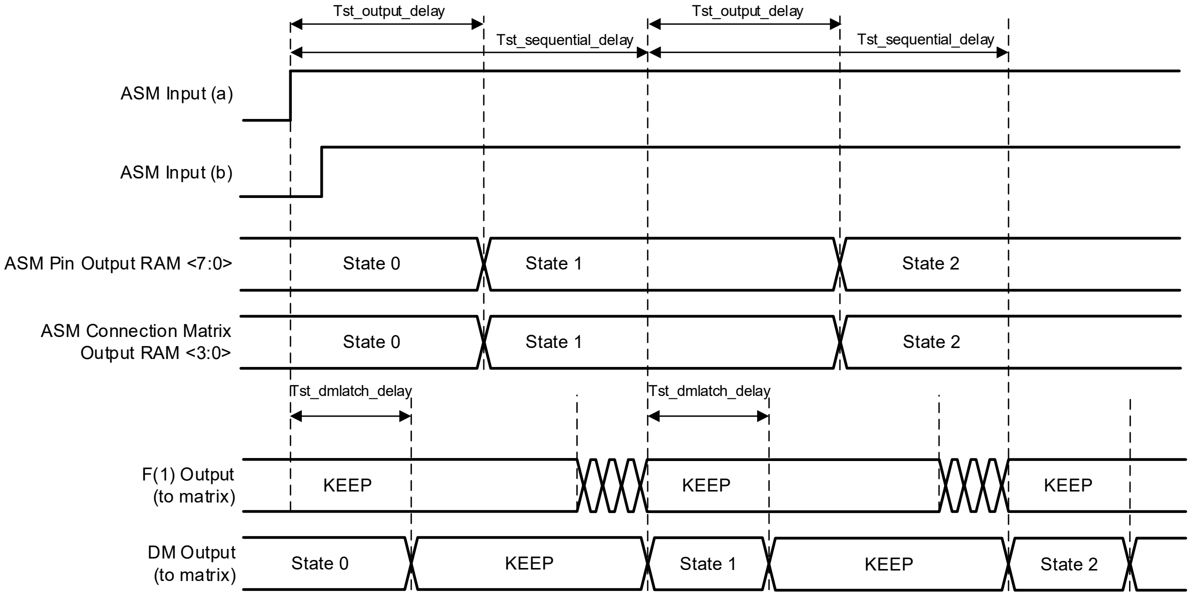


Figure 105. State Transition - Sequential Timing

14.7.4 State Transition Closed Cycling

It is possible to have a closed cycle of state transitions that will run continuously, if there are valid inputs that are active at the same time. The rate at which the state transitions will take place is determined by $T_{st\_sequential\_delay}$, which determines the timing from one state transition signal that is accepted (and causes a state transition) to the ASM Subsystem being ready for the next input signal. The example shown in Figure 106 involves cycling between two states, but any number of two – twelve states can be included in state transition closed cycling of this nature. Figure 107 shows the associated timing for closed cycling.

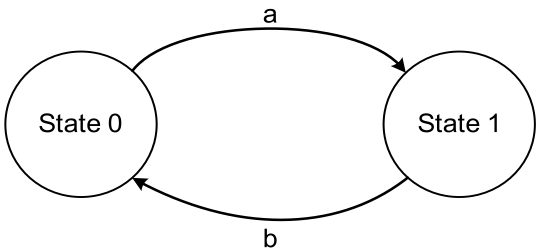


Figure 106. State Transition - Closed Cycling

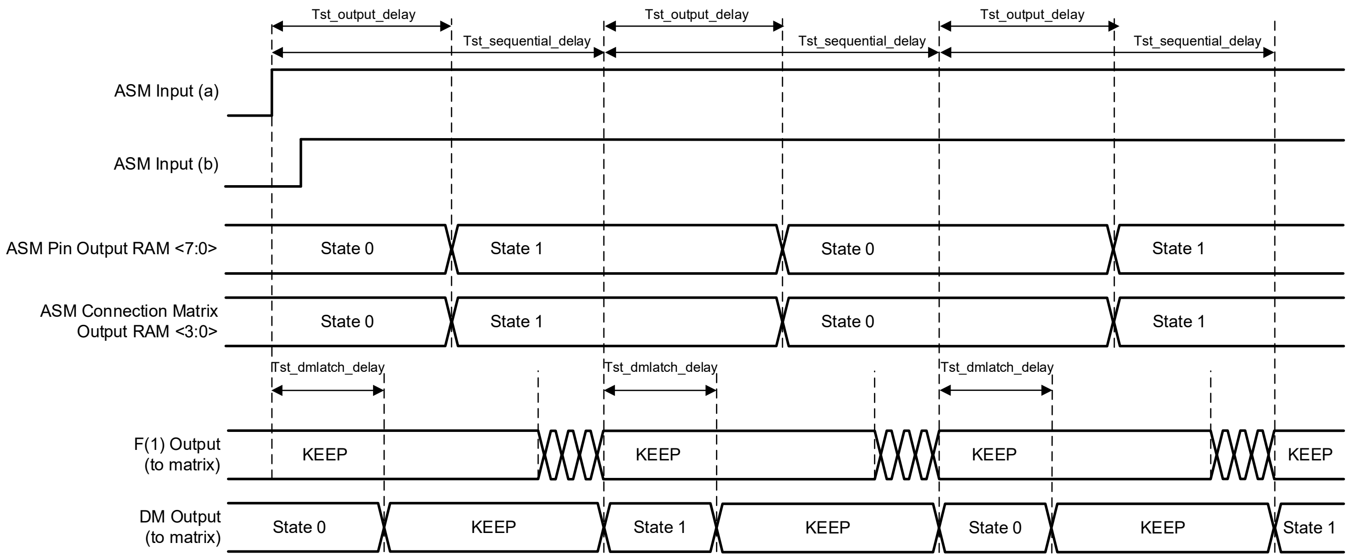


Figure 107. State Transition - Closed Cycling Timing

15. Asynchronous State Machine Macrocell

15.1 Asynchronous State Machine Overview

The Asynchronous State Machine macrocell is one of several macrocells in the Asynchronous State Machine Subsystem, and its specific role is to hold one active state at a time, and to facility user defined state transitions in a fast and power efficient manner. This macrocell is designed to allow the user to create state machines with between 2 to 12 states. When combined with the other macrocells in the ASM subsystem (four Dynamic Memory (DMx_x) macrocells, three Matrix Interface (MIx) macrocells, and one f(1) Computation Macrocell), the user has flexibility to define the available states, the available state transitions, and the input signals (a, b, c …) that will cause transitions from one state to another state, as shown in the example in Figure 108.

The ASM macrocell has a total of 8 input signal lines, as shown in Figure 109, which come from a combination of three Matrix Interface (MI) macrocell outputs and DM macrocell outputs. Of these 8 inputs, 3 are user selectable inputs coming from the three Matrix Interface (MI) macrocells (one per macrocell) to the ASM macrocell. There are also 4 inputs that come from the DMx_x macrocells (one per macrocell). There is 1 ASM_nReset input that is for driving a state transition in the ASM macrocell to a user defined Initial/Reset state.

The ASM macrocell has a total of 12 output signal lines, as shown in Figure 110. There are a total of 4 output signals which go to the Connections Matrix inputs, and from there can be routed to other internal macrocells or pins. The 4 output signals are user defined for each of the possible 12 states. There are a total of 8 output signals which go directly to the 8 GPOs. The 8 outputs are user defined for each of the possible 12 states.

In using this macrocell, the user must take into consideration the critical timing required on all input and output signals. The timing waveforms and timing specifications for this macrocell are all measured relative to the input signals (which come into the macrocell on the Connection Matrix outputs) and on the outputs from the macrocell (which are direct connections to Connection Matrix inputs). The user must consider any delays from other logic and internal chip connections, including IO delays, to ensure that signals are properly processed, and state transitions are deterministic.

It is also important to note that the timing for the ASM Subsystem will change based on changes in temperature and system voltage. The user design that implements a state machine function must take into consideration, and be tolerant of this variation.

The Go Configure Software Hub development tools support user designs for the ASM macrocell at both the physical level and logic level. Figure 109 is a representation of the user design at the logical level, and Figure 109 shows the physical resources inside the various macrocells in the ASM Subsystem. To best utilize this subsystem, the user must develop a logical representation of their desired state machine, as well as a physical mapping of the input and outputs required for the desired functionality.

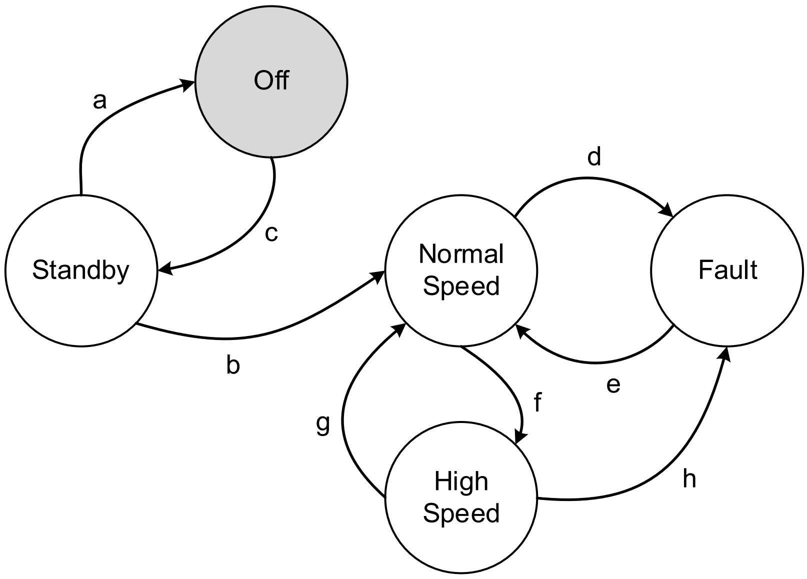


Figure 108. Asynchronous State Machine State Transitions

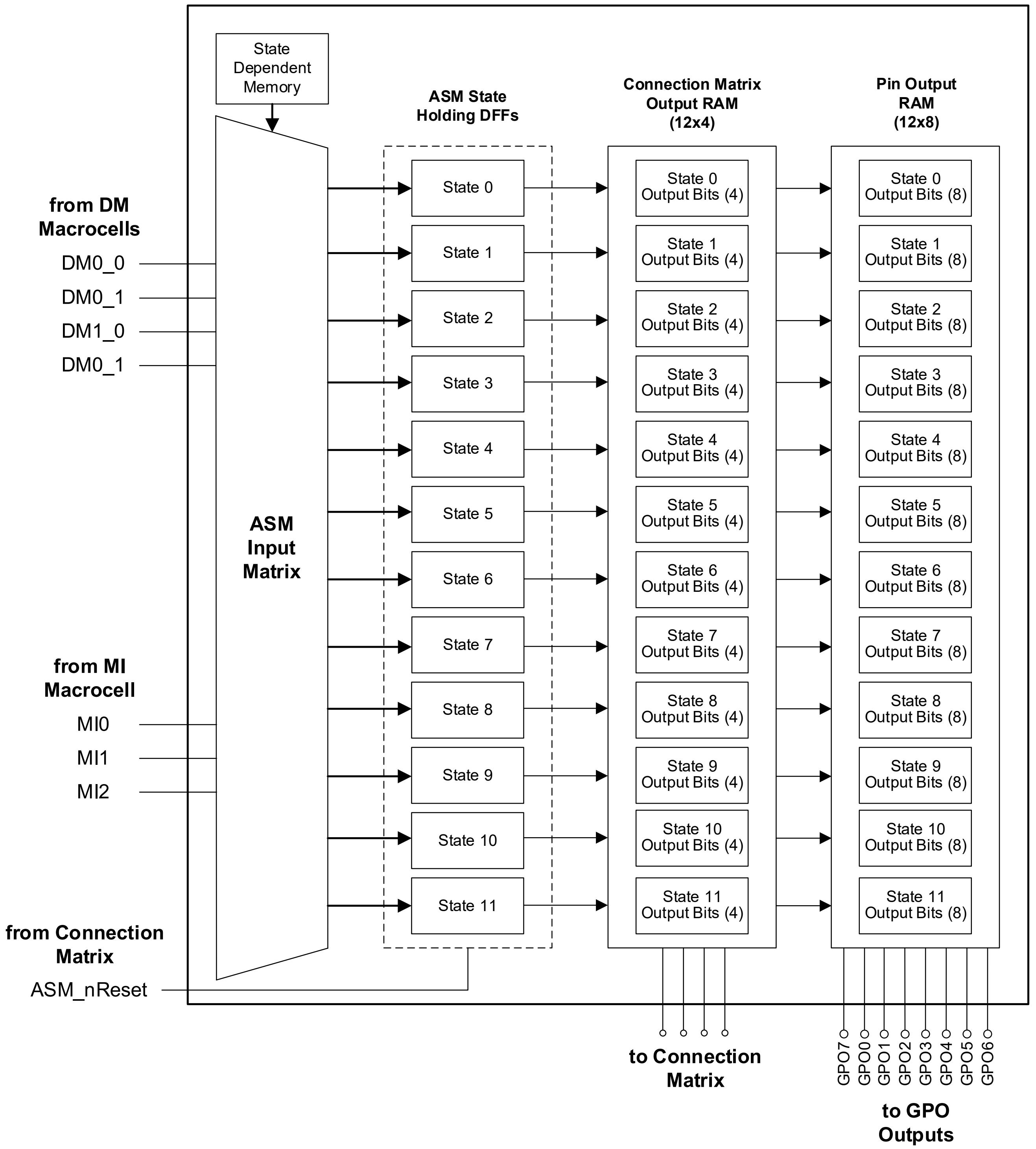


Figure 109. 12 State ASM Macrocell

15.2 ASM Macrocell Input Signals

The ASM macrocell has a total of 8 input signal lines, as shown in Figure 109, which come from a combination of Connection Matrix outputs and DM macrocell outputs.

There are 3 user selectable input signals that come from the MIx macrocells (one per macrocell) to the ASM macrocell. These signals are shown in Figure 111, highlighted in green. Each of these input signals are level sensitive and active HIGH. A HIGH-level signal on any of these inputs can be enabled to drive a state transition, depending on the coding in the ASM Input Matrix.

There are 4 input signals that come from the DMx_x macrocells (one per macrocell). These signals are shown in Figure 111, highlighted in blue. Each of these input signals are level sensitive and active HIGH. A HIGH-level signal on any of these inputs can be enabled to drive a state transition, depending on the coding in the ASM Input Matrix.

There is 1 ASM_nReset input that is for driving a state transition in the ASM macrocell to user defined Initial/Reset state. This signal is shown in Figure 111, highlighted in yellow. This input signal is level sensitive and active LOW.

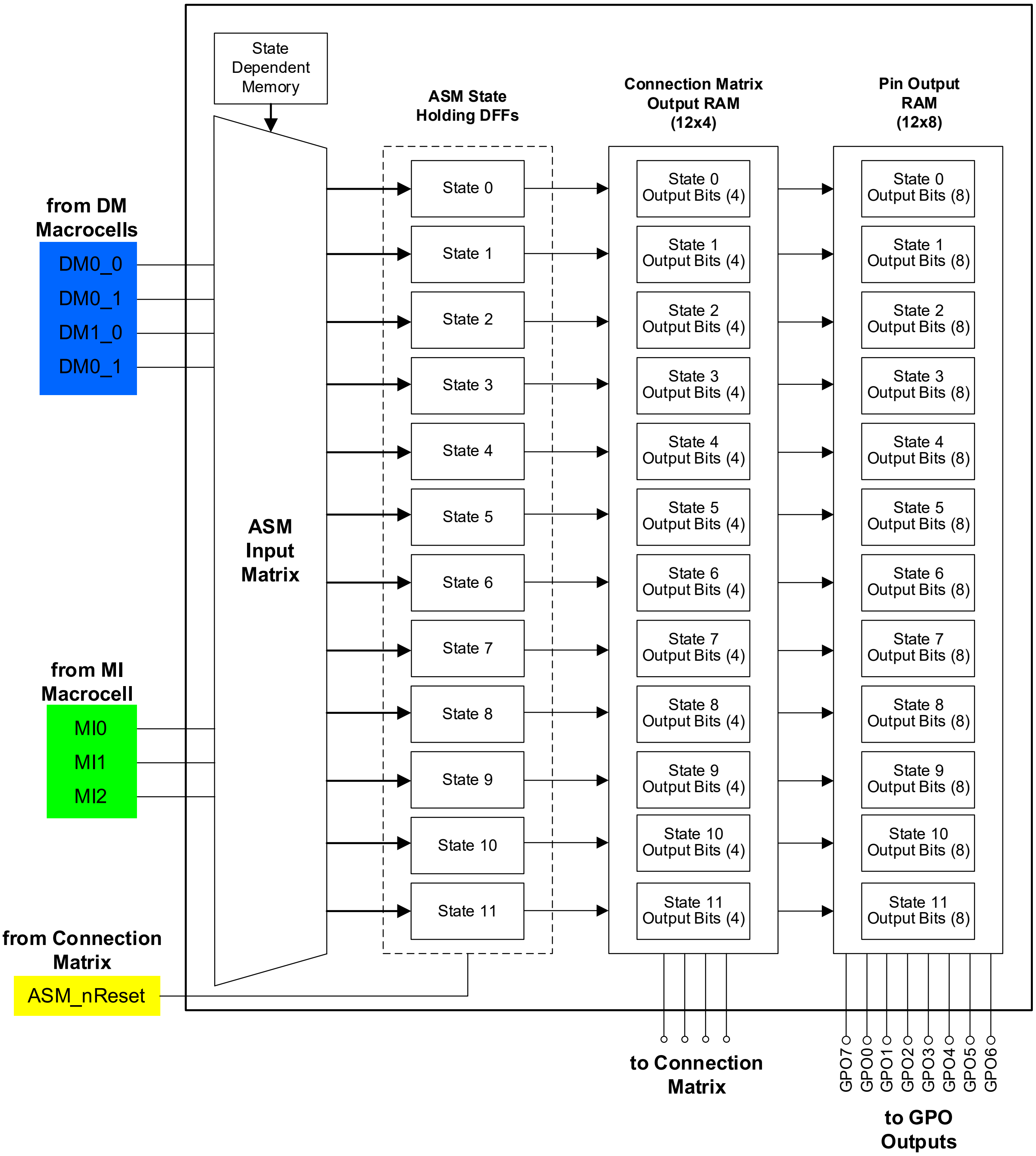


Figure 110. ASM Macrocell Input Signals

15.2.1 ASM Macrocell Output Signals

The ASM macrocell has a total of 12 output signal lines, as shown in Figure 111.

There are a total of 4 output signals which go to the Connections Matrix inputs, and from there can be routed to other internal macrocells or pins. These signals are shown in Figure 111, highlighted in green. The 4 outputs are user defined for each of the possible 12 states. The user defined values for these outputs are stored in the Connection Matrix Output RAM which is 12 x 4 in size (12 states x 4 outputs), for a total of 48 bits.

There are a total of 8 output signals which go directly to the 8 GPOs. These signals are shown in Figure 111, highlighted in blue. The 8 outputs are user defined for each of the possible 12 states. The user defined values for these outputs are stored in the Connection Matrix Output RAM which is 12 x 8 in size (12 states x 8 outputs), for a total of 96 bits. Each of the 8 GPOs has an internal mux that will either accept a signal from the outputs defined here, or directly from a Connection Matrix output. This mux in each GPO is under control of a register bit.

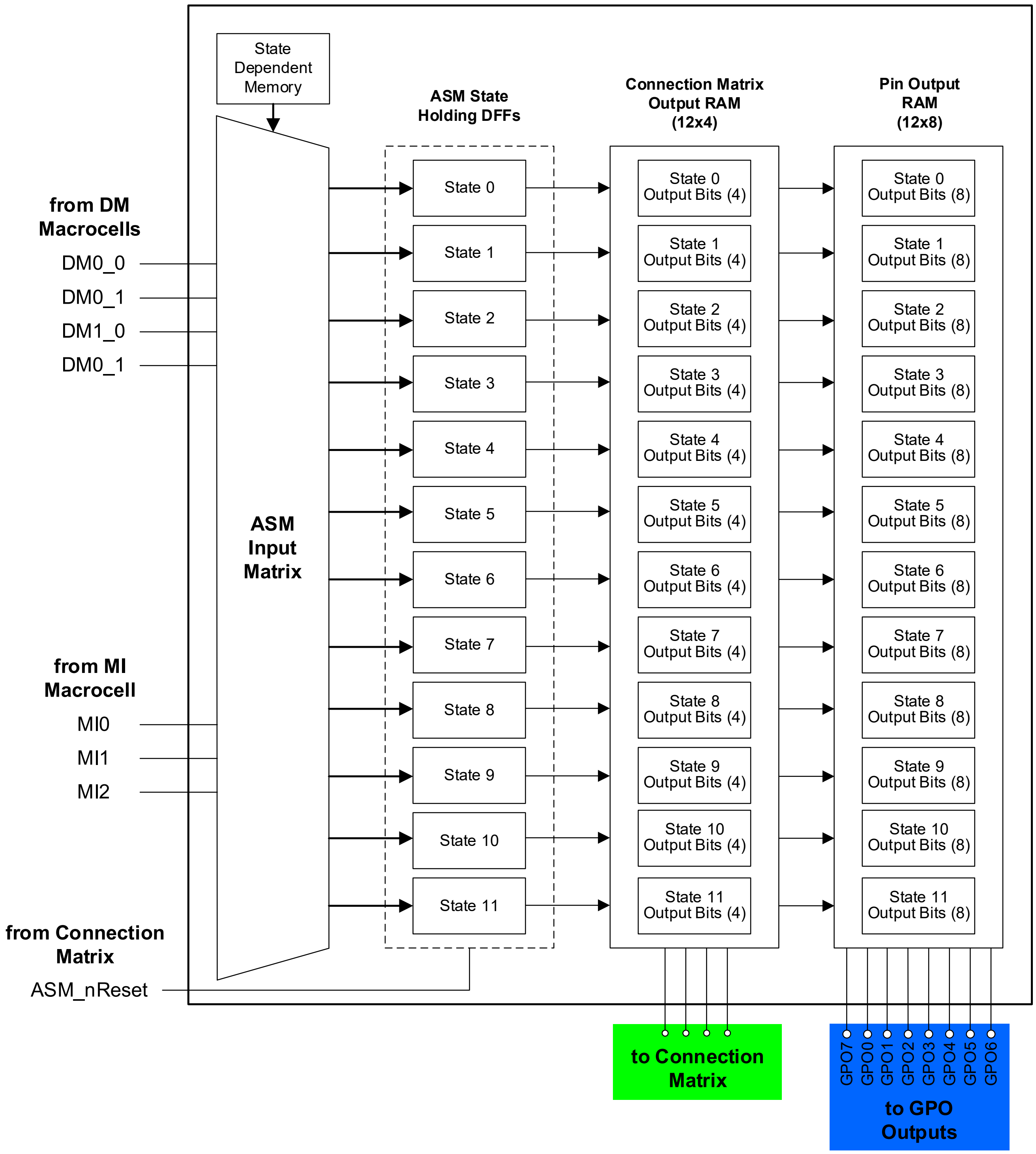


Figure 111. ASM Macrocell Output Signals

15.3 ASM Logical vs. Physical Design

A successful design with the ASM macrocell must include both the logic level design, as well as the physical level design. The Go Configure Software Hub development software support user designs for the ASM macrocell at both the logic level and physical level. The logic level design of the user defined state machine takes place inside the ASM Editor. In the ASM Editor, the user can select and name states, define and name allowed state transitions, define the Initial/Reset state, and define the output values for the 8 outputs in the Pin Output RAM and 4 outputs in the Connection Matrix Output RAM. The physical level design takes place in the general Go Configure Software Hub window, and here the user makes connections for the sources for ASM input signals, as well as making connections for destinations for ASM output signals.

16. Dynamic Memory Macrocell

16.1 Dynamic Memory Macrocell Overview

The ASM Sub-System includes several discrete macrocells, including the ASM macrocell, four Dynamic Memory (DMx_x) macrocells, and one f(1) Computation Macrocell. These macrocells are designed to work as a system for building user defined state machines.

The Dynamic Memory (DM) macrocells have the characteristic that they can change internal configuration characteristics and their connections to the Connection Matrix based on the current state of the State Machine (SM) macrocell. This is accomplished by making different memory register bit settings contained within the macrocell active, based on the current active state of the SM. This allows the user to “repurpose” the resources inside these macrocells to match the circuit needs in various states.

There are two different types of DM macrocells, which vary slightly in the resources available inside the DM macrocell, as well as the connectivity to the Connection Matrix. The SLG46880-E has a total of four DM macrocells. DM0_0 and DM0_1 have the same structure and resources as each other, and DM1_0 and DM1_1 also have the same structure and resources as each other. The DM0_x macrocells include all the functionality of the DM1_x macrocells, but they also have an output control capability, which is optimized for using the output of this macrocell to drive IO pin output states though the Connection Matrix. The DM CNT included in the DM0_x macrocells has more operating modes than the equivalent structure in the DM1_x macrocells.

Each DM macrocell has a DMx_x Configuration Register Table, which is a bank of 6 DMx_x Configuration Registers. The bits in these registers hold user selections which define all functional aspects of the behavior for the DM macrocell, including input connections from the Connection Matrix, DM LUT settings, DM CNT settings, and settings of switching internal to the DM macrocell. The fact that there are 6 Configuration Registers means that there can only be a total of six unique configurations for each DMx_x macrocell. There are a total of twelve states, which means that the user can either re-use the configuration coded in a particular DMx_x Operating Mode Register in more than one state, or not use some DMx_x macrocells in some states.

Each DM macrocell has a DMx_x Configuration Selection Table, which is a bank of 12 Configuration Selection Registers, one for each state of the State Machine macrocell. The bits in these registers hold the user’s selection of DM functional behavior, by mapping to a particular selection in the Configuration Register Table, based on the current state of the State Machine macrocell.

16.2 DM0_0 and DM0_1 Macrocell Architecture

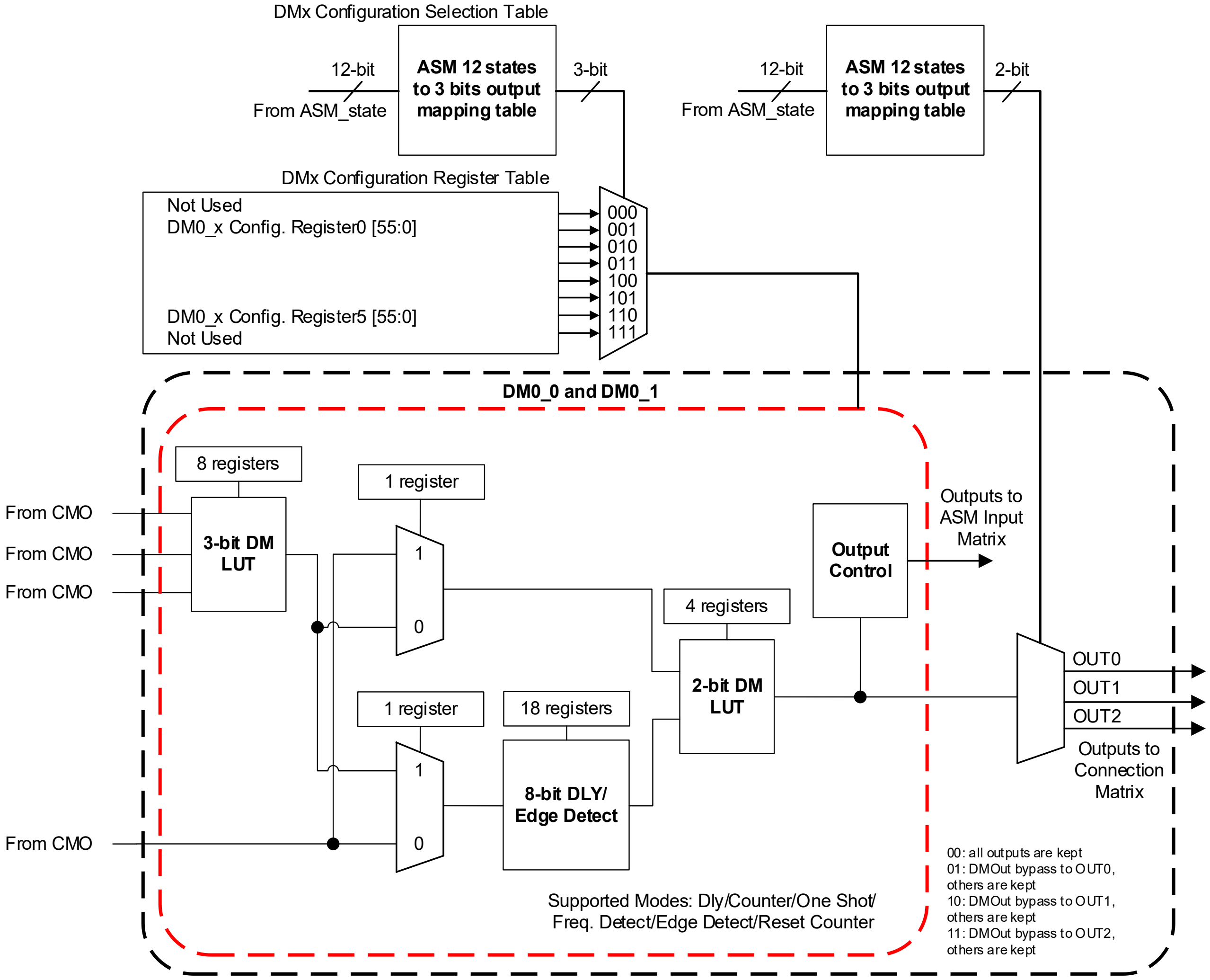


Figure 112. DM0_0/DM0_1

16.3 DM1_0 and DM1_1 Macrocell Architecture

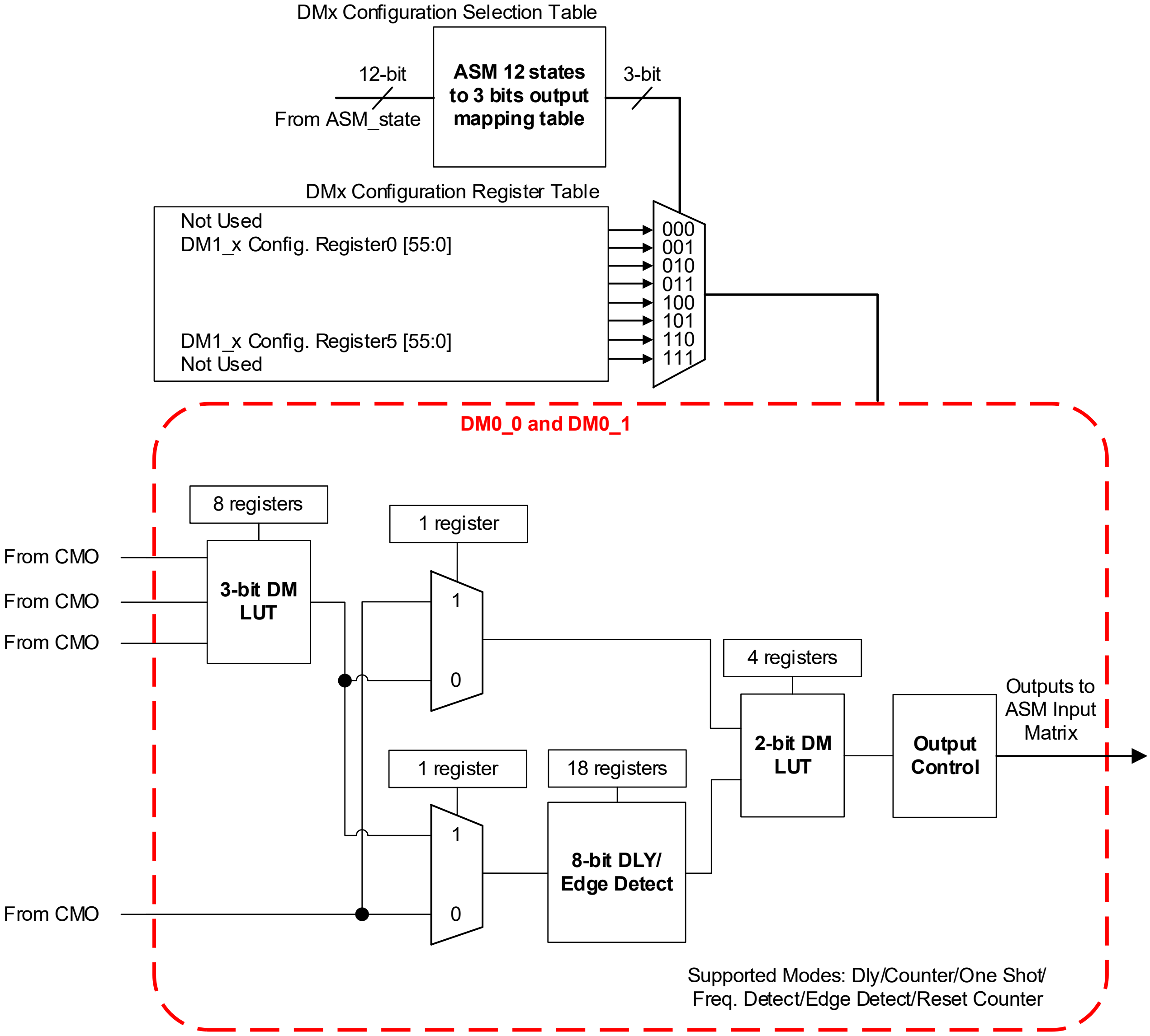


Figure 113. DM1_0/DM1_1

16.4 DMx_x Macrocell Input Signals

Each DMx_x macrocell has 4 digital input signals coming from the Connection Matrix and from there can be routed to other internal macrocells or pins. These 4 signals are shown in Figure 114 and Figure 115, highlighted in blue.

