PSoC® Creator™
Project Datasheet for SystemController

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1 Overview

The Cypress PSoC 5 is a family of 32-bit devices with the following characteristics:

- High-performance 32-bit ARM Cortex-M3 core with a nested vectored interrupt controller (NVIC) and a high-performance DMA controller
- Digital system that includes configurable Universal Digital Blocks (UDBs) and specific function peripherals, such as USB, I2C and SPI
- Analog subsystem that includes 20-bit Delta Sigma converters (ADC), SAR ADCs, 8-bit DACs that can be configured for 12-bit operation, comparators, op amps and configurable switched capacitor (SC) and continuous time (CT) blocks to create PGAs, TIAs, mixers, and more
- Several types of memory elements, including SRAM, flash, and EEPROM
- Programming and debug system through JTAG, serial wire debug (SWD), and single wire viewer (SWV)
- Flexible routing to all pins

Figure 1 shows the major components of a typical CY8C58LP series member PSoC 5LP device. For details on all the systems listed above, please refer to the PSoC 5LP Technical Reference Manual.

Figure 1. CY8C58LP Device Series Block Diagram

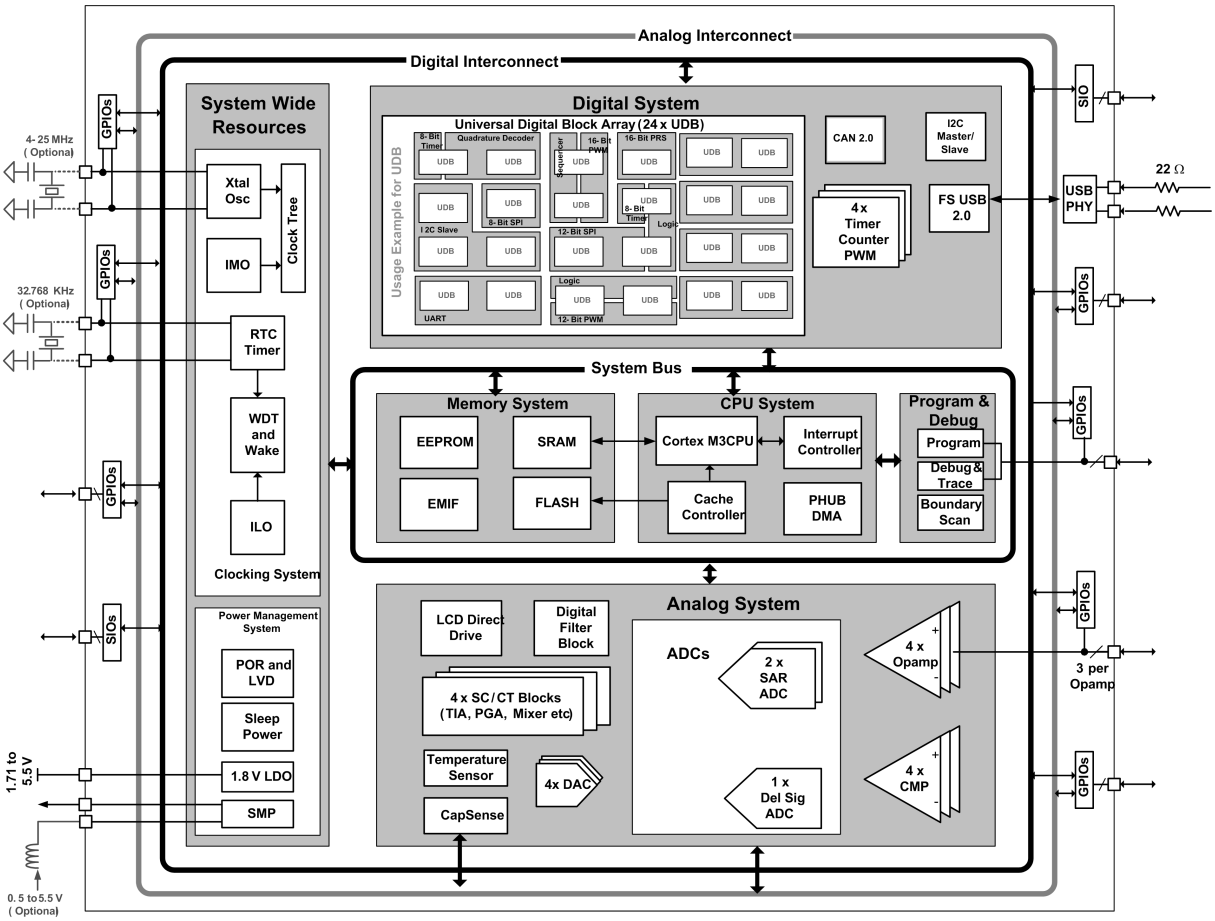


Table 1 lists the key characteristics of this device.

Table 1. Device Characteristics

Name	Value
Part Number	CY8C5888LTI-LP097
Package Name	68-QFN
Family	PSoC 5LP
Series	CY8C58LP
Max CPU speed (MHz)	0
Flash size (kB)	256
SRAM size (kB)	64
EEPROM size (bytes)	2048
Vdd range (V)	1.71 to 5.5
Automotive qualified	No (Industrial Grade Only)
Temp range (Celsius)	-40 to 85
JTAG ID	0x2E161069

NOTE: The CPU speed noted above is the maximum available speed. The CPU is clocked by Bus Clock, listed in the System Clocks section below.

Table 2 lists the device resources that this design uses:

Table 2. Device Resources

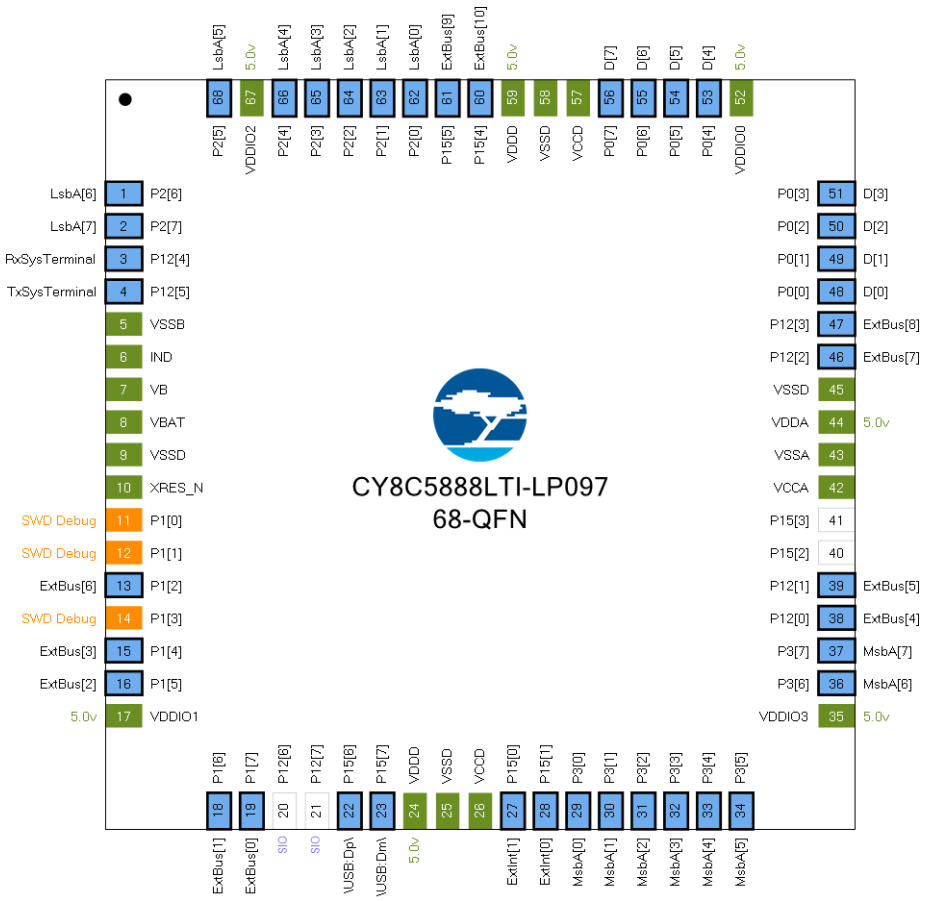
Resource Type	Used	Free	Max	% Used
Digital Clocks	3	5	8	37.50 %
Analog Clocks	0	4	4	0.00 %
CapSense Buffers	0	2	2	0.00 %
Digital Filter Block	0	1	1	0.00 %
Interrupts	13	19	32	40.63 %
IO	44	4	48	91.67 %
Segment LCD	0	1	1	0.00 %
CAN 2.0b	0	1	1	0.00 %
I2C	0	1	1	0.00 %
USB	1	0	1	100.00 %
DMA Channels	2	22	24	8.33 %
Timer	0	4	4	0.00 %
UDB				
Macrocells	50	142	192	26.04 %
Unique P-terms	77	307	384	20.05 %
Total P-terms	88			
Datapath Cells	3	21	24	12.50 %
Status Cells	16	8	24	66.67 %
Status Registers	4			
StatusI Registers	2			
Sync Cells (x33)	9			
Routed Count7 Load/Enable	1			
Control Cells	3	21	24	12.50 %
Control Registers	2			
Count7 Cells	1			
Opamp	0	4	4	0.00 %
Comparator	0	4	4	0.00 %
Delta-Sigma ADC	0	1	1	0.00 %
LPF	0	2	2	0.00 %
SAR ADC	0	2	2	0.00 %

Resource Type	Used	Free	Max	% Used
Analog (SC/CT) Blocks	0	4	4	0.00 %
DAC				
VIDAC	0	4	4	0.00 %

2 Pins

Figure 2 shows the pin layout of this device.

Figure 2. Device Pin Layout



2.1 Hardware Pins

Table 3 contains information about the pins on this device in device pin order. (No connection ["n/c"] pins have been omitted.)

Table 3. Device Pins

Pin	Port	Name	Type	Drive Mode	Reset State
1	P2[6]	LsbA[6]	Dgtl In	Strong drive	HiZ Analog Unb
2	P2[7]	LsbA[7]	Dgtl In	Strong drive	HiZ Analog Unb
3	P12[4]	RxSysTerminal	Dgtl In	HiZ digital	HiZ Analog Unb
4	P12[5]	TxSysTerminal	Dgtl Out	Strong drive	HiZ Analog Unb
5	VSSB	VSSB	Dedicated		
6	IND	IND	Dedicated		
7	VB	VB	Dedicated		
8	VBAT	VBAT	Dedicated		
9	VSSD	VSSD	Power		
10	XRES_N	XRES_N	Dedicated		
11	P1[0]	Debug:SWD_IO	Reserved		
12	P1[1]	Debug:SWD_CK	Reserved		
13	P1[2]	ExtBus[6]	Dgtl In	HiZ digital	HiZ Analog Unb
14	P1[3]	Debug:SWV	Reserved		
15	P1[4]	ExtBus[3]	Dgtl In	Strong drive	HiZ Analog Unb
16	P1[5]	ExtBus[2]	Dgtl In	Strong drive	HiZ Analog Unb
17	VDDIO1	VDDIO1	Power		
18	P1[6]	ExtBus[1]	Dgtl In	Strong drive	HiZ Analog Unb
19	P1[7]	ExtBus[0]	Dgtl In	Strong drive	HiZ Analog Unb
20	P12[6]	SIO [unused]			HiZ Analog Unb
21	P12[7]	SIO [unused]			HiZ Analog Unb
22	P15[6]	\USB:Dp\	Analog	HiZ analog	HiZ Analog Unb
23	P15[7]	\USB:Dm\	Analog	HiZ analog	HiZ Analog Unb
24	VDDD	VDDD	Power		
25	VSSD	VSSD	Power		
26	VCCD	VCCD	Power		
27	P15[0]	ExtInt[1]	Software In/Out	OD, DL	HiZ Analog Unb
28	P15[1]	ExtInt[0]	Software In/Out	OD, DL	HiZ Analog Unb
29	P3[0]	MsbA[0]	Dgtl In	Strong drive	HiZ Analog Unb
30	P3[1]	MsbA[1]	Dgtl In	Strong drive	HiZ Analog Unb
31	P3[2]	MsbA[2]	Dgtl In	Strong drive	HiZ Analog Unb
32	P3[3]	MsbA[3]	Dgtl In	Strong drive	HiZ Analog Unb
33	P3[4]	MsbA[4]	Dgtl In	Strong drive	HiZ Analog Unb
34	P3[5]	MsbA[5]	Dgtl In	Strong drive	HiZ Analog Unb
35	VDDIO3	VDDIO3	Power		
36	P3[6]	MsbA[6]	Dgtl In	Strong drive	HiZ Analog Unb
37	P3[7]	MsbA[7]	Dgtl In	Strong drive	HiZ Analog Unb
38	P12[0]	ExtBus[4]	Software In/Out	Strong drive	HiZ Analog Unb
39	P12[1]	ExtBus[5]	Dgtl In	HiZ digital	HiZ Analog Unb
40	P15[2]	GPIO [unused]			HiZ Analog Unb
41	P15[3]	GPIO [unused]			HiZ Analog Unb
42	VCCA	VCCA	Power		
43	VSSA	VSSA	Power		