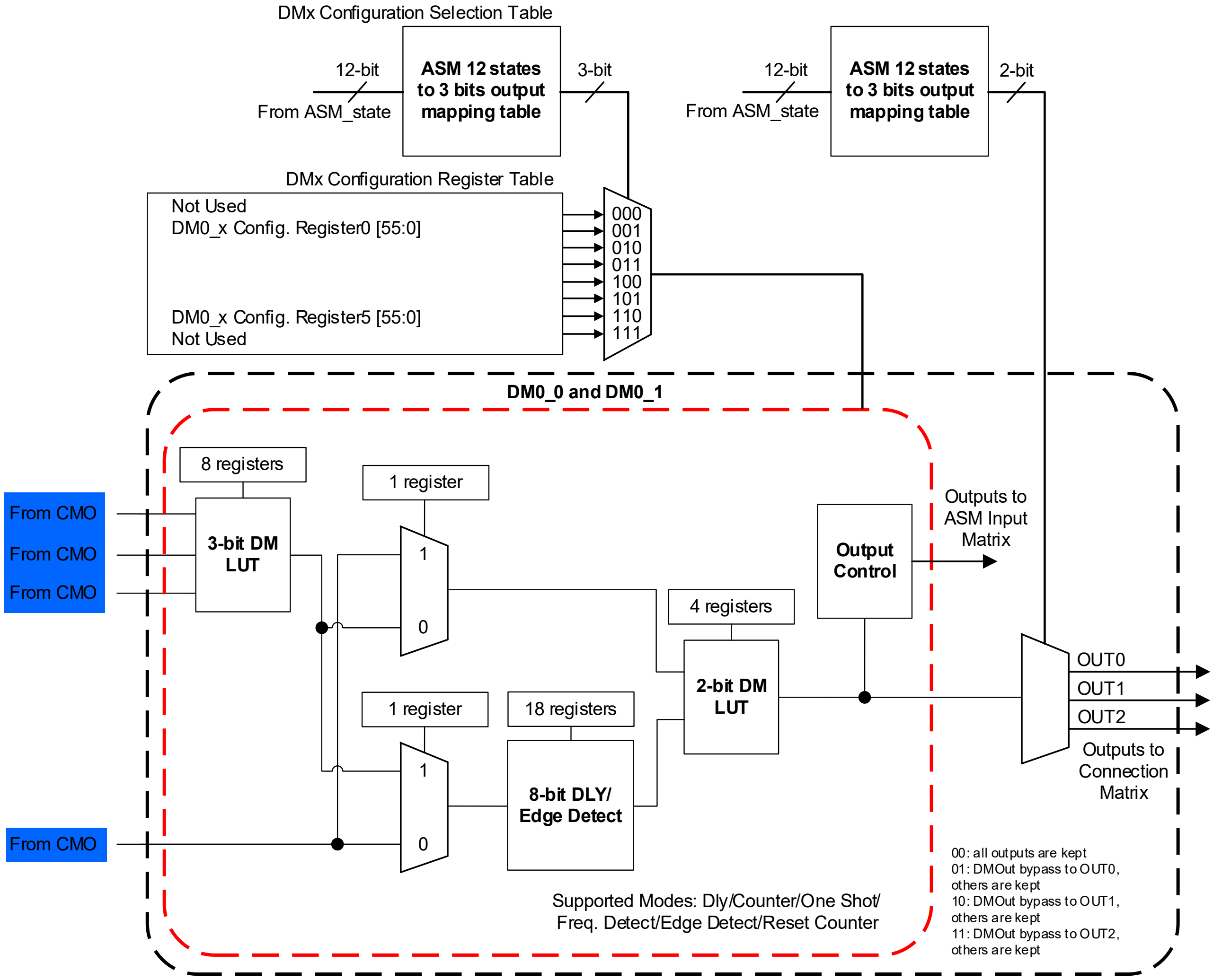


Figure 114. DM0_0/DM0_1 Inputs

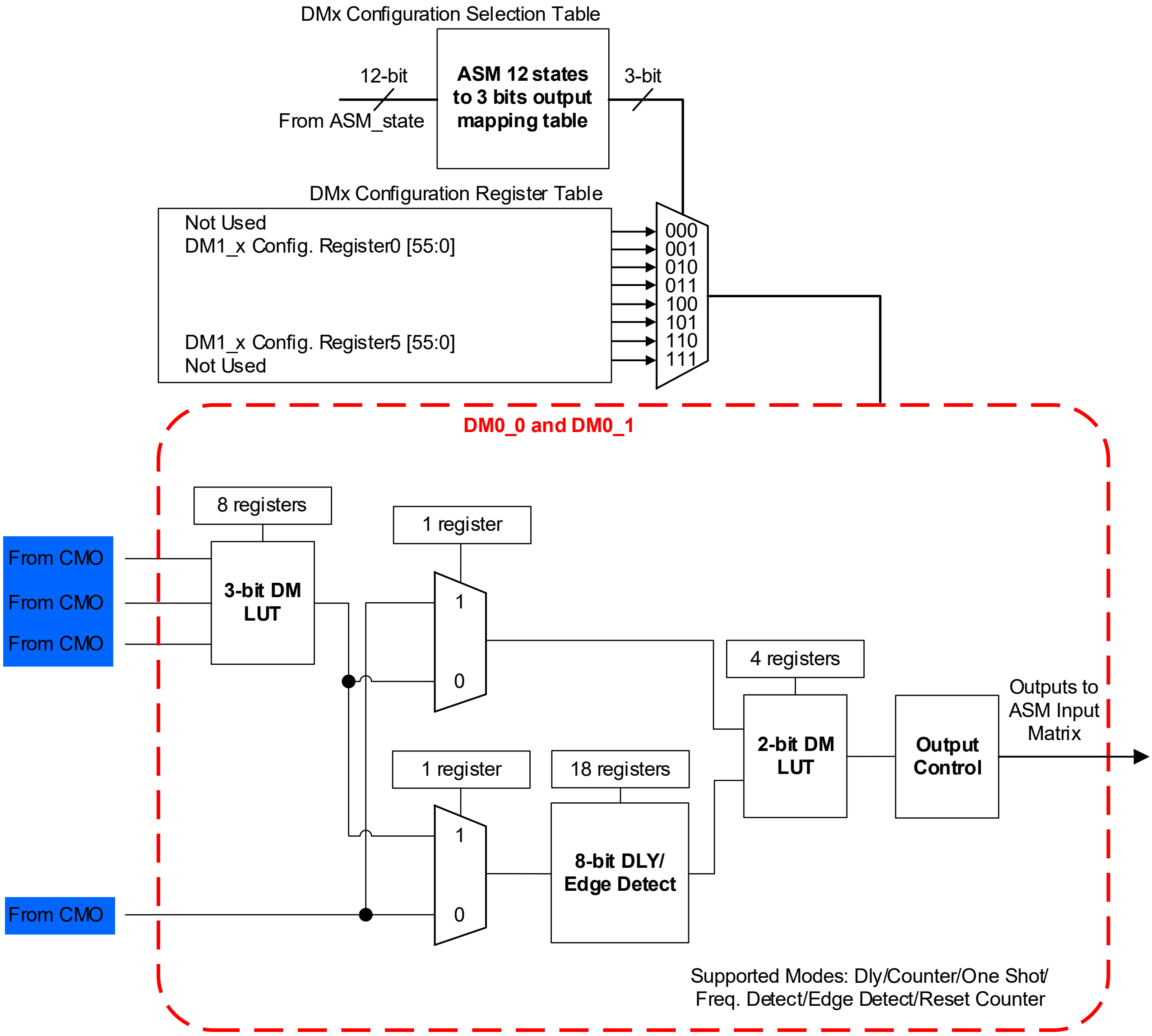


Figure 115. DM1_0/DM1_1 Inputs

16.5 DMx_x Macrocell Output Signals

Each DMx_ x macrocell has 1 digital output signal, which goes directly to the ASM Input Matrix inside the ASM Macrocell. This signal is shown in Figure 116 and Figure 117, highlighted in blue.

Additionally, the DM0_0 and DM0_1 Macrocells each have 3 digital output signals which go to the Connection Matrix and from there can be routed to other internal macrocells or pins. These 3 signals are shown in Figure 116, highlighted in green.

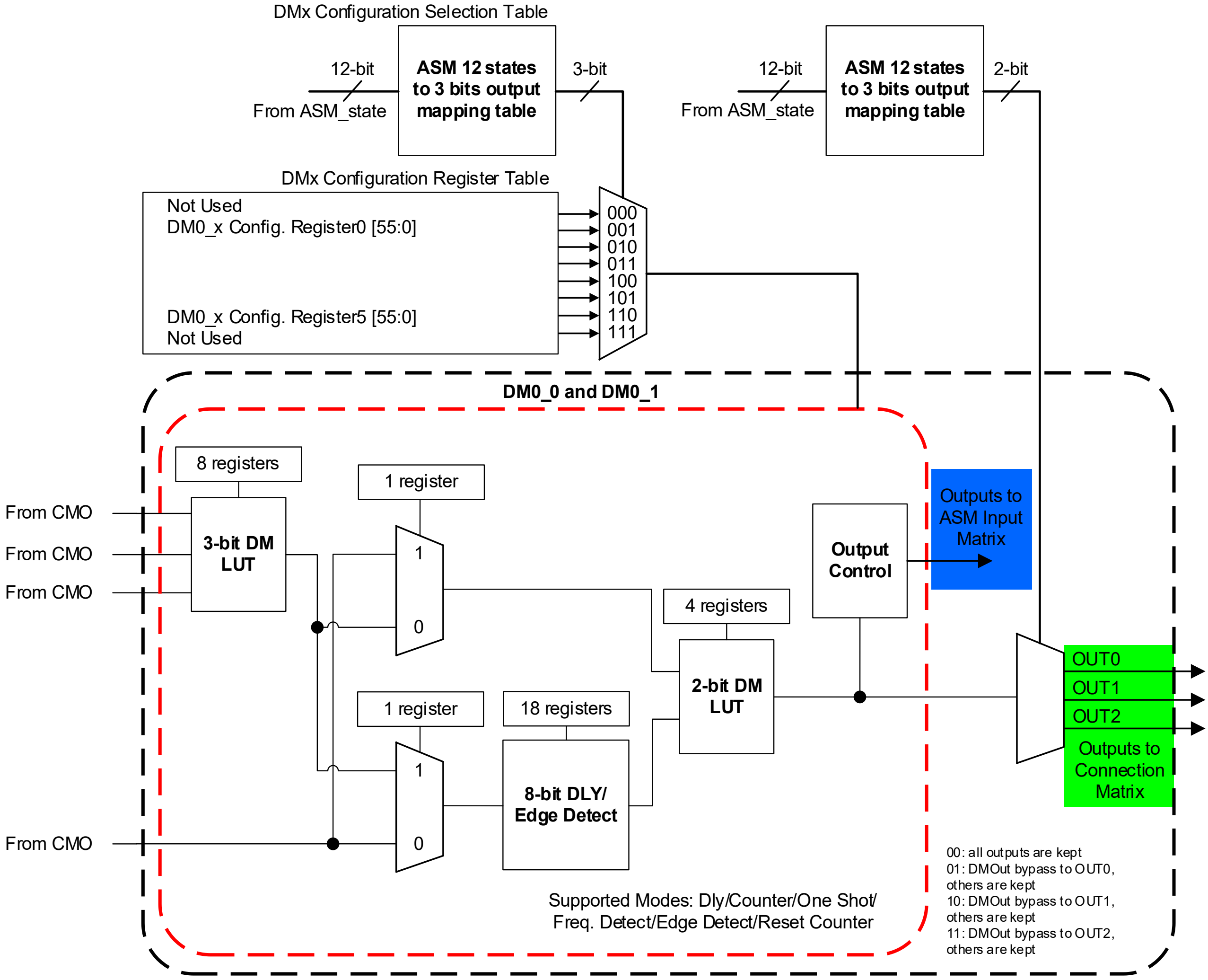


Figure 116. DM0_0/DM0_1 Outputs

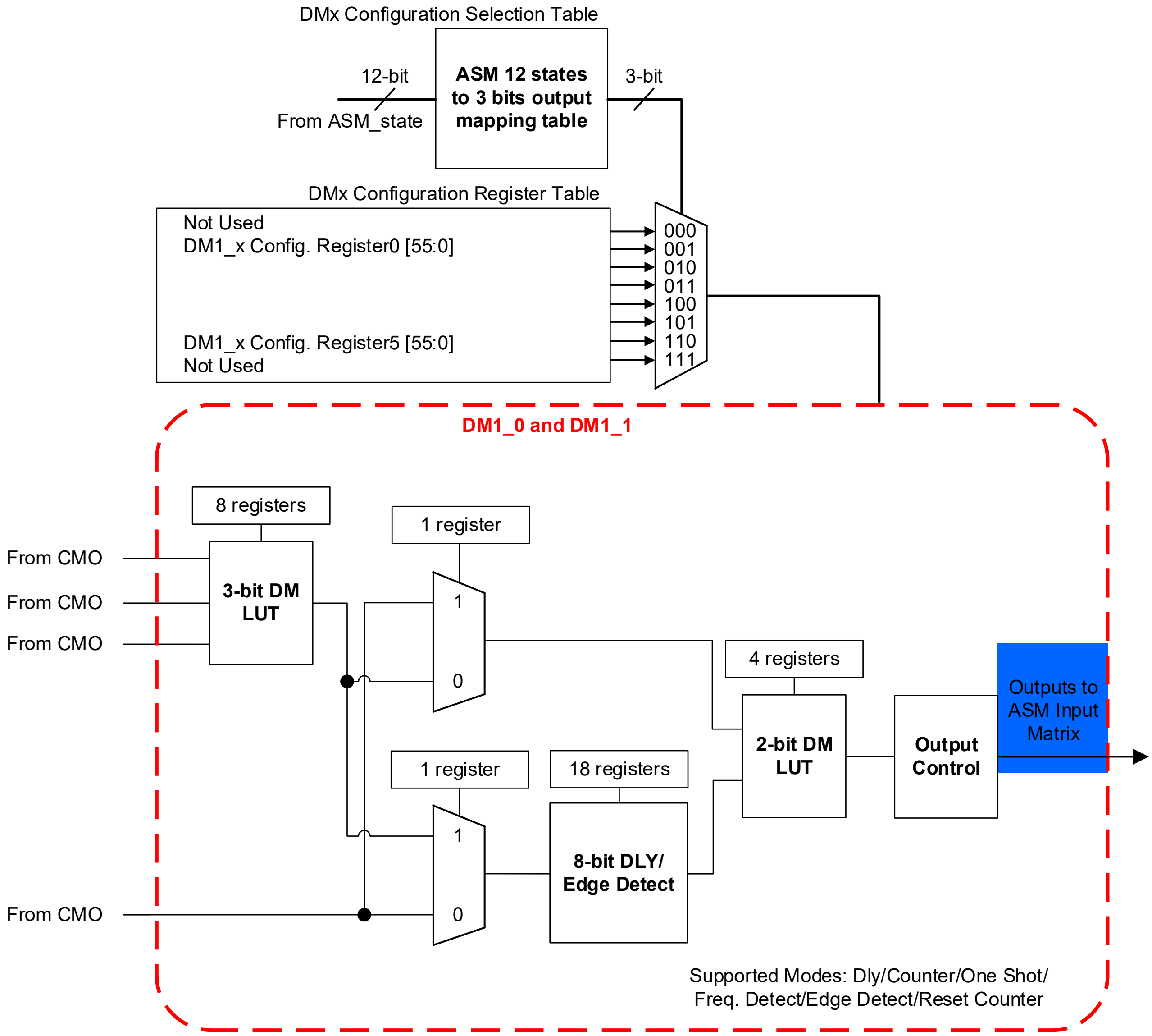


Figure 117. DM1_0/DM1_1 Outputs

17. f(1) Computation Macrocell

17.1 f(1) Computation Macrocell Overview

The f(1) Computation Macrocell consists of a specialized state machine which is optimized for simple data manipulation activities on single data bit values. The operation of this macrocell can be initiated whenever the ASM Macrocell enters a new state and can execute a string of up to 12 commands for loading and storing 1 bit data, as well as doing simple logical functions such as ANDs, ORs, and XORs.

The only time the f(1) Computation Macrocell will begin to execute instructions is when the ASM Macrocell first enters a new state. At that point in time, the f(1) Computation Macrocell will execute the user selected commands, if any, that are associated with that particular ASM state. When the f(1) Computation Macrocell completes the commands, it will then relinquish control back to the ASM Macrocell. During the time that the f(1) Computation Macrocell is active, there can be no activity in the ASM macrocell (i.e., the ASM Macrocell is prevented from any state transition during the time when the f(1) Macrocell is active).

The f(1) Computation Macrocell has two digital inputs, ASM_nReset and f1_Interupt. An active signal on either of these inputs will immediately halt any command execution for the f(1) Computation Macrocell and will immediately relinquish control back to the ASM macrocell.

The f(1) Command Register Table has 4 registers, each of which holds a string of up to 12 commands to run when the f(1) Computation Macrocell is initiated. These 4 registers allow for 4 different command strings that the user can choose from. The f(1) Command Selection Table has 12 entries (one per ASM state), which allow the user to select which of the f(1) Command Registers will be used upon entry into each state. The user can also select that no commands are used in a particular state (one of the selection options for each entry in the f(1) Command Selection Table), in which case the f(1) Computation Macrocell is completely bypassed upon entry to that particular state.

There are a total of 8 analog inputs coming from various pins which can be muxed into the positive input for the f(1) Analog Comparator inside the f(1) Computation Macrocell. The f(1) Analog Comparator can be re-programmed for analog input source and negative input reference settings. The user selections for both positive input signal and negative reference are included as part of the information stored in the f(1) Command Register Table. This allows the user to make different analog measurements that are state dependent in their analog sources and reference settings.

This macrocell also includes a f(1) Memory Stack, which is 1 bit wide by 16 deep memory which is organized as a stack, and can serve as a data source or data destination for the commands running on the macrocell. LOADx commands will push data down into the stack. OUTx commands will pop data off the stack and send to the contents of the Top-Of-Stack to one of three outputs of the f(1) macrocell to the Connection Matrix. The contents of this memory are not changed during ASM state transitions and are only changed by the commands running inside the f(1) Computation Macrocell itself. The initial memory stack values are loaded from registers [3279:3264].

17.2 f(1) Computation Macrocell Architecture

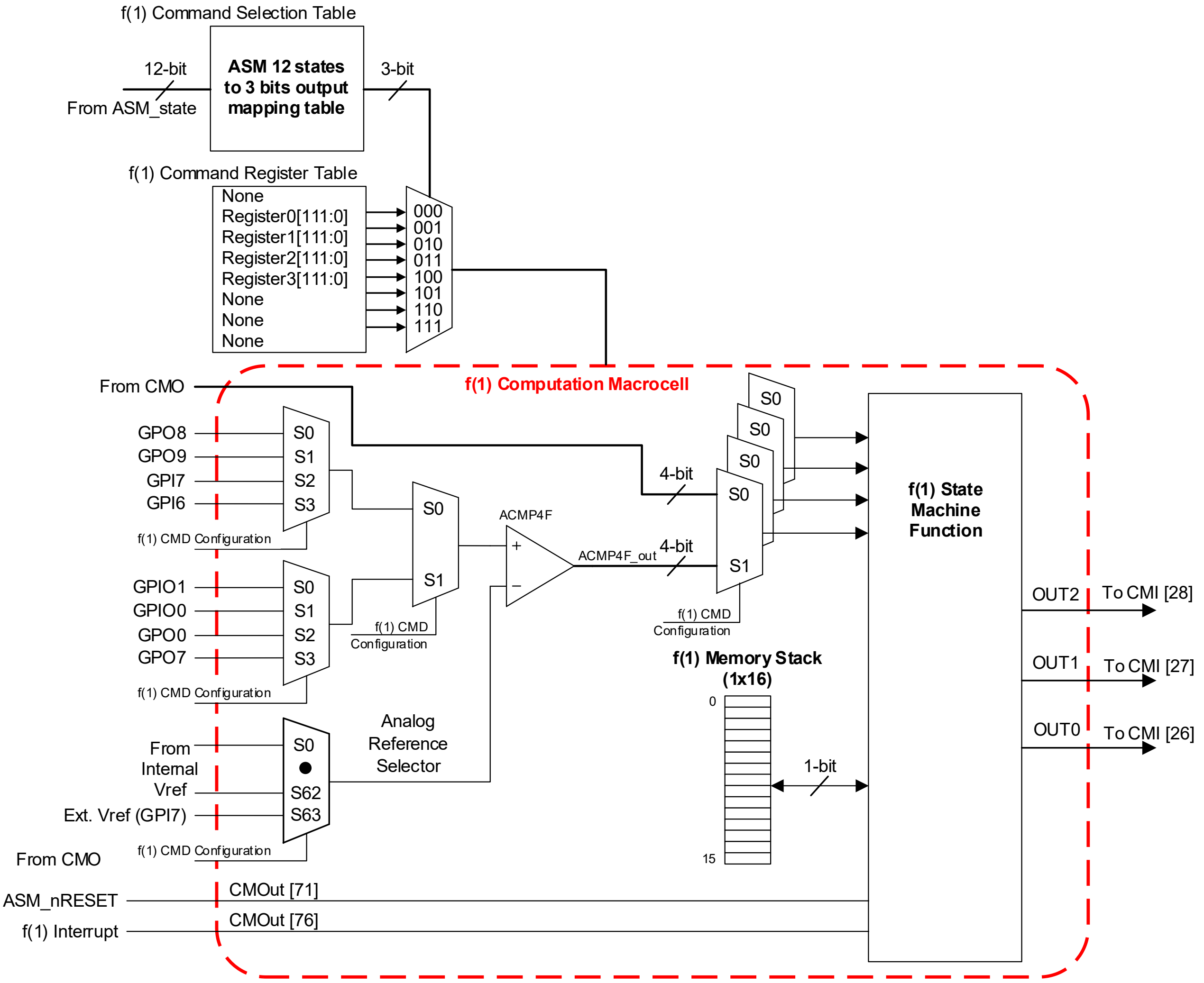


Figure 118. f(1) Computation Macrocell Architecture

17.3 f(1) Computation Macrocell Input Signals

The f(1) Computation Macrocell has 6 digital input signals, ASM_nReset, f1_Interupt, and four inputs from Connection Matrix outputs. An active signal on either of the first 2 inputs will immediately halt any command execution for the f(1) Computation Macrocell and will immediately relinquish control back to the ASM macrocell. The ASM_nReset is a level sensitive signal, and active LOW. The f1_Interupt is a level sensitive signal, and active HIGH. These signals are shown in Figure 119, highlighted in blue. Also, there are 4 digital inputs from the Connection Matrix, which can be routed to any Connection Matrix outputs from the f(1) Commands. These signals are shown on Figure 119, highlighted in yellow.

There are a total of 8 analog inputs coming from various pins which can be muxed into the positive input for the f(1) Analog Comparator inside the f(1) Computation Macrocell. These signals are shown in Figure 95, highlighted in green. The f(1) Analog Comparator can be re-programmed for analog input source and negative input reference settings with settings inside the LOADx command. The user selections for both positive input signal and negative reference are included as part of the information stored in the f(1) Command Register Table. This allows the user to make different analog measurements that are state dependent in their analog sources and reference settings.

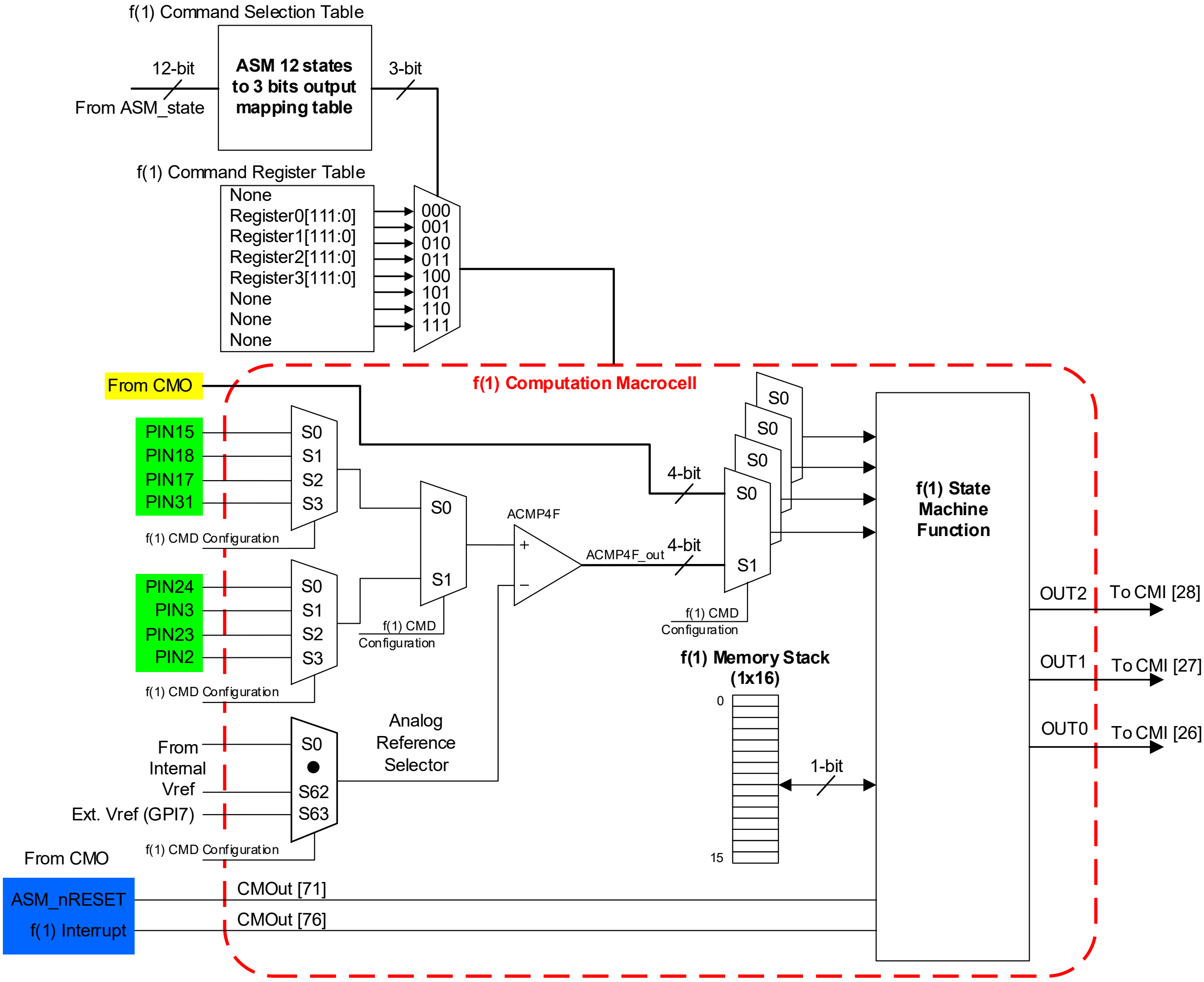


Figure 119. f(1) Computation Macrocell Input Signals

The f(1) interrupt signal comes from Connection Matrix Output. The HIGH-level f(1) interrupt signal forces the f(1) computation macrocell to immediately finish command execution and return control to the ASM similar to the END command. It is possible to load initial memory stack with the f(1) interrupt signal when register [3766] is HIGH.

The ASM_nRESET LOW-level signal forces the ASM macrocell and the f(1) computation macrocell to an initial state and an initial memory stack value.

17.4 f(1) Computation Macrocell Output Signals

The f(1) Computation Macrocell has 3 digital output signals that go to the Connection Matrix, and from there can be routed to other internal macrocells or pins. These signals are shown in Figure 120, highlighted in blue. The states of these output signals are under user control and are changed based on the Output commands.

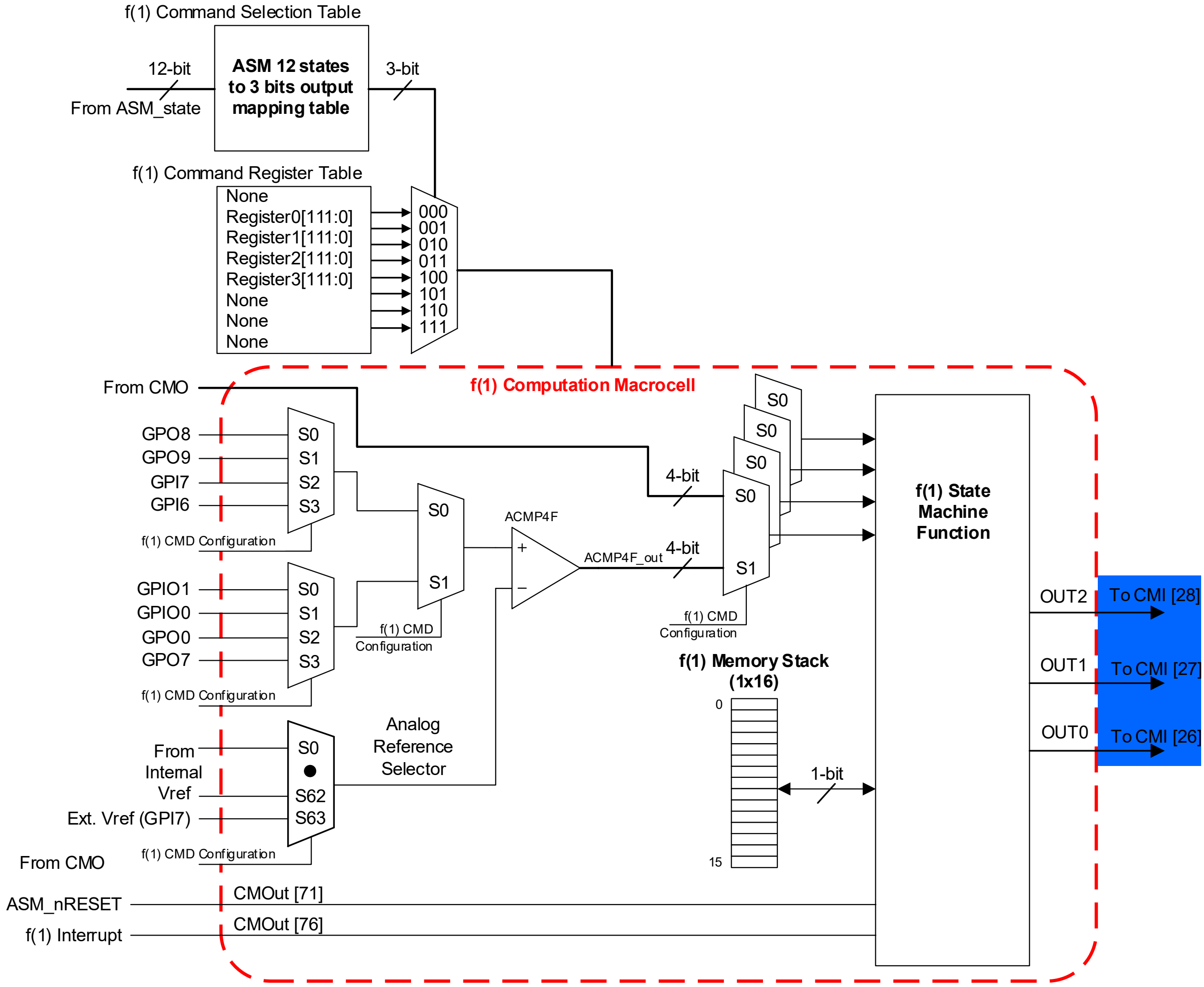


Figure 120. f(1) Computation Macrocell Output Signals

17.5 f(1) Command Registers

The f(1) Computation Macrocell consists of a specialized state machine which is optimized for simple data manipulation activities on single data bit values. The f(1) Computation Macrocell must be used for accessing the 8:1 analog multiplexer and associated analog comparator. The f(1) is also useful for storing state independent values, looping operations such as periodic signal checks, and for performing simple repetitive logic functions.

The operation of this macrocell can be initiated whenever the ASM Macrocell enters a new state and can execute a string of up to 12 commands for loading and storing 1 bit data, as well as doing simple logical functions such as ANDs, ORs, and XORs.

The f(1) Command Register Table has 4 registers, therefore 4 independent f(1) functions can be defined. Each state of the ASM can access one of the four f(1) configurable instances of the f(1).

Each of the four f(1) configurations may contain up to 12 commands which run when the f(1) Computation Macrocell is initiated. The list of available commands is as follows:

Table 28. f(1) Macrocell Commands

Command	Command Name	Command Description
0000	LOAD1	Loads a one bit value to the top of the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in location 15 is lost. The data loaded by Load 1 command is defined in the Load 1 register, which defines where the value is to be loaded from such as a pin, the f(1) comparator, and others.

Command	Command Name	Command Description
0001	LOAD2	Loads a one bit value to the top of the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in location 15 is lost. The data loaded by Load 2 command is defined in the Load 2 register, which defines where the value is to be loaded from such as a pin, the f(1) comparator, and others.
0010	LOAD3	Loads a one bit value to the top of the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in location 15 is lost. The data loaded by Load 3 command is defined in the Load 3 register, which defines where the value is to be loaded from such as a pin, the f(1) comparator, and others.
0011	LOAD4	Loads a one bit value to the top of the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in location 15 is lost. The data loaded by Load 4 command is defined in the Load 4 register, which defines where the value is to be loaded from such as a pin, the f(1) comparator, and others.
0100	AND	Performs a logical AND to the top two locations in the memory stack (location 0 and location 1). During execution of this command, the two values in the top two stack locations are deleted, and the logical AND result is pushed on the top of stack (location 0). In the process, all other values in the stack are shifted up 1 location, and a 0 is loaded in location 15.
0101	OR	Performs a logical OR to the top two locations in the memory stack (location 0 and location 1). During execution of this command, the two values in the top two stack locations are deleted, and the logical OR result is pushed on the top of stack (location 0). In the process, all other values in the stack are shifted up 1 location, and a 0 is loaded in location 15.
0110	XOR	Performs a logical XOR to the top two locations in the memory stack (location 0 and location 1). During execution of this command, the two values in the top two stack locations are deleted, and the logical XOR result is pushed on the top of stack (location 0). In the process, all other values in the stack are shifted up 1 location, and a 0 is loaded in location 15.
0111	INV	Performs a logical Invert (INV) to the top location in the memory stack (location 0). During execution of this command, the value in the top stack location is deleted, and the logical INV result is pushed on the top of stack. There is no effect on all other values in the stack.
1000	PUSH0	Pushes a 0 into the top location in the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in the location 15 is lost.
1001	POP	During execution of this command, values in the stack are shifted up 1 location, and a 0 is loaded in location 15.
1010	DELAY	The execution of commands by the f(1) Computation microcell is delayed by a period of time defined in the configuration of the delay function. Once this time period is completed, the next f(1) instruction will execute.
1011	LOOP with DELAY	If the top location in the memory stack (location 0) is equal to 0, the command execution in the f(1) Macrocell is delayed by a period of time defined in the configuration of the delay function and then executes the f(1) sequence at the specified jump location. If the top location in the memory stack (location 0) is equal to 1, the f(1) Macrocell proceeds with execution of the next command in sequence.
1100	OUT1	Outputs the top location in the memory stack (location 0) on matrix input OUT1.
1101	OUT2	Outputs the top location in the memory stack (location 0) on matrix input OUT2.
1110	OUT3	Outputs the top location in the memory stack (location 0) on matrix input OUT3.
1111	END	Immediately ends execution of commands by f(1) Macrocell, and control is returned to ASM Macrocell.

These commands form a machine level language that may be configured within Go Configure Software Hub software using a simple GUI, as opposed to using a typical text editor. See application examples below:

Example 1: Sensor Application showing the command sequence for a potential use case of the f(1) Macrocell.

Table 29. Example 1 of f(1) Macrocell Command Sequence

f(1) Command Sequence	Command	Description
1	INV	Change Top Memory location from 0 → 1.
2	OUT1	Output a 1 to a pin defined by OUT1 register. This can be used to turn on or bias an external sensor.
3	DELAY	Wait for a time defined by DELAY register. This can be used to allow sensor to settle.
4	LOAD1	Capture the output of f(1) ACMP from an analog pin connected to the sensor as defined by the LOAD1 register.
5	LOAD2	Capture the output of a pin as defined by the LOAD2 register. This can be used to check a power good signal.
6	AND	Logically AND the top two values of the 1x16 memory that were just loaded with LOAD1 and LOAD2.
7	OUT2	Output the result of sensor output AND power good signal for a control decision for the ASM.
8	END	ASM can now act on OUT2 signal.

Example 2: Power Good Application showing the command sequence for a potential use case of the f(1) Macrocell.

Table 30. Example 2 of f(1) Macrocell Command Sequence

f(1) Command Sequence	Command	Description
1	LOAD1	Capture the output of f(1) ACMP from an analog pin connected to power rail 1 as defined by the LOAD1 register. A “1” means that power is good on power rail 1.
2	LOAD2	Capture the output of f(1) ACMP from an analog pin connected to power rail 2 as defined by the LOAD2 register. A “1” means that power is good on power rail 2.
3	LOAD3	Capture the output of f(1) ACMP from an analog pin connected to power rail 3 a s defined by the LOAD3 register. A “1” means that power is good on power rail 3.
4	LOAD4	Capture the output of f(1) ACMP from an analog pin connected to power rail 4 as defined by the LOAD4 register. A “1” means that power is good on power rail 4.
5	AND	LOAD4 result ANDs with LOAD3 result (LOAD4 and LOAD3). This combines two of the Power Good signals.
6	AND	(LOAD4 and LOAD3) and LOAD2. This combines three of the Power Good signals.
7	AND	((LOAD4 and LOAD3) and LOAD2) and LOAD1. This combines four of the Power Good signals.
8	OUT1	Output the Controller Power Good signal to a location defined by the OUT1 register.

The LOADx, OUTx, and DELAY/LWD commands are required to be defined before using them.

17.5.1 Delay Command Configuration Bits

The Delay Command is defined by 12 bits. Each of the 4 instances of the f(1) command can configure a new value for the delays. However, the DELAY and LWD use the same configuration data, so these two delays must be identical.

Table 31. Delay Configuration Bits

Configuration Bits	Description	
8 Bits	Delay Count (0 .. 255)	
3 Bits	Delay Clock	
	000	OSC2
	001	OSC2/4
	010	OSC1
	011	OSC1/8
	100	OSC1/64
	101	OSC0
	110	OSC0/8
	111	OSC0/64
1 Bit	ACMP Shutdown during Delay	ACMP is shutdown after data Load

17.5.2 LOADx Command Configuration Bits

There are two types of load configuration schemes. One method defines loading from one of eight analog pins via the f(1) ACMP. The other method defines loading from any of the matrix outputs connected to digital input pins, logic macrocells, ASM outputs, oscillators, and others. LOAD1 and LOAD2 can only be configured for 4 analog input pins. LOAD3 and LOAD 4 can be configured for the remaining 4 analog input pins.

Table 32 shows LOAD1, 2, 3, 4 Command from f(1) ACMP or Matrix connection. A single bit determines if LOADx takes its value from the f(1) analog comparator or from a matrix output.

Table 32. LOAD1, 2, 3, 4 Command from f(1) ACMP or Matrix Connection

Configuration Bits	Description	
1 Bit	LOAD1 Connection	0: Matrix, 1: f(1) ACMP
1 Bit	LOAD2 Connection	0: Matrix, 1: f(1) ACMP
1 Bit	LOAD3 Connection	0: Matrix, 1: f(1) ACMP
1 Bit	LOAD4 Connection	0: Matrix, 1: f(1) ACMP

Table 33. LOAD1 and LOAD2 Configuration Bits f(1) ACMP Input

Configuration Bits	Description	
6 Bits	ACMP Voltage Reference value	000000 is 32 mV, 111111 is 2.048 V
2 Bits	One of four analog input pins	
	00	Analog pin 1
	01	Analog pin 2
	10	Analog pin 3
	11	Analog pin 4
1 Bit	Reserved	

Table 34. LOAD3 and LOAD4 Configuration Bits f(1) ACMP Input

Configuration Bits	Description	
6 Bits	ACMP Voltage Reference value	000000 is 32 mV, 111111 is 2.048 V
2 Bits	One of four analog input pins	
	00	Analog pin 5
	01	Analog pin 6
	10	Analog pin 7
	11	Analog pin 8
1 Bit	Reserved	

17.5.3 OUTx Command Configuration Bits

Each f(1) instance can be configured to output to up to three matrix inputs using the OUTx command. OUT1, 2, and 3's initial condition is two bit selectable. Each time the ASM changes state, the initial condition of the f(1) is re-loaded.