Pin	Port	Name	Type	Drive Mode	Reset State
44	VDDA	VDDA	Power		
45	VSSD	VSSD	Power		
46	P12[2]	ExtBus[7]	Dgtl In	Strong drive	HiZ Analog Unb
47	P12[3]	ExtBus[8]	Dgtl Out	Strong drive	HiZ Analog Unb
48	P0[0]	D[0]	Dgtl In	Strong drive	HiZ Analog Unb
49	P0[1]	D[1]	Dgtl In	Strong drive	HiZ Analog Unb
50	P0[2]	D[2]	Dgtl In	Strong drive	HiZ Analog Unb
51	P0[3]	D[3]	Dgtl In	Strong drive	HiZ Analog Unb
52	VDDIO0	VDDIO0	Power		
53	P0[4]	D[4]	Dgtl In	Strong drive	HiZ Analog Unb
54	P0[5]	D[5]	Dgtl In	Strong drive	HiZ Analog Unb
55	P0[6]	D[6]	Dgtl In	Strong drive	HiZ Analog Unb
56	P0[7]	D[7]	Dgtl In	Strong drive	HiZ Analog Unb
57	VCCD	VCCD	Power		
58	VSSD	VSSD	Power		
59	VDDD	VDDD	Power		
60	P15[4]	ExtBus[10]	Dgtl In	HiZ digital	HiZ Analog Unb
61	P15[5]	ExtBus[9]	Dgtl Out	Strong drive	HiZ Analog Unb
62	P2[0]	LsbA[0]	Dgtl In	Strong drive	HiZ Analog Unb
63	P2[1]	LsbA[1]	Dgtl In	Strong drive	HiZ Analog Unb
64	P2[2]	LsbA[2]	Dgtl In	Strong drive	HiZ Analog Unb
65	P2[3]	LsbA[3]	Dgtl In	Strong drive	HiZ Analog Unb
66	P2[4]	LsbA[4]	Dgtl In	Strong drive	HiZ Analog Unb
67	VDDIO2	VDDIO2	Power		
68	P2[5]	LsbA[5]	Dgtl In	Strong drive	HiZ Analog Unb

Abbreviations used in Table 3 have the following meanings:

- Dgtl In = Digital Input
- HiZ Analog Unb = Hi-Z Analog Unbuffered
- HiZ digital = High impedance digital
- Dgtl Out = Digital Output
- HiZ analog = High impedance analog
- OD, DL = Open drain, drives low

2.2 Hardware Ports

Table 4 contains information about the pins on this device in device port order. (No connection ["n/c"], power and dedicated pins have been omitted.)

Table 4. Device Ports

Port	Pin	Name	Type	Drive Mode	Reset State
P0[0]	48	D[0]	Dgtl In	Strong drive	HiZ Analog Unb
P0[1]	49	D[1]	Dgtl In	Strong drive	HiZ Analog Unb
P0[2]	50	D[2]	Dgtl In	Strong drive	HiZ Analog Unb
P0[3]	51	D[3]	Dgtl In	Strong drive	HiZ Analog Unb
P0[4]	53	D[4]	Dgtl In	Strong drive	HiZ Analog Unb
P0[5]	54	D[5]	Dgtl In	Strong drive	HiZ Analog Unb
P0[6]	55	D[6]	Dgtl In	Strong drive	HiZ Analog Unb
P0[7]	56	D[7]	Dgtl In	Strong drive	HiZ Analog Unb
P1[0]	11	Debug:SWD_IO	Reserved		
P1[1]	12	Debug:SWD_CK	Reserved		
P1[2]	13	ExtBus[6]	Dgtl In	HiZ digital	HiZ Analog Unb
P1[3]	14	Debug:SWV	Reserved		
P1[4]	15	ExtBus[3]	Dgtl In	Strong drive	HiZ Analog Unb
P1[5]	16	ExtBus[2]	Dgtl In	Strong drive	HiZ Analog Unb
P1[6]	18	ExtBus[1]	Dgtl In	Strong drive	HiZ Analog Unb
P1[7]	19	ExtBus[0]	Dgtl In	Strong drive	HiZ Analog Unb
P12[0]	38	ExtBus[4]	Software In/Out	Strong drive	HiZ Analog Unb
P12[1]	39	ExtBus[5]	Dgtl In	HiZ digital	HiZ Analog Unb
P12[2]	46	ExtBus[7]	Dgtl In	Strong drive	HiZ Analog Unb
P12[3]	47	ExtBus[8]	Dgtl Out	Strong drive	HiZ Analog Unb
P12[4]	3	RxSysTerminal	Dgtl In	HiZ digital	HiZ Analog Unb
P12[5]	4	TxSysTerminal	Dgtl Out	Strong drive	HiZ Analog Unb
P12[6]	20	SIO [unused]			HiZ Analog Unb
P12[7]	21	SIO [unused]			HiZ Analog Unb
P15[0]	27	ExtInt[1]	Software In/Out	OD, DL	HiZ Analog Unb
P15[1]	28	ExtInt[0]	Software In/Out	OD, DL	HiZ Analog Unb
P15[2]	40	GPIO [unused]			HiZ Analog Unb
P15[3]	41	GPIO [unused]			HiZ Analog Unb
P15[4]	60	ExtBus[10]	Dgtl In	HiZ digital	HiZ Analog Unb
P15[5]	61	ExtBus[9]	Dgtl Out	Strong drive	HiZ Analog Unb
P15[6]	22	\USB:Dp\	Analog	HiZ analog	HiZ Analog Unb
P15[7]	23	\USB:Dm\	Analog	HiZ analog	HiZ Analog Unb
P2[0]	62	LsbA[0]	Dgtl In	Strong drive	HiZ Analog Unb
P2[1]	63	LsbA[1]	Dgtl In	Strong drive	HiZ Analog Unb
P2[2]	64	LsbA[2]	Dgtl In	Strong drive	HiZ Analog Unb
P2[3]	65	LsbA[3]	Dgtl In	Strong drive	HiZ Analog Unb
P2[4]	66	LsbA[4]	Dgtl In	Strong drive	HiZ Analog Unb
P2[5]	68	LsbA[5]	Dgtl In	Strong drive	HiZ Analog Unb
P2[6]	1	LsbA[6]	Dgtl In	Strong drive	HiZ Analog Unb
P2[7]	2	LsbA[7]	Dgtl In	Strong drive	HiZ Analog Unb
P3[0]	29	MsbA[0]	Dgtl In	Strong drive	HiZ Analog Unb
P3[1]	30	MsbA[1]	Dgtl In	Strong drive	HiZ Analog Unb
P3[2]	31	MsbA[2]	Dgtl In	Strong drive	HiZ Analog Unb

Port	Pin	Name	Type	Drive Mode	Reset State
P3[3]	32	MsbA[3]	Dgtl In	Strong drive	HiZ Analog Unb
P3[4]	33	MsbA[4]	Dgtl In	Strong drive	HiZ Analog Unb
P3[5]	34	MsbA[5]	Dgtl In	Strong drive	HiZ Analog Unb
P3[6]	36	MsbA[6]	Dgtl In	Strong drive	HiZ Analog Unb
P3[7]	37	MsbA[7]	Dgtl In	Strong drive	HiZ Analog Unb

Abbreviations used in Table 4 have the following meanings:

- Dgtl In = Digital Input
- HiZ Analog Unb = Hi-Z Analog Unbuffered
- HiZ digital = High impedance digital
- Dgtl Out = Digital Output
- OD, DL = Open drain, drives low
- HiZ analog = High impedance analog

2.3 Software Pins

Table 5 contains information about the software pins on this device in alphabetical order. (Only software-accessible pins are shown.)

Table 5. Software Pins

Name	Port	Type	Reset State
\USB:Dm\	P15[7]	Analog	HiZ Analog Unb
\USB:Dp\	P15[6]	Analog	HiZ Analog Unb
D[0]	P0[0]	Dgtl In	HiZ Analog Unb
D[1]	P0[1]	Dgtl In	HiZ Analog Unb
D[2]	P0[2]	Dgtl In	HiZ Analog Unb
D[3]	P0[3]	Dgtl In	HiZ Analog Unb
D[4]	P0[4]	Dgtl In	HiZ Analog Unb
D[5]	P0[5]	Dgtl In	HiZ Analog Unb
D[6]	P0[6]	Dgtl In	HiZ Analog Unb
D[7]	P0[7]	Dgtl In	HiZ Analog Unb
Debug:SWD_CK	P1[1]	Reserved	
Debug:SWD_IO	P1[0]	Reserved	
Debug:SWV	P1[3]	Reserved	
ExtBus[0]	P1[7]	Dgtl In	HiZ Analog Unb
ExtBus[1]	P1[6]	Dgtl In	HiZ Analog Unb
ExtBus[10]	P15[4]	Dgtl In	HiZ Analog Unb
ExtBus[2]	P1[5]	Dgtl In	HiZ Analog Unb
ExtBus[3]	P1[4]	Dgtl In	HiZ Analog Unb
ExtBus[4]	P12[0]	Software In/Out	HiZ Analog Unb
ExtBus[5]	P12[1]	Dgtl In	HiZ Analog Unb
ExtBus[6]	P1[2]	Dgtl In	HiZ Analog Unb
ExtBus[7]	P12[2]	Dgtl In	HiZ Analog Unb
ExtBus[8]	P12[3]	Dgtl Out	HiZ Analog Unb
ExtBus[9]	P15[5]	Dgtl Out	HiZ Analog Unb
ExtInt[0]	P15[1]	Software In/Out	HiZ Analog Unb
ExtInt[1]	P15[0]	Software In/Out	HiZ Analog Unb
GPIO [unused]	P15[2]		HiZ Analog Unb
GPIO [unused]	P15[3]		HiZ Analog Unb
LsbA[0]	P2[0]	Dgtl In	HiZ Analog Unb
LsbA[1]	P2[1]	Dgtl In	HiZ Analog Unb
LsbA[2]	P2[2]	Dgtl In	HiZ Analog Unb
LsbA[3]	P2[3]	Dgtl In	HiZ Analog Unb
LsbA[4]	P2[4]	Dgtl In	HiZ Analog Unb
LsbA[5]	P2[5]	Dgtl In	HiZ Analog Unb
LsbA[6]	P2[6]	Dgtl In	HiZ Analog Unb
LsbA[7]	P2[7]	Dgtl In	HiZ Analog Unb
MsbA[0]	P3[0]	Dgtl In	HiZ Analog Unb
MsbA[1]	P3[1]	Dgtl In	HiZ Analog Unb
MsbA[2]	P3[2]	Dgtl In	HiZ Analog Unb
MsbA[3]	P3[3]	Dgtl In	HiZ Analog Unb
MsbA[4]	P3[4]	Dgtl In	HiZ Analog Unb
MsbA[5]	P3[5]	Dgtl In	HiZ Analog Unb
MsbA[6]	P3[6]	Dgtl In	HiZ Analog Unb

Name	Port	Type	Reset State
MsbA[7]	P3[7]	Dgtl In	HiZ Analog Unb
RxSysTerminal	P12[4]	Dgtl In	HiZ Analog Unb
SIO [unused]	P12[6]		HiZ Analog Unb
SIO [unused]	P12[7]		HiZ Analog Unb
TxSysTerminal	P12[5]	Dgtl Out	HiZ Analog Unb

Abbreviations used in Table 5 have the following meanings:

- HiZ Analog Unb = Hi-Z Analog Unbuffered
- Dgtl In = Digital Input
- Dgtl Out = Digital Output

For more information on reading, writing and configuring pins, please refer to:

- Pins chapter in the System Reference Guide
  - CyPins API routines
- Programming Application Interface section in the cy_pins component datasheet

3 System Settings

3.1 System Configuration

Table 6. System Configuration Settings

Name	Value
Device Configuration Mode	Compressed
Enable Error Correcting Code (ECC)	False
Store Configuration Data in ECC Memory	True
Instruction Cache Enabled	True
Enable Fast IMO During Startup	True
Unused Bonded IO	Allow but warn
Heap Size (bytes)	0x80
Stack Size (bytes)	0x0800
Include CMSIS Core Peripheral Library Files	True

3.2 System Debug Settings

Table 7. System Debug Settings

Name	Value
Debug Select	SWD+SWV (serial wire debug and viewer)
Enable Device Protection	False
Embedded Trace (ETM)	False
Use Optional XRES	False

3.3 System Operating Conditions

Table 8. System Operating Conditions

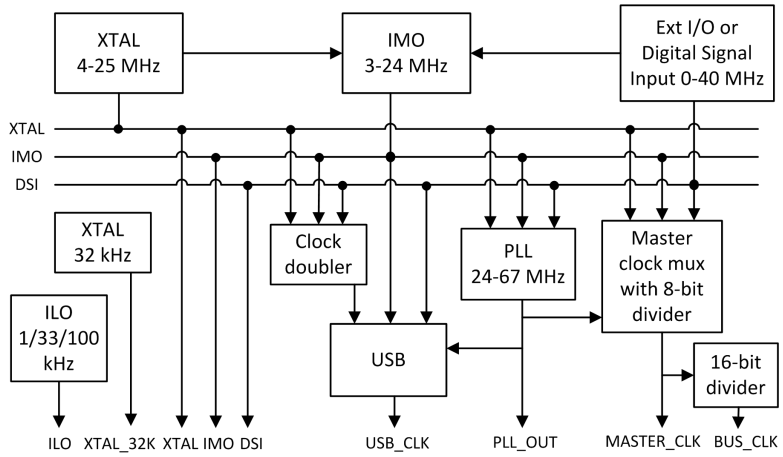
Name	Value
VDDA (V)	5.0
VDDD (V)	5.0
VDDIO0 (V)	5.0
VDDIO1 (V)	5.0
VDDIO2 (V)	5.0
VDDIO3 (V)	5.0
Variable VDDA	False
Temperature Range	0C - 85/125C