Table 35. f(1) Macrocell OUTx Configuration Bits

Configuration Bits	Description
00	OUTx equals previous OUTx
01	OUTx is 0
10	OUTx is 1
11	none (high Z)

The only time the f(1) Computation Macrocell will run is when ASM macrocell first enters a new state. At that point in time, the f(1) Computation Macrocell will execute the user selected commands (based on user selection) and then relinquish control back to the ASM macrocell. During the time that the f(1) Computation Macrocell is active, there can be no activity in the ASM macrocell (that is no ASM macrocell state change).

The f(1) Computation Macrocell has two digital inputs, ASM_nReset and f1_Interupt. An active signal on either of these inputs will immediately halt any command execution for the f(1) Computation Macrocell and will immediately relinquish control back to the ASM macrocell.

17.5.4 LOOP WITH DELAY Configuration Bits

There is one conditional command LOOP WITH DELAY (LWD) in f(1) computation macrocell. The order of the f(1) command execution depends on the LWD usage and its configuration. If top value in 1 x 16 memory stack is 0, then the f(1) is delayed according to the configuration of the f(1) delay function and the f(1) command sequence starting from the location defined by 4-bit register is executed, otherwise f(1) continues to execute commands one by one.

Table 36. f(1) LOOP WITH DELAY Configuration Bits

Configuration Bits	Description	
4 bits	Next command location after LWD command	0000 is the first command in the f(1) sequence, 1011 is the twelfth last command in the f(1) sequence

Example 3: Rising Edge Deglitch Application showing the command sequence for a potential use case of the f(1) Macrocell.

Table 37. Example 3 of f(1) Macrocell Command Sequence

f(1) Command Sequence	Command	Description
1	LOAD1	Capture the output of a pin or any macrocell output defined by the LOAD1 register.
2	DELAY	Delay for the time defined by configuration register.
3	LOAD1	Capture the output of a pin or any macrocell output defined by the LOAD1 register.
4	DELAY	Delay for time defined by configuration register.
5	LOAD1	Capture the output of a pin or any macrocell output defined by the LOAD1 register.
6	AND	Logically AND the top two values of the 1x16 memory stack, that was loaded before (LOAD1 and LOAD1 after Delay).
7	AND	(LOAD1 and LOAD1 after Delay) and LOAD1 after double Delay.
8	LWD	If the calculated value is 0, then start to execute first command once again, which is defined by the configuration bits. Otherwise f(1) continues to execute next command (command 9).
9	OUT1	Output the result value, which is a HIGH level.
10	END	ASM can act on any other signals.

Figure 121 shows the f(1) rising edge deglitch based on three samples application.

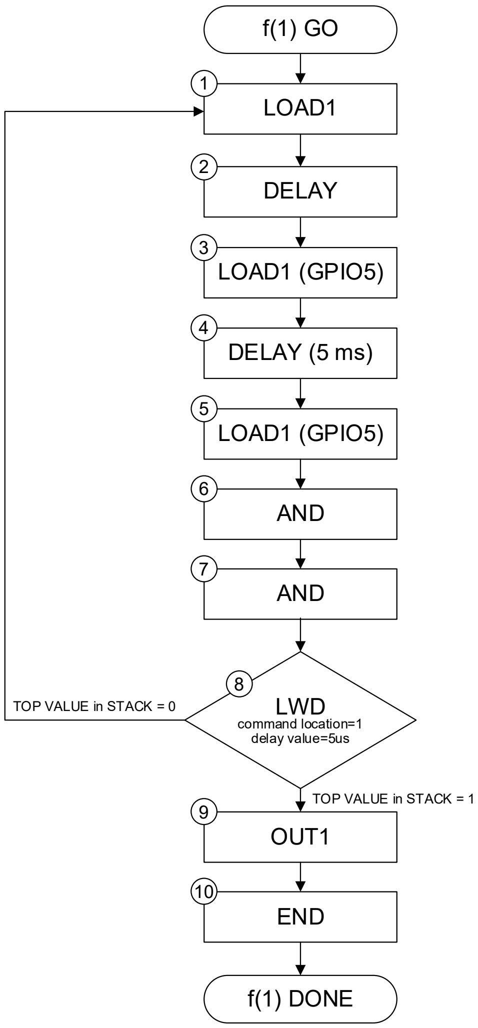


Figure 121. f(1) Flowchart for Rising Edge Deglitch

Example 4: Average Function for Captured Data, showing the command sequence for a potential use case of the f(1) Macrocell. This function requires two f(1) Macrocell command sequences to implement.

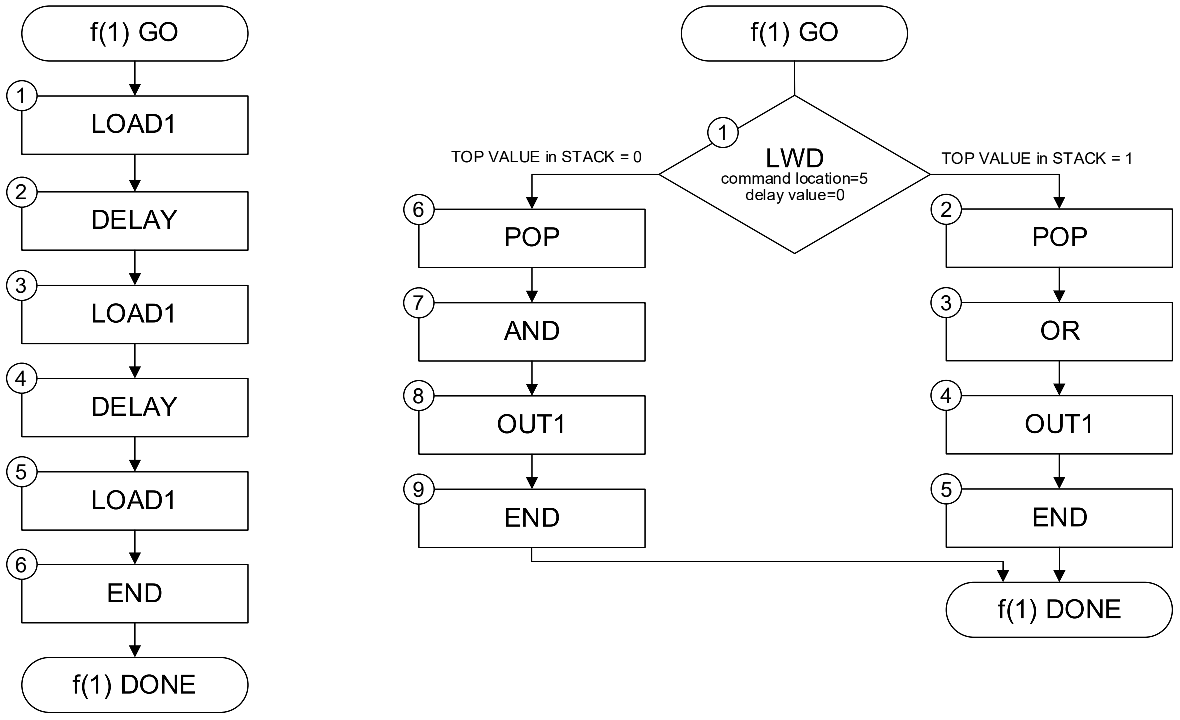


Figure 122. f(1) Flowchart for Average Function for Captured Data

17.6 f(1) Typical Performance

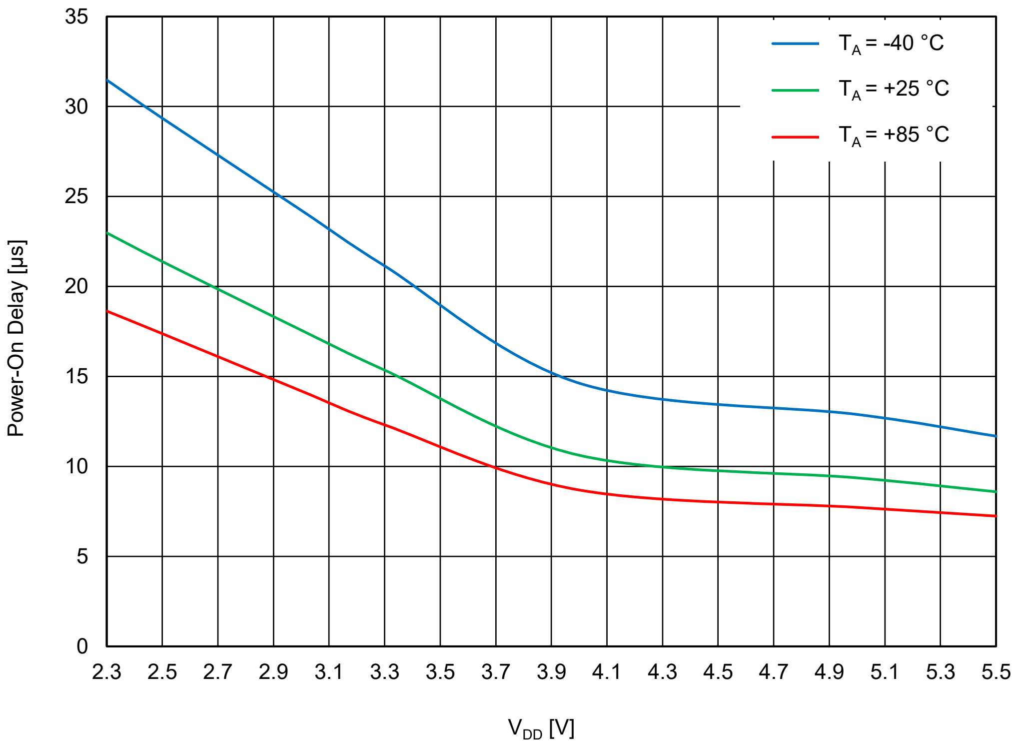


Figure 123. ACMP4F Power-On Delay vs. V_{DD}

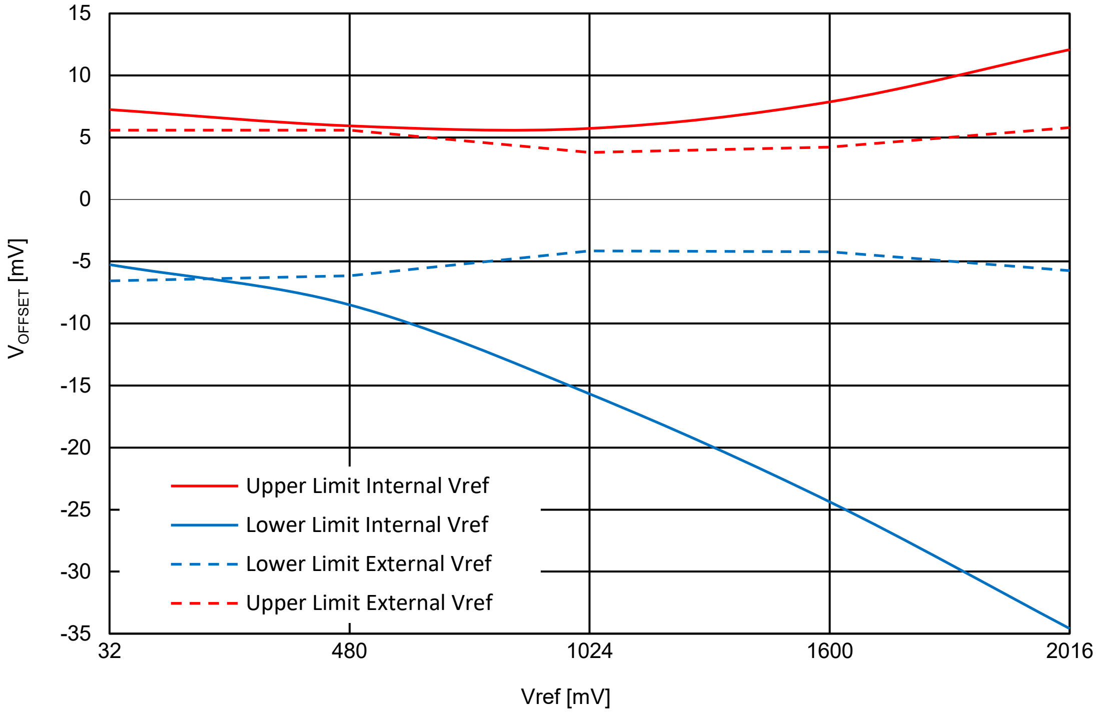


Figure 124. ACMP4F Input Offset Voltage vs. V_{REF} at T_A = -40 °C to +125 °C, Input Buffer Disabled

18. Matrix Interface Macrocells

The ASM Sub-System includes several discrete macrocells, including the ASM macrocell, four Dynamic Memory (DMx_x) macrocells, three Matrix Interface (MI) Macrocells, and one f(1) Computation Macrocell. These macrocells are designed to work as a system for building user defined state machines.

The Matrix Interface macrocells have the characteristic that they can change internal configuration characteristics and their connections to the Connection Matrix based on the current state of the State Machine (SM) macrocell. This is accomplished by making different memory register bit settings contained within the macrocell active, based on the current active state of the SM. This allows the user to “repurpose” the resources inside these macrocells to match the circuit needs in various states.

The SLG46880-E has a total of three MI macrocells, MI0, MI1, and MI2.

Each MI macrocell has a MIx Configuration Register Table, which is a bank of 4 MIx Configuration Registers. The bits in these registers hold user selections which define the input connections from the Connection Matrix. The fact that there are 4 Configuration Registers means that there can only be a total of four unique configurations for each MIx macrocell. There are a total of twelve states, which means that the user can either re-use the configuration coded in a particular MIx Operating Mode Register in more than one state, or not use some MIx macrocells in some states.

Each MI macrocell has a MIx Operating Mode Selection Table, which is a bank of 12 Configuration Selection Registers, one for each state of the State Machine macrocell. The bits in these registers hold the user’s selection of MI functional behavior (input selection from Connection Matrix), by mapping to a particular selection in the Configuration Register Table, based on the current state of the State Machine macrocell.

18.1 MI0, MI1, and MI2 Macrocell Architecture

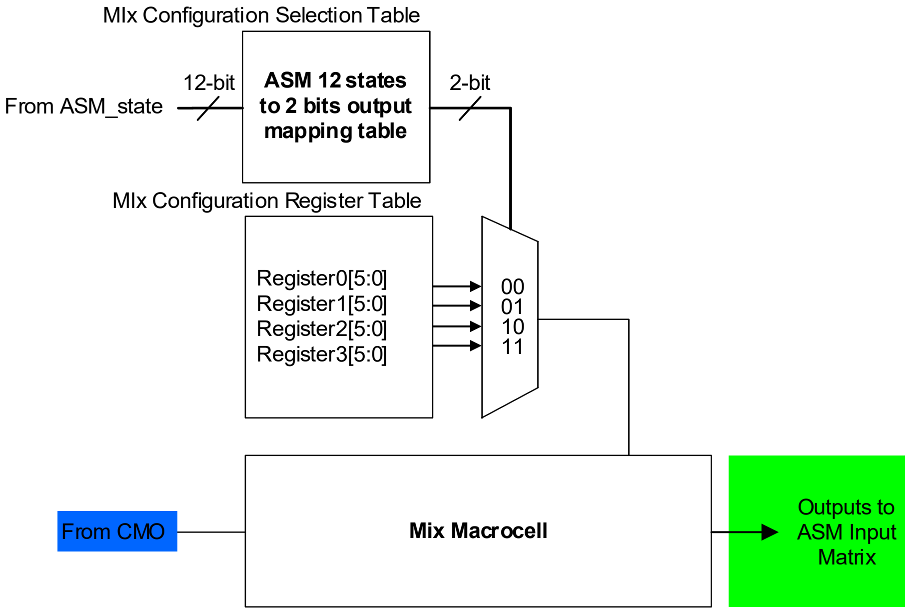


Figure 125. MIx Macrocell Architecture

18.2 MIx Macrocell Input Signals

Each MIx macrocell has a single digital input signal coming from the Connection Matrix and from there can be routed to other internal macrocells or pins. This signal is shown in Figure 125, highlighted in blue.

18.3 MIx Macrocell Output Signals

Each MIx macrocell has a single digital output signal, which goes directly to the ASM Input Matrix inside the ASM Macrocell. This signal is shown in Figure 125, highlighted in green.

19. I²C Serial Communications Macrocell

19.1 I²C Serial Communications Macrocell Overview

In the standard use case for the GreenPAK devices, the configuration choices made by the user are stored as bit settings in the Non-Volatile Memory (NVM), and this information is transferred at startup time to volatile RAM registers that enable the configuration of the macrocells. Other RAM registers in the device are responsible for setting the connections in the Connection Matrix to route signals in the manner most appropriate for the user's application.

The I²C Serial Communications Macrocell in this device allows an I²C bus controller (master) to read and write this information via a serial channel directly to the RAM registers, allowing the remote re-configuration of macrocells, and remote changes to signal chains within the device.

An I²C bus controller is also able to read and write other register bits that are not associated with NVM memory. As an example, the input lines to the Connection Matrix can be read as digital register bits. These are the signal output of each of the macrocells in the device, giving an I²C bus controller the capability to remotely read the current value of any macrocell.

The user has the flexibility to control read access and write access via registers bits registers [4071:4069]. See section 19.5 I2C Serial Command Register Map for more details on I²C read/write memory protection.

19.2 I²C Serial Communications Device Addressing

Each command to the I²C Serial Communications macrocell begins with a Control Byte. The bits inside this Control Byte are shown in Figure 126. After the START condition, the first four bits are a control code, which can be set by the user in registers [4083:4080] or value defined externally by GPIs 4, 5, 6, and 7. The LSB of the control code is defined by the value of GPI4, while the MSB is defined by the value of GPI7The address source is selected by register [4087]. This gives the user flexibility on the chip level addressing of this device and other devices on the same I²C bus. The Block Address is the next three bits (A10, A9, A8), which will define the most significant bits in the addressing of the data to be read or written by the command. The last bit in the Control Byte is the R/W bit, which selects whether a read command or write command is requested, with a '1' selecting for a Read command, and a '0' selecting for a Write command. This Control Byte will be followed by an Acknowledge bit (ACK), which is sent by this device to indicate successful communication of the Control Byte data.

In the I²C-bus specification and user manual, there are two groups of eight addresses (0000 xxx and 1111 xxx) that are reserved for the special functions, such as a system General Call address. If the user of this device choses to set the Control Code to either '1111' or '0000' in a system with other target (slave) device, please consult the I²C-bus specification and user manual to understand the addressing and implementation of these special functions, to insure reliable operation.

In the read and write command address structure, there are a total of 11 bits of addressing, each pointing to a unique byte of information, resulting in a total address space of 2K bytes. Of this 2K byte address space, the valid addresses accessible to the I²C Macrocell on the SLG46880-E are in the range from 0 (00H) to 511 (1FFH). The upper two address bits (A10 and A9) will be '0' for all commands to the SLG46880-E. The value of Address bit A8 will depend on whether the Bus controller is addressing the upper or lower half of the 4K bit address space.

With the exception of the Current Address Read command, all commands will have the Control Byte followed by the Word Address.

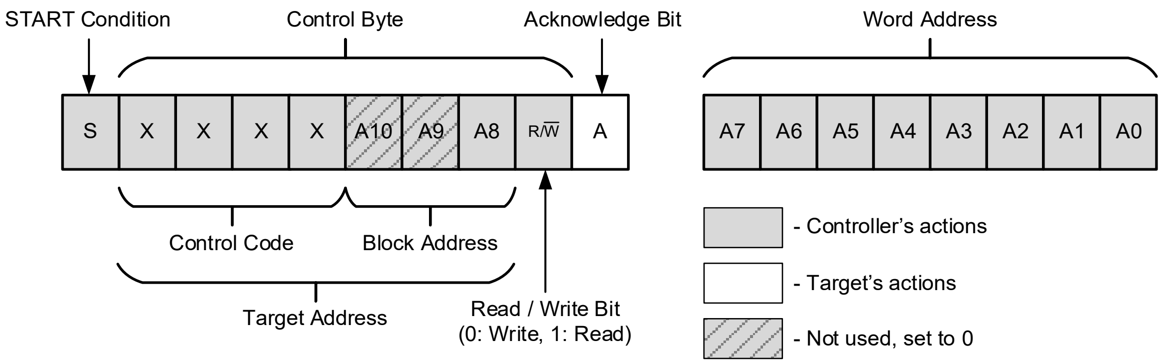


Figure 126. Basic Command Structure

19.3 I²C Serial General Timing

General timing characteristics for the I²C Serial Communications macrocell are shown in Figure 127. Timing specifications can be found in section 3.4.2 I2C Specifications.

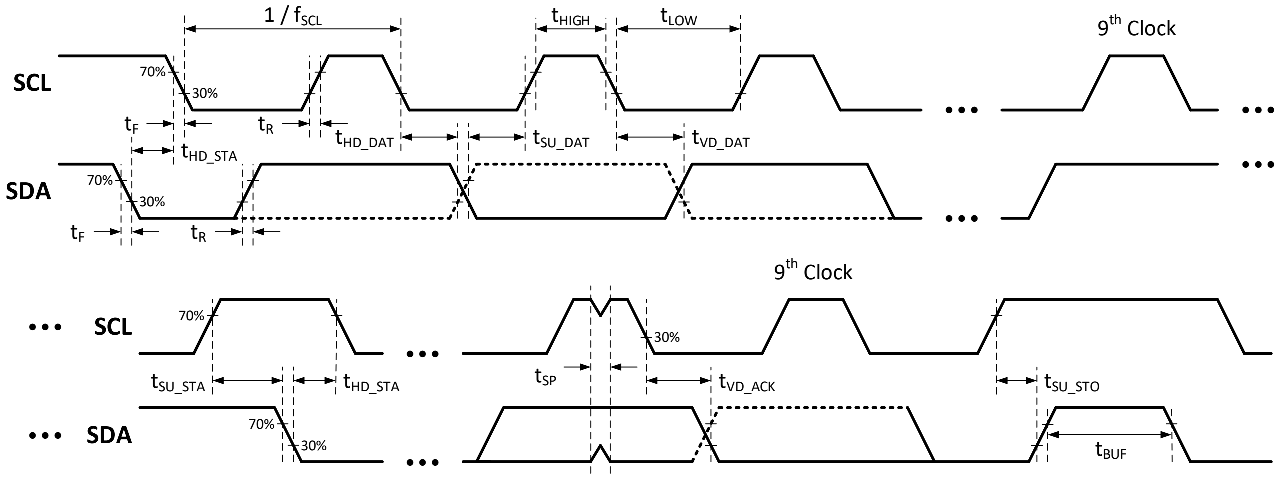


Figure 127. I²C General Timing Characteristics

19.4 I²C Serial Communications Commands

19.4.1 Byte Write Command

Following the START condition from the controller, the Control Code [4 bits], the Block Address [3 bits], and the R/W bit (set to '0') are placed onto the I²C bus by the controller. After the SLG46880-E sends an Acknowledge bit (ACK), the next byte transmitted by the controller is the Word Address. The Block Address (A10, A9, A8), combined with the Word Address (A7 through A0), together set the internal address pointer in the SLG46880-E, where the data byte is to be written. After the SLG46880-E sends another Acknowledge bit, the controller will transmit the data byte to be written into the addressed memory location. The SLG46880-E again provides an Acknowledge bit and then the controller generates a STOP condition. The internal write cycle for the data will take place at the time that the SLG46880-E generates the Acknowledge bit.

It is possible to latch all IOs during I²C write command, register [4065] = 1 - Enable. It means that IOs will remain their state until the write command is done.

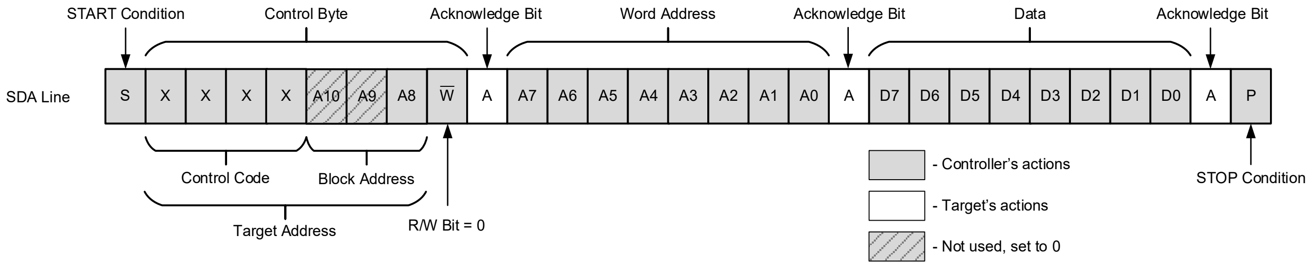


Figure 128. Byte Write Command, R/W = 0

19.4.2 Sequential Write Command

The write Control Byte, Word Address, and the first data byte are transmitted to the SLG46880-E in the same way as in a Byte Write command. However, instead of generating a Stop condition, the Bus controller continues to transmit data bytes to the SLG46880-E. Each subsequent data byte will increment the internal address counter and will be written into the next higher byte in the command addressing. As in the case of the Byte Write command, the internal write cycle will take place at the time that the SLG46880-E generates the Acknowledge bit.

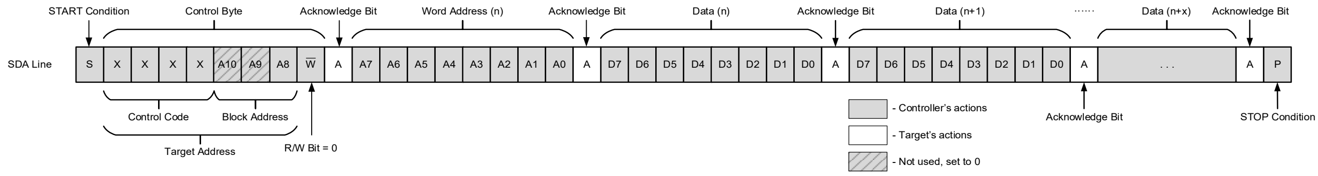


Figure 129. Sequential Write Command

19.4.3 Current Address Read Command

The Current Address Read Command reads from the current pointer address location. The address pointer is incremented at the first STOP condition following any write control byte. For example, if a Sequential Read command (which contains a write control byte) reads data up to address 'n', the address pointer would get incremented to 'n + 1' upon the STOP of that command. Subsequently, a Current Address Read that follows would start reading data at 'n + 1'. The Current Address Read Command contains the Control Byte sent by the controller, with the R/W bit = '1'. The SLG46880-E will issue an Acknowledge bit and then transmit eight data bits for the requested byte. The controller will not issue an Acknowledge bit and follow immediately with a STOP condition.

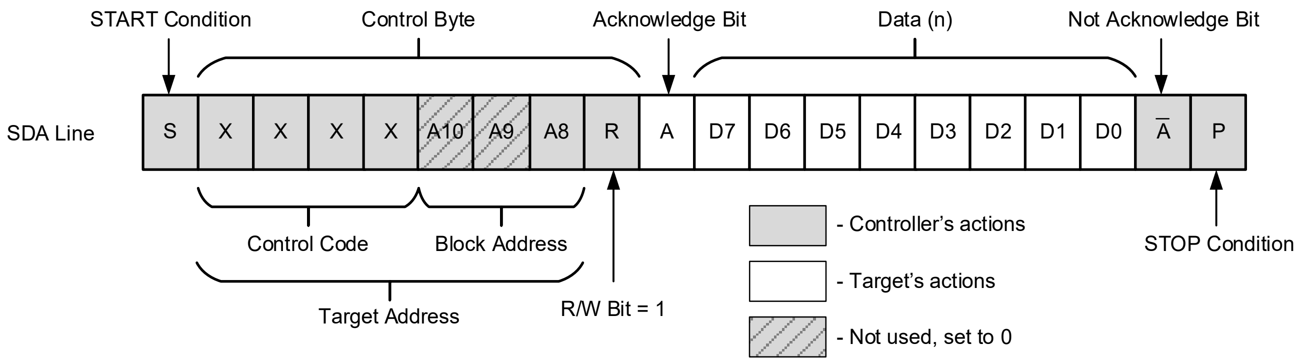


Figure 130. Current Address Read Command, R/W = 1

19.4.4 Random Read Command

The Random Read Command allows to read data at an arbitrary address. The Random Read command starts with a Control Byte (with R/W bit set to '0', indicating a write command) and Word Address to set the internal byte address, followed by a START condition, and then the Control Byte for the read (exactly the same as the Byte Write command). The START condition in the middle of the command will halt the decoding of a Write command but will set the internal address counter in preparation for the second half of the command. After the

START condition, the Bus controller issues a second control byte with the R/W bit set to ‘1’, after which the SLG46880-E issues an Acknowledge bit, followed by the requested eight data bits.

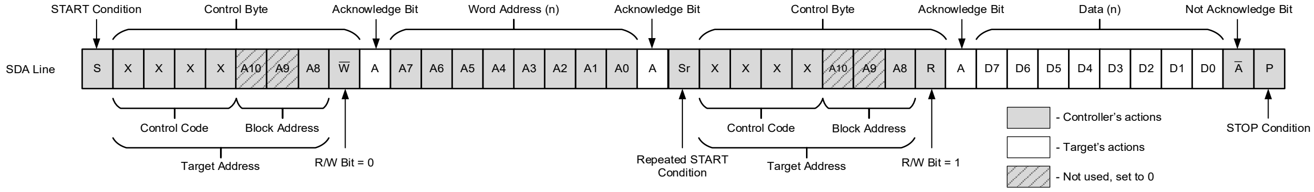


Figure 131. Random Read Command

19.4.5 Sequential Read Command

The Sequential Read command is initiated in the same way as a Random Read command, except that once the SLG46880-E transmits the first data byte, the Bus controller issues an Acknowledge bit as opposed to a STOP condition in a random read. The Bus controller can continue reading sequential bytes of data and will terminate the command with a STOP condition.

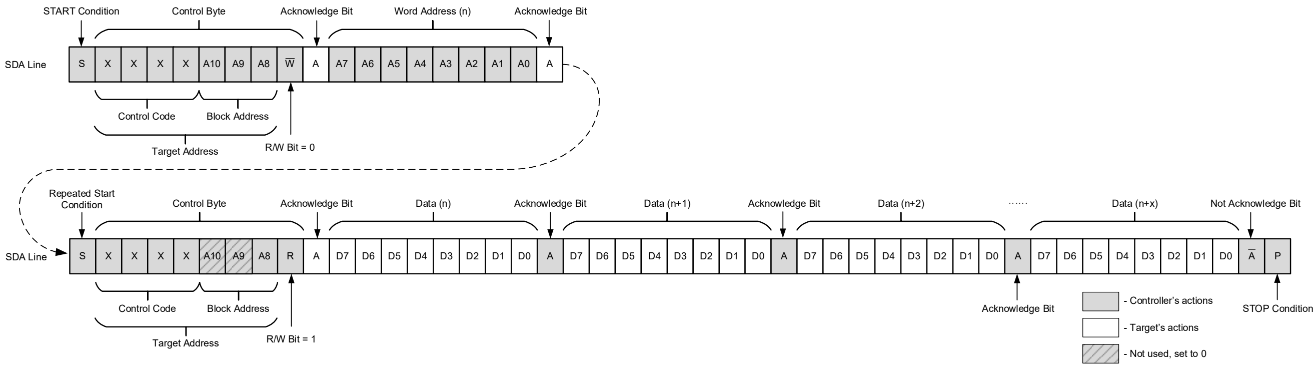


Figure 132. Sequential Read Command

19.4.6 I^{2}C Serial Reset Command

If I^{2}C serial communication is established with the device, it is possible to reset the device to initial power up conditions, including configuration of all macrocells, and all connections provided by the Connection Matrix. This is implemented by setting register [4064] I^{2}C reset bit to ‘1’, which causes the device to re-enable the Power-On Reset (POR) sequence, including the reload of all register data from NVM. During the POR sequence, the outputs of the device will be in tri-state. After the reset has taken place, the contents of register [4064] will be set to ‘0’ automatically. The timing diagram shown below illustrates the sequence of events for this reset function.

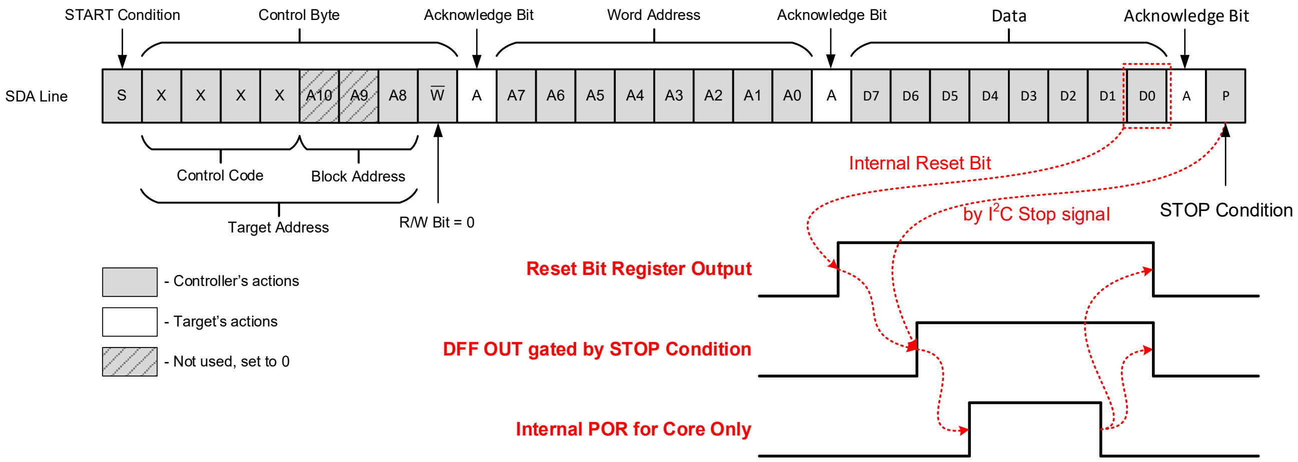


Figure 133. Reset Command Timing

19.5 I²C Serial Command Register Map

There are seven read/write protect modes for the design sequence from being corrupted or copied. See Table 38 for details.

Table 38. Read/Write Protection Options

Configurations	Protection Modes Configuration							Data Output From	Register Address
	Unlocked	Partly Lock Read1	Partly Lock Read2	Partly Lock Read2/ Write	Lock Read	Lock Write	Lock Read/ Write		
	(Mode 0)	(Mode 1)	(Mode 2)	(Mode 3)	(Mode 4)	(Mode 5)	(Mode 6)		
I²C Byte Write Bit Masking (section 19.6.4 I2C Byte Write Bit Masking)	R/W	R/W	R/W	R/W	W	R	-	Memory	1FD
I²C Serial Reset Command (section 19.4.6 I2C Serial Reset Command)	R/W	R/W	R/W	R/W	W	R	-	Memory	1FC,b'0
Outputs Latching During I²C Write	R/W	R/W	R/W	R/W	W	R	-	Memory	1FC,b'1
f(1) Computation Macrocell Stack	R/W	R/W	R/W	R/W	W	R	-	Macrocell	198~199
Connection Matrix Virtual Inputs (section 6.3 Connection Matrix Virtual Inputs)	R/W	R/W	R/W	R/W	W	R	-	Macrocell	1DB
Configuration Bits for All Macrocells (IO Pins, ACMPs, Combination Function Macrocells, ASM, and others)	R/W	R/W	W	-	W	R	-	Memory	
Macrocells Inputs Configuration (Connection Matrix Outputs, section 6.2 Matrix Output Table)	R/W	W	W	-	W	R	-	Memory	0~3E
Protection Mode Selection	R/W	R	R	R	R	R	R	Memory	1FC,b'7,6,5
Macrocells Output Values (Connection Matrix Inputs, section 6.1 Matrix Input Table)	R	R	R	R	-	R	-	Macrocell	1D7~1DA;1 DC~1DE
Counter Current Value	R	R	R	R	-	R	-	Macrocell	1DF,1E0,1E 1,1E2
ASM Current State	R	R	R	R	-	R	-	Macrocell	1E3,1E4
I²C Control Code (section 19.4 I2C Serial Communications Commands)	R	R	R	R	R	R	R	Memory	1FE,b'3~0
I²C Disable/Enable	R	R	R	R	R	R	R	Memory	1FE,b'4

R/W	Allow Read and Write Data
W	Allow Write Data Only
R	Allow Read Data Only
-	The Data is protected for Read and Write

It is possible to read some data from macrocells, such as counter current value, ASM current state, connection matrix, f(1) computation macrocell stack, and connection matrix virtual inputs. The I²C write will not have any impact on data in case data comes from macrocell output, except f(1) Computation Macrocell Stack and Connection Matrix Virtual Inputs. The silicon identification service bits allow identifying silicon family, its revision, and others.

See section 21 Registers for detailed information on all registers.

19.6 I²C Additional Options

When Output latching during I²C write, register [4065] = 1 allows all PINs output value to be latched until I²C write is done. It will protect the output change due to configuration process during I²C write in case multiple register bytes are changed. Inputs and internal macrocells retain their status during I²C write.

If the user sets GPIO0 and GPIO1 function to a selection other than SDA and SCL, all access via I²C will be disabled.

Note: Any write commands that come to the device via I²C that are not blocked, based on the protection bits, will change the contents of the RAM register bits that mirror the NVM bits. These write commands will not change the NVM bits themselves, and a POR event will restore the register bits to original programmed contents of the NVM.

See section 21 Registers for detailed information on all registers.

19.6.1 Reading Counter Data via I²C

The current count value in three counters in the device can be read via I²C. The counters that have this additional functionality are 16-bit CNT0, and 8-bit counters CNT2 and CNT4.

19.6.2 Reading ASM Current State via I²C

The Current State of the ASM can be read via I²C. There are 12 memory bits located at registers [3875:3864]. Configuration for each Current State can be found in Table 39.

Table 39. ASM Current State Bits Configuration

I²C Address	Register Bit Number	ASM State Number	ASM Current State Bits Configuration											
			State 0	State 1	State 2	State 3	State 4	State 5	State 6	State 7	State 8	State 9	State 10	State 11
1E3	3864	State 0	1	0	0	0	0	0	0	0	0	0	0	0
	3865	State 1	0	1	0	0	0	0	0	0	0	0	0	0
	3866	State 2	0	0	1	0	0	0	0	0	0	0	0	0
	3867	State 3	0	0	0	1	0	0	0	0	0	0	0	0
	3868	State 4	0	0	0	0	1	0	0	0	0	0	0	0
	3869	State 5	0	0	0	0	0	1	0	0	0	0	0	0
	3870	State 6	0	0	0	0	0	0	1	0	0	0	0	0
	3871	State 7	0	0	0	0	0	0	0	1	0	0	0	0
1E4	3872	State 8	0	0	0	0	0	0	0	0	1	0	0	0

I²C Address	Register Bit Number	ASM State Number	ASM Current State Bits Configuration											
			State 0	State 1	State 2	State 3	State 4	State 5	State 6	State 7	State 8	State 9	State 10	State 11
1E4	3873	State 9	0	0	0	0	0	0	0	0	0	1	0	0
	3874	State 10	0	0	0	0	0	0	0	0	0	0	1	0
	3875	State 11	0	0	0	0	0	0	0	0	0	0	0	1

19.6.3 I²C Expander

In addition to the eight Connection Matrix Virtual Inputs, the SLG46880-E chip has four pins which can be used as an I²C Expander. These four pins are GPIO4, GPIO5, GPIO6, and GPIO7.

Each of these pins can be used as an I²C Expander output or used as a normal pin. Also, each of these four expander outputs have initial state settings which are specified in registers [3880:3870].

19.6.4 I²C Byte Write Bit Masking

The I²C macrocell inside SLG46880-E supports masking of individual bits within a byte that is written to the RAM memory space. This function is supported across the entire RAM memory space. To implement this function, the user performs a Byte Write Command (see section 19.4.1 Byte Write Command for details) on the I²C Byte Write Mask Register (address 1FDH) with the desired bit mask pattern. This sets a bit mask pattern for the target memory location that will take effect on the next Byte Write Command to this register byte. Any bit in the mask that is set to '1' in the I²C Byte Write Mask Register will mask the effect of changing that particular bit in the target register, during the next Byte Write Command. The contents of the I²C Byte Write Mask Register are reset (set to 00h) after the Byte Write Command. If the next command received by the device is not a Byte Write Command, the effect of the bit masking function will be aborted, and the I²C Byte Write Mask Register will be reset with no effect. Figure 134 shows an example of this function.

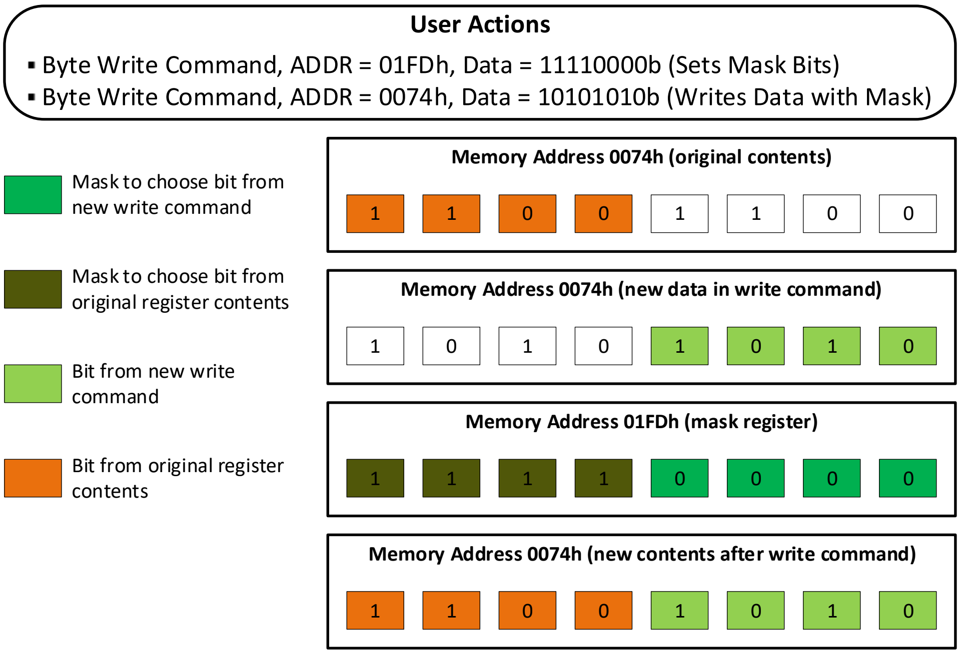


Figure 134. Example of I²C Byte Write Bit Masking

20. Analog Temperature Sensor

The SLG46880-E has an Analog Temperature sensor (TS) with an output voltage linearly-proportional to the Centigrade temperature. The TS cell shares buffer with $V_{REF}0$, so it is impossible to use both cells simultaneously, its output can be connected directly to the GPIO9 or to the ACPM3_L positive input. Using buffer causes low output impedance, linear output, and makes interfacing to readout or control circuitry especially easy. The TS is rated to operate over a -40 °C to +125 °C temperature range. The error in the whole temperature range does not exceed ±3.6 %. TS output voltage variation over V_{DD} at constant temperature is less than ±1 %. For more detail refer to section 3 Specifications.

The equation below calculates the typical analog voltage passed from the TS to the ACMPs' IN+ source input. It is important to note that there will be a chip-to-chip variation of about ±2 °C.

$$V_{TS1} = -2.3 \times T_J + 905.0$$

$$V_{TS2} = -2.8 \times T_J + 1093.4$$

where:

V_{TS1}: TS Output Voltage in mV, range 1

V_{TS2}: TS Output Voltage in mV, range 2

T_J: Junction temperature in °C.

Temperature hysteresis can be setup by enabling the GreenPAK's internal ACMP hysteresis.

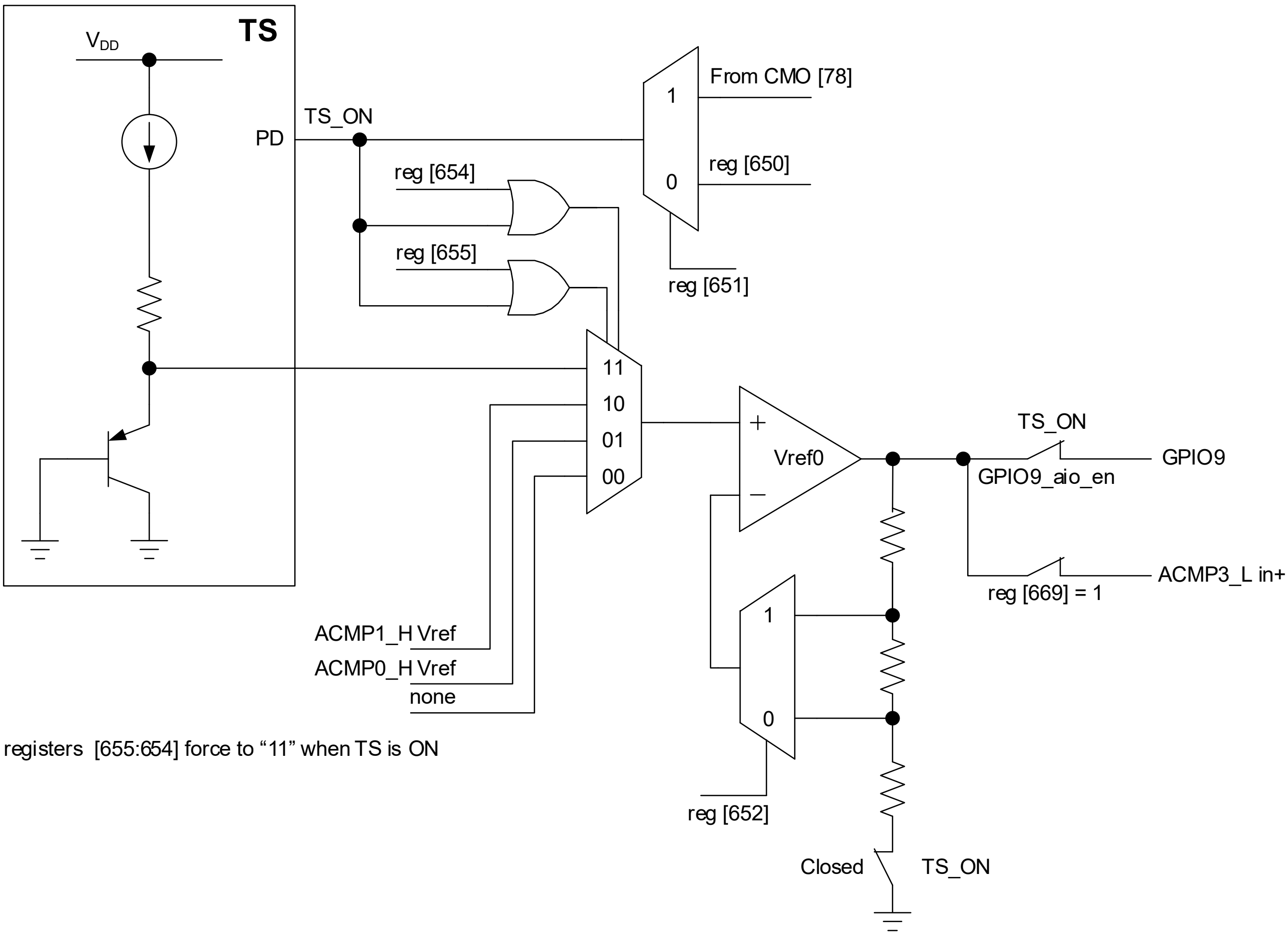


Figure 135. Analog Temperature Sensor Structure Diagram

Note that the Power-Down Mode is paired with Crystal OSC, see section 12.6 Crystal Oscillator. If it is enabled for Temp Sensor, it is not available for Crystal OSC and vice versa. However, it is possible to enable Power-Down Mode for Crystal OSC and Temp Sensor simultaneously.

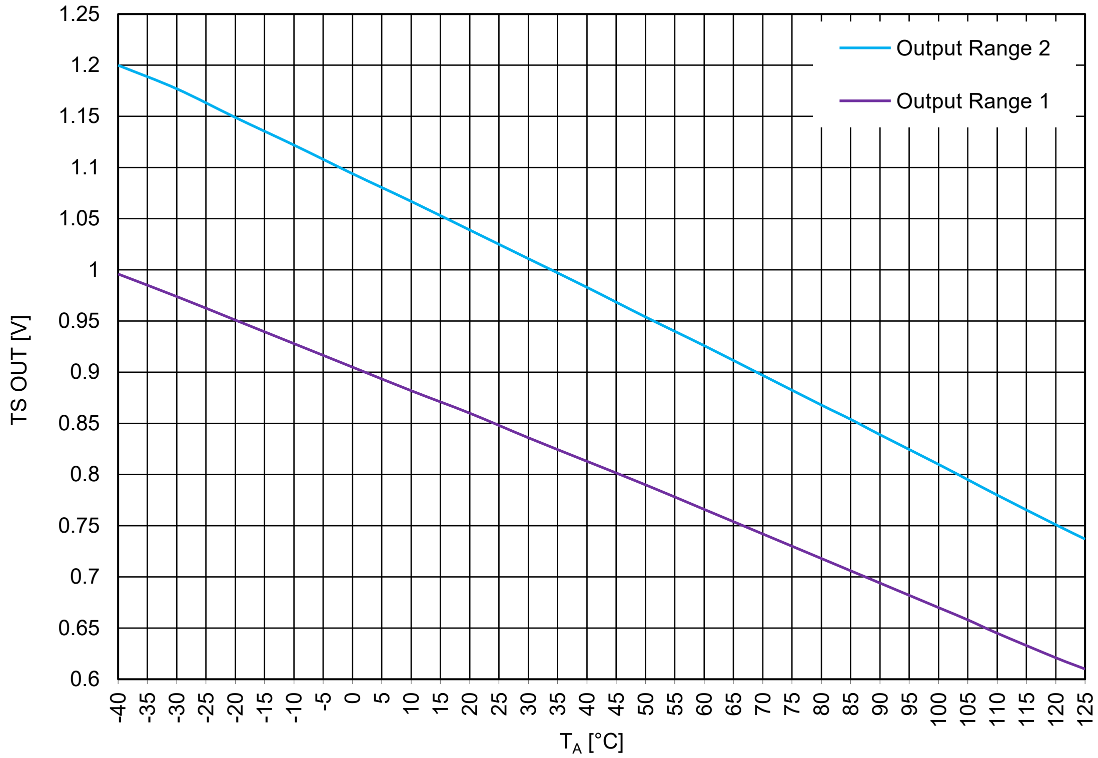


Figure 136. TS Output vs. Temperature, V_{DD} = 2.3 V to 5.5 V

21. Registers

21.1 Register Map

Table 40. Register Map

Address		Bit Name	Bit Description
Byte	Bit		
0	0	OUT0: IN0 of 2-bit LUT0 or Clock Input of DFF0	
	1		
	2		
	3		
	4		
	5		
	6	OUT1: IN1 of 2-bit LUT0 or Data Input of DFF0	
	7		
1	8		
	9		
	10		
	11		
	12	OUT2: IN0 of 2-bit LUT1 or Clock Input of PGen	
	13		
	14		
	15		
2	16		
	17		
	18	OUT3: IN1 of 2-bit LUT1 or nRST of PGen	
	19		
	20		
	21		
	22		
	23		
3	24	OUT4: IN0 of 3-bit LUT0 or Clock Input of DFF1	
	25		
	26		
	27		
	28		
	29		

Address		Bit Name	Bit Description
Byte	Bit		
3	30	OUT5: IN1 of 3-bit LUT0 or Data Input of DFF1	
	31		
4	32		
	33		
	34		
	35		
	36	OUT6: IN2 of 3-bit LUT0 or nRST (nSET) of DFF1	
	37		
	38		
	39		
5	40		
	41		
	42	OUT7: IN0 of 3-bit LUT1 or Clock Input of DFF2	
	43		
	44		
	45		
	46		
	47		
6	48	OUT8: IN1 of 3-bit LUT1 or Data Input of DFF2	
	49		
	50		
	51		
	52		
	53		
	54	OUT9: IN2 of 3-bit LUT1 or nRST (nSET) of DFF2	
	55		
7	56		
	57		
	58		
	59		

Address		Bit Name	Bit Description
Byte	Bit		
7	60	OUT10: IN0 of 3-bit LUT2 or Clock Input of DFF3	
	61		
	62		
	63		
8	64		
	65		
	66	OUT11: IN1 of 3-bit LUT2 or Data Input of DFF3	
	67		
	68		
	69		
	70		
	71		
9	72	OUT12: IN2 of 3-bit LUT2 or nRST (nSET) of DFF3	
	73		
	74		
	75		
	76		
	77		
	78	OUT13: IN0 of 3-bit LUT3 or Clock Input of DFF4	
	79		
A	80		
	81		
	82		
	83		
	84	OUT14: IN1 of 3-bit LUT3 or Data Input of DFF4	
	85		
	86		
	87		
B	88		
	89		

Address		Bit Name	Bit Description
Byte	Bit		
B	90	OUT15: IN2 of 3-bit LUT3 or nRST (nSET) of DFF4	
	91		
	92		
	93		
	94		
	95		
C	96	OUT16: IN0 of 3-bit LUT4 or Delay1 Input (or Counter1 nRST Input)	
	97		
	98		
	99		
	100		
	101		
	102	OUT17: IN1 of 3-bit LUT4 or External Clock1 Input of Delay1 (or Counter1)	
	103		
D	104		
	105		
	106		
	107		
	108	OUT18: IN2 of 3-bit LUT4	
	109		
	110		
	111		
E	112		
	113		
	114	OUT19: IN0 of 3-bit LUT5 or Delay2 Input (or Counter2 nRST Input)	
	115		
	116		
	117		
	118		
	119		

Address		Bit Name	Bit Description
Byte	Bit		
F	120	OUT20: IN1 of 3-bit LUT5 or External Clock1 Input of Delay2 (or Counter2)	
	121		
	122		
	123		
	124		
	125		
	126	OUT21: IN2 of 3-bit LUT5	
	127		
10	128		
	129		
	130		
	131		
	132	OUT22: IN0 of 3-bit LUT6 or Delay3 Input (or Counter3 nRST Input)	
	133		
	134		
	135		
11	136		
	137		
	138	OUT23: IN1 of 3-bit LUT6 or External Clock1 Input of Delay3 (or Counter3)	
	139		
	140		
	141		
	142		
	143		
12	144	OUT24: IN2 of 3-bit LUT6	
	145		
	146		
	147		
	148		
	149		

Address		Bit Name	Bit Description
Byte	Bit		
12	150	OUT25: IN0 of 3-bit LUT7 or Delay4 Input (or Counter4 nRST Input)	
	151		
13	152		
	153		
	154		
	155		
	156	OUT26: IN1 of 3-bit LUT7 or External Clock1 Input of Delay4 (or Counter4)	
	157		
	158		
	159		
14	160		
	161		
	162	OUT27: IN2 of 3-bit LUT7	
	163		
	164		
	165		
	166		
	167		
15	168	OUT28: IN0 of 3-bit LUT8 or Input of Pipe Delay or UP signal of Ripple CNT	
	169		
	170		
	171		
	172		
	173		
	174	OUT29: IN1 of 3-bit LUT8 or nRST of Pipe Delay or nSET of Ripple CNT	
	175		
16	176		
	177		
	178		
	179		

Address Byte	Address Bit	Bit Name	Bit Description
16	180	OUT30: IN2 of 3-bit LUT8 or Clock of Pipe Delay_Ripple CNT	
	181		
	182		
	183		
17	184		
	185		
	186	OUT31: IN0 of 4-bit LUT0 or Delay0 Input (or Counter0 nRST Input)	
	187		
	188		
	189		
	190		
	191		
18	192	OUT32: IN1 of 4-bit LUT0 or External Clock Input of Delay0 (or Counter0)	
	193		
	194		
	195		
	196		
	197		
	198	OUT33: IN2 of 4-bit LUT0 or UP Input of FSM0	
	199		
19	200		
	201		
	202		
	203		
	204	OUT34: IN3 of 4-bit LUT0 or KEEP Input of FSM0	
	205		
	206		
	207		
1A	208		
	209		

Address		Bit Name	Bit Description
Byte	Bit		
1A	210	OUT35: PWR UP of ACMP0_H	
	211		
	212		
	213		
	214		
	215		
1B	216	OUT36: PWR UP of ACMP1_H	
	217		
	218		
	219		
	220		
	221		
	222	OUT37: PWR UP of ACMP2_L	
	223		
1C	224		
	225		
	226		
	227		
	228	OUT38: PWR UP of ACMP3_L	
	229		
	230		
	231		
1D	232		
	233		
	234	OUT39: GPO7 DOUT	
	235		
	236		
	237		
	238		
	239		

Address		Bit Name	Bit Description
Byte	Bit		
1E	240	OUT40: GPO0 DOUT	
	241		
	242		
	243		
	244		
	245		
	246	OUT41: GPIO0 DOUT	
	247		
1F	248		
	249		
	250		
	251		
	252	OUT42: GPIO0 DOUT OE	
	253		
	254		
	255		
20	256		
	257		
	258	OUT43: GPIO1 DOUT	
	259		
	260		
	261		
	262		
	263		
21	264	OUT44:GPIO1 DOUT OE	
	265		
	266		
	267		
	268		
	269		

Address		Bit Name	Bit Description
Byte	Bit		
21	270	OUT45: GPIO2 DOUT	
	271		
22	272		
	273		
	274		
	275		
	276	OUT46: GPIO2 DOUT OE	
	277		
	278		
	279		
23	280		
	281		
	282	OUT47: GPIO3 DOUT	
	283		
	284		
	285		
	286		
	287		
24	288	OUT48: GPIO3 DOUT OE	
	289		
	290		
	291		
	292		
	293		
	294	OUT49: GPIO4 DOUT	
	295		
25	296		
	297		
	298		
	299		

Address		Bit Name	Bit Description
Byte	Bit		
25	300	OUT50: GPIO4 DOUT OE	
	301		
	302		
	303		
26	304		
	305		
	306	OUT51: GPIO5 DOUT	
	307		
	308		
	309		
	310		
	311		
27	312	OUT52: GPIO5 DOUT OE	
	313		
	314		
	315		
	316		
	317		
	318	OUT53: GPO1 DOUT	
	319		
28	320		
	321		
	322		
	323		
	324	OUT54: GPO2 DOUT	
	325		
	326		
	327		
29	328		
	329		

Address		Bit Name	Bit Description
Byte	Bit		
29	330	OUT55: GPO3 DOUT	
	331		
	332		
	333		
	334		
	335		
2A	336	OUT56: GPO4 DOUT	
	337		
	338		
	339		
	340		
	341		
	342	OUT57: GPIO6 DOUT OE	
	343		
2B	344		
	345		
	346		
	347		
	348	OUT58: GPIO6 DOUT	
	349		
	350		
	351		
2C	352		
	353		
	354	OUT59: GPIO7 DOUT	
	355		
	356		
	357		
	358		
	359		

Address		Bit Name	Bit Description
Byte	Bit		
2D	360	OUT60: GPIO7 DOUT OE	
	361		
	362		
	363		
	364		
	365		
	366	OUT61: GPIO8 DOUT OE	
	367		
2E	368		
	369		
	370		
	371		
	372	OUT62: GPIO8 DOUT	
	373		
	374		
	375		
2F	376		
	377		
	378	OUT63: GPIO9 DOUT OE	
	379		
	380		
	381		
	382		
	383		
30	384	OUT64: GPIO9 DOUT	
	385		
	386		
	387		
	388		
	389		

Address		Bit Name	Bit Description
Byte	Bit		
30	390	OUT65: GPIO10 DOUT OE	
	391		
31	392		
	393		
	394		
	395		
	396	OUT66: GPIO10 DOUT	
	397		
	398		
	399		
32	400		
	401		
	402	OUT67: GPIO1 DOUT OE	
	403		
	404		
	405		
	406		
	407		
33	408	OUT68: GPIO11 DOUT	
	409		
	410		
	411		
	412		
	413		
	414	OUT69: GPO5 DOUT	
	415		
34	416		
	417		
	418		
	419		

Address Byte	Address Bit	Bit Name	Bit Description
34	420	OUT70: GPO6 DOUT	
	421		
	422		
	423		
35	424		
	425		
	426	OUT71: ASM nRESET	
	427		
	428		
	429		
	430		
	431		
36	432	OUT72: OSC0 ENABLE	
	433		
	434		
	435		
	436		
	437		
	438	OUT73: OSC1 ENABLE	
	439		
37	440		
	441		
	442		
	443		
	444	OUT74: OSC2 ENABLE	
	445		
	446		
	447		
38	448		
	449		

Address		Bit Name	Bit Description
Byte	Bit		
38	450	OUT75: Filter/Edge detect input	
	451		
	452		
	453		
	454		
	455		
39	456	OUT76: F1 interrupt	
	457		
	458		
	459		
	460		
	461		
	462	OUT77: Programmable delay/edge detect input	
	463		
3A	464		
	465		
	466		
	467		
	468	OUT78: Temp sensor/Crystal OSC/V_{REF} Out_0/V_{REF} Out_1 Power Up	
	469		
	470		
	471		
3B	472		
	473		
	474	OUT79: GPI LATCH enable	
	475		
	476		
	477		
	478		
	479		

Address		Bit Name	Bit Description
Byte	Bit		
3C	480	OUT80: GPIO LATCH enable	
	481		
	482		
	483		
	484		
	485		
	486	OUT81: BG Power-down	
	487		
3D	488		
	489		
	490		
	491		
	492	OUT82: DM EXT CLK0	
	493		
	494		
	495		
3E	496		
	497		
	498	OUT83: DM EXT CLK1	
	499		
	500		
	501		
	502		
	503		
3F	504	OSC1 turn On by register	when matrix output enable/pd control signal = 0: 0: auto On by delay cells 1: always On
	505	OSC1 matrix Power-down or On select	0: matrix Down, and register [504] should set to 1 1: matrix On, and register [504] should set to 0
	506	External clock source enable	0: internal OSC1 1: external clock from GPI1
	507	Post divider ratio control	00: div 1 01: div 2 10: div 4 11: div 8
	508		

Address		Bit Name	Bit Description
Byte	Bit		
3F	509	Matrix divider ratio control	000: /1 001: /2 010: /4 011: /3 100: /8 101: /12 110: /24 111: /64
	510		
	511		
40	512	Matrix OUT enable	0: disable 1: enable
	513	Reserved	
	514	Reserved	
	515	Reserved	
	516	OSC2 turn On by register	when matrix output enable/pd control signal = 0: 0: auto On by delay cells 1: always On
	517	Matrix Power-down or On select	0: matrix Down 1: matrix On
	518	External clock source enable	0: internal OSC2 1: external clock from GPI0
	519	Matrix OUT enable	0: disable 1: enable
41	520	Post divider ratio control	00: div 1 01: div 2 10: div 4 11: div 8
	521		
	522	Matrix divider ratio control	000: /1 001: /2 010: /4 011: /3 100: /8 101: /12 110: /24 111: /64
	523		
	524		
	525	100 ns Startup Delay	0: enable 1: disable
	526	OSC0 turn On by register	when matrix output enable/pd control signal = 0: 0: auto On by delay cells 1: always On
	527	Matrix Power-down or On select	0: matrix Down 1: matrix On
42	528	External clock source enable	0: internal OSC0 1: external clock from PIN30

Address		Bit Name	Bit Description
Byte	Bit		
42	529	Matrix OUT enable	0: disable 1: enable
	530	Post divider ratio control	00: div 1 01: div 2 10: div 4 11: div 8
	531		
	532	Matrix divider ratio control	000: /1 001: /2 010: /4 011: /3 100: /8 101: /12 110: /24 111: /64
	533		
	534		
	535	Reserved	
43	536	GPI0 Digital Input 100 ns debounce enable	0: disable 1: enable
	537	GPI1 Digital Input 100 ns debounce enable	0: disable 1: enable
	538	GPI5 Digital Input 100 ns debounce enable	0: disable 1: enable
	539	GPI6 Digital Input 100 ns debounce enable	0: disable 1: enable
	540	Filter or Edge Detector selection	Filter or Edge Detector Select 0: filter 1: edge det
	541	Output Polarity Select	0: Filter/edge detect output 1: Filter/edge detect output inverted
	542	Select the edge mode	00: Rising Edges Det 01: Falling Edge Det 10: Both Edge Det 11: Both Edge dly
	543		
44	544	LUT value or Pipe Delay OUT sel or nSET/END value	[7:4]: 3-bit LUT8 [7:4]/REG_S1[3:0] Pipe Delay OUT1 sel [3:0]: 3-bit LUT8 [3:0]/REG_S0[3:0] Pipe Delay OUT0 sel at Ripple CNT mode: bit[546:544] is the nSET value bit[549:547] is the END value bit [550] is the range control: 0: full cycle, 1: ranged cycle bit [551] Not used
	545		
	546		
	547		
	548		
	549		
	550		
	551		
45	552	Pipe Delay OUT1 Polarity Select	0: Non-inverted 1: Inverted

Address		Bit Name	Bit Description
Byte	Bit		
45	553	3-bit LUT8 or Pipe Delay Select	0: 3-bit LUT8 1: Pipe Delay or Ripple CNT
	554	PIPE_Ripple_CNT_S	0: Pipe delay mode selection 1: Ripple Counter mode selection
	555	Reserved	
	556	Select the Edge Mode of Programmable Delay and Edge Detector	00: Rising Edge Detector 01: Falling Edge Detector 10: Both Edge Detector 11: Both Edge Delay
	557		
	558	Delay Value Select for Programmable Delay and Edge Detector	00: 125 ns 01: 250 ns 10: 375 ns 11: 500 ns
	559		
46	560	2-bit LUT0/DFF0 setting	[3]: 2-bit LUT0 [3]/DFF0 or LATCH Select 0: DFF function 1: LATCH function [2]: 2-bit LUT0 [2]/DFF0 Output Select 0: Q output 1: QB output [1]: 2-bit LUT0 [1]/DFF0 Initial Polarity Select 0: LOW 1: HIGH [0]: 2-bit LUT0 [0]
	561		
	562		
	563		
	564	LUT2_1_VAL or PGen_data	2-bit LUT1[3:0] or PGen 4bit counter data[3:0]
	565		
	566		
	567		

Address		Bit Name	Bit Description
Byte	Bit		
47	568	PGen data	PGen Data[15:0]
	569		
	570		
	571		
	572		
	573		
	574		
	575		
48	576		
	577		
	578		
	579		
	580		
	581		
	582		
	583		
49	584	3-bit LUT0/DFF1 setting	[7]: 3-bit LUT0 [7]/DFF1 or LATCH Select 0: DFF function 1: LATCH function [6]: 3-bit LUT0 [6]/DFF1 Output Select 0: Q output 1: QB output [5]: 3-bit LUT0 [5]/DFF1 0: nRST from Matrix Output 1: nSET from Matrix Output [4]: 3-bit LUT0 [4]/DFF1 Initial Polarity Select 0: LOW, 1: HIGH [3:0]: 3-bit LUT0 [3:0]
	585		
	586		
	587		
	588		
	589		
	590		
	591		
4A	592	3-bit LUT1/DFF2 setting	[7]: 3-bit LUT1 [7]/DFF2 or LATCH Select 0: DFF function 1: LATCH function [6]: 3-bit LUT1 [6]/DFF2 Output Select 0: Q output 1: QB output [5]: 3-bit LUT1 [5]/DFF2 0: nRST from Matrix Output 1: nSET from Matrix Output [4]: 3-bit LUT1 [4]/DFF2 Initial Polarity Select 0: LOW 1: HIGH [3:0]: 3-bit LUT1 [3:0]
	593		
	594		
	595		
	596		
	597		
	598		
	599		

Address		Bit Name	Bit Description
Byte	Bit		
4B	600	3-bit LUT2/DFF3 setting	[7]: 3-bit LUT2 [7]/DFF3 or LATCH Select 0: DFF function, 1: LATCH function [6]: 3-bit LUT2 [6]/DFF3 Output Select 0: Q output 1: QB output [5]: 3-bit LUT2 [5]/DFF3 0: nRST from Matrix Output 1: nSET from Matrix Output [4]: 3-bit LUT2 [4]/DFF3 Initial Polarity Select 0: LOW 1: HIGH [3:0]: 3-bit LUT2 [3:0]
	601		
	602		
	603		
	604		
	605		
	606		
	607		
4C	608	3-bit LUT3/DFF4 setting	[7]: 3-bit LUT3 [7]/DFF4 or LATCH Select 0: DFF function 1: LATCH function [6]: 3-bit LUT3 [6]/DFF4 Output Select 0: Q output 1: QB output [5]: 3-bit LUT3 [5]/DFF4 0: nRST from Matrix Output 1: nSET from Matrix Output [4]: 3-bit LUT3 [4]/DFF4 Initial Polarity Select 0: LOW 1: HIGH [3:0]: 3-bit LUT3 [3:0]
	609		
	610		
	611		
	612		
	613		
	614		
	615		
4D	616	2-bit LUT0 or DFF0 Select	0: 2-bit LUT0 1: DFF0
	617	2-bit LUT1 or PGen Select	0: 2-bit LUT1 1: PGen
	618	3-bit LUT0 or DFF1 Select	0: 3-bit LUT0 1: DFF1
	619	DFF1_SECONDQ_Sel	0: Q of first DFF 1: Q of second DFF
	620	3-bit LUT1 or DFF2 Select	0: 3-bit LUT1 1: DFF2
	621	3-bit LUT2 or DFF3 Select	0: 3-bit LUT2 1: DFF3
	622	3-bit LUT3 or DFF4 Select	0: 3-bit LUT3 1: DFF4
	623	Reserved	
4E	624	BG CHOP OFF	0: CHOP enable 1: chopper Off
	625	BG Chopper clock test enable	1: enable
	626	Bandgap internal voltage output to Pin enable	1: enable

Address		Bit Name	Bit Description
Byte	Bit		
4E	627	ACMP0_H hysteresis	00: 0 mV 01: 32 mV 10: 64 mV 11: 192 mV
	628		
	629	Reserved	
	630	ACMP0_H input buffer enable	1: enable
	631	Reserved	
4F	632	ACMP0_H input tie to V_{DD} enable	1: enable
	633	ACMP1_H positive input come from ACMP0_H's input mux output enable	1: enable
	634	Reserved	
	635	ACMP1_H hysteresis	00: 0 mV 01: 32 mV 10: 64 mV 11: 192 mV
	636		
	637	ACMP1_H input buffer enable	0: disable 1: enable
	638	Reserved	
	639	ACMP2_L positive input come from ACMP0_H's input mux output enable	1: enable
50	640	ACMP2_L positive input come from ACMP1_H's input mux output enable	1: enable
	641	ACMP2_L hysteresis	00: 0 mV 01: 32 mV 10: 64 mV 11: 192 mV
	642		
	643	Reserved	
	644	Reserved	
	645	ACMP3_L hysteresis	00: 0 mV 01: 32 mV 10: 64 mV 11: 192 mV
	646		
	647	Reserved	
51	648	Reserved	
	649	ACMP3_L positive input come from ACMP2_L's input mux output enable	1: enable
	650	Temp sensor register pd control	0: Power-down 1: Power-On
	651	Temp sensor register pd select	0: from register 1: from matrix
	652	Temp sensor range select	0: range 1 (0.62 V ~ 0.99 V (typ)) 1: range 2 (0.75 V ~ 1.2 V (typ))

Address		Bit Name	Bit Description
Byte	Bit		
51	653	V_{REF}0 output OP	0: disable 1: enable
	654	V_{REF}0 input selection	00: None 01: ACMP0_H V_{REF} 10: ACMP1_H V_{REF} 11: temp sensor
	655		
52	656	V_{REF}1 output OP	0: disable 1: enable
	657	V_{REF}1 input selection	00: None 01: ACMP2_L V_{REF} 10: ACMP3_L V_{REF}
	658		
	659	Reserved	
	660	Reserved	
	661	Reserved	
	662	Reserved	
	663	ACMP0_H Wake/Sleep enable	1: enable
53	664	ACMP1_H Wake/Sleep enable	1: enable
	665	ACMP Wake/Sleep time selection	0: short time 1: normal w/s
	666	ACMP0_H 100uA current source enable	1: enable
	667	Reserved	
	668	Reserved	0: VBG 1: V_{REF} normal 2.048 output
	669	ACMP3_L input come from Temp sensor output enable	1: enable
	670	IO fast Pull-up/down enable	0: disable 1: enable
	671	8 GPO outputs skew enable	0: disable 1: enable
54	672	GPO7 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	673		
	674	GPO7 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	675		
	676	GPO7 Pull-up/down selection	0: Pull-down 1: Pull-up
	677	GPO7 digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[0])
	678	GPO7 output enable	0: disable 1: enable

Address Byte	Address Bit	Bit Name	Bit Description
54	679	GPO0 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
55	680		
	681	GPO0 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	682		
	683	GPO0 Pull-up/down selection	0: Pull-down 1: Pull-up
	684	GPO0 digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[1])
	685	GPO0 output enable	0: disable 1: enable
	686	Reserved	
	687	GPIO0 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
56	688		
	689	GPIO0 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	690		
	691	GPIO0 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	692		
	693	GPIO0 Pull-up/down selection	0: Pull-down 1: Pull-up
	694	Reserved	
	695	Reserved	
57	696	GPIO1 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	697		
	698	GPIO1 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	699		
	700	GPIO1 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	701		

Address		Bit Name	Bit Description
Byte	Bit		
57	702	GPIO1 Pull-up/down selection	0: Pull-down 1: Pull-up
	703	Reserved	
58	704	Reserved	
	705 706	GPIO2 digital input LATCH configuration	00: without LATCH 01: normal LATCH 10: input data 0 LATCH (when LATCH_en is HIGH) 11: input data 1 LATCH (when LATCH_en is HIGH)
	707 708	GPIO2 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	709 710	GPIO2 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
58 / 59	711 712	GPIO2 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
59	713	GPIO2 Pull-up/down selection	0: Pull-down 1: Pull-up
	714 715	GPI0 digital input LATCH configuration	00: without LATCH 01: normal LATCH 10: input data 0 LATCH (when LATCH_en is HIGH) 11: input data 1 LATCH (when LATCH_en is HIGH)
	716 717	GPI0 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	718 719	GPI0 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M