4 Clocks

The clock system includes these clock resources:

- Four internal clock sources increase system integration:
  - 3 to 74.7 MHz Internal Main Oscillator (IMO) ±1% at 3 MHz
  - 1 kHz, 33 kHz, and 100 kHz Internal Low Speed Oscillator (ILO) outputs
  - 12 to 80 MHz clock doubler output, sourced from IMO, MHz External Crystal Oscillator (MHzECO), and Digital System Interconnect (DSI)
  - 24 to 80 MHz fractional Phase-Locked Loop (PLL) sourced from IMO, MHzECO, and DSI
- Clock generated using a DSI signal from an external I/O pin or other logic
- Two external clock sources provide high precision clocks:
  - 4 to 25 MHz External Crystal Oscillator (MHzECO)
  - 32.768 kHz External Crystal Oscillator (kHzECO) for Real Time Clock (RTC)
- Dedicated 16-bit divider for bus clock
- Eight individually sourced 16-bit clock dividers for the digital system peripherals
- Four individually sourced 16-bit clock dividers with skew for the analog system peripherals
- IMO has a USB mode that synchronizes to USB host traffic, requiring no external crystal for USB. (USB equipped parts only)

Figure 3. System Clock Configuration



4.1 System Clocks

Table 9 lists the system clocks used in this design.

Table 9. System Clocks

Name	Domain	Source	Desired Freq	Nominal Freq	Accuracy (%)	Start at Reset	Enabled
BUS_CLK	DIGITAL	MASTER_CLK	? MHz	72 MHz	±0.25	True	True
MASTER_CLK	DIGITAL	PLL_OUT	? MHz	72 MHz	±0.25	True	True
PLL_OUT	DIGITAL	IMO	72 MHz	72 MHz	±0.25	True	True
USB_CLK	DIGITAL	IMO	48 MHz	48 MHz	±0.25	False	True
IMO	DIGITAL		24 MHz	24 MHz	±0.25	True	True
ILO	DIGITAL		? MHz	100 kHz	-55,+100	True	True
XTAL 32kHz	DIGITAL		32.768 kHz	? MHz	±0	False	False
Digital Signal	DIGITAL		? MHz	? MHz	±0	False	False
XTAL	DIGITAL		20 MHz	? MHz	±0.1	False	False

4.2 Local and Design Wide Clocks

Local clocks drive individual analog and digital blocks. Design wide clocks are a user-defined optimization, where two or more analog or digital blocks that share a common clock profile (frequency, etc) can be driven from the same clock divider output source.

Figure 4. Local and Design Wide Clock Configuration

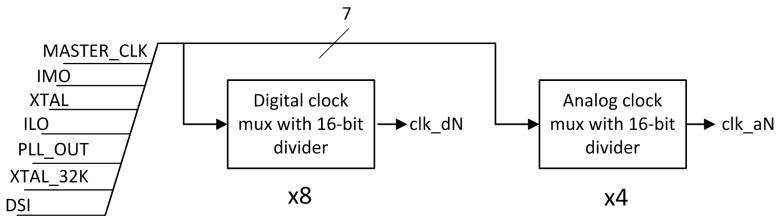


Table 10 lists the local clocks used in this design.

Table 10. Local Clocks

Name	Domain	Source	Desired Freq	Nominal Freq	Accuracy (%)	Start at Reset	Enabled
Z80Ctrl_BusClk	DIGITAL	BUS_CLK	? MHz	72 MHz	±0.25	True	True
CPUCLK_FAST	DIGITAL	MASTER_CLK	? MHz	36 MHz	±0.25	True	True
SysTerminal_-IntClock	DIGITAL	MASTER_CLK	921.6 kHz	923.077 kHz	±0.25	True	True
CPUCLK_SLOW	DIGITAL	ILO	1 kHz	1 kHz	-55,+100	True	True

For more information on clocking resources, please refer to:

- Clocking System chapter in the PSoC 5LP Technical Reference Manual
- Clocking chapter in the System Reference Guide
  - CyPLL API routines
  - CyIMO API routines
  - CyILO API routines
  - CyMaster API routines
  - CyXTAL API routines

5 Interrupts and DMAs

5.1 Interrupts

This design contains the following interrupt components: (0 is the highest priority)

Table 11. Interrupts

Name	Intr Num	Vector	Priority
ISR_HALT	0	0	7
ISR_MMU	1	1	7
SysTerminal_-RXInternalInterrupt	2	2	3
SysTerminal_-TXInternalInterrupt	3	3	4
USB_ep_1	4	4	7
USB_ep_2	5	5	7
Z80Ctrl_ISR_INT	6	6	2
Z80Ctrl_ISR_IO	7	7	1
USB_dp_int	12	12	7
USB_arb_int	22	22	7
USB_bus_reset	23	23	7
USB_ep_0	24	24	7
USB_ord_int	25	25	7

For more information on interrupts, please refer to:

- Interrupt Controller chapter in the PSoC 5LP Technical Reference Manual
- Interrupts chapter in the System Reference Guide
  - CyInt API routines and related registers
- Datasheet for cy_isr component

5.2 DMAs

This design contains the following DMA components: (0 is the highest priority)

Table 12. DMAs

Name	Priority	Channel Number
USB_ep1	2	0
USB_ep2	2	1

For more information on DMAs, please refer to:

- PHUB and DMAC chapter in the PSoC 5LP Technical Reference Manual
- DMA chapter in the System Reference Guide
  - DMA API routines and related registers
- Datasheet for cy_dma component

6 Flash Memory

PSoC 5LP devices offer a host of Flash protection options and device security features that you can leverage to meet the security and protection requirements of an application. These requirements range from protecting configuration settings or Flash data to locking the entire device from external access.

Table 13 lists the Flash protection settings for your design.

Table 13. Flash Protection Settings

Start Address	End Address	Protection Level
0x0	0x3FFFF	U - Unprotected

Flash memory is organized as rows with each row of flash having 256 bytes. Each flash row can be assigned one of four protection levels:

- U - Unprotected
- F - Factory Upgrade
- R - Field Upgrade
- W - Full Protection

For more information on Flash memory and protection, please refer to:

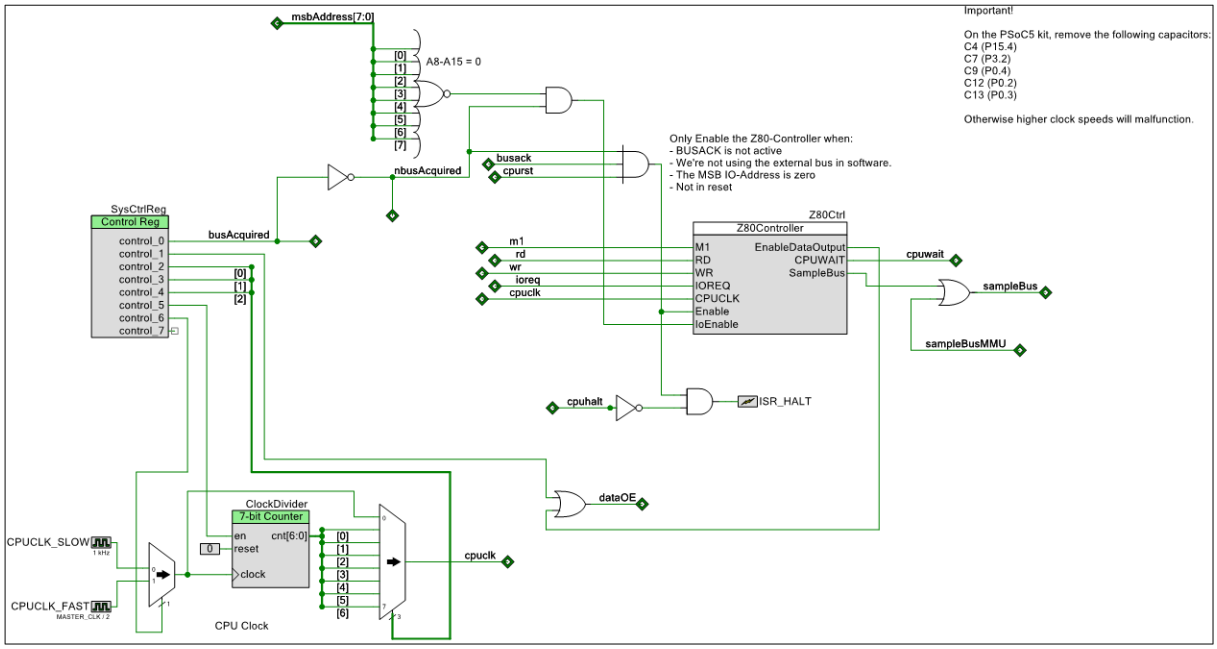
- Flash Protection chapter in the PSoC 5LP Technical Reference Manual
- Flash and EEPROM chapter in the System Reference Guide
  - CyWrite API routines
  - CyFlash API routines

7 Design Contents

This design's schematic content consists of the following 5 schematic sheets:

7.1 Schematic Sheet: Main

Figure 5. Schematic Sheet: Main

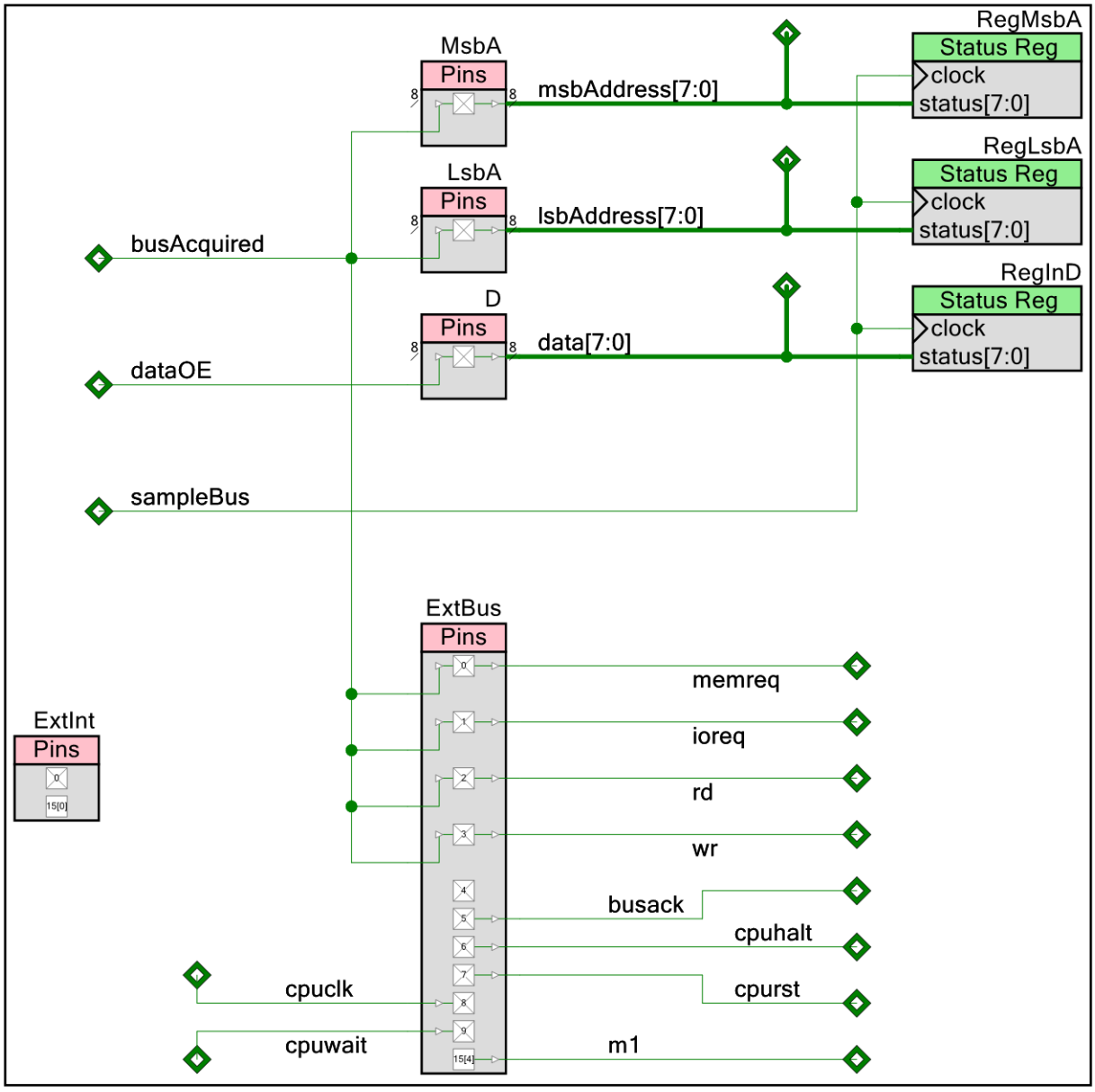


This schematic sheet contains the following component instances:

- Instance ClkDivMux (type: mux_v1_10)
- Instance ClkSrcMux (type: mux_v1_10)
- Instance ClockDivider (type: BasicCounter_v1_0)
- Instance SysCtrlReg (type: CyControlReg_v1_80)
- Instance Z80Ctrl (type: Z80Controller)

7.2 Schematic Sheet: Z80 Bus

Figure 6. Schematic Sheet: Z80 Bus

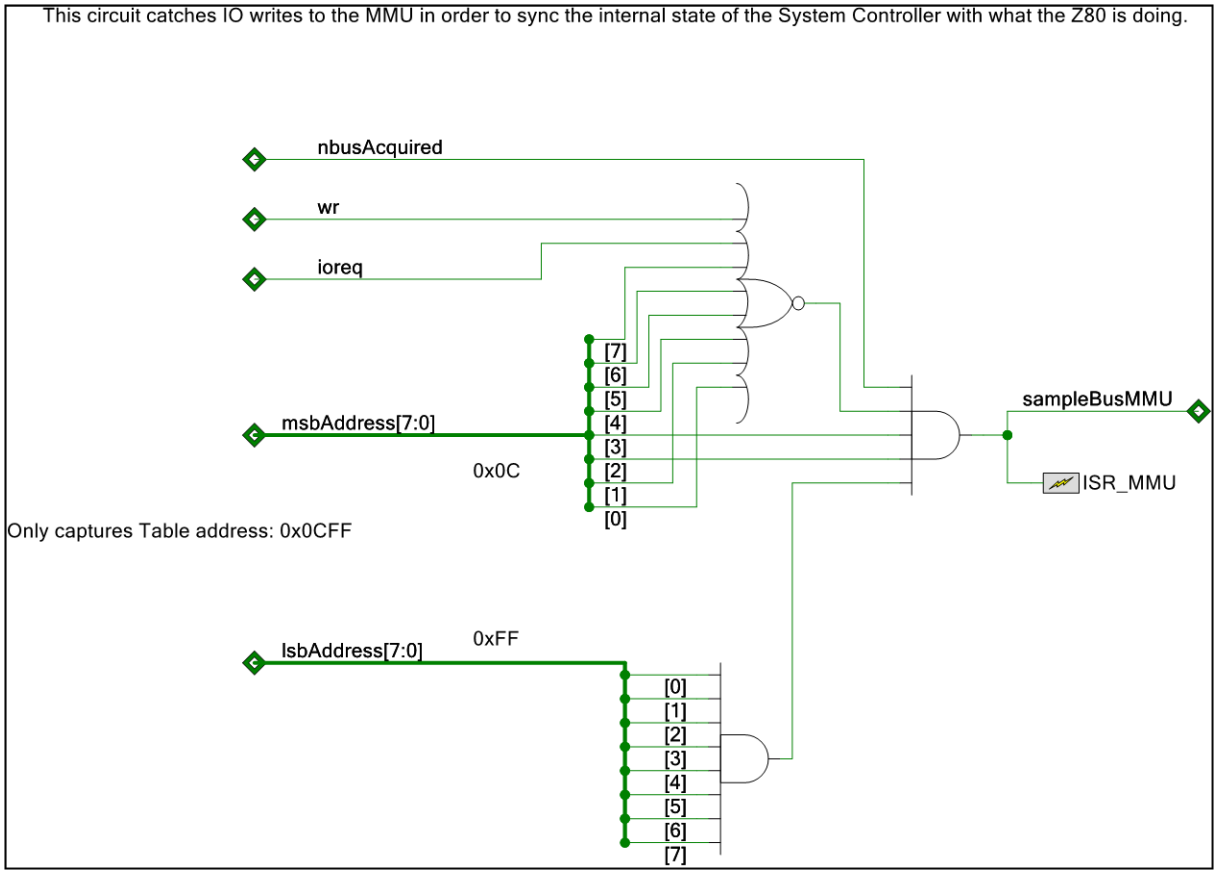


This schematic sheet contains the following component instances:

- Instance RegInD (type: CyStatusReg_v1_90)
- Instance RegLsbA (type: CyStatusReg_v1_90)
- Instance RegMsbA (type: CyStatusReg_v1_90)

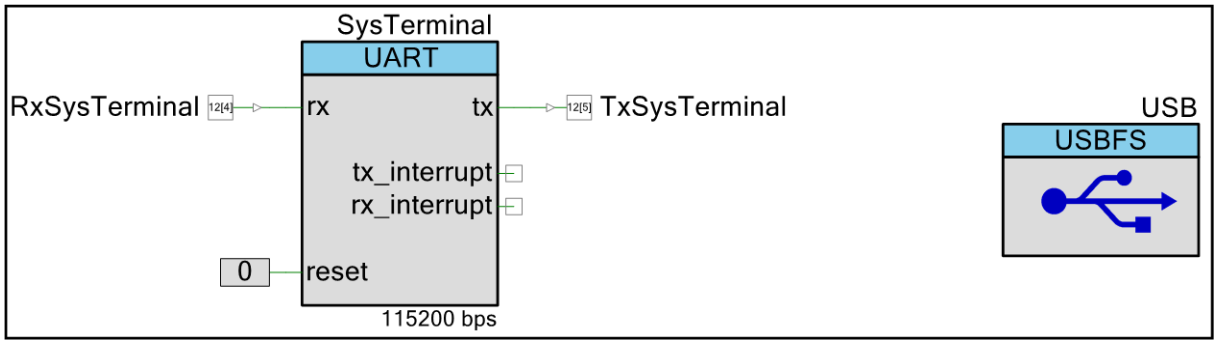
7.3 Schematic Sheet: Memory Manager Sync