Address		Bit Name	Bit Description
Byte	Bit		
5A	720	GPI0 Pull-up/down selection	0: Pull-down 1: Pull-up
	721	Reserved	
	722 723	GPI1 digital input LATCH configuration	00: without LATCH 01: normal LATCH 10: input data 0 LATCH (when LATCH_en is HIGH) 11: input data 1 LATCH (when LATCH_en is HIGH)
	724 725	GPI1 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	726 727	GPI1 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
5B	728	GPI1 Pull-up/down selection	0: Pull-down 1: Pull-up
	729	Reserved	
	730 731	GPI2/SDA input mode configuration	00: digital in without Schmitt Trigger 01: digital in with Schmitt Trigger (when register [4084] = 1) 10: low voltage digital in 11: Reserved
	732 733	GPI2/SDA Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	734	GPI2/SDA Pull-up/down selection	0: Pull-down 1: Pull-up
	735	Reserved	
5C	736 737	GPI3/SCL input mode configuration	00: digital in without Schmitt Trigger 01: digital in with Schmitt Trigger (when register [4084] = 1) 10: low voltage digital in 11: Reserved
	738 739	GPI3/SCL Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	740	GPI3/SCL Pull-up/down selection	0: Pull-down 1: Pull-up
	741	Reserved	

Address		Bit Name	Bit Description
Byte	Bit		
5C	742	GPIO3 digital input LATCH configuration	00: without LATCH 01: normal LATCH 10: input data 0 LATCH (when LATCH_en is HIGH) 11: input data 1 LATCH (when LATCH_en is HIGH)
	743		
5D	744	GPIO3 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	745		
	746	GPIO3 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	747		
	748	GPIO3 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	749		
	750	GPIO3 Pull-up/down selection	0: Pull-down 1: Pull-up
	751	Reserved	
5E	752	Reserved	
	753	GPIO4 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	754		
	755	GPIO4 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	756		
	757	GPIO4 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	758		
	759	GPIO4Pull-up/down selection	0: Pull-down 1: Pull-up

Address		Bit Name	Bit Description
Byte	Bit		
5F	760	Reserved	
	761 762	GPIO5 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	763 764	GPIO5 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	765 766	GPIO5 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	767	GPIO5 Pull-up/down selection	0: Pull-down 1: Pull-up
60	768 769	GPO1output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	770 771	GPO1 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	772	GPO1 Pull-up/down selection	0: Pull-down 1: Pull-up
	773	GPO1 digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[2])
	774	GPO1 output enable	0: disable 1: enable
60 / 61	775 776	GPO2 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
61	777 778	GPO2 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	779	GPO2 Pull-up/down selection	0: Pull-down 1: Pull-up
	780	GPO2 digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[3])
	781	GPO2 output enable	0: disable 1: enable

Address		Bit Name	Bit Description
Byte	Bit		
61	782	GPO3 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	783		
62	784	GPO3 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	785		
	786	GPO3 Pull-up/down selection	0: Pull-down 1: Pull-up
	787	GPO3 digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[4])
	788	GPO3 output enable	0: disable 1: enable
	789	GPO4 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	790		
	791	GPO4 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
63	792		
	793	GPO4 Pull-up/down selection	0: Pull-down 1: Pull-up
	794	GPO4 digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[5])
	795	GPO4 output enable	0: disable 1: enable
	796	Reserved	
	797	GPIO6 digital input LATCH configuration	00: without LATCH 01: normal LATCH 10: input data 0 LATCH (when LATCH_en is HIGH) 11: input data 1 LATCH (when LATCH_en is HIGH)
	798		
	799	GPIO6 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
64	800		
	801	GPIO6 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	802		

Address		Bit Name	Bit Description
Byte	Bit		
64	803	GPIO6 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	804		
	805	GPIO6 Pull-up/down selection	0: Pull-down 1: Pull-up
	806	Reserved	
	807	Reserved	
65	808	GPIO7 digital input LATCH configuration	00: without LATCH 01: normal LATCH 10: input data 0 LATCH (when LATCH_en is HIGH) 11: input data 1 LATCH (when LATCH_en is HIGH)
	809		
	810	GPIO7 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	811		
	812	GPIO7 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	813		
	814	GPIO7 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
	815		
66	816	GPIO7 Pull-up/down selection	0: Pull-down 1: Pull-up
	817	Reserved	
	818	Reserved	
	819	GPIO8 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	820		
	821	GPIO8 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
	822		
	823	GPIO8 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
67	824		

Address		Bit Name	Bit Description
Byte	Bit		
67	825	GPIO8 Pull-up/down selection	0: Pull-down 1: Pull-up
	826	Reserved	
	827 828	GPI4 digital input LATCH configuration	00: without LATCH 01: normal LATCH 10: input data 0 LATCH (when LATCH_en is HIGH) 11: input data 1 LATCH (when LATCH_en is HIGH)
	829 830	GPI4 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
67 68	831 832	GPI4 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
68	833	GPI4 Pull-up/down selection	0: Pull-down 1: Pull-up
	834	Reserved	
	835 836	GPI5 digital input LATCH configuration	00: without LATCH 01: normal LATCH 10: input data 0 LATCH (when LATCH_en is HIGH) 11: input data 1 LATCH (when LATCH_en is HIGH)
	837 838	GPI5 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
68 69	839 840	GPI5 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
69	841	GPI5 Pull-up/down selection	0: Pull-down 1: Pull-up
	842	Reserved	
	843 844	GPI6 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
	845 846	GPI6 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M

Address		Bit Name	Bit Description
Byte	Bit		
69	847	GPI6 Pull-up/down selection	0: Pull-down 1: Pull-up
6A	848	Reserved	
6A	849 850	GPI7 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
6A	851 852	GPI7 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
6A	853	GPI7 Pull-up/down selection	0: Pull-down 1: Pull-up
6A	854	Reserved	
6A / 6B	855 856	GPIO9 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
6B	857 858	GPIO9 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
6B	859 860	GPIO9 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
6B	861	GPIO9 Pull-up/down selection	0: Pull-down 1: Pull-up
6B	862	Reserved	
6B / 6C	863 864	GPIO10 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
6C	865 866	GPIO10 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
6C	867 868	GPIO10 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
6C	869	GPIO10 Pull-up/down selection	0: Pull-down 1: Pull-up

Address		Bit Name	Bit Description
Byte	Bit		
6C	870	Reserved	
6C	871	GPIO11 input mode configuration	00: digital without Schmitt Trigger 01: digital with Schmitt Trigger 10: low voltage digital in 11: analog IO
6D	872		
6D	873	GPIO11 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
6D	874		
6D	875	GPIO11 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
6D	876		
6D	877	GPIO11 Pull-up/down selection	0: Pull-down 1: Pull-up
6D	878	Reserved	
6D	879	GPO5 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
6E	880		
6E	881	GPO5 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
6E	882		
6E	883	GPO5 Pull-up/down selection	0: Pull-down 1: Pull-up
6E	884	GPO5 digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[6])
6E	885	GPO5 output enable	0: disable 1: enable
6E	886	GPO6 output mode configuration	00: Push-pull 1x 01: Push-pull 2x 10: 1x Open-drain 11: 2x Open-drain
6E	887		
6F	888	GPO6 Pull-up/down resistance selection	00: floating 01: 10 k 10: 100 k 11: 1 M
6F	889		
6F	890	GPO6 Pull-up/down selection	0: Pull-down 1: Pull-up
6F	891	GPO6 digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[7])

Address		Bit Name	Bit Description
Byte	Bit		
6F	892	GPO6 output enable	0: disable 1: enable
	893	I²C mode selection	0: I²C fast mode + 1: I²C standard/fast mode
	894	XTAL Enable and Matrix IN [51] source MUX select	1: xtal enable is controlled by Matrix OUT [78] and Matrix IN [51] source is from Xtal OSC 0: xtal is powered Down and Matrix IN [51] source is from GPI4
	895	XTAL matrix Enable signal gating	0: matrix enable signal (Matrix OUT [78]) is gated and xtal is controlled by register [894] 1: matrix enable signal is effective if register [894] = 1 (Matrix OUT [78] = 0 → off, Matrix OUT [78] = 1 → on)
70	896	DLY/CNT0 Mode Selection	00: DLY 01: one shot 10: frequency det 11: cnt register [913] = 0
	897		
	898	DLY/CNT0 edge Mode Selection	00: both edge 01: falling edge 10: rising edge 11: HIGH Level Reset (only in CNT mode)
	899		
	900	DLY/CNT0 Clock Source Select	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT4_END 1110: External 1111: Not used
	901		
	902		
	903		
71	904	FSM0 SET/RST Selection	0: Reset to 0 1: Set to data
	905	CNT0 output pol selection	0: Default Output 1: Inverted Output
	906	CNT0 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	907		

Address		Bit Name	Bit Description
Byte	**Bit**		
71	908	4-bit LUT0 or DLY/CNT0 selection	0: 4-bit LUT0 1: DLY/CNT0(16bits)
	909	Wake Sleep Power-down state selection	0: (LOW) 1: (HIGH)
	910	Wake Sleep mode selection	0: Default Mode 1: Wake Sleep Mode (registers [897:896] = 11)
	911	Keep signal SYNC selection	0: bypass 1: after two DFFs
72	912	UP signal SYNC selection	0: bypass 1: after two DFFs
	913	CNT0 DLY EDET FUNCTION Selection	0: normal 1: DLY function edge detection (registers [897:896] = 00)
	914	CNT0 CNT mode SYNC selection	0: bypass 1: after two DFFs
	915	CNT1 CNT mode SYNC selection	0: bypass 1: after two DFFs
	916 917 918 919	DLY/CNT1 Clock Source Select	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT0_END 1110: External 1111: Not used
73	920 921	CNT1 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1

Address Byte	Address Bit	Bit Name	Bit Description
73	922 923 924 925	CNT1 function and edge mode selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	926	CNT1 output pol selection	0: Default Output 1: Inverted Output
	927	3-bit LUT4 or CNT_1 selection	0: 3-bit LUT4 1: DLY/CNT1 (8bits)
74	928	CNT2 CNT mode SYNC selection	0: bypass; 1: after two DFFs
	929 930 931 932	DLY/CNT2 Clock Source Select	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT1_END 1110: External 1111: Not used
	933 934	CNT2 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1

Address		Bit Name	Bit Description
Byte	Bit		
74	935	CNT2 function and edge mode selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT register [941] = 0
75	936		
	937		
	938		
	939	CNT2 output pol selection	0: Default Output 1: Inverted Output
	940	3-bit LUT5 or CNT_2 selection	0: 3-bit LUT5 1: DLY/CNT2(8bits)
	941	CNT2 DLY EDET FUNCTION Selection	0: normal 1: DLY function edge detection (registers [938:935]=0000/0001/0010)
	942	CNT3 CNT mode SYNC selection	0: bypass 1: after two DFFs
	943	DLY/CNT3 Clock Source Select	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT2_END 1110: External 1111: Not used
76	944		
	945		
	946		

Address		Bit Name	Bit Description
Byte	Bit		
76	947	CNT3 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	948		
	949	CNT3 function and edge mode selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	950		
	951		
77	952		
	953	CNT3 output pol selection	0: Default Output 1: Inverted Output
	954	3-bit LUT6 or CNT_3 selection	0: 3-bit LUT6 1: DLY/CNT3(8bits)
	955	CNT4 CNT mode SYNC selection	0: bypass 1: after two DFFs
	956	DLY/CNT4 Clock Source Select	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT3_END 1110: External 1111: Not used
	957		
	958		
	959		
78	960	CNT4 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	961		

Address		Bit Name	Bit Description
Byte	Bit		
78	962	CNT4 function and edge mode selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	963		
	964		
	965		
	966	CNT4 output pol selection	0: Default Output 1: Inverted Output
	967	3-bit LUT7 or CNT_4 selection	0: 3-bit LUT7 1: DLY/CNT4(8bits)
79	968	REG_TEST_EN	
	969	Reserved	
	970	Reserved	
	971	Reserved	
	972	Reserved	
	973	Reserved	
	974	Reserved	
	975	Reserved	
7A	976	ASM State 0 Output Memory for 8 GPOs	Memory for GPO 0
	977		Memory for GPO 1
	978		Memory for GPO 2
	979		Memory for GPO 3
	980		Memory for GPO 4
	981		Memory for GPO 5
	982		Memory for GPO 6
	983		Memory for GPO 7

Address		Bit Name	Bit Description
Byte	Bit		
7B	984	ASM State 1 Output Memory for 8 GPOs	Memory for GPO 0
	985		Memory for GPO 1
	986		Memory for GPO 2
	987		Memory for GPO 3
	988		Memory for GPO 4
	989		Memory for GPO 5
	990		Memory for GPO 6
	991		Memory for GPO 7
7C	992	ASM State 2 Output Memory for 8 GPOs	Memory for GPO 0
	993		Memory for GPO 1
	994		Memory for GPO 2
	995		Memory for GPO 3
	996		Memory for GPO 4
	997		Memory for GPO 5
	998		Memory for GPO 6
	999		Memory for GPO 7
7D	1000	ASM State 3 Output Memory for 8 GPOs	Memory for GPO 0
	1001		Memory for GPO 1
	1002		Memory for GPO 2
	1003		Memory for GPO 3
	1004		Memory for GPO 4
	1005		Memory for GPO 5
	1006		Memory for GPO 6
	1007		Memory for GPO 7
7E	1008	ASM State 4 Output Memory for 8 GPOs	Memory for GPO 0
	1009		Memory for GPO 1
	1010		Memory for GPO 2
	1011		Memory for GPO 3
	1012		Memory for GPO 4
	1013		Memory for GPO 5
	1014		Memory for GPO 6
	1015		Memory for GPO 7

Address		Bit Name	Bit Description
Byte	Bit		
7F	1016	ASM State 5 Output Memory for 8 GPOs	Memory for GPO 0
	1017		Memory for GPO 1
	1018		Memory for GPO 2
	1019		Memory for GPO 3
	1020		Memory for GPO 4
	1021		Memory for GPO 5
	1022		Memory for GPO 6
	1023		Memory for GPO 7
80	1024	ASM State 6 Output Memory for 8 GPOs	Memory for GPO 0
	1025		Memory for GPO 1
	1026		Memory for GPO 2
	1027		Memory for GPO 3
	1028		Memory for GPO 4
	1029		Memory for GPO 5
	1030		Memory for GPO 6
	1031		Memory for GPO 7
81	1032	ASM State 7 Output Memory for 8 GPOs	Memory for GPO 0
	1033		Memory for GPO 1
	1034		Memory for GPO 2
	1035		Memory for GPO 3
	1036		Memory for GPO 4
	1037		Memory for GPO 5
	1038		Memory for GPO 6
	1039		Memory for GPO 7
82	1040	ASM State 8 Output Memory for 8 GPOs	Memory for GPO 0
	1041		Memory for GPO 1
	1042		Memory for GPO 2
	1043		Memory for GPO 3
	1044		Memory for GPO 4
	1045		Memory for GPO 5
	1046		Memory for GPO 6
	1047		Memory for GPO 7

Address		Bit Name	Bit Description
Byte	Bit		
83	1048	ASM State 9 Output Memory for 8 GPOs	Memory for GPO 0
	1049		Memory for GPO 1
	1050		Memory for GPO 2
	1051		Memory for GPO 3
	1052		Memory for GPO 4
	1053		Memory for GPO 5
	1054		Memory for GPO 6
	1055		Memory for GPO 7
84	1056	ASM State 10 Output Memory for 8 GPOs	Memory for GPO 0
	1057		Memory for GPO 1
	1058		Memory for GPO 2
	1059		Memory for GPO 3
	1060		Memory for GPO 4
	1061		Memory for GPO 5
	1062		Memory for GPO 6
	1063		Memory for GPO 7
85	1064	ASM State 11 Output Memory for 8 GPOs	Memory for GPO 0
	1065		Memory for GPO 1
	1066		Memory for GPO 2
	1067		Memory for GPO 3
	1068		Memory for GPO 4
	1069		Memory for GPO 5
	1070		Memory for GPO 6
	1071		Memory for GPO 7
86	1072	ASM State 0 Output Memory for Matrix Input	Memory for Matrix input 0
	1073		Memory for Matrix input 1
	1074		Memory for Matrix input 2
	1075		Memory for Matrix input 3
	1076	ASM State 1 Output Memory for Matrix Input	Memory for Matrix input 0
	1077		Memory for Matrix input 1
	1078		Memory for Matrix input 2
	1079		Memory for Matrix input 3

Address		Bit Name	Bit Description
Byte	Bit		
87	1080	ASM State 2 Output Memory for Matrix Input	Memory for Matrix input 0
	1081		Memory for Matrix input 1
	1082		Memory for Matrix input 2
	1083		Memory for Matrix input 3
	1084	ASM State 3 Output Memory for Matrix Input	Memory for Matrix input 0
	1085		Memory for Matrix input 1
	1086		Memory for Matrix input 2
	1087		Memory for Matrix input 3
88	1088	ASM State 4 Output Memory for Matrix Input	Memory for Matrix input 0
	1089		Memory for Matrix input 1
	1090		Memory for Matrix input 2
	1091		Memory for Matrix input 3
	1092	ASM State 5 Output Memory for Matrix Input	Memory for Matrix input 0
	1093		Memory for Matrix input 1
	1094		Memory for Matrix input 2
	1095		Memory for Matrix input 3
89	1096	ASM State 6 Output Memory for Matrix Input	Memory for Matrix input 0
	1097		Memory for Matrix input 1
	1098		Memory for Matrix input 2
	1099		Memory for Matrix input 3
	1100	ASM State 7 Output Memory for Matrix Input	Memory for Matrix input 0
	1101		Memory for Matrix input 1
	1102		Memory for Matrix input 2
	1103		Memory for Matrix input 3
8A	1104	ASM State 8 Output Memory for Matrix Input	Memory for Matrix input 0
	1105		Memory for Matrix input 1
	1106		Memory for Matrix input 2
	1107		Memory for Matrix input 3
	1108	ASM State 9 Output Memory for Matrix Input	Memory for Matrix input 0
	1109		Memory for Matrix input 1
	1110		Memory for Matrix input 2
	1111		Memory for Matrix input 3

Address Byte	Address Bit	Bit Name	Bit Description
8B	1112	ASM State 10 Output Memory for Matrix Input	Memory for Matrix input 0
	1113		Memory for Matrix input 1
	1114		Memory for Matrix input 2
	1115		Memory for Matrix input 3
	1116	ASM State 11 Output Memory for Matrix Input	Memory for Matrix input 0
	1117		Memory for Matrix input 1
	1118		Memory for Matrix input 2
	1119		Memory for Matrix input 3
8C	1120	ASM Initial State Selection	0000 → 1011: State 0 → State 11
	1121		
	1122		
	1123		
	1124	Reserved	
	1125	Reserved	
	1126	Reserved	
	1127	Reserved	
8D	1128	6Bit MATRIX_IN_Setting0	OUT0_Setting0: REG_MATRIX_IN_SEL[5:0]
	1129		
	1130		
	1131		
	1132		
	1133		
	1134	6Bit MATRIX_IN_Setting1	OUT0_Setting0: REG_MATRIX_IN_SEL[11:6]
	1135		
8E	1136		
	1137		
	1138		
	1139		
	1140	6Bit MATRIX_IN_Setting2	OUT0_Setting0: REG_MATRIX_IN_SEL[17:12]
	1141		
	1142		
	1143		
8F	1144		
	1145		

Address		Bit Name	Bit Description
Byte	Bit		
8F	1146	6Bit MATRIX_IN_Setting3	OUT0_Setting0: REG_MATRIX_IN_SEL[23:18]
	1147		
	1148		
	1149		
	1150		
	1151		
90	1152	6Bit MATRIX_IN_Setting0	OUT1_Setting0: REG_MATRIX_IN_SEL[5:0]
	1153		
	1154		
	1155		
	1156		
	1157		
	1158	6Bit MATRIX_IN_Setting1	OUT1_Setting0: REG_MATRIX_IN_SEL[11:6]
	1159		
91	1160		
	1161		
	1162		
	1163		
	1164	6Bit MATRIX_IN_Setting2	OUT1_Setting0: REG_MATRIX_IN_SEL[17:12]
	1165		
	1166		
	1167		
92	1168		
	1169		
	1170	6Bit MATRIX_IN_Setting3	OUT1_Setting0: REG_MATRIX_IN_SEL[23:18]
	1171		
	1172		
	1173		
	1174		
	1175		

Address		Bit Name	Bit Description
Byte	Bit		
93	1176	6Bit MATRIX_IN_Setting0	OUT2_Setting0: REG_MATRIX_IN_SEL[5:0]
	1177		
	1178		
	1179		
	1180		
	1181		
	1182	6Bit MATRIX_IN_Setting1	OUT2_Setting0: REG_MATRIX_IN_SEL[11:6]
	1183		
94	1184		
	1185		
	1186		
	1187		
	1188	6Bit MATRIX_IN_Setting2	OUT2_Setting0: REG_MATRIX_IN_SEL[17:12]
	1189		
	1190		
	1191		
95	1192		
	1193		
	1194	6Bit MATRIX_IN_Setting3	OUT2_Setting0: REG_MATRIX_IN_SEL[23:18]
	1195		
	1196		
	1197		
	1198		
	1199		
96	1200	State0_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1201		
	1202	State0_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1203		
	1204	State0_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1205		

Address		Bit Name	Bit Description
Byte	Bit		
96	1206 1207	State1_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
97	1208 1209	State1_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
97	1210 1211	State1_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
97	1212 1213	State2_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
97	1214 1215	State2_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
98	1216 1217	State2_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
98	1218 1219	State3_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
98	1220 1221	State3_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
98	1222 1223	State3_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
99	1224 1225	State4_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
99	1226 1227	State4_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3

Address		Bit Name	Bit Description
Byte	Bit		
99	1228	State4_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1229		
	1230	State5_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1231		
9A	1232	State5_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1233		
	1234	State5_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1235		
	1236	State6_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1237		
	1238	State6_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1239		
9B	1240	State6_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1241		
	1242	State7_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1243		
	1244	State7_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1245		
	1246	State7_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1247		

Address		Bit Name	Bit Description
Byte	Bit		
9C	1248 1249	State8_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1250 1251	State8_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1252 1253	State8_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1254 1255	State9_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
9D	1256 1257	State9_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1258 1259	State9_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1260 1261	State10_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1262 1263	State10_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
9E	1264 1265	State10_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1266 1267	State11_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1268 1269	State11_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3

Address		Bit Name	Bit Description
Byte	Bit		
9E	1270	State11_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1271		
9F	1272	ASM Input Matrix (Signal Source for State 0 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1273		
	1274		
	1275	ASM Input Matrix (Signal Source for State 0 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1276		
	1277		
	1278	ASM Input Matrix (Signal Source for State 0 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1279		
A0	1280		
	1281	ASM Input Matrix (Signal Source for State 0 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1282		
	1283		
	1284	ASM Input Matrix (Signal Source for State 0 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1285		
	1286		

Address		Bit Name	Bit Description
Byte	Bit		
A0	1287	ASM Input Matrix (Signal Source for State 0 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A1	1288		
	1289		
	1290	ASM Input Matrix (Signal Source for State 0 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1291		
	1292		
	1293	ASM Input Matrix (Signal Source for State 0 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1294		
	1295		
A2	1296	ASM Input Matrix (Signal Source for State 0 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1297		
	1298		
	1299	ASM Input Matrix (Signal Source for State 0 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1300		
	1301		
	1302	ASM Input Matrix (Signal Source for State 0 →State 10 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1303		
A3	1304		

Address		Bit Name	Bit Description
Byte	Bit		
A3	1305 1306 1307	ASM Input Matrix (Signal Source for State 0 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A3	1308	ASM Input Matrix (Signal Source for State 1 →State 10 Transition), bit [2] Note: This bit, along with registers [1343:1342], select the signal source for State 1 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A3	1309 1310 1311	ASM Input Matrix (Signal Source for State 1 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A4	1312 1313 1314	ASM Input Matrix (Signal Source for State 1 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A4	1315 1316 1317	ASM Input Matrix (Signal Source for State 1 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A4 A5	1318 1319 1320	ASM Input Matrix (Signal Source for State 1 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1

Address		Bit Name	Bit Description
Byte	Bit		
A5	1321	ASM Input Matrix (Signal Source for State 1 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1322		
	1323		
	1324	ASM Input Matrix (Signal Source for State 1 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1325		
	1326		
	1327	ASM Input Matrix (Signal Source for State 1 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A6	1328		
	1329		
	1330	ASM Input Matrix (Signal Source for State 1 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1331		
	1332		
	1333	ASM Input Matrix (Signal Source for State 1 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1334		
	1335		
A7	1336	ASM Input Matrix (Signal Source for State 1 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1337		
	1338		

Address		Bit Name	Bit Description
Byte	Bit		
A7	1339 1340 1341	ASM Input Matrix (Signal Source for State 1 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A7	1342 1343	ASM Input Matrix (Signal Source for State 1 →State 10 Transition), bits [1:0] Note: These bits, along with register [1308], select the signal source for State 1 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A8	1344 1345 1346	ASM Input Matrix (Signal Source for State 2 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A8	1347 1348 1349	ASM Input Matrix (Signal Source for State 2 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A8 / A9	1350 1351 1352	ASM Input Matrix (Signal Source for State 2 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
A9	1353 1354 1355	ASM Input Matrix (Signal Source for State 2 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1

Address		Bit Name	Bit Description
Byte	Bit		
A9	1356	ASM Input Matrix (Signal Source for State 2 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1357		
	1358		
	1359	ASM Input Matrix (Signal Source for State 2 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
AA	1360		
	1361		
	1362	ASM Input Matrix (Signal Source for State 2 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1363		
	1364		
	1365	ASM Input Matrix (Signal Source for State 2 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1366		
	1367		
AB	1368	ASM Input Matrix (Signal Source for State 2 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1369		
	1370		
	1371	ASM Input Matrix (Signal Source for State 2 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1372		
	1373		

Address		Bit Name	Bit Description
Byte	Bit		
AB	1374	ASM Input Matrix (Signal Source for State 2 →State 10 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1375		
AC	1376		
	1377	ASM Input Matrix (Signal Source for State 2 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1378		
	1379		
	1380	ASM Input Matrix (Signal Source for State 3 →State 10 Transition), bit [2] Note: This bit, along with registers [1415:1414], select the signal source for State 3 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1381	ASM Input Matrix (Signal Source for State 3 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1382		
	1383		
AD	1384	ASM Input Matrix (Signal Source for State 3 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1385		
	1386		
	1387	ASM Input Matrix (Signal Source for State 3 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1388		
	1389		

Address Byte	Address Bit	Bit Name	Bit Description
AD	1390	ASM Input Matrix (Signal Source for State 3 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
AD	1391		
AE	1392		
AE	1393	ASM Input Matrix (Signal Source for State 3 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
AE	1394		
AE	1395		
AE	1396	ASM Input Matrix (Signal Source for State 3 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
AE	1397		
AE	1398		
AE	1399	ASM Input Matrix (Signal Source for State 3 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
AF	1400		
AF	1401		
AF	1402	ASM Input Matrix (Signal Source for State 3 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
AF	1403		
AF	1404		
AF	1405	ASM Input Matrix (Signal Source for State 3 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
AF	1406		
AF	1407		

Address		Bit Name	Bit Description
Byte	Bit		
B0	1408	ASM Input Matrix (Signal Source for State 3 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1409		
	1410		
	1411	ASM Input Matrix (Signal Source for State 3 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1412		
	1413		
	1414	ASM Input Matrix (Signal Source for State 3 →State 10 Transition), bits [1:0] Note: These bits, along with registers [1380], select the signal source for State 3 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1415		
B1	1416	ASM Input Matrix (Signal Source for State 4 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1417		
	1418		
	1419	ASM Input Matrix (Signal Source for State 4 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1420		
	1421		
	1422	ASM Input Matrix (Signal Source for State 4 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1423		
B2	1424		

Address		Bit Name	Bit Description
Byte	Bit		
B2	1425	ASM Input Matrix (Signal Source for State 4 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1426		
	1427		
	1428	ASM Input Matrix (Signal Source for State 4 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1429		
	1430		
	1431	ASM Input Matrix (Signal Source for State 4 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
B3	1432		
	1433		
	1434	ASM Input Matrix (Signal Source for State 4 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1435		
	1436		
	1437	ASM Input Matrix (Signal Source for State 4 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1438		
	1439		
B4	1440	ASM Input Matrix (Signal Source for State 4 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1441		
	1442		

Address		Bit Name	Bit Description
Byte	Bit		
B4	1443	ASM Input Matrix (Signal Source for State 4 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1444		
	1445		
	1446	ASM Input Matrix (Signal Source for State 4 →State 10 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1447		
B5	1448		
	1449	ASM Input Matrix (Signal Source for State 4 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1450		
	1451		
	1452	ASM Input Matrix (Signal Source for State 5 →State 10 Transition), bit [2] Note: This bit, along with registers [1487:1486], select the signal source for State 5 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1453	ASM Input Matrix (Signal Source for State 5 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1454		
	1455		
B6	1456	ASM Input Matrix (Signal Source for State 5 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1457		
	1458		

Address		Bit Name	Bit Description
Byte	Bit		
B6	1459	ASM Input Matrix (Signal Source for State 5 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1460		
	1461		
	1462	ASM Input Matrix (Signal Source for State 5 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1463		
B7	1464		
	1465	ASM Input Matrix (Signal Source for State 5 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1466		
	1467		
	1468	ASM Input Matrix (Signal Source for State 5 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1469		
	1470		
	1471	ASM Input Matrix (Signal Source for State 5 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
B8	1472		
	1473		
	1474	ASM Input Matrix (Signal Source for State 5 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1475		
	1476		

Address		Bit Name	Bit Description
Byte	Bit		
B8	1477 1478 1479	ASM Input Matrix (Signal Source for State 5 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
B9	1480 1481 1482	ASM Input Matrix (Signal Source for State 5 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1483 1484 1485	ASM Input Matrix (Signal Source for State 5 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1486 1487	ASM Input Matrix (Signal Source for State 5 →State 10 Transition), bits [1:0] Note: These bits, along with register [1452], select the signal source for State 5 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
BA	1488 1489 1490	ASM Input Matrix (Signal Source for State 6 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1491 1492 1493	ASM Input Matrix (Signal Source for State 6 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1

Address		Bit Name	Bit Description
Byte	Bit		
BA	1494	ASM Input Matrix (Signal Source for State 6 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1495		
BB	1496		
	1497	ASM Input Matrix (Signal Source for State 6 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1498		
	1499		
	1500	ASM Input Matrix (Signal Source for State 6 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1501		
	1502		
	1503	ASM Input Matrix (Signal Source for State 6 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
BC	1504		
	1505		
	1506	ASM Input Matrix (Signal Source for State 6 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1507		
	1508		
	1509	ASM Input Matrix (Signal Source for State 6 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1510		
	1511		

Address		Bit Name	Bit Description
Byte	Bit		
BD	1512	ASM Input Matrix (Signal Source for State 6 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1513		
	1514		
	1515	ASM Input Matrix (Signal Source for State 6 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1516		
	1517		
	1518	ASM Input Matrix (Signal Source for State 6 →State 10 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1519		
BE	1520		
	1521	ASM Input Matrix (Signal Source for State 6 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1522		
	1523		
	1524	ASM Input Matrix (Signal Source for State 7 →State 10 Transition), bit [2] Note: This bit, along with registers [1559:1558], select the signal source for State 7 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1525	ASM Input Matrix (Signal Source for State 7 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1526		
	1527		

Address		Bit Name	Bit Description
Byte	Bit		
BF	1528	ASM Input Matrix (Signal Source for State 7 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1529		
	1530		
	1531	ASM Input Matrix (Signal Source for State 7 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1532		
	1533		
	1534	ASM Input Matrix (Signal Source for State 7 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1535		
C0	1536		
	1537	ASM Input Matrix (Signal Source for State 7 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1538		
	1539		
	1540	ASM Input Matrix (Signal Source for State 7 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1541		
	1542		
	1543	ASM Input Matrix (Signal Source for State 7 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
C1	1544		
	1545		

Address		Bit Name	Bit Description
Byte	Bit		
C1	1546	ASM Input Matrix (Signal Source for State 7 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1547		
	1548		
	1549	ASM Input Matrix (Signal Source for State 7 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1550		
	1551		
C2	1552	ASM Input Matrix (Signal Source for State 7 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1553		
	1554		
	1555	ASM Input Matrix (Signal Source for State 7 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1556		
	1557		
	1558	ASM Input Matrix (Signal Source for State 7 →State 10 Transition), bits [1:0] Note: These bits, along with register [1524], select the signal source for State 7 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1559		
C3	1560	ASM Input Matrix (Signal Source for State 8 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1561		
	1562		

Address		Bit Name	Bit Description
Byte	Bit		
C3	1563	ASM Input Matrix (Signal Source for State 8 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1564		
	1565		
	1566	ASM Input Matrix (Signal Source for State 8 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1567		
C4	1568		
	1569	ASM Input Matrix (Signal Source for State 8 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1570		
	1571		
	1572	ASM Input Matrix (Signal Source for State 8 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1573		
	1574		
	1575	ASM Input Matrix (Signal Source for State 8 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
C5	1576		
	1577		
	1578	ASM Input Matrix (Signal Source for State 8 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1579		
	1580		

Address		Bit Name	Bit Description
Byte	Bit		
C5	1581 1582 1583	ASM Input Matrix (Signal Source for State 8 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
C6	1584 1585 1586	ASM Input Matrix (Signal Source for State 8 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
C6	1587 1588 1589	ASM Input Matrix (Signal Source for State 8 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
C6 / C7	1590 1591 1592	ASM Input Matrix (Signal Source for State 8 →State 10 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
C7	1593 1594 1595	ASM Input Matrix (Signal Source for State 8 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
C7	1596	ASM Input Matrix (Signal Source for State 9 →State 10 Transition), bit [2] Note: This bit, along with registers [1631:1630], select the signal source for State 9 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1

Address		Bit Name	Bit Description
Byte	Bit		
C7	1597	ASM Input Matrix (Signal Source for State 9 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1598		
	1599		
C8	1600	ASM Input Matrix (Signal Source for State 9 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1601		
	1602		
	1603	ASM Input Matrix (Signal Source for State 9 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1604		
	1605		
	1606	ASM Input Matrix (Signal Source for State 9 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1607		
C9	1608		
	1609	ASM Input Matrix (Signal Source for State 9 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1610		
	1611		
	1612	ASM Input Matrix (Signal Source for State 9 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1613		
	1614		

Address		Bit Name	Bit Description
Byte	Bit		
C9	1615	ASM Input Matrix (Signal Source for State 9 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
CA	1616		
	1617		
	1618	ASM Input Matrix (Signal Source for State 9 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1619		
	1620		
	1621	ASM Input Matrix (Signal Source for State 9 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1622		
	1623		
CB	1624	ASM Input Matrix (Signal Source for State 9 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1625		
	1626		
	1627	ASM Input Matrix (Signal Source for State 9 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1628		
	1629		
	1630	ASM Input Matrix (Signal Source for State 9 →State 10 Transition), bits [1:0] Note: These bits, along with register [1596], select the signal source for State 9 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1631		

Address		Bit Name	Bit Description
Byte	Bit		
CC	1632	ASM Input Matrix (Signal Source for State 10 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1633		
	1634		
	1635	ASM Input Matrix (Signal Source for State 10 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1636		
	1637		
	1638	ASM Input Matrix (Signal Source for State 10 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1639		
CD	1640		
	1641	ASM Input Matrix (Signal Source for State 10 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1642		
	1643		
	1644	ASM Input Matrix (Signal Source for State 10 →State 4 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1645		
	1646		
	1647	ASM Input Matrix (Signal Source for State 10 →State 5 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
CE	1648		
	1649		

Address		Bit Name	Bit Description
Byte	Bit		
CE	1650 1651 1652	ASM Input Matrix (Signal Source for State 10 →State 6 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
CE	1653 1654 1655	ASM Input Matrix (Signal Source for State 10 →State 7 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
CF	1656 1657 1658	ASM Input Matrix (Signal Source for State 10 →State 8 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
CF	1659 1660 1661	ASM Input Matrix (Signal Source for State 10 →State 9 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
CF / D0	1662 1663 1664	ASM Input Matrix (Signal Source for State 10 →State 10 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
D0	1665 1666 1667	ASM Input Matrix (Signal Source for State 10 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1

Address		Bit Name	Bit Description
Byte	Bit		
D0	1668	ASM Input Matrix (Signal Source for State 11 →State 10 Transition), bit [2] Note: This bit, along with registers [1703:1702], select the signal source for State 11 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1669	ASM Input Matrix (Signal Source for State 11 →State 11 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1670		
	1671		
D1	1672	ASM Input Matrix (Signal Source for State 11 →State 0 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1673		
	1674		
	1675	ASM Input Matrix (Signal Source for State 11 →State 1 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1676		
	1677		
	1678	ASM Input Matrix (Signal Source for State 11 →State 2 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1679		
D2	1680		
	1681	ASM Input Matrix (Signal Source for State 11 →State 3 Transition)	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1682		
	1683		

<table>
<tr><th colspan="2">Address</th><th rowspan="2">Bit Name</th><th rowspan="2">Bit Description</th></tr>
<tr><th>Byte</th><th>Bit</th></tr>
<tr><td rowspan="4">D2</td><td>1684</td><td rowspan="3">ASM Input Matrix (Signal Source for State 11 →State 4 Transition)</td><td rowspan="3">000: VSS
001: 6Bit_Matrix_OUT0
010: 6Bit_Matrix_OUT1
011: 6Bit_Matrix_OUT2
100: DM0_0
101: DM0_1
110: DM1_0
111: DM1_1</td></tr>
<tr><td>1685</td></tr>
<tr><td>1686</td></tr>
<tr><td>1687</td><td rowspan="3">ASM Input Matrix (Signal Source for State 11 →State 5 Transition)</td><td rowspan="3">000: VSS
001: 6Bit_Matrix_OUT0
010: 6Bit_Matrix_OUT1
011: 6Bit_Matrix_OUT2
100: DM0_0
101: DM0_1
110: DM1_0
111: DM1_1</td></tr>
<tr><td rowspan="8">D3</td><td>1688</td></tr>
<tr><td>1689</td></tr>
<tr><td>1690</td><td rowspan="3">ASM Input Matrix (Signal Source for State 11 →State 6 Transition)</td><td rowspan="3">000: VSS
001: 6Bit_Matrix_OUT0
010: 6Bit_Matrix_OUT1
011: 6Bit_Matrix_OUT2
100: DM0_0
101: DM0_1
110: DM1_0
111: DM1_1</td></tr>
<tr><td>1691</td></tr>
<tr><td>1692</td></tr>
<tr><td>1693</td><td rowspan="3">ASM Input Matrix (Signal Source for State 11 →State 7 Transition)</td><td rowspan="3">000: VSS
001: 6Bit_Matrix_OUT0
010: 6Bit_Matrix_OUT1
011: 6Bit_Matrix_OUT2
100: DM0_0
101: DM0_1
110: DM1_0
111: DM1_1</td></tr>
<tr><td>1694</td></tr>
<tr><td>1695</td></tr>
<tr><td rowspan="6">D4</td><td>1696</td><td rowspan="3">ASM Input Matrix (Signal Source for State 11 →State 8Transition)</td><td rowspan="3">000: VSS
001: 6Bit_Matrix_OUT0
010: 6Bit_Matrix_OUT1
011: 6Bit_Matrix_OUT2
100: DM0_0
101: DM0_1
110: DM1_0
111: DM1_1</td></tr>
<tr><td>1697</td></tr>
<tr><td>1698</td></tr>
<tr><td>1699</td><td rowspan="3">ASM Input Matrix (Signal Source for State 11 →State 9 Transition)</td><td rowspan="3">000: VSS
001: 6Bit_Matrix_OUT0
010: 6Bit_Matrix_OUT1
011: 6Bit_Matrix_OUT2
100: DM0_0
101: DM0_1
110: DM1_0
111: DM1_1</td></tr>
<tr><td>1700</td></tr>
<tr><td>1701</td></tr>
</table>

Address		Bit Name	Bit Description
Byte	Bit		
D4	1702	ASM Input Matrix (Signal Source for State 11 →State 10 Transition), bits [1:0] Note: These bits, along with register [1668], select the signal source for State 11 to State 10 Transition	000: VSS 001: 6Bit_Matrix_OUT0 010: 6Bit_Matrix_OUT1 011: 6Bit_Matrix_OUT2 100: DM0_0 101: DM0_1 110: DM1_0 111: DM1_1
	1703		
D5	1704	DM0_0 Configuration Register 0 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1705		
	1706		
	1707		
	1708		
	1709		
	1710	DM0_0 Configuration Register 0 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1711		
D6	1712		
	1713		
	1714		
	1715		
	1716	DM0_0 Configuration Register 0 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1717		
	1718		
	1719		
D7	1720		
	1721		
	1722	DM0_0 Configuration Register 0 DLY input from matrix	DM Delay input
	1723		
	1724		
	1725		
	1726		
	1727		

Address		Bit Name	Bit Description
Byte	Bit		
D8	1728	DM0_0 Configuration Register 0 Data of 3-bit LUT	REG_VAL_LUT3[0]
	1729		REG_VAL_LUT3[1]
	1730		REG_VAL_LUT3[2]
	1731		REG_VAL_LUT3[3]
	1732		REG_VAL_LUT3[4]
	1733		REG_VAL_LUT3[5]
	1734		REG_VAL_LUT3[6]
	1735		REG_VAL_LUT3[7]
D9	1736	DM0_0 Configuration Register 0 Data of 2-bit LUT	REG_VAL_LUT2[0]
	1737		REG_VAL_LUT2[1]
	1738		REG_VAL_LUT2[2]
	1739		REG_VAL_LUT2[3]
	1740	DM0_0 Configuration Register 0 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	1741		
	1742		
	1743		
DA	1744	DM0_0 Configuration Register 0 Data of Delay	Data[7:0]
	1745		
	1746		
	1747		
	1748		
	1749		
	1750		
	1751		
DB	1752	DM0_0 Configuration Register 0 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	1753		

Address		Bit Name	Bit Description
Byte	Bit		
DB	1754	DM0_0 Configuration Register 0 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	1755		
	1756		
	1757		
	1758	DM0_0 Configuration Register 0 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	1759	DM0_0 Configuration Register 0 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
DC	1760	DM0_0 Configuration Register 1 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1761		
	1762		
	1763		
	1764		
	1765		
	1766	DM0_0 Configuration Register 1 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1767		
DD	1768		
	1769		
	1770		
	1771		
	1772	DM0_0 Configuration Register 1 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1773		
	1774		
	1775		
DE	1776		
	1777		

Address		Bit Name	Bit Description
Byte	Bit		
DE	1778	DM0_0 Configuration Register 1 DLY input from matrix	DM Delay input
	1779		
	1780		
	1781		
	1782		
	1783		
DF	1784	DM0_0 Configuration Register 1 Data of 3-bit LUT	REG_VAL_LUT3[0]
	1785		REG_VAL_LUT3[1]
	1786		REG_VAL_LUT3[2]
	1787		REG_VAL_LUT3[3]
	1788		REG_VAL_LUT3[4]
	1789		REG_VAL_LUT3[5]
	1790		REG_VAL_LUT3[6]
	1791		REG_VAL_LUT3[7]
E0	1792	DM0_0 Configuration Register 1 Data of 2-bit LUT	REG_VAL_LUT2[0]
	1793		REG_VAL_LUT2[1]
	1794		REG_VAL_LUT2[2]
	1795		REG_VAL_LUT2[3]
	1796	DM0_0 Configuration Register 1 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	1797		
	1798		
	1799		

Address		Bit Name	Bit Description
Byte	Bit		
E1	1800	DM0_0 Configuration Register 1 Data of Delay	Data[7:0]
	1801		
	1802		
	1803		
	1804		
	1805		
	1806		
	1807		
E2	1808	DM0_0 Configuration Register 1 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	1809		
	1810	DM0_0 Configuration Register 1 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	1811		
	1812		
	1813		
	1814	DM0_0 Configuration Register 1 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	1815	DM0_0 Configuration Register 1 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
E3	1816	DM0_0 Configuration Register 2 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1817		
	1818		
	1819		
	1820		
	1821		

Address		Bit Name	Bit Description
Byte	Bit		
E3	1822	DM0_0 Configuration Register 2 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1823		
E4	1824		
	1825		
	1826		
	1827		
	1828	DM0_0 Configuration Register 2 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1829		
	1830		
	1831		
E5	1832		
	1833		
	1834	DM0_0 Configuration Register 2 DLY input from matrix	DM Delay input
	1835		
	1836		
	1837		
	1838		
	1839		
E6	1840	DM0_0 Configuration Register 2 Data of 3-bit LUT	REG_VAL_LUT3[0]
	1841		REG_VAL_LUT3[1]
	1842		REG_VAL_LUT3[2]
	1843		REG_VAL_LUT3[3]
	1844		REG_VAL_LUT3[4]
	1845		REG_VAL_LUT3[5]
	1846		REG_VAL_LUT3[6]
	1847		REG_VAL_LUT3[7]
E7	1848	DM0_0 Configuration Register 2 Data of 2-bit LUT	REG_VAL_LUT2[0]
	1849		REG_VAL_LUT2[1]
	1850		REG_VAL_LUT2[2]
	1851		REG_VAL_LUT2[3]

Address		Bit Name	Bit Description
Byte	Bit		
E7	1852	DM0_0 Configuration Register 2 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	1853		
	1854		
	1855		
E8	1856	DM0_0 Configuration Register 2 Data of Delay	Data[7:0]
	1857		
	1858		
	1859		
	1860		
	1861		
	1862		
	1863		
E9	1864	DM0_0 Configuration Register 2 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	1865		
	1866	DM0_0 Configuration Register 2 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	1867		
	1868		
	1869		

Address		Bit Name	Bit Description
Byte	Bit		
E9	1870	DM0_0 Configuration Register 2 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	1871	DM0_0 Configuration Register 2 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
EA	1872	DM0_0 Configuration Register 3 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1873		
	1874		
	1875		
	1876		
	1877		
	1878	DM0_0 Configuration Register 3 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1879		
EB	1880		
	1881		
	1882		
	1883		
	1884	DM0_0 Configuration Register 3 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1885		
	1886		
	1887		
EC	1888		
	1889		
	1890	DM0_0 Configuration Register 3 DLY input from matrix	DM Delay input
	1891		
	1892		
	1893		
	1894		
	1895		
ED	1896	DM0_0 Configuration Register 3 Data of 3-bit LUT	REG_VAL_LUT3[0]
	1897		REG_VAL_LUT3[1]
	1898		REG_VAL_LUT3[2]
	1899		REG_VAL_LUT3[3]
	1900		REG_VAL_LUT3[4]
	1901		REG_VAL_LUT3[5]
	1902		REG_VAL_LUT3[6]
	1903		REG_VAL_LUT3[7]

Address		Bit Name	Bit Description
Byte	Bit		
EE	1904	DM0_0 Configuration Register 3 Data of 2-bit LUT	REG_VAL_LUT2[0]
	1905		REG_VAL_LUT2[1]
	1906		REG_VAL_LUT2[2]
	1907		REG_VAL_LUT2[3]
	1908	DM0_0 Configuration Register 3 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	1909		
	1910		
	1911		
EF	1912	DM0_0 Configuration Register 3 Data of Delay	Data[7:0]
	1913		
	1914		
	1915		
	1916		
	1917		
	1918		
	1919		
F0	1920	DM0_0 Configuration Register 3 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	1921		

Address		Bit Name	Bit Description
Byte	Bit		
F0	1922	DM0_0 Configuration Register 3 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	1923		
	1924		
	1925		
	1926	DM0_0 Configuration Register 3 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	1927	DM0_0 Configuration Register 3 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
F1	1928	DM0_0 Configuration Register 4 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1929		
	1930		
	1931		
	1932		
	1933		
	1934	DM0_0 Configuration Register 4 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1935		
F2	1936		
	1937		
	1938		
	1939		
	1940	DM0_0 Configuration Register 4 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1941		
	1942		
	1943		
F3	1944		
	1945		

Address		Bit Name	Bit Description
Byte	Bit		
F3	1946	DM0_0 Configuration Register 4 DLY input from matrix	DM Delay input
	1947		
	1948		
	1949		
	1950		
	1951		
F4	1952	DM0_0 Configuration Register 4 Data of 3-bit LUT	REG_VAL_LUT3[0]
	1953		REG_VAL_LUT3[1]
	1954		REG_VAL_LUT3[2]
	1955		REG_VAL_LUT3[3]
	1956		REG_VAL_LUT3[4]
	1957		REG_VAL_LUT3[5]
	1958		REG_VAL_LUT3[6]
	1959		REG_VAL_LUT3[7]
F5	1960	DM0_0 Configuration Register 4 Data of 2-bit LUT	REG_VAL_LUT2[0]
	1961		REG_VAL_LUT2[1]
	1962		REG_VAL_LUT2[2]
	1963		REG_VAL_LUT2[3]
	1964	DM0_0 Configuration Register 4 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	1965		
	1966		
	1967		

Address		Bit Name	Bit Description
Byte	Bit		
F6	1968	DM0_0 Configuration Register 4 Data of Delay	Data[7:0]
	1969		
	1970		
	1971		
	1972		
	1973		
	1974		
	1975		
F7	1976	DM0_0 Configuration Register 4 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	1977		
	1978	DM0_0 Configuration Register 4 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	1979		
	1980		
	1981		
	1982	DM0_0 Configuration Register 4 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	1983	DM0_0 Configuration Register 4 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
F8	1984	DM0_0 Configuration Register 5 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1985		
	1986		
	1987		
	1988		
	1989		

Address		Bit Name	Bit Description
Byte	Bit		
F8	1990	DM0_0 Configuration Register 5 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1991		
F9	1992		
	1993		
	1994		
	1995		
	1996	DM0_0 Configuration Register 5 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1997		
	1998		
	1999		
FA	2000		
	2001		
	2002	DM0_0 Configuration Register 5 DLY input from matrix	DM Delay input
	2003		
	2004		
	2005		
	2006		
	2007		
FB	2008	DM0_0 Configuration Register 5 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2009		REG_VAL_LUT3[1]
	2010		REG_VAL_LUT3[2]
	2011		REG_VAL_LUT3[3]
	2012		REG_VAL_LUT3[4]
	2013		REG_VAL_LUT3[5]
	2014		REG_VAL_LUT3[6]
	2015		REG_VAL_LUT3[7]
FC	2016	DM0_0 Configuration Register 5 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2017		REG_VAL_LUT2[1]
	2018		REG_VAL_LUT2[2]
	2019		REG_VAL_LUT2[3]

Address		Bit Name	Bit Description
Byte	Bit		
FC	2020	DM0_0 Configuration Register 5 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2021		
	2022		
	2023		
FD	2024	DM0_0 Configuration Register 5 Data of Delay	Data[7:0]
	2025		
	2026		
	2027		
	2028		
	2029		
	2030		
	2031		
FE	2032	DM0_0 Configuration Register 5 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2033		
	2034	DM0_0 Configuration Register 5 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2035		
	2036		
	2037		

Address		Bit Name	Bit Description
Byte	Bit		
FE	2038	DM0_0 Configuration Register 5 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2039	DM0_0 Configuration Register 5 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
FF	2040	Reserved	
	2041	Reserved	
	2042	Reserved	
	2043	Reserved	
	2044	Reserved	
	2045	Reserved	
	2046	Reserved	
	2047	Reserved	
100	2048	DM0_1 Configuration Register 0 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2049		
	2050		
	2051		
	2052		
	2053		
	2054	DM0_1 Configuration Register 0 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2055		
101	2056		
	2057		
	2058		
	2059		
	2060	DM0_1 Configuration Register 0 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2061		
	2062		
	2063		
102	2064		
	2065		
	2066	DM0_1 Configuration Register 0 DLY input from matrix	DM Delay input
	2067		
	2068		
	2069		
	2070		
	2071		

Address		Bit Name	Bit Description
Byte	Bit		
103	2072	DM0_1 Configuration Register 0 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2073		REG_VAL_LUT3[1]
	2074		REG_VAL_LUT3[2]
	2075		REG_VAL_LUT3[3]
	2076		REG_VAL_LUT3[4]
	2077		REG_VAL_LUT3[5]
	2078		REG_VAL_LUT3[6]
	2079		REG_VAL_LUT3[7]
104	2080	DM0_1 Configuration Register 0 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2081		REG_VAL_LUT2[1]
	2082		REG_VAL_LUT2[2]
	2083		REG_VAL_LUT2[3]
	2084	DM0_1 Configuration Register 0 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2085		
	2086		
	2087		
105	2088	DM0_1 Configuration Register 0 Data of Delay	Data[7:0]
	2089		
	2090		
	2091		
	2092		
	2093		
	2094		
	2095		
106	2096	DM0_1 Configuration Register 0 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2097		

Address		Bit Name	Bit Description
Byte	Bit		
106	2098	DM0_1 Configuration Register 0 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2099		
	2100		
	2101		
	2102	DM0_1 Configuration Register 0 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2103	DM0_1 Configuration Register 0 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
107	2104	DM0_1 Configuration Register 1 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2105		
	2106		
	2107		
	2108		
	2109		
	2110	DM0_1 Configuration Register 1 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2111		
108	2112		
	2113		
	2114		
	2115		
	2116	DM0_1 Configuration Register 1 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2117		
	2118		
	2119		
109	2120		
	2121		

Address		Bit Name	Bit Description
Byte	Bit		
109	2122	DM0_1 Configuration Register 1 DLY input from matrix	DM Delay input
	2123		
	2124		
	2125		
	2126		
	2127		
10A	2128	DM0_1 Configuration Register 1 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2129		REG_VAL_LUT3[1]
	2130		REG_VAL_LUT3[2]
	2131		REG_VAL_LUT3[3]
	2132		REG_VAL_LUT3[4]
	2133		REG_VAL_LUT3[5]
	2134		REG_VAL_LUT3[6]
	2135		REG_VAL_LUT3[7]
10B	2136	DM0_1 Configuration Register 1 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2137		REG_VAL_LUT2[1]
	2138		REG_VAL_LUT2[2]
	2139		REG_VAL_LUT2[3]
	2140	DM0_1 Configuration Register 1 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2141		
	2142		
	2143		

Address		Bit Name	Bit Description
Byte	Bit		
10C	2144	DM0_1 Configuration Register 1 Data of Delay	Data[7:0]
	2145		
	2146		
	2147		
	2148		
	2149		
	2150		
	2151		
10D	2152	DM0_1 Configuration Register 1 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2153		
	2154	DM0_1 Configuration Register 1 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2155		
	2156		
	2157		
	2158	DM0_1 Configuration Register 1 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2159	DM0_1 Configuration Register 1 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
10E	2160	DM0_1 Configuration Register 2 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2161		
	2162		
	2163		
	2164		
	2165		

Address		Bit Name	Bit Description
Byte	Bit		
10E	2166	DM0_1 Configuration Register 2 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2167		
10F	2168		
	2169		
	2170		
	2171		
	2172	DM0_1 Configuration Register 2 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2173		
	2174		
	2175		
110	2176		
	2177		
	2178	DM0_1 Configuration Register 2 DLY input from matrix	DM Delay input
	2179		
	2180		
	2181		
	2182		
	2183		
111	2184	DM0_1 Configuration Register 2 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2185		REG_VAL_LUT3[1]
	2186		REG_VAL_LUT3[2]
	2187		REG_VAL_LUT3[3]
	2188		REG_VAL_LUT3[4]
	2189		REG_VAL_LUT3[5]
	2190		REG_VAL_LUT3[6]
	2191		REG_VAL_LUT3[7]
112	2192	DM0_1 Configuration Register 2 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2193		REG_VAL_LUT2[1]
	2194		REG_VAL_LUT2[2]
	2195		REG_VAL_LUT2[3]

Address		Bit Name	Bit Description
Byte	Bit		
112	2196	DM0_1 Configuration Register 2 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2197		
	2198		
	2199		
113	2200	DM0_1 Configuration Register 2 Data of Delay	Data[7:0]
	2201		
	2202		
	2203		
	2204		
	2205		
	2206		
	2207		
114	2208	DM0_1 Configuration Register 2 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2209		
	2210	DM0_1 Configuration Register 2 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2211		
	2212		
	2213		

Address		Bit Name	Bit Description
Byte	Bit		
114	2214	DM0_1 Configuration Register 2 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2215	DM0_1 Configuration Register 2 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
115	2216	DM0_1 Configuration Register 3 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2217		
	2218		
	2219		
	2220		
	2221		
	2222	DM0_1 Configuration Register 3 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2223		
116	2224		
	2225		
	2226		
	2227		
	2228	DM0_1 Configuration Register 3 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2229		
	2230		
	2231		
117	2232		
	2233		
	2234	DM0_1 Configuration Register 3 DLY input from matrix	DM Delay input
	2235		
	2236		
	2237		
	2238		
	2239		
118	2240	DM0_1 Configuration Register 3 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2241		REG_VAL_LUT3[1]
	2242		REG_VAL_LUT3[2]
	2243		REG_VAL_LUT3[3]
	2244		REG_VAL_LUT3[4]
	2245		REG_VAL_LUT3[5]
	2246		REG_VAL_LUT3[6]
	2247		REG_VAL_LUT3[7]

Address		Bit Name	Bit Description
Byte	Bit		
119	2248	DM0_1 Configuration Register 3 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2249		REG_VAL_LUT2[1]
	2250		REG_VAL_LUT2[2]
	2251		REG_VAL_LUT2[3]
	2252	DM0_1 Configuration Register 3 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2253		
	2254		
	2255		
11A	2256	DM0_1 Configuration Register 3 Data of Delay	Data[7:0]
	2257		
	2258		
	2259		
	2260		
	2261		
	2262		
	2263		
11B	2264	DM0_1 Configuration Register 3 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2265		

Address		Bit Name	Bit Description
Byte	Bit		
11B	2266	DM0_1 Configuration Register 3 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2267		
	2268		
	2269		
	2270	DM0_1 Configuration Register 3 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2271	DM0_1 Configuration Register 3 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
11C	2272	DM0_1 Configuration Register 4 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2273		
	2274		
	2275		
	2276		
	2277		
	2278	DM0_1 Configuration Register 4 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2279		
11D	2280		
	2281		
	2282		
	2283		
	2284	DM0_1 Configuration Register 4 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2285		
	2286		
	2287		
11E	2288		
	2289		

Address		Bit Name	Bit Description
Byte	Bit		
11E	2290	DM0_1 Configuration Register 4 DLY input from matrix	DM Delay input
	2291		
	2292		
	2293		
	2294		
	2295		
11F	2296	DM0_1 Configuration Register 4 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2297		REG_VAL_LUT3[1]
	2298		REG_VAL_LUT3[2]
	2299		REG_VAL_LUT3[3]
	2300		REG_VAL_LUT3[4]
	2301		REG_VAL_LUT3[5]
	2302		REG_VAL_LUT3[6]
	2303		REG_VAL_LUT3[7]
120	2304	DM0_1 Configuration Register 4 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2305		REG_VAL_LUT2[1]
	2306		REG_VAL_LUT2[2]
	2307		REG_VAL_LUT2[3]
	2308	DM0_1 Configuration Register 4 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2309		
	2310		
	2311		

Address		Bit Name	Bit Description
Byte	Bit		
121	2312	DM0_1 Configuration Register 4 Data of Delay	Data[7:0]
	2313		
	2314		
	2315		
	2316		
	2317		
	2318		
	2319		
122	2320	DM0_1 Configuration Register 4 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2321		
	2322	DM0_1 Configuration Register 4 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2323		
	2324		
	2325		
	2326	DM0_1 Configuration Register 4 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2327	DM0_1 Configuration Register 4 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
123	2328	DM0_1 Configuration Register 5 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2329		
	2330		
	2331		
	2332		
	2333		

Address		Bit Name	Bit Description
Byte	Bit		
123	2334	DM0_1 Configuration Register 5 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2335		
124	2336		
	2337		
	2338		
	2339		
	2340	DM0_1 Configuration Register 5 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2341		
	2342		
	2343		
125	2344		
	2345		
	2346	DM0_1 Configuration Register 5 DLY input from matrix	DM Delay input
	2347		
	2348		
	2349		
	2350		
	2351		
126	2352	DM0_1 Configuration Register 5 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2353		REG_VAL_LUT3[1]
	2354		REG_VAL_LUT3[2]
	2355		REG_VAL_LUT3[3]
	2356		REG_VAL_LUT3[4]
	2357		REG_VAL_LUT3[5]
	2358		REG_VAL_LUT3[6]
	2359		REG_VAL_LUT3[7]
127	2360	DM0_1 Configuration Register 5 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2361		REG_VAL_LUT2[1]
	2362		REG_VAL_LUT2[2]
	2363		REG_VAL_LUT2[3]

Address		Bit Name	Bit Description
Byte	Bit		
127	2364	DM0_1 Configuration Register 5 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2365		
	2366		
	2367		
128	2368	DM0_1 Configuration Register 5 Data of Delay	Data[7:0]
	2369		
	2370		
	2371		
	2372		
	2373		
	2374		
	2375		
129	2376	DM0_1 Configuration Register 5 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2377		
	2378	DM0_1 Configuration Register 5 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2379		
	2380		
	2381		

Address		Bit Name	Bit Description
Byte	Bit		
129	2382	DM0_1 Configuration Register 5 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2383	DM0_1 Configuration Register 5 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
12A	2384	DM1_0 Configuration Register 0 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2385		
	2386		
	2387		
	2388		
	2389		
	2390	DM1_0 Configuration Register 0 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2391		
12B	2392		
	2393		
	2394		
	2395		
	2396	DM1_0 Configuration Register 0 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2397		
	2398		
	2399		
12C	2400		
	2401		
	2402	DM1_0 Configuration Register 0 DLY input from matrix	DM Delay input
	2403		
	2404		
	2405		
	2406		
	2407		
12D	2408	DM1_0 Configuration Register 0 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2409		REG_VAL_LUT3[1]
	2410		REG_VAL_LUT3[2]
	2411		REG_VAL_LUT3[3]
	2412		REG_VAL_LUT3[4]
	2413		REG_VAL_LUT3[5]
	2414		REG_VAL_LUT3[6]
	2415		REG_VAL_LUT3[7]

Address		Bit Name	Bit Description
Byte	Bit		
12E	2416	DM1_0 Configuration Register 0 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2417		REG_VAL_LUT2[1]
	2418		REG_VAL_LUT2[2]
	2419		REG_VAL_LUT2[3]
	2420	DM1_0 Configuration Register 0 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2421		
	2422		
	2423		
12F	2424	DM1_0 Configuration Register 0 Data of Delay	Data[7:0]
	2425		
	2426		
	2427		
	2428		
	2429		
	2430		
	2431		
130	2432	DM1_0 Configuration Register 0 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2433		

Address		Bit Name	Bit Description
Byte	Bit		
130	2434	DM1_0 Configuration Register 0 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2435		
	2436		
	2437		
	2438	DM1_0 Configuration Register 0 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2439	DM1_0 Configuration Register 0 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
131	2440	DM1_0 Configuration Register 1 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2441		
	2442		
	2443		
	2444		
	2445		
	2446	DM1_0 Configuration Register 1 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2447		
132	2448		
	2449		
	2450		
	2451		
	2452	DM1_0 Configuration Register 1 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2453		
	2454		
	2455		
133	2456		
	2457		

Address		Bit Name	Bit Description
Byte	Bit		
133	2458	DM1_0 Configuration Register 1 DLY input from matrix	DM Delay input
	2459		
	2460		
	2461		
	2462		
	2463		
134	2464	DM1_0 Configuration Register 1 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2465		REG_VAL_LUT3[1]
	2466		REG_VAL_LUT3[2]
	2467		REG_VAL_LUT3[3]
	2468		REG_VAL_LUT3[4]
	2469		REG_VAL_LUT3[5]
	2470		REG_VAL_LUT3[6]
	2471		REG_VAL_LUT3[7]
135	2472	DM1_0 Configuration Register 1 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2473		REG_VAL_LUT2[1]
	2474		REG_VAL_LUT2[2]
	2475		REG_VAL_LUT2[3]
	2476	DM1_0 Configuration Register 1 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2477		
	2478		
	2479		

Address		Bit Name	Bit Description
Byte	Bit		
136	2480	DM1_0 Configuration Register 1 Data of Delay	Data[7:0]
	2481		
	2482		
	2483		
	2484		
	2485		
	2486		
	2487		
137	2488	DM1_0 Configuration Register 1 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2489		
	2490	DM1_0 Configuration Register 1 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2491		
	2492		
	2493		
	2494	DM1_0 Configuration Register 1 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2495	DM1_0 Configuration Register 1 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
138	2496	DM1_0 Configuration Register 2 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2497		
	2498		
	2499		
	2500		
	2501		

Address		Bit Name	Bit Description
Byte	Bit		
138	2502	DM1_0 Configuration Register 2 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2503		
139	2504		
	2505		
	2506		
	2507		
	2508	DM1_0 Configuration Register 2 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2509		
	2510		
	2511		
13A	2512		
	2513		
	2514	DM1_0 Configuration Register 2 DLY input from matrix	DM Delay input
	2515		
	2516		
	2517		
	2518		
	2519		
13B	2520	DM1_0 Configuration Register 2 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2521		REG_VAL_LUT3[1]
	2522		REG_VAL_LUT3[2]
	2523		REG_VAL_LUT3[3]
	2524		REG_VAL_LUT3[4]
	2525		REG_VAL_LUT3[5]
	2526		REG_VAL_LUT3[6]
	2527		REG_VAL_LUT3[7]
13C	2528	DM1_0 Configuration Register 2 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2529		REG_VAL_LUT2[1]
	2530		REG_VAL_LUT2[2]
	2531		REG_VAL_LUT2[3]

Address		Bit Name	Bit Description
Byte	Bit		
13C	2532 2533 2534 2535	DM1_0 Configuration Register 2 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
13D	2536 2537 2538 2539 2540 2541 2542 2543	DM1_0 Configuration Register 2 Data of Delay	Data[7:0]
13E	2544 2545	DM1_0 Configuration Register 2 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2546 2547 2548 2549	DM1_0 Configuration Register 2 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT

Address		Bit Name	Bit Description
Byte	Bit		
13E	2550	DM1_0 Configuration Register 2 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
13E	2551	DM1_0 Configuration Register 2 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
13F	2552	DM1_0 Configuration Register 3 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
13F	2553		
13F	2554		
13F	2555		
13F	2556		
13F	2557		
13F	2558	DM1_0 Configuration Register 3 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
13F	2559		
140	2560		
140	2561		
140	2562		
140	2563		
140	2564	DM1_0 Configuration Register 3 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
140	2565		
140	2566		
140	2567		
141	2568		
141	2569		
141	2570	DM1_0 Configuration Register 3 DLY input from matrix	DM Delay input
141	2571		
141	2572		
141	2573		
141	2574		
141	2575		
142	2576	DM1_0 Configuration Register 3 Data of 3-bit LUT	REG_VAL_LUT3[0]
142	2577		REG_VAL_LUT3[1]
142	2578		REG_VAL_LUT3[2]
142	2579		REG_VAL_LUT3[3]
142	2580		REG_VAL_LUT3[4]
142	2581		REG_VAL_LUT3[5]
142	2582		REG_VAL_LUT3[6]
142	2583		REG_VAL_LUT3[7]

Address		Bit Name	Bit Description
Byte	Bit		
143	2584	DM1_0 Configuration Register 3 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2585		REG_VAL_LUT2[1]
	2586		REG_VAL_LUT2[2]
	2587		REG_VAL_LUT2[3]
	2588	DM1_0 Configuration Register 3 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2589		
	2590		
	2591		
144	2592	DM1_0 Configuration Register 3 Data of Delay	Data[7:0]
	2593		
	2594		
	2595		
	2596		
	2597		
	2598		
	2599		
145	2600	DM1_0 Configuration Register 3 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2601		

Address		Bit Name	Bit Description
Byte	Bit		
145	2602	DM1_0 Configuration Register 3 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2603		
	2604		
	2605		
	2606	DM1_0 Configuration Register 3 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2607	DM1_0 Configuration Register 3 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
146	2608	DM1_0 Configuration Register 4 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2609		
	2610		
	2611		
	2612		
	2613		
	2614	DM1_0 Configuration Register 4 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2615		
147	2616		
	2617		
	2618		
	2619		
	2620	DM1_0 Configuration Register 4 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2621		
	2622		
	2623		
148	2624		
	2625		

Address		Bit Name	Bit Description
Byte	Bit		
148	2626	DM1_0 Configuration Register 4 DLY input from matrix	DM Delay input
	2627		
	2628		
	2629		
	2630		
	2631		
149	2632	DM1_0 Configuration Register 4 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2633		REG_VAL_LUT3[1]
	2634		REG_VAL_LUT3[2]
	2635		REG_VAL_LUT3[3]
	2636		REG_VAL_LUT3[4]
	2637		REG_VAL_LUT3[5]
	2638		REG_VAL_LUT3[6]
	2639		REG_VAL_LUT3[7]
14A	2640	DM1_0 Configuration Register 4 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2641		REG_VAL_LUT2[1]
	2642		REG_VAL_LUT2[2]
	2643		REG_VAL_LUT2[3]
	2644	DM1_0 Configuration Register 4 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2645		
	2646		
	2647		

Address		Bit Name	Bit Description
Byte	Bit		
14B	2648	DM1_0 Configuration Register 4 Data of Delay	Data[7:0]
	2649		
	2650		
	2651		
	2652		
	2653		
	2654		
	2655		
14C	2656	DM1_0 Configuration Register 4 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2657		
	2658	DM1_0 Configuration Register 4 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2659		
	2660		
	2661		
	2662	DM1_0 Configuration Register 4 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2663	DM1_0 Configuration Register 4 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
14D	2664	DM1_0 Configuration Register 5 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2665		
	2666		
	2667		
	2668		
	2669		

Address		Bit Name	Bit Description
Byte	Bit		
14D	2670	DM1_0 Configuration Register 5 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2671		
14E	2672		
	2673		
	2674		
	2675		
	2676	DM1_0 Configuration Register 5 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2677		
	2678		
	2679		
14F	2680		
	2681		
	2682	DM1_0 Configuration Register 5 DLY input from matrix	DM Delay input
	2683		
	2684		
	2685		
	2686		
	2687		
150	2688	DM1_0 Configuration Register 5 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2689		REG_VAL_LUT3[1]
	2690		REG_VAL_LUT3[2]
	2691		REG_VAL_LUT3[3]
	2692		REG_VAL_LUT3[4]
	2693		REG_VAL_LUT3[5]
	2694		REG_VAL_LUT3[6]
	2695		REG_VAL_LUT3[7]
151	2696	DM1_0 Configuration Register 5 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2697		REG_VAL_LUT2[1]
	2698		REG_VAL_LUT2[2]
	2699		REG_VAL_LUT2[3]

Address		Bit Name	Bit Description
Byte	Bit		
151	2700 2701 2702 2703	DM1_0 Configuration Register 5 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
152	2704 2705 2706 2707 2708 2709 2710 2711	DM1_0 Configuration Register 5 Data of Delay	Data[7:0]
153	2712 2713	DM1_0 Configuration Register 5 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2714 2715 2716 2717	DM1_0 Configuration Register 5 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT

Address		Bit Name	Bit Description
Byte	Bit		
153	2718	DM1_0 Configuration Register 5 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2719	DM1_0 Configuration Register 5 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
154	2720	DM1_1 Configuration Register 0 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2721		
	2722		
	2723		
	2724		
	2725		
	2726	DM1_1 Configuration Register 0 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2727		
155	2728		
	2729		
	2730		
	2731		
	2732	DM1_1 Configuration Register 0 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2733		
	2734		
	2735		
156	2736		
	2737		
	2738	DM1_1 Configuration Register 0 DLY input from matrix	DM Delay input
	2739		
	2740		
	2741		
	2742		
	2743		
157	2744	DM1_1 Configuration Register 0 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2745		REG_VAL_LUT3[1]
	2746		REG_VAL_LUT3[2]
	2747		REG_VAL_LUT3[3]
	2748		REG_VAL_LUT3[4]
	2749		REG_VAL_LUT3[5]
	2750		REG_VAL_LUT3[6]
	2751		REG_VAL_LUT3[7]

Address		Bit Name	Bit Description
Byte	Bit		
158	2752	DM1_1 Configuration Register 0 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2753		REG_VAL_LUT2[1]
	2754		REG_VAL_LUT2[2]
	2755		REG_VAL_LUT2[3]
	2756	DM1_1 Configuration Register 0 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2757		
	2758		
	2759		
159	2760	DM1_1 Configuration Register 0 Data of Delay	Data[7:0]
	2761		
	2762		
	2763		
	2764		
	2765		
	2766		
	2767		
15A	2768	DM1_1 Configuration Register 0 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2769		

Address		Bit Name	Bit Description
Byte	Bit		
15A	2770	DM1_1 Configuration Register 0 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2771		
	2772		
	2773		
	2774	DM1_1 Configuration Register 0 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2775	DM1_1 Configuration Register 0 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
15B	2776	DM1_1 Configuration Register 1 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2777		
	2778		
	2779		
	2780		
	2781		
	2782	DM1_1 Configuration Register 1 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2783		
15C	2784		
	2785		
	2786		
	2787		
	2788	DM1_1 Configuration Register 1 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2789		
	2790		
	2791		
15D	2792		
	2793		

Address Byte	Address Bit	Bit Name	Bit Description
15D	2794	DM1_1 Configuration Register 1 DLY input from matrix	DM Delay input
	2795		
	2796		
	2797		
	2798		
	2799		
15E	2800	DM1_1 Configuration Register 1 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2801		REG_VAL_LUT3[1]
	2802		REG_VAL_LUT3[2]
	2803		REG_VAL_LUT3[3]
	2804		REG_VAL_LUT3[4]
	2805		REG_VAL_LUT3[5]
	2806		REG_VAL_LUT3[6]
	2807		REG_VAL_LUT3[7]
15F	2808	DM1_1 Configuration Register 1 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2809		REG_VAL_LUT2[1]
	2810		REG_VAL_LUT2[2]
	2811		REG_VAL_LUT2[3]
	2812	DM1_1 Configuration Register 1 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2813		
	2814		
	2815		

Address		Bit Name	Bit Description
Byte	Bit		
160	2816	DM1_1 Configuration Register 1 Data of Delay	Data[7:0]
	2817		
	2818		
	2819		
	2820		
	2821		
	2822		
	2823		
161	2824	DM1_1 Configuration Register 1 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2825		
	2826	DM1_1 Configuration Register 1 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2827		
	2828		
	2829		
	2830	DM1_1 Configuration Register 1 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2831	DM1_1 Configuration Register 1 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
162	2832	DM1_1 Configuration Register 2 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2833		
	2834		
	2835		
	2836		
	2837		

Address		Bit Name	Bit Description
Byte	Bit		
162	2838	DM1_1 Configuration Register 2 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2839		
163	2840		
	2841		
	2842		
	2843		
	2844	DM1_1 Configuration Register 2 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2845		
	2846		
	2847		
164	2848		
	2849		
	2850	DM1_1 Configuration Register 2 DLY input from matrix	DM Delay input
	2851		
	2852		
	2853		
	2854		
	2855		
165	2856	DM1_1 Configuration Register 2 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2857		REG_VAL_LUT3[1]
	2858		REG_VAL_LUT3[2]
	2859		REG_VAL_LUT3[3]
	2860		REG_VAL_LUT3[4]
	2861		REG_VAL_LUT3[5]
	2862		REG_VAL_LUT3[6]
	2863		REG_VAL_LUT3[7]
166	2864	DM1_1 Configuration Register 2 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2865		REG_VAL_LUT2[1]
	2866		REG_VAL_LUT2[2]
	2867		REG_VAL_LUT2[3]

Address		Bit Name	Bit Description
Byte	Bit		
166	2868	DM1_1 Configuration Register 2 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2869		
	2870		
	2871		
167	2872	DM1_1 Configuration Register 2 Data of Delay	Data[7:0]
	2873		
	2874		
	2875		
	2876		
	2877		
	2878		
	2879		
168	2880	DM1_1 Configuration Register 2 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2881		
	2882	DM1_1 Configuration Register 2 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2883		
	2884		
	2885		

Address		Bit Name	Bit Description
Byte	Bit		
168	2886	DM1_1 Configuration Register 2 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2887	DM1_1 Configuration Register 2 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
169	2888	DM1_1 Configuration Register 3 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2889		
	2890		
	2891		
	2892		
	2893		
	2894	DM1_1 Configuration Register 3 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2895		
16A	2896		
	2897		
	2898		
	2899		
	2900	DM1_1 Configuration Register 3 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2901		
	2902		
	2903		
16B	2904		
	2905		
	2906	DM1_1 Configuration Register 3 DLY input from matrix	DM Delay input
	2907		
	2908		
	2909		
	2910		
	2911		
16C	2912	DM1_1 Configuration Register 3 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2913		REG_VAL_LUT3[1]
	2914		REG_VAL_LUT3[2]
	2915		REG_VAL_LUT3[3]
	2916		REG_VAL_LUT3[4]
	2917		REG_VAL_LUT3[5]
	2918		REG_VAL_LUT3[6]
	2919		REG_VAL_LUT3[7]

Address		Bit Name	Bit Description
Byte	Bit		
16D	2920	DM1_1 Configuration Register 3 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2921		REG_VAL_LUT2[1]
	2922		REG_VAL_LUT2[2]
	2923		REG_VAL_LUT2[3]
	2924	DM1_1 Configuration Register 3 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2925		
	2926		
	2927		
16E	2928	DM1_1 Configuration Register 3 Data of Delay	Data[7:0]
	2929		
	2930		
	2931		
	2932		
	2933		
	2934		
	2935		
16F	2936	DM1_1 Configuration Register 3 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2937		

Address		Bit Name	Bit Description
Byte	Bit		
16F	2938	DM1_1 Configuration Register 3 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2939		
	2940		
	2941		
	2942	DM1_1 Configuration Register 3 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2943	DM1_1 Configuration Register 3 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
170	2944	DM1_1 Configuration Register 4 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2945		
	2946		
	2947		
	2948		
	2949		
	2950	DM1_1 Configuration Register 4 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2951		
171	2952		
	2953		
	2954		
	2955		
	2956	DM1_1 Configuration Register 4 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2957		
	2958		
	2959		
172	2960		
	2961		

Address Byte	Address Bit	Bit Name	Bit Description
172	2962	DM1_1 Configuration Register 4 DLY input from matrix	DM Delay input
	2963		
	2964		
	2965		
	2966		
	2967		
173	2968	DM1_1 Configuration Register 4 Data of 3-bit LUT	REG_VAL_LUT3[0]
	2969		REG_VAL_LUT3[1]
	2970		REG_VAL_LUT3[2]
	2971		REG_VAL_LUT3[3]
	2972		REG_VAL_LUT3[4]
	2973		REG_VAL_LUT3[5]
	2974		REG_VAL_LUT3[6]
	2975		REG_VAL_LUT3[7]
174	2976	DM1_1 Configuration Register 4 Data of 2-bit LUT	REG_VAL_LUT2[0]
	2977		REG_VAL_LUT2[1]
	2978		REG_VAL_LUT2[2]
	2979		REG_VAL_LUT2[3]
	2980	DM1_1 Configuration Register 4 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	2981		
	2982		
	2983		

Address		Bit Name	Bit Description
Byte	Bit		
175	2984	DM1_1 Configuration Register 4 Data of Delay	Data[7:0]
	2985		
	2986		
	2987		
	2988		
	2989		
	2990		
	2991		
176	2992	DM1_1 Configuration Register 4 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2993		
	2994	DM1_1 Configuration Register 4 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	2995		
	2996		
	2997		
	2998	DM1_1 Configuration Register 4 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	2999	DM1_1 Configuration Register 4 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
177	3000	DM1_1 Configuration Register 5 IN0 of 3-bit LUT	REG_MATRIX_LUT3_IN0_SEL[5:0]
	3001		
	3002		
	3003		
	3004		
	3005		

Address		Bit Name	Bit Description
Byte	Bit		
177	3006	DM1_1 Configuration Register 5 IN1 of 3-bit LUT	REG_MATRIX_LUT3_IN1_SEL[5:0]
	3007		
178	3008		
	3009		
	3010		
	3011		
	3012	DM1_1 Configuration Register 5 IN2 of 3-bit LUT	REG_MATRIX_LUT3_IN2_SEL[5:0]
	3013		
	3014		
	3015		
179	3016		
	3017		
	3018	DM1_1 Configuration Register 5 DLY input from matrix	DM Delay input
	3019		
	3020		
	3021		
	3022		
	3023		
17A	3024	DM1_1 Configuration Register 5 Data of 3-bit LUT	REG_VAL_LUT3[0]
	3025		REG_VAL_LUT3[1]
	3026		REG_VAL_LUT3[2]
	3027		REG_VAL_LUT3[3]
	3028		REG_VAL_LUT3[4]
	3029		REG_VAL_LUT3[5]
	3030		REG_VAL_LUT3[6]
	3031		REG_VAL_LUT3[7]
17B	3032	DM1_1 Configuration Register 5 Data of 2-bit LUT	REG_VAL_LUT2[0]
	3033		REG_VAL_LUT2[1]
	3034		REG_VAL_LUT2[2]
	3035		REG_VAL_LUT2[3]

Address		Bit Name	Bit Description
Byte	Bit		
17B	3036	DM1_1 Configuration Register 5 Clock source selection	Clock source sel[3:0] 0000: 25M 0001: 25M/4 0010: 2.048M 0011: 2.048M/8 0100: 2.048M/64 0101: 2.048M/512 0110: 2.048K 0111: 2.048K/8 1000: 2.048K/64 1001: 2.048K/512 1010: 2.048K/4096 1011: 2.048K/32768 1100: 2.048K/262144 1101: CNT_END 1110: External 1111: External
	3037		
	3038		
	3039		
17C	3040	DM1_1 Configuration Register 5 Data of Delay	Data[7:0]
	3041		
	3042		
	3043		
	3044		
	3045		
	3046		
	3047		
17D	3048	DM1_1 Configuration Register 5 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	3049		
	3050	DM1_1 Configuration Register 5 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: HIGH Level Reset CNT
	3051		
	3052		
	3053		

Address		Bit Name	Bit Description
Byte	Bit		
17D	3054	DM1_1 Configuration Register 5 MUX1 selection for 2-bit LUT	0: from 3-bit LUT 1: from matrix (DLY IN)
	3055	DM1_1 Configuration Register 5 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from 3-bit LUT
17E	3056	DM0_0 Selection Register State 0, bit [0]	selection bit[2:0]: 000: Not Used 001: DM0_0 Configuration Register 0 010: DM0_0 Configuration Register 1 011: DM0_0 Configuration Register 2 100: DM0_0 Configuration Register 3 101: DM0_0 Configuration Register 4 110: DM0_0 Configuration Register 5 111: Not Used
	3057	DM0_0 Selection Register State 1, bit [0]	
	3058	DM0_0 Selection Register State 2, bit [0]	
	3059	DM0_0 Selection Register State 3, bit [0]	
	3060	DM0_0 Selection Register State 4, bit [0]	
	3061	DM0_0 Selection Register State 5, bit [0]	
	3062	DM0_0 Selection Register State 6, bit [0]	
	3063	DM0_0 Selection Register State 7, bit [0]	
17F	3064	DM0_0 Selection Register State 8, bit [0]	
	3065	DM0_0 Selection Register State 9, bit [0]	
	3066	DM0_0 Selection Register State 10, bit [0]	
	3067	DM0_0 Selection Register State 11, bit [0]	

Address		Bit Name	Bit Description
Byte	Bit		
17F	3068	DM0_0 Selection Register State 0, bit [1]	selection bit[2:0]: 000: Not Used 001: DM0_0 Configuration Register 0 010: DM0_0 Configuration Register 1 011: DM0_0 Configuration Register 2 100: DM0_0 Configuration Register 3 101: DM0_0 Configuration Register 4 110: DM0_0 Configuration Register 5 111: Not Used
	3069	DM0_0 Selection Register State 1, bit [1]	
	3070	DM0_0 Selection Register State 2, bit [1]	
	3071	DM0_0 Selection Register State 3, bit [1]	
180	3072	DM0_0 Selection Register State 4, bit [1]	
	3073	DM0_0 Selection Register State 5, bit [1]	
	3074	DM0_0 Selection Register State 6, bit [1]	
	3075	DM0_0 Selection Register State 7, bit [1]	
	3076	DM0_0 Selection Register State 8, bit [1]	
	3077	DM0_0 Selection Register State 9, bit [1]	
	3078	DM0_0 Selection Register State 10, bit [1]	
	3079	DM0_0 Selection Register State 11, bit [1]	
181	3080	DM0_0 Selection Register State 0, bit [2]	selection bit[2:0]: 000: Not Used 001: DM0_0 Configuration Register 0 010: DM0_0 Configuration Register 1 011: DM0_0 Configuration Register 2 100: DM0_0 Configuration Register 3 101: DM0_0 Configuration Register 4 110: DM0_0 Configuration Register 5 111: Not Used
	3081	DM0_0 Selection Register State 1, bit [2]	
	3082	DM0_0 Selection Register State 2, bit [2]	
	3083	DM0_0 Selection Register State 3, bit [2]	
	3084	DM0_0 Selection Register State 4, bit [2]	
	3085	DM0_0 Selection Register State 5, bit [2]	
	3086	DM0_0 Selection Register State 6, bit [2]	
	3087	DM0_0 Selection Register State 7, bit [2]	
182	3088	DM0_0 Selection Register State 8, bit [2]	
	3089	DM0_0 Selection Register State 9, bit [2]	
	3090	DM0_0 Selection Register State 10, bit [2]	
	3091	DM0_0 Selection Register State 11, bit [2]	
	3092	DM0_0 Output Configuration Selection Register State 0, bit [0]	control bit[1:0]: 00:DM out0/1/2 keep 01:DM out bypass to out0, out1/2 keep 10: DM out bypass to out1, out0/2 keep 11: DM out bypass to out2, out0/1 keep
	3093	DM0_0 Output Configuration Selection Register State 1, bit [0]	
	3094	DM0_0 Output Configuration Selection Register State 2, bit [0]	
	3095	DM0_0 Output Configuration Selection Register State 3, bit [0]	
183	3096	DM0_0 Output Configuration Selection Register State 4, bit [0]	
	3097	DM0_0 Output Configuration Selection Register State 5, bit [0]	
	3098	DM0_0 Output Configuration Selection Register State 6, bit [0]	
	3099	DM0_0 Output Configuration Selection Register State 7, bit [0]	
	3100	DM0_0 Output Configuration Selection Register State 8, bit [0]	
	3101	DM0_0 Output Configuration Selection Register State 9, bit [0]	
	3102	DM0_0 Output Configuration Selection Register State 10, bit [0]	
	3103	DM0_0 Output Configuration Selection Register State 11, bit [0]	

Address		Bit Name	Bit Description
Byte	Bit		
184	3104	DM0_0 Output Configuration Selection Register State 0, bit [1]	control bit[1:0]: 00:DM out0/1/2 keep 01:DM out bypass to out0, out1/2 keep 10: DM out bypass to out1, out0/2 keep 11: DM out bypass to out2, out0/1 keep
	3105	DM0_0 Output Configuration Selection Register State 1, bit [1]	
	3106	DM0_0 Output Configuration Selection Register State 2, bit [1]	
	3107	DM0_0 Output Configuration Selection Register State 3, bit [1]	
	3108	DM0_0 Output Configuration Selection Register State 4, bit [1]	
	3109	DM0_0 Output Configuration Selection Register State 5, bit [1]	
	3110	DM0_0 Output Configuration Selection Register State 6, bit [1]	
	3111	DM0_0 Output Configuration Selection Register State 7, bit [1]	
185	3112	DM0_0 Output Configuration Selection Register State 8, bit [1]	
	3113	DM0_0 Output Configuration Selection Register State 9, bit [1]	
	3114	DM0_0 Output Configuration Selection Register State 10, bit [1]	
	3115	DM0_0 Output Configuration Selection Register State 11, bit [1]	
	3116	DM1_0 Selection Register State 0, bit [0]	selection bit[2:0]: 000: Not Used 001: DM1_0 Configuration Register 0 010: DM1_0 Configuration Register 1 011: DM1_0 Configuration Register 2 100: DM1_0 Configuration Register 3 101: DM1_0 Configuration Register 4 110: DM1_0 Configuration Register 5 111: Not Used
	3117	DM1_0 Selection Register State 1, bit [0]	
	3118	DM1_0 Selection Register State 2, bit [0]	
	3119	DM1_0 Selection Register State 3, bit [0]	
186	3120	DM1_0 Selection Register State 4, bit [0]	
	3121	DM1_0 Selection Register State 5, bit [0]	
	3122	DM1_0 Selection Register State 6, bit [0]	
	3123	DM1_0 Selection Register State 7, bit [0]	
	3124	DM1_0 Selection Register State 8, bit [0]	
	3125	DM1_0 Selection Register State 9, bit [0]	
	3126	DM1_0 Selection Register State 10, bit [0]	
	3127	DM1_0 Selection Register State 11, bit [0]	
187	3128	DM1_0 Selection Register State 0, bit [1]	selection bit[2:0]: 000: Not Used 001: DM1_0 Configuration Register 0 010: DM1_0 Configuration Register 1 011: DM1_0 Configuration Register 2 100: DM1_0 Configuration Register 3 101: DM1_0 Configuration Register 4 110: DM1_0 Configuration Register 5 111: Not Used
	3129	DM1_0 Selection Register State 1, bit [1]	
	3130	DM1_0 Selection Register State 2, bit [1]	
	3131	DM1_0 Selection Register State 3, bit [1]	
	3132	DM1_0 Selection Register State 4, bit [1]	
	3133	DM1_0 Selection Register State 5, bit [1]	
	3134	DM1_0 Selection Register State 6, bit [1]	
	3135	DM1_0 Selection Register State 7, bit [1]	
188	3136	DM1_0 Selection Register State 8, bit [1]	
	3137	DM1_0 Selection Register State 9, bit [1]	
	3138	DM1_0 Selection Register State 10, bit [1]	
	3139	DM1_0 Selection Register State 11, bit [1]	

Address		Bit Name	Bit Description
Byte	Bit		
188	3140	DM1_0 Selection Register State 0, bit [2]	selection bit[2:0]: 000: Not Used 001: DM1_0 Configuration Register 0 010: DM1_0 Configuration Register 1 011: DM1_0 Configuration Register 2 100: DM1_0 Configuration Register 3 101: DM1_0 Configuration Register 4 110: DM1_0 Configuration Register 5 111: Not Used
	3141	DM1_0 Selection Register State 1, bit [2]	
	3142	DM1_0 Selection Register State 2, bit [2]	
	3143	DM1_0 Selection Register State 3, bit [2]	
189	3144	DM1_0 Selection Register State 4, bit [2]	
	3145	DM1_0 Selection Register State 5, bit [2]	
	3146	DM1_0 Selection Register State 6, bit [2]	
	3147	DM1_0 Selection Register State 7, bit [2]	
	3148	DM1_0 Selection Register State 8, bit [2]	
	3149	DM1_0 Selection Register State 9, bit [2]	
	3150	DM1_0 Selection Register State 10, bit [2]	
	3151	DM1_0 Selection Register State 11, bit [2]	
18A	3152	DM0_1 Selection Register State 0, bit [0]	selection bit[2:0]: 000: Not Used 001: DM0_1 Configuration Register 0 010: DM0_1 Configuration Register 1 011: DM0_1 Configuration Register 2 100: DM0_1 Configuration Register 3 101: DM0_1 Configuration Register 4 110: DM0_1 Configuration Register 5 111: Not Used
	3153	DM0_1 Selection Register State 1, bit [0]	
	3154	DM0_1 Selection Register State 2, bit [0]	
	3155	DM0_1 Selection Register State 3, bit [0]	
	3156	DM0_1 Selection Register State 4, bit [0]	
	3157	DM0_1 Selection Register State 5, bit [0]	
	3158	DM0_1 Selection Register State 6, bit [0]	
	3159	DM0_1 Selection Register State 7, bit [0]	
18B	3160	DM0_1 Selection Register State 8, bit [0]	
	3161	DM0_1 Selection Register State 9, bit [0]	
	3162	DM0_1 Selection Register State 10, bit [0]	
	3163	DM0_1 Selection Register State 11, bit [0]	
	3164	DM0_1 Selection Register State 0, bit [1]	selection bit[2:0]: 000: Not Used 001: DM0_1 Configuration Register 0 010: DM0_1 Configuration Register 1 011: DM0_1 Configuration Register 2 100: DM0_1 Configuration Register 3 101: DM0_1 Configuration Register 4 110: DM0_1 Configuration Register 5 111: Not Used
	3165	DM0_1 Selection Register State 1, bit [1]	
	3166	DM0_1 Selection Register State 2, bit [1]	
	3167	DM0_1 Selection Register State 3, bit [1]	
18C	3168	DM0_1 Selection Register State 4, bit [1]	
	3169	DM0_1 Selection Register State 5, bit [1]	
	3170	DM0_1 Selection Register State 6, bit [1]	
	3171	DM0_1 Selection Register State 7, bit [1]	
	3172	DM0_1 Selection Register State 8, bit [1]	
	3173	DM0_1 Selection Register State 9, bit [1]	
	3174	DM0_1 Selection Register State 10, bit [1]	
	3175	DM0_1 Selection Register State 11, bit [1]	

Address		Bit Name	Bit Description
Byte	Bit		
18D	3176	DM0_1 Selection Register State 0, bit [2]	selection bit[2:0]: 000: Not Used 001: DM0_1 Configuration Register 0 010: DM0_1 Configuration Register 1 011: DM0_1 Configuration Register 2 100: DM0_1 Configuration Register 3 101: DM0_1 Configuration Register 4 110: DM0_1 Configuration Register 5 111: Not Used
	3177	DM0_1 Selection Register State 1, bit [2]	
	3178	DM0_1 Selection Register State 2, bit [2]	
	3179	DM0_1 Selection Register State 3, bit [2]	
	3180	DM0_1 Selection Register State 4, bit [2]	
	3181	DM0_1 Selection Register State 5, bit [2]	
	3182	DM0_1 Selection Register State 6, bit [2]	
	3183	DM0_1 Selection Register State 7, bit [2]	
18E	3184	DM0_1 Selection Register State 8, bit [2]	
	3185	DM0_1 Selection Register State 9, bit [2]	
	3186	DM0_1 Selection Register State 10, bit [2]	
	3187	DM0_1 Selection Register State 11, bit [2]	
	3188	DM0_1 Output Configuration Selection Register State 0, bit [0]	control bit[1:0]: 00:DM out0/1/2 keep 01:DM out bypass to out0, out1/2 keep 10: DM out bypass to out1, out0/2 keep 11: DM out bypass to out2, out0/1 keep
	3189	DM0_1 Output Configuration Selection Register State 1, bit [0]	
	3190	DM0_1 Output Configuration Selection Register State 2, bit [0]	
	3191	DM0_1 Output Configuration Selection Register State 3, bit [0]	
18F	3192	DM0_1 Output Configuration Selection Register State 4, bit [0]	
	3193	DM0_1 Output Configuration Selection Register State 5, bit [0]	
	3194	DM0_1 Output Configuration Selection Register State 6, bit [0]	
	3195	DM0_1 Output Configuration Selection Register State 7, bit [0]	
	3196	DM0_1 Output Configuration Selection Register State 8, bit [0]	
	3197	DM0_1 Output Configuration Selection Register State 9, bit [0]	
	3198	DM0_1 Output Configuration Selection Register State 10, bit [0]	
	3199	DM0_1 Output Configuration Selection Register State 11, bit [0]	
190	3200	DM0_1 Output Configuration Selection Register State 0, bit [1]	control bit[1:0]: 00:DM out0/1/2 keep 01:DM out bypass to out0, out1/2 keep 10: DM out bypass to out1, out0/2 keep 11: DM out bypass to out2, out0/1 keep
	3201	DM0_1 Output Configuration Selection Register State 1, bit [1]	
	3202	DM0_1 Output Configuration Selection Register State 2, bit [1]	
	3203	DM0_1 Output Configuration Selection Register State 3, bit [1]	
	3204	DM0_1 Output Configuration Selection Register State 4, bit [1]	
	3205	DM0_1 Output Configuration Selection Register State 5, bit [1]	
	3206	DM0_1 Output Configuration Selection Register State 6, bit [1]	
	3207	DM0_1 Output Configuration Selection Register State 7, bit [1]	
191	3208	DM0_1 Output Configuration Selection Register State 8, bit [1]	
	3209	DM0_1 Output Configuration Selection Register State 9, bit [1]	
	3210	DM0_1 Output Configuration Selection Register State 10, bit [1]	
	3211	DM0_1 Output Configuration Selection Register State 11, bit [1]	

Address		Bit Name	Bit Description
Byte	Bit		
191	3212	DM1_1 Selection Register State 0, bit [0]	selection bit[2:0]: 000: Not Used 001: DM1_1 Configuration Register 0 010: DM1_1 Configuration Register 1 011: DM1_1 Configuration Register 2 100: DM1_1 Configuration Register 3 101: DM1_1 Configuration Register 4 110: DM1_1 Configuration Register 5 111: Not Used
	3213	DM1_1 Selection Register State 1, bit [0]	
	3214	DM1_1 Selection Register State 2, bit [0]	
	3215	DM1_1 Selection Register State 3, bit [0]	
192	3216	DM1_1 Selection Register State 4, bit [0]	
	3217	DM1_1 Selection Register State 5, bit [0]	
	3218	DM1_1 Selection Register State 6, bit [0]	
	3219	DM1_1 Selection Register State 7, bit [0]	
	3220	DM1_1 Selection Register State 8, bit [0]	
	3221	DM1_1 Selection Register State 9, bit [0]	
	3222	DM1_1 Selection Register State 10, bit [0]	
	3223	DM1_1 Selection Register State 11, bit [0]	
193	3224	DM1_1 Selection Register State 0, bit [1]	selection bit[2:0]: 000: Not Used 001: DM1_1 Configuration Register 0 010: DM1_1 Configuration Register 1 011: DM1_1 Configuration Register 2 100: DM1_1 Configuration Register 3 101: DM1_1 Configuration Register 4 110: DM1_1 Configuration Register 5 111: Not Used
	3225	DM1_1 Selection Register State 1, bit [1]	
	3226	DM1_1 Selection Register State 2, bit [1]	
	3227	DM1_1 Selection Register State 3, bit [1]	
	3228	DM1_1 Selection Register State 4, bit [1]	
	3229	DM1_1 Selection Register State 5, bit [1]	
	3230	DM1_1 Selection Register State 6, bit [1]	
	3231	DM1_1 Selection Register State 7, bit [1]	
194	3232	DM1_1 Selection Register State 8, bit [1]	
	3233	DM1_1 Selection Register State 9, bit [1]	
	3234	DM1_1 Selection Register State 10, bit [1]	
	3235	DM1_1 Selection Register State 11, bit [1]	
	3236	DM1_1 Selection Register State 0, bit [2]	selection bit[2:0]: 000: Not Used 001: DM1_1 Configuration Register 0 010: DM1_1 Configuration Register 1 011: DM1_1 Configuration Register 2 100: DM1_1 Configuration Register 3 101: DM1_1 Configuration Register 4 110: DM1_1 Configuration Register 5 111: Not Used
	3237	DM1_1 Selection Register State 1, bit [2]	
	3238	DM1_1 Selection Register State 2, bit [2]	
	3239	DM1_1 Selection Register State 3, bit [2]	
195	3240	DM1_1 Selection Register State 4, bit [2]	
	3241	DM1_1 Selection Register State 5, bit [2]	
	3242	DM1_1 Selection Register State 6, bit [2]	
	3243	DM1_1 Selection Register State 7, bit [2]	
	3244	DM1_1 Selection Register State 8, bit [2]	
	3245	DM1_1 Selection Register State 9, bit [2]	
	3246	DM1_1 Selection Register State 10, bit [2]	
	3247	DM1_1 Selection Register State 11, bit [2]	

Address		Bit Name	Bit Description
Byte	Bit		
196	3248	DM0_0 function 4 outputs initial value	0: initial 0 1: initial 1
	3249	DM0_1 function 4 outputs initial value	0: initial 0 1: initial 1
	3250	Reserved	
	3251	Reserved	
	3252	Reserved	
	3253	Reserved	
	3254	Reserved	
	3255	Reserved	
197	3256	Reserved	
	3257	Reserved	
	3258	Reserved	
	3259	Reserved	
	3260	V_{REF}O0 register PD control	V_{REF}O0 register Power-down signal 0: Power-down, 1: Power-On
	3261	V_{REF}O0 PD control select	V_{REF}O0 pd selection 0: from register [3260], 1: from Matrix OUT [78]
	3262	V_{REF}O1 register PD control	V_{REF}O1 register Power-down signal 0: Power-down, 1: Power-On
	3263	V_{REF}O1 PD control select	V_{REF}O1 pd selection 0: from register [3262], 1: from Matrix OUT [78]
198	3264	F1 stack memory, lower byte	Bit0 (top memory)
	3265		Bit1
	3266		Bit2
	3267		Bit3
	3268		Bit4
	3269		Bit5
	3270		Bit6
	3271		Bit7
199	3272	F1 stack memory, higher byte	Bit8
	3273		Bit9
	3274		Bit10
	3275		Bit11
	3276		Bit12
	3277		Bit13
	3278		Bit14
	3279		Bit15

Address		Bit Name	Bit Description
Byte	Bit		
19A	3280	aio0-3 input selection load 1	00: aio0 01: aio1 10: aio2 11: aio3
	3281		
	3282	ACMP4_F V_{REF} selection load 1	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3283		
	3284		
	3285		
	3286		
	3287		
19B	3288	aio0-3 input selection load 2	00: aio0 01: aio1 10: aio2 11: aio3
	3289		
	3290	ACMP4_F V_{REF} selection load 2	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3291		
	3292		
	3293		
	3294		
	3295		
19C	3296	aio4-7 input selection load 3	00: aio4 01: aio5 10: aio6 11: aio7
	3297		
	3298	ACMP4_F V_{REF} selection load 3	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3299		
	3300		
	3301		
	3302		
	3303		

Address		Bit Name	Bit Description
Byte	Bit		
19D	3304	aio4-7 input selection load 4	00: aio4 01: aio5 10: aio6 11: aio7
	3305		
	3306	ACMP4_F V_{REF} selection load 4	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3307		
	3308		
	3309		
	3310		
	3311		
19E	3312	F1 input selection load 1	0: from matrix 1: from ACMP4_F
	3313	F1 input selection load 2	0: from matrix 1: from ACMP4_F
	3314	F1 input selection load 3	0: from matrix 1: from ACMP4_F
	3315	F1 input selection load 4	0: from matrix 1: from ACMP4_F
	3316	Reserved	
	3317	Delay clock source selection	000: OSC2 001: OSC2/4 010: OSC1 011: OSC1/8 100: OSC1/64 101: OSC0 110: OSC0/8 111: OSC0/64
	3318		
	3319		
19F	3320	F1 delay data	Data[7:0]
	3321		
	3322		
	3323		
	3324		
	3325		
	3326		
	3327		
1A0	3328	F1 CMD1 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3329		
	3330		
	3331		

Address		Bit Name	Bit Description
Byte	Bit		
1A0	3332	F1 CMD2 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3333		
	3334		
	3335		
1A1	3336	F1 CMD3 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3337		
	3338		
	3339		
	3340	F1 CMD4 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3341		
	3342		
	3343		
1A2	3344	F1 CMD5 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3345		
	3346		
	3347		
	3348	F1 CMD6 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3349		
	3350		
	3351		
1A3	3352	F1 CMD7 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3353		
	3354		
	3355		
	3356	F1 CMD8 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3357		
	3358		
	3359		
1A4	3360	F1 CMD9 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3361		
	3362		
	3363		

Address		Bit Name	Bit Description
Byte	Bit		
1A4	3364	F1 CMD10 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3365		
	3366		
	3367		
1A5	3368	F1 CMD11 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3369		
	3370		
	3371		
	3372	F1 CMD12 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3373		
	3374		
	3375		
1A6	3376	Loop with delay to location selection	0000:CMD1; 0001:CMD2; 0010:CMD3; 0011:CMD4; 0100:CMD5; 0101:CMD6:or; 0110:CMD7; 0111:CMD8; 1000:CMD9; 1001:CMD10; 1010:CMD11; 1011:CMD12
	3377		
	3378		
	3379		
	3380	Output mux1 initial state setting	00: keep 01: 0 10: 1 11: none
	3381		
	3382	Output mux2 initial state setting	00: keep 01: 0 10: 1 11: none
	3383		
1A7	3384	Output mux3 initial state setting	00: keep 01: 0 10: 1 11: none
	3385		
	3386	Interrupt reset stack memory enable	0: no reset stack memory 1: reset stack memory
	3387	Reserved	
	3388	Reserved	
	3389	Reserved	
	3390	Reserved	
	3391	Reserved	

Address		Bit Name	Bit Description
Byte	Bit		
1A8	3392	aio0-3 input selection load 1	00: aio0 01: aio1 10: aio2 11: aio3
	3393		
	3394	ACMP4_F V_{REF} selection load 1	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3395		
	3396		
	3397		
	3398		
	3399		
1A9	3400	aio0-3 input selection load 2	00: aio0 01: aio1 10: aio2 11: aio3
	3401		
	3402	ACMP4_F V_{REF} selection load 2	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3403		
	3404		
	3405		
	3406		
	3407		
1AA	3408	aio4-7 input selection load 3	00: aio4 01: aio5 10: aio6 11: aio7
	3409		
	3410	ACMP4_F V_{REF} selection load 3	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3411		
	3412		
	3413		
	3414		
	3415		
1AB	3416	aio4-7 input selection load 4	00: aio4 01: aio5 10: aio6 11: aio7
	3417		

Address		Bit Name	Bit Description
Byte	Bit		
1AB	3418	ACMP4_F V_{REF} selection load 4	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3419		
	3420		
	3421		
	3422		
	3423		
1AC	3424	F1 input selection load 1	0: from matrix 1: from ACMP4_F
	3425	F1 input selection load 2	0: from matrix 1: from ACMP4_F
	3426	F1 input selection load 3	0: from matrix 1: from ACMP4_F
	3427	F1 input selection load 4	0: from matrix 1: from ACMP4_F
	3428	Reserved	
	3429	Delay clock source selection	000: OSC2 001: OSC2/4 010: OSC1 011: OSC1/8 100: OSC1/64 101: OSC0 110: OSC0/8 111: OSC0/64
	3430		
	3431		
1AD	3432	F1 delay data	Data[7:0]
	3433		
	3434		
	3435		
	3436		
	3437		
	3438		
	3439		
1AE	3440	F1 CMD1 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3441		
	3442		
	3443		

Address		Bit Name	Bit Description
Byte	Bit		
1AE	3444	F1 CMD2 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3445		
	3446		
	3447		
1AF	3448	F1 CMD3 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3449		
	3450		
	3451		
	3452	F1 CMD4 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3453		
	3454		
	3455		
1B0	3456	F1 CMD5 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3457		
	3458		
	3459		
	3460	F1 CMD6 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3461		
	3462		
	3463		
1B1	3464	F1 CMD7 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3465		
	3466		
	3467		
	3468	F1 CMD8 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3469		
	3470		
	3471		
1B2	3472	F1 CMD9 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3473		
	3474		
	3475		

Address		Bit Name	Bit Description
Byte	Bit		
1B2	3476	F1 CMD10 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3477		
	3478		
	3479		
1B3	3480	F1 CMD11 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3481		
	3482		
	3483		
	3484	F1 CMD12 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3485		
	3486		
	3487		
1B4	3488	Loop with delay to location selection	0000:CMD1; 0001:CMD2; 0010:CMD3; 0011:CMD4; 0100:CMD5; 0101:CMD6:or; 0110:CMD7; 0111:CMD8; 1000:CMD9; 1001:CMD10; 1010:CMD11; 1011:CMD12
	3489		
	3490		
	3491		
	3492	Output mux1 initial state setting	00: keep 01: 0 10: 1 11: none
	3493		
	3494	Output mux2 initial state setting	00: keep 01: 0 10: 1 11: none
	3495		
1B5	3496	Output mux3 initial state setting	00: keep 01: 0 10: 1 11: none
	3497		
	3498	Interrupt reset stack memory enable	0: no reset stack memory 1: reset stack memory
	3499	Reserved	
	3500	Reserved	
	3501	Reserved	
	3502	Reserved	
	3503	Reserved	

Address		Bit Name	Bit Description
Byte	Bit		
1B6	3504	aio0-3 input selection load 1	00: aio0 01: aio1 10: aio2 11: aio3
	3505		
	3506	ACMP4_F V_{REF} selection load 1	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3507		
	3508		
	3509		
	3510		
	3511		
1B7	3512	aio0-3 input selection load 2	00: aio0 01: aio1 10: aio2 11: aio3
	3513		
	3514	ACMP4_F V_{REF} selection load 2	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3515		
	3516		
	3517		
	3518		
	3519		
1B8	3520	aio4-7 input selection load 3	00: aio4 01: aio5 10: aio6 11: aio7
	3521		
	3522	ACMP4_F V_{REF} selection load 3	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3523		
	3524		
	3525		
	3526		
	3527		
1B9	3528	aio4-7 input selection load 4	00: aio4 01: aio5 10: aio6 11: aio7
	3529		

Address		Bit Name	Bit Description
Byte	Bit		
1B9	3530	ACMP4_F V_{REF} selection load 4	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External VRE
	3531		
	3532		
	3533		
	3534		
	3535		
1BA	3536	F1 input selection load 1	0: from matrix 1: from ACMP4_F
	3537	F1 input selection load 2	0: from matrix 1: from ACMP4_F
	3538	F1 input selection load 3	0: from matrix 1: from ACMP4_F
	3539	F1 input selection load 4	0: from matrix 1: from ACMP4_F
	3540	Reserved	
	3541	Delay clock source selection	000: OSC2 001: OSC2/4 010: OSC1 011: OSC1/8 100: OSC1/64 101: OSC0 110: OSC0/8 111: OSC0/64
	3542		
	3543		
1BB	3544	F1 delay data	Data[7:0]
	3545		
	3546		
	3547		
	3548		
	3549		
	3550		
	3551		
1BC	3552	F1 CMD1 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3553		
	3554		
	3555		

Address		Bit Name	Bit Description
Byte	Bit		
1BC	3556	F1 CMD2 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3557		
	3558		
	3559		
1BD	3560	F1 CMD3 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end.
	3561		
	3562		
	3563		
	3564	F1 CMD4 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end.
	3565		
	3566		
	3567		
1BE	3568	F1 CMD5 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3569		
	3570		
	3571		
	3572	F1 CMD6 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3573		
	3574		
	3575		
1BF	3576	F1 CMD7 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv;1 000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3577		
	3578		
	3579		
	3580	F1 CMD8 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3581		
	3582		
	3583		
1C0	3584	F1 CMD9 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3585		
	3586		
	3587		

Address		Bit Name	Bit Description
Byte	Bit		
1C0	3588	F1 CMD10 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3589		
	3590		
	3591		
1C1	3592	F1 CMD11 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3593		
	3594		
	3595		
	3596	F1 CMD12 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3597		
	3598		
	3599		
1C2	3600	Loop with delay to location selection	0000:CMD1; 0001:CMD2; 0010:CMD3; 0011:CMD4; 0100:CMD5; 0101:CMD6:or; 0110:CMD7; 0111:CMD8; 1000:CMD9; 1001:CMD10; 1010:CMD11; 1011:CMD12
	3601		
	3602		
	3603		
	3604	Output mux1 initial state setting	00: keep 01: 0 10: 1 11: none
	3605		
	3606	Output mux2 initial state setting	00: keep 01: 0 10: 1 11: none
	3607		
1C3	3608	Output mux3 initial state setting	00: keep 01: 0 10: 1 11: none
	3609		
	3610	Interrupt reset stack memory enable	0: no reset stack memory 1: reset stack memory
	3611	Reserved	
	3612	Reserved	
	3613	Reserved	
	3614	Reserved	
	3615	Reserved	

Address		Bit Name	Bit Description
Byte	Bit		
1C4	3616	aio0-3 input selection load 1	00: aio0 01: aio1 10: aio2 11: aio3
	3617		
	3618	ACMP4_F V_{REF} selection load 1	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3619		
	3620		
	3621		
	3622		
	3623		
1C5	3624	aio0-3 input selection load 2	00: aio0 01: aio1 10: aio2 11: aio3
	3625		
	3626	ACMP4_F V_{REF} selection load 2	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3627		
	3628		
	3629		
	3630		
	3631		
1C6	3632	aio4-7 input selection load 3	00: aio4 01: aio5 10: aio6 11: aio7
	3633		
	3634	ACMP4_F V_{REF} selection load 3	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3635		
	3636		
	3637		
	3638		
	3639		
1C7	3640	aio4-7 input selection load 4	00: aio4 01: aio5 10: aio6 11: aio7
	3641		

Address		Bit Name	Bit Description
Byte	Bit		
1C7	3642	ACMP4_F V_{REF} selection load 4	"F1 input selection load 1" bit = 0: Matrix input select: 000000: Matrix IN [0]; ~ 111111: Matrix IN [63] "F1 input selection load 1" bit = 1: ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV; 111111: External V_{REF}
	3643		
	3644		
	3645		
	3646		
	3647		
1C8	3648	F1 input selection load 1	0: from matrix 1: from ACMP4_F
	3649	F1 input selection load 2	0: from matrix 1: from ACMP4_F
	3650	F1 input selection load 3	0: from matrix 1: from ACMP4_F
	3651	F1 input selection load 4	0: from matrix 1: from ACMP4_F
	3652	Reserved	
	3653	Delay clock source selection	000: OSC2 001: OSC2/4 010: OSC1 011: OSC1/8 100: OSC1/64 101: OSC0 110: OSC0/8 111: OSC0/64
	3654		
	3655		
1C9	3656	F1 delay data	Data[7:0]
	3657		
	3658		
	3659		
	3660		
	3661		
	3662		
	3663		
1CA	3664	F1 CMD1 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3665		
	3666		
	3667		

Address		Bit Name	Bit Description
Byte	Bit		
1CA	3668	F1 CMD2 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3669		
	3670		
	3671		
1CB	3672	F1 CMD3 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3673		
	3674		
	3675		
	3676	F1 CMD4 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3677		
	3678		
	3679		
1CC	3680	F1 CMD5 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end.
	3681		
	3682		
	3683		
	3684	F1 CMD6 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3685		
	3686		
	3687		
1CD	3688	F1 CMD7 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3689		
	3690		
	3691		
	3692	F1 CMD8 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3693		
	3694		
	3695		
1CE	3696	F1 CMD9 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3697		
	3698		
	3699		

Address Byte	Address Bit	Bit Name	Bit Description
1CE	3700	F1 CMD10 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end.
	3701		
	3702		
	3703		
1CF	3704	F1 CMD11 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end.
	3705		
	3706		
	3707		
	3708	F1 CMD12 selection	0000:load1; 0001:load2; 0010:load3; 0011:load4; 0100:and; 0101:or; 0110:xor; 0111:inv; 1000:push0; 1001:pop; 1010:delay; 1011:delay with loop; 1100:out1; 1101:out2; 1110:out3; 1111:end
	3709		
	3710		
	3711		
1D0	3712	Loop with delay to location selection	0000: CMD1; 0001: CMD2; 0010: CMD3; 0011: CMD4; 0100: CMD5; 0101: CMD6 or; 0110: CMD7; 0111: CMD8; 1000: CMD9; 1001: CMD10; 1010: CMD11; 1011: CMD12
	3713		
	3714		
	3715		
	3716	Output mux1 initial state setting	00: keep 01: 0 10: 1 11: none
	3717		
	3718	Output mux2 initial state setting	00: keep 01: 0 10: 1 11: none
	3719		
1D1	3720	Output mux3 initial state setting	00: keep 01: 0 10: 1 11: none
	3721		
	3722	Interrupt reset stack memory enable	0: no reset stack memory 1: reset stack memory
	3723	Reserved	
	3724	Reserved	
	3725	Reserved	
	3726	Reserved	
	3727	Reserved	

Address		Bit Name	Bit Description
Byte	Bit		
1D2	3728	F1 state 0 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3729		
	3730		
	3731	F1 state 1 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3732		
	3733		
	3734	F1 state 2 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3735		
1D3	3736		
	3737	F1 state 3 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3738		
	3739		
	3740	F1 state 4 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3741		
	3742		
	3743	F1 state 5 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
1D4	3744		
	3745		

Address		Bit Name	Bit Description
Byte	Bit		
1D4	3746 3747 3748	F1 state 6 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
1D4	3749 3750 3751	F1 state 7 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
1D5	3752 3753 3754	F1 state 8 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
1D5	3755 3756 3757	F1 state 9 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
1D5 1D6	3758 3759 3760	F1 state 10 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
1D6	3761 3762 3763	F1 state 11 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none

Address Byte	Address Bit	Bit Name	Bit Description
1D6	3764	Reserved	
	3765	Reserved	
	3766	Register interrupt	1: interrupt active
	3767	Reserved	
1D7	3768	Matrix Input 0	GND
	3769	Matrix Input 1	GPIO0 Digital Input
	3770	Matrix Input 2	GPIO1 Digital Input
	3771	Matrix Input 3	GPIO2 Digital Input
	3772	Matrix Input 4	GPI0 Digital Input
	3773	Matrix Input 5	GPI1 Digital Input
	3774	Matrix Input 6	GPIO3 Digital Input
	3775	Matrix Input 7	GPIO4 Digital Input
1D8	3776	Matrix Input 8	2-bit LUT0/DFF0 Output
	3777	Matrix Input 9	2-bit LUT1/PGen Output
	3778	Matrix Input 10	3-bit LUT0/DFF1 Output
	3779	Matrix Input 11	3-bit LUT1/DFF2 Output
	3780	Matrix Input 12	3-bit LUT2/DFF3 Output
	3781	Matrix Input 13	3-bit LUT3/DFF4 Output
	3782	Matrix Input 14	3-bit LUT4/CNT_DLY1(8bit) Output
	3783	Matrix Input 15	3-bit LUT5/CNT_DLY2(8bit) Output
1D9	3784	Matrix Input 16	3-bit LUT6/CNT_DLY3(8bit) Output
	3785	Matrix Input 17	3-bit LUT7/CNT_DLY4(8bit) Output
	3786	Matrix Input 18	4-bit LUT0/CNT_DLY0(16bit) Output
	3787	Matrix Input 19	3-bit LUT8/Pipe Delay Output0/Ripple CNT Output0
	3788	Matrix Input 20	Pipe Delay Output1/Ripple CNT Output1
	3789	Matrix Input 21	Internal OSC1 2.048 MHz Output
	3790	Matrix Input 22	Internal OSC0 2.048 kHz Output
	3791	Matrix Input 23	Internal OSC2 25 MHz Output
1DA	3792	Matrix Input 24	Filter0/Edge Detect0 Output/Ripple CNT Output2
	3793	Matrix Input 25	Programmable Delay with Edge Detector Output
	3794	Matrix Input 26	f(1) Function Output0
	3795	Matrix Input 27	f(1) Function Output1
	3796	Matrix Input 28	f(1) Function Output2
	3797	Matrix Input 29	DM0_0 Block Output0

Address		Bit Name	Bit Description
Byte	Bit		
1DA	3798	Matrix Input 30	DM0_0 Block Output1
	3799	Matrix Input 31	DM0_0 Block Output2
1DB	3800	Matrix Input 32	GPI2/SDA Digital Input or I^2C_virtual_0 Input
	3801	Matrix Input 33	GPI3/SCL Digital Input or I^2C_virtual_1 Input
	3802	Matrix Input 34	I^2C_virtual_2 Input
	3803	Matrix Input 35	I^2C_virtual_3 Input
	3804	Matrix Input 36	I^2C_virtual_4 Input
	3805	Matrix Input 37	I^2C_virtual_5 Input
	3806	Matrix Input 38	I^2C_virtual_6 Input
	3807	Matrix Input 39	I^2C_virtual_7 Input
1DC	3808	Matrix Input 40	DM0_1 Macrocell Output0
	3809	Matrix Input 41	DM0_1 Macrocell Output1
	3810	Matrix Input 42	DM0_1 Macrocell Output2
	3811	Matrix Input 43	ASM Connection Matrix Output RAM 0
	3812	Matrix Input 44	ASM Connection Matrix Output RAM 1
	3813	Matrix Input 45	ASM Connection Matrix Output RAM 2
	3814	Matrix Input 46	ASM Connection Matrix Output RAM 3
	3815	Matrix Input 47	GPIO5 Digital Input
1DD	3816	Matrix Input 48	GPIO6 Digital Input
	3817	Matrix Input 49	GPIO7 Digital Input
	3818	Matrix Input 50	GPIO8 Digital Input
	3819	Matrix Input 51	GPI4 Digital Input
	3820	Matrix Input 52	GPI5 Digital Input
	3821	Matrix Input 53	GPI6 Digital Input
	3822	Matrix Input 54	GPI7 Digital Input
	3823	Matrix Input 55	GPIO9 Digital Input
1DE	3824	Matrix Input 56	ACMP0H Output
	3825	Matrix Input 57	ACMP1H Output
	3826	Matrix Input 58	ACMP2L Output
	3827	Matrix Input 59	ACMP3L output
	3828	Matrix Input 60	GPIO10 Digital Input
	3829	Matrix Input 61	GPIO11 Digital Input
	3830	Matrix Input 62	nRST_core (POR) as matrix input
	3831	Matrix Input 63	V_{DD}

Address		Bit Name	Bit Description
Byte	Bit		
1DF	3832	CNT0 (16bits) Counted Value	
	3833		
	3834		
	3835		
	3836		
	3837		
	3838		
	3839		
1E0	3840		
	3841		
	3842		
	3843		
	3844		
	3845		
	3846		
	3847		
1E1	3848	CNT2 (8bits) Counted Value	
	3849		
	3850		
	3851		
	3852		
	3853		
	3854		
	3855		
1E2	3856	CNT4 (8bits) Counted Value	
	3857		
	3858		
	3859		
	3860		
	3861		
	3862		
	3863		

Address		Bit Name	Bit Description
Byte	Bit		
1E3	3864	ASM state read back	
	3865		
	3866		
	3867		
	3868		
	3869		
	3870		
	3871		
1E4	3872		
	3873		
	3874		
	3875		
	3876		
	3877		
	3878		
	3879		
1E5	3880	GPIO4 I^{2}C output expander data	
	3881	GPIO4 I^{2}C output expander select	0: GPIO4 output from matrix 1: GPIO4 output is register
	3882	GPIO5 I^{2}C output expander data	
	3883	GPIO5 I^{2}C output expander select	0: GPIO5 output from matrix 1: GPIO5 output is register
	3884	GPIO6 I^{2}C output expander data	
	3885	GPIO6 I^{2}C output expander select	0: GPIO6 output from matrix 1: GPIO6 output is register
	3886	GPIO7 I^{2}C output expander data	
	3887	GPIO7 I^{2}C output expander select	0: GPIO7 output from matrix 1: GPIO7 output is register
1E6	3888	ACMP0_H Gain divider	ACMP gain divider select: 00: 1x 01: 0.5x 10: 0.33x 11: 0.25x
	3889		

Address		Bit Name	Bit Description
Byte	Bit		
1E6	3890	ACMP0_H V_{REF}	ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV 111111: External V_{REF}
	3891		
	3892		
	3893		
	3894		
	3895		
1E7	3896	ACMP1_H Gain divider	ACMP gain divider select: 00: 1x 01: 0.5x 10: 0.33x 11: 0.25x
	3897		
	3898	ACMP1_H V_{REF}	ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV 111111: External V_{REF}
	3899		
	3900		
	3901		
	3902		
	3903		
1E8	3904	ACMP2_L Gain divider	ACMP gain divider select: 00: 1x 01: 0.5x 10: 0.33x 11: 0.25x
	3905		
	3906	ACMP2_L V_{REF}	ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV 111111: External V_{REF}
	3907		
	3908		
	3909		
	3910		
	3911		
1E9	3912	ACMP3_L Gain divider	ACMP gain divider select: 00: 1x 01: 0.5x 10: 0.33x 11: 0.25x
	3913		
	3914	ACMP3_L V_{REF}	ACMP V_{REF} select: 000000: 32 mV ~ 111110: 2.016 V/step = 32 mV 111111: External V_{REF}
	3915		
	3916		
	3917		
	3918		
	3919		

Address		Bit Name	Bit Description
Byte	Bit		
1EA	3920	REG_LUT4_0_D0[15:0]	Data[15:0]
	3921		
	3922		
	3923		
	3924		
	3925		
	3926		
	3927		
1EB	3928		
	3929		
	3930		
	3931		
	3932		
	3933		
	3934		
	3935		
1EC	3936	REG_LUT3_4_D1[7:0]	Data[7:0]
	3937		
	3938		
	3939		
	3940		
	3941		
	3942		
	3943		
1ED	3944	REG_LUT3_5_D2[7:0]	Data[7:0]
	3945		
	3946		
	3947		
	3948		
	3949		
	3950		
	3951		

Address		Bit Name	Bit Description
Byte	Bit		
1EE	3952	REG_LUT3_6_D3[7:0]	Data[7:0]
	3953		
	3954		
	3955		
	3956		
	3957		
	3958		
	3959		
1EF	3960	REG_LUT3_7_D4[7:0]	Data[7:0]
	3961		
	3962		
	3963		
	3964		
	3965		
	3966		
	3967		
1F0	3968	Reserved	
	3969	Reserved	
	3970	Reserved	
	3971	Reserved	
	3972	Reserved	
	3973	Reserved	
	3974	Reserved	
	3975	Reserved	
1F1	3976	Reserved	
	3977	Reserved	
	3978	Reserved	
	3979	Reserved	
	3980	Reserved	
	3981	Reserved	
	3982	Reserved	
	3983	Reserved	

Address		Bit Name	Bit Description
Byte	Bit		
1F2	3984	Reserved	
	3985	Reserved	
	3986	Reserved	
	3987	Reserved	
	3988	Reserved	
	3989	Reserved	
	3990	Reserved	
	3991	Reserved	
1F3	3992	Reserved	
	3993	Reserved	
	3994	Reserved	
	3995	Reserved	
	3996	Reserved	
	3997	Reserved	
	3998	Reserved	
	3999	Reserved	
1F4	4000	Reserved	
	4001	Reserved	
	4002	Reserved	
	4003	Reserved	
	4004	Reserved	
	4005	Reserved	
	4006	Reserved	
	4007	Reserved	
1F5	4008	Reserved	
	4009	Reserved	
	4010	Reserved	
	4011	Reserved	
	4012	Reserved	
	4013	Reserved	
	4014	Reserved	
	4015	Reserved	

Address		Bit Name	Bit Description
Byte	Bit		
1F6	4016	Reserved	
	4017	Reserved	
	4018	Reserved	
	4019	Reserved	
	4020	Reserved	
	4021	Reserved	
	4022	Reserved	
	4023	Reserved	
1F7	4024	Reserved	
	4025	Reserved	
	4026	Reserved	
	4027	Reserved	
	4028	Reserved	
	4029	Reserved	
	4030	Reserved	
	4031	Reserved	
1F8	4032	Reserved	
	4033	Reserved	
	4034	Reserved	
	4035	Reserved	
	4036	Reserved	
	4037	Reserved	
	4038	Reserved	
	4039	Reserved	
1F9	4040	8-bit Pattern ID Byte 0 (From NVM): ID[23:16]	
	4041		
	4042		
	4043		
	4044		
	4045		
	4046		
	4047		

Address		Bit Name	Bit Description
Byte	Bit		
1FA	4048	Reserved	
	4049	Reserved	
	4050	Reserved	
	4051	Reserved	
	4052	Reserved	
	4053	Reserved	
	4054	Reserved	
	4055	Reserved	
1FB	4056	Reserved	
	4057	Reserved	
	4058	Reserved	
	4059	Reserved	
	4060	Reserved	
	4061	Reserved	
	4062	Reserved	
	4063	Reserved	
1FC	4064	I^2C reset bit with reloading NVM into Data register (soft reset)	0: Keep existing condition 1: Reset execution
	4065	IO Latching Enable During I^2C Write Interface	0: Disable 1: Enable
	4066	Reserved	
	4067	Protect mode enable	0: Disable 1: Enable
	4068	Reserved	0: Disable 1: Enable
	4069	Register protection mode bit 0	000: all open read/write (mode 0); 001: partly lock read (mode 1); 010: partly lock read2 (mode 2);011: partly lock read2/write (mode 3); 100: all lock read (mode 4); 101: all lock write (mode 5); 110: all lock read/write (mode 6)
	4070	Register protection mode bit 1	
	4071	Register protection mode bit 2	
1FD	4072	I^2C write mask bits	1: mask 0: overwrite
	4073		
	4074		
	4075		
	4076		
	4077		
	4078		
	4079		

Address		Bit Name	Bit Description
Byte	Bit		
1FE	4080	I²C target address	
	4081		
	4082		
	4083		
	4084	I²C operation disable bit	0: I²C operation enable; Matrix IN [34](35) select I²C_virtual_0(1) Input 1: I²C operation disable; Matrix IN [34](35) select GPI2(3) digital input
	4085	Reserved	
	4086	Reserved	
	4087	Target address selection	0: from Register 1: from Pin
1FF	4088	Reserved	
	4089	Reserved	
	4090	Reserved	
	4091	Reserved	
	4092	Reserved	
	4093	Reserved	
	4094	Reserved	
	4095	Reserved	

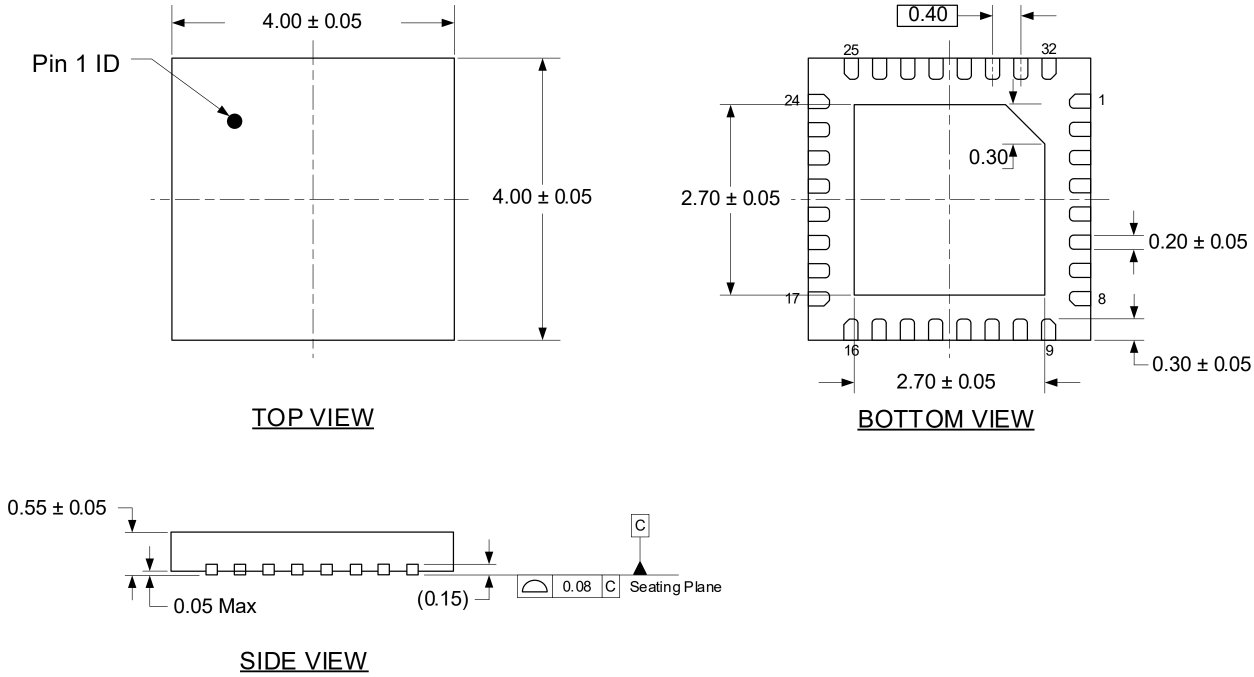
22. Package Information

22.1 Package Outline Drawings

22.1.1 STQFN-32 (4.0 mm x 4.0 mm x 0.55 mm, 0.4 mm Pitch)

JEDEC MO-220, Variation WECE

IC Net Weight: 0.028 g



Note 1: JEDEC compatible.
Note 2: All dimensions are in mm and angles are in degrees.
Note 3: Use ±0.05 mm for the non-toleranced dimensions.
Note 4: Numbers in ( ) are for references only.

Figure 137. STQFN-32 Package Outline Drawing

22.2 Package Top Marking

22.2.1 STQFN-32 (4.0 mm x 4.0 mm x 0.55 mm, 0.4 mm Pitch)

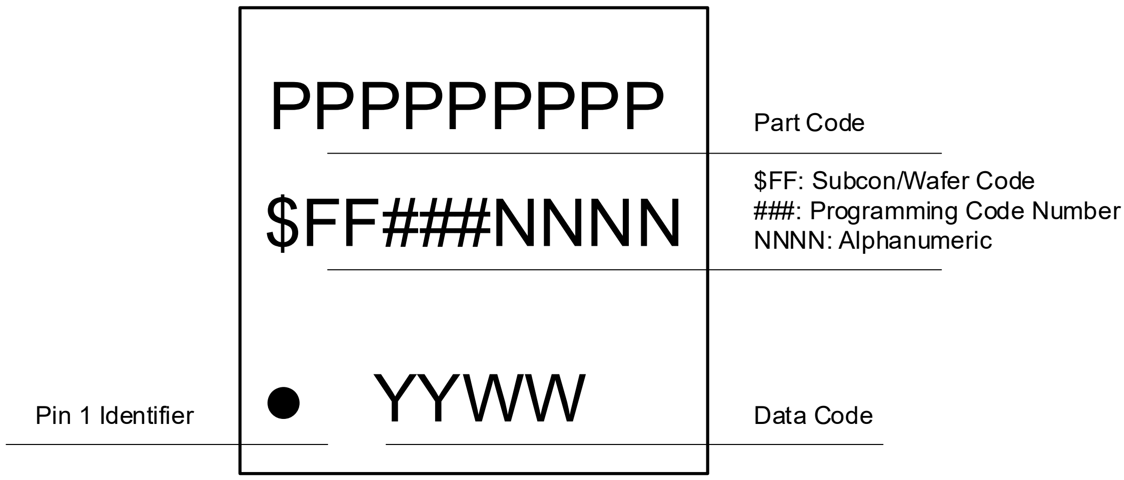


Figure 138. STQFN-32 Package Top Marking

22.3 Moisture Sensitivity Level

The Moisture Sensitivity Level (MSL) is an indicator for the maximum allowable time period (floor lifetime) in which a moisture sensitive plastic device, once removed from the dry bag, can be exposed to an environment with a specified maximum temperature and a maximum relative humidity before the solder reflow process. The MSL classification is defined in

For detailed information on MSL levels refer to the IPC/JEDEC standard J-STD-020, which can be downloaded from http://www.jedec.org.

The STQFN 32 package is qualified for MSL 1.

Table 41. MSL Classification

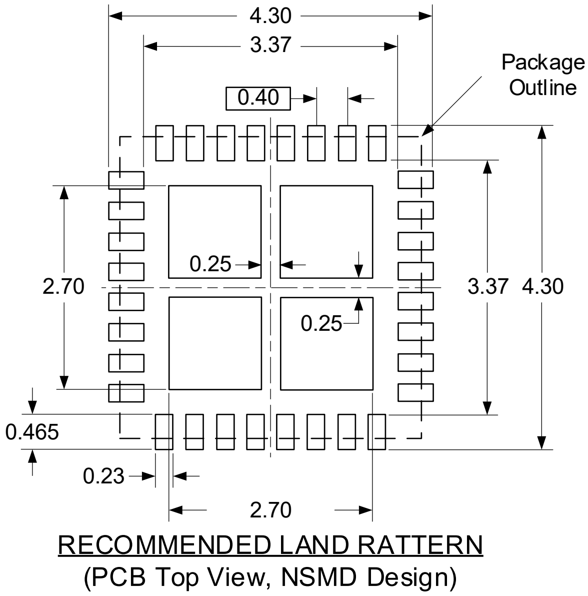
MSL Level	Floor Lifetime	Conditions
MSL 4	72 hours	30 °C / 60 % RH
MSL 3	168 hours	30 °C / 60 % RH
MSL 2A	4 weeks	30 °C / 60 % RH
MSL 2	1 year	30 °C / 60 % RH
MSL 1	Unlimited	30 °C / 85 % RH

22.4 Soldering Information

Please see IPC/JEDEC J-STD-020: latest revision for reflow profile based on package volume of 3.85 mm^3 (nominal). More information can be found at http://www.jedec.org.

23. Layout Guidelines

23.1 STQFN-32 (4.0 mm x 4.0 mm x 0.55 mm, 0.4 mm Pitch)



Note 1: JEDEC compatible.
Note 2: All dimensions are in mm and angles are in degrees.
Note 3: Use ±0.05 mm for the non-toleranced dimensions.
Note 4: Numbers in ( ) are for references only.

Figure 139. STQFN-32 Layout Example Schematic

24. Ordering Information

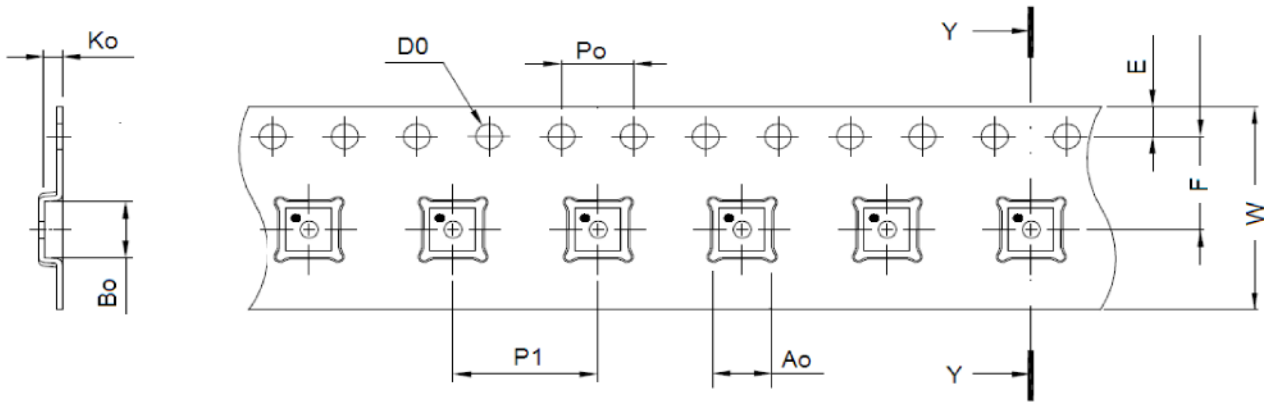
Part Number	Package Description	Carrier Type	Temperature Range
SLG46880-EV	STQFN-32, 4.0 mm x 4.0 mm x 0.55 mm	Tape and Reel	-40 °C to +125 °C

24.1 Tape and Reel Specifications

Package Type	# of Pins	Nominal Package Size [mm]	Max Unit		Reel and Hub [mm]	Leader (min)		Trailer (min)		Tape Width [mm]	Part Pitch [mm]
			Per Reel	Per Box		Pockets	Length [mm]	Pockets	Length [mm]		
STQFN 32L 4.0 mm x 4.0 mm 0.4P Green	32	4.0 x 4.0 x 0.55	5000	10000	330/100	42	336	42	336	12	8

24.2 Carrier Tape Drawing and Dimensions

Package Type	PocketB™ Length [mm]	PocketB™ Width [mm]	Pocket Depth [mm]	Index Hole Pitch [mm]	Pocket Pitch [mm]	Index Hole Diameter [mm]	Index Hole to Tape Edge [mm]	Index Hole to Pocket Center [mm]	Tape Width [mm]
	A0	B0	K0	P0	P1	D0	E	F	W
STQFN 32L 4.0 mm x 4.0 mm 0.4P Green	4.25	4.25	0.75	4	8	1.5	1.75	5.5	12



Glossary

A

ACK	Acknowledge Bit
ACMP	Analog Comparator
ACMPH	Analog Comparator High Speed
ACMPL	Analog Comparator Low Speed
ASM	Asynchronous State Machine

B

BG	Bandgap

C

CF	Combination Function
CLK	Clock
CMI	Connection Matrix Input
CMO	Connection Matrix Output
CNT	Counter

D

DFF	D Flip-flop
DLY	Delay
DM	Dynamic Memory

E

EC	Electrical Characteristics
ERSE	Erase Enable
ERSR	Erase Register
ESD	Electrostatic Discharge
EV	End Value

F

FSM	Finite State Machine

G

GPI	General Purpose Input
GPIO	General Purpose Input/Output
GPO	General Purpose Output

I

IN	Input
IO	Input/Output

L

LPF	Low-pass Filter
LSB	Least Significant Bit
LUT	Look-up Table
LV	Low Voltage
LWD	Loop with Delay

M

MSB	Most Significant Bit
MTP	Multiple-time-programmable
MUX	Multiplexer

N

NPR	Non-volatile Memory Read/Write/Erase Protection
nRST	Reset
NVM	Non-volatile Memory

O

OD	Open-drain
OE	Output Enable
OSC	Oscillator
OUT	Output

P

PD	Power-down
PGen	Pattern Generator
P_DLY	Programmable Delay
POR	Power-on Reset
PP	Push-pull
PRL	Protect Lock Bit
PWR	Power
P DLY	Programmable Delay

R

RPR	Register Read/Write Protection
RPRB	Register Read/Write Protection Bit
RPRL	Register Protection Read/Write/Erase Lock
R/W	Read/Write

S

SCL	I^2C Clock Input
SDA	I^2C Data Input/Output
SLA	Target Address
SMT	With Schmitt Trigger
SV	nSET Value

T

TS	Temperature Sensor

V

V_{REF}	Voltage Reference

W

WOSMT	Without Schmitt Trigger
WPB	Write Protect Bit
WPR	Write Protection Register
WPRE	Write Protect Enable
WS	Wake and Sleep Controller

Revision History

Revision	Date	Description
1.00	Sep 01, 2025	Initial release

A. ECAD Design Information

This information supports the development of the PCB ECAD model for this device. It is intended to be used by PCB designers.

A.1 Part Number Indexing

This information supports the development of the PCB ECAD model for this device. It is intended to be used by PCB designers.

Orderable Part Number	Number of Pins	Package Type	Package Code/POD Number
SLG46880-EV	32	STQFN	KOA/ QY0032AA

A.2 Symbol Pin Information

A.2.1 32-STQFN

Pin Number	Primary Pin Name	Primary Electrical Type	Alternate Pin Name(s)
1	GPO0	Output	-
2	GPIO0	I/O	-
3	GPIO1	I/O	-
4	GPIO2	I/O	-
5	GPI0	Input	-
6	GPI1	Input	-
7	GPI2	Input	-
8	GPI3	Input	-
9	GPIO3	I/O	-
10	GPIO4	I/O	-
11	GPIO5	I/O	-
12	GPO1	Output	-
13	GPO2	Output	-
14	GND	Power	-
15	V_{DD2}	Power	-
16	GPO3	Output	-
17	GPO4	Output	-
18	GPIO6	I/O	-
19	GPIO7	I/O	-
20	GPIO8	I/O	-
21	GPI4	Input	-
22	GPI5	Input	-
23	GPI6	Input	-
24	GPI7	Input	-
25	GPIO9	I/O	-
26	GPIO10	I/O	-
27	GPIO11	I/O	-
28	GPO5	Output	-

Pin Number	Primary Pin Name	Primary Electrical Type	Alternate Pin Name(s)
29	GPO6	Output	-
30	GND	Power	-
31	V_{DD}	Power	-
32	GPO7	Output	-
TP	TP	-	-

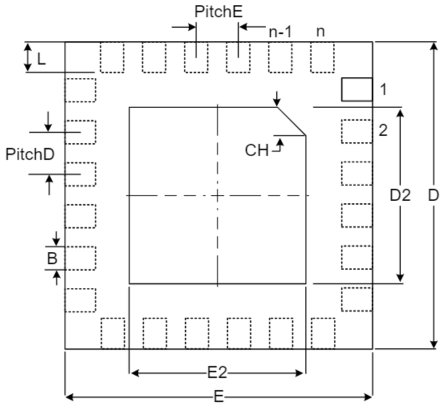
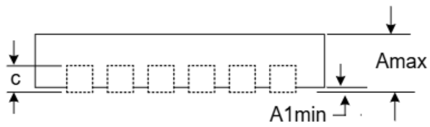
A.3 Symbol Parameters

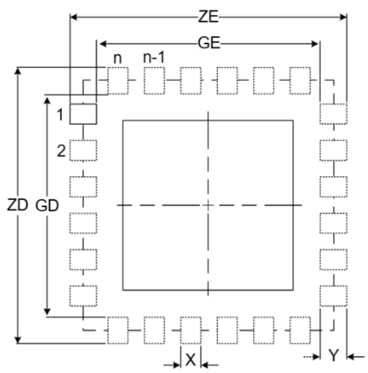
Orderable Part Number	Qualification	Min Operating Temperature	Max Operating Temperature	Min Input Voltage	Max Input Voltage	Number of ACMP	Number of V_{REF}	Number of GPIO	Number of GPI	Number of GPO	Number of CF	Number of ASM	Number of Oscillator	Interface	RoHS
SLG46880-EV	Industrial	-40 °C	+125 °C	2.30 V	5.50 V	4	2	10	8	8	12	1	3	I^2C	Compliant

A.4 Footprint Design Information

A.4.1 32-STQFN

IPC Footprint Type	Package Code/POD Number	Number of Pins
QFN	KOA/ QY0032AA	32

Description	Dimension	Value (mm)	Diagram
Minimum body span (vertical side)	Dmin	3.95	 Bottom View  Side View
Maximum body span (vertical side)	Dmax	4.05	
Minimum body span (horizontal side)	Emin	3.95	
Maximum body span (horizontal side)	Emax	4.05	
Minimum Lead Width	Bmin	0.15	
Maximum Lead Width	Bmax	0.25	
Minimum Lead Length	Lmin	0.25	
Maximum Lead Length	Lmax	0.35	
Number of pins (vertical side)	PinCountD	8	
Number of pins (horizontal side)	PinCountE	8	
Distance between the center of any two adjacent pins (vertical side)	PitchD	0.40	
Distance between the center of any two adjacent pins (horizontal side)	PitchE	0.40	
Location of pin 1; S2 = corner of D side (top left), C1 = center of E side(center).	Pin1	S2	
Thermal pad Chamfer. If not present give hyphen (-).	CH	0.3	
Minimum thermal pad size (vertical side)	D2min	2.65	
Maximum thermal pad size (vertical side)	D2max	2.75	
Minimum thermal pad size (horizontal side)	E2min	2.65	
Maximum thermal pad size (horizontal side)	E2max	2.75	
Maximum Height	Amax	0.60	
Minimum Standoff Height	A1min	0.00	
Minimum Lead Thickness	cmin	0.10	
Maximum Lead Thickness	cmax	0.20	

Recommended Land Pattern			
Description	**Dimension**	**Value (mm)**	**Diagram**
Distance between left pad toe to right pad toe (horizontal side)	ZE	4.30	 PCB Top View
Distance between top pad toe to bottom pad toe (vertical side)	ZD	4.30	
Distance between left pad heel to right pad heel (horizontal side)	GE	3.37	
Distance between top pad heel to bottom pad heel (vertical side)	GD	3.37	
Pad Width	X	0.23	
Pad Length	Y	0.465	