Figure 7. Schematic Sheet: Memory Manager Sync



7.4 Schematic Sheet: Communication

Figure 8. Schematic Sheet: Communication

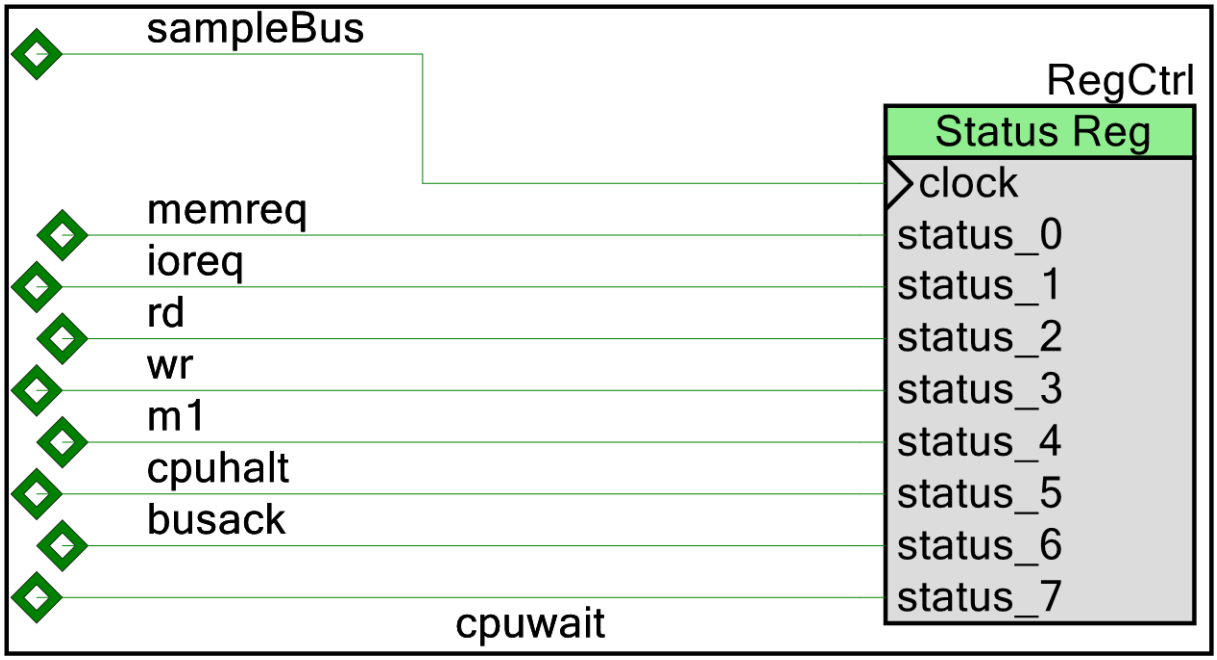


This schematic sheet contains the following component instances:

- Instance SysTerminal (type: UART_v2_50)
- Instance USB (type: USBFS_v3_20)

7.5 Schematic Sheet: Logger

Figure 9. Schematic Sheet: Logger



This schematic sheet contains the following component instances:

- Instance RegCtrl (type: CyStatusReg_v1_90)

8 Components

8.1 Component type: BasicCounter [v1.0]

8.1.1 Instance ClockDivider

Description: Basic Counter
Instance type: BasicCounter [v1.0]
Datasheet: online component datasheet for BasicCounter

Table 14. Component Parameters for ClockDivider

Parameter Name	Value	Description
User Comments		Instance-specific comments.
Width	7	Width of the counter. Must be between 2 and 32.

8.2 Component type: CyControlReg [v1.80]

8.2.1 Instance SysCtrlReg

Description: The Control Register allows the firmware to set values for to use for digital signals.
Instance type: CyControlReg [v1.80]
Datasheet: online component datasheet for CyControlReg

Table 15. Component Parameters for SysCtrlReg

Parameter Name	Value	Description
Bit0Mode	DirectMode	Defines bit 0 mode
Bit1Mode	DirectMode	Defines bit 1 mode
Bit2Mode	DirectMode	Defines bit 2 mode
Bit3Mode	DirectMode	Defines bit 3 mode
Bit4Mode	DirectMode	Defines bit 4 mode
Bit5Mode	DirectMode	Defines bit 5 mode
Bit6Mode	DirectMode	Defines bit 6 mode
Bit7Mode	DirectMode	Defines bit 7 mode
BitValue	0	Defines bit value
BusDisplay	false	Displays the output terminals as bus
ExternalReset	false	Shows the reset terminal
NumOutputs	8	Defines the number of outputs needed (1-8)
User Comments		Instance-specific comments.

8.3 Component type: CyStatusReg [v1.90]

8.3.1 Instance RegCtrl

Description: The Status Register allows the firmware to read values from digital signals.
Instance type: CyStatusReg [v1.90]
Datasheet: online component datasheet for CyStatusReg

Table 16. Component Parameters for RegCtrl

Parameter Name	Value	Description
Bit0Mode	Transparent	Bit Mode for Bit 0 of the Status Register
Bit1Mode	Transparent	Bit Mode for Bit 1 of the Status Register
Bit2Mode	Transparent	Bit Mode for Bit 2 of the Status Register
Bit3Mode	Transparent	Bit Mode for Bit 3 of the Status Register
Bit4Mode	Transparent	Bit Mode for Bit 4 of the Status Register
Bit5Mode	Transparent	Bit Mode for Bit 5 of the Status Register
Bit6Mode	Transparent	Bit Mode for Bit 6 of the Status Register
Bit7Mode	Transparent	Bit Mode for Bit 7 of the Status Register
BusDisplay	false	Displays the input terminals as bus
Interrupt	false	Shows the interrupt terminal
MaskValue	0	Defines the value of the interrupt mask
NumInputs	8	Defines the number of status inputs (1-8)
User Comments		Instance-specific comments.

8.3.2 Instance RegInD

Description: The Status Register allows the firmware to read values from digital signals.
Instance type: CyStatusReg [v1.90]
Datasheet: online component datasheet for CyStatusReg

Table 17. Component Parameters for RegInD

Parameter Name	Value	Description
Bit0Mode	Transparent	Bit Mode for Bit 0 of the Status Register
Bit1Mode	Transparent	Bit Mode for Bit 1 of the Status Register
Bit2Mode	Transparent	Bit Mode for Bit 2 of the Status Register
Bit3Mode	Transparent	Bit Mode for Bit 3 of the Status Register
Bit4Mode	Transparent	Bit Mode for Bit 4 of the Status Register
Bit5Mode	Transparent	Bit Mode for Bit 5 of the Status Register
Bit6Mode	Transparent	Bit Mode for Bit 6 of the Status Register
Bit7Mode	Transparent	Bit Mode for Bit 7 of the Status Register
BusDisplay	true	Displays the input terminals as bus
Interrupt	false	Shows the interrupt terminal
MaskValue	0	Defines the value of the interrupt mask

Parameter Name	Value	Description
NumInputs	8	Defines the number of status inputs (1-8)
User Comments		Instance-specific comments.

8.3.3 Instance RegLsbA

Description: The Status Register allows the firmware to read values from digital signals.
Instance type: CyStatusReg [v1.90]
Datasheet: online component datasheet for CyStatusReg

Table 18. Component Parameters for RegLsbA

Parameter Name	Value	Description
Bit0Mode	Transparent	Bit Mode for Bit 0 of the Status Register
Bit1Mode	Transparent	Bit Mode for Bit 1 of the Status Register
Bit2Mode	Transparent	Bit Mode for Bit 2 of the Status Register
Bit3Mode	Transparent	Bit Mode for Bit 3 of the Status Register
Bit4Mode	Transparent	Bit Mode for Bit 4 of the Status Register
Bit5Mode	Transparent	Bit Mode for Bit 5 of the Status Register
Bit6Mode	Transparent	Bit Mode for Bit 6 of the Status Register
Bit7Mode	Transparent	Bit Mode for Bit 7 of the Status Register
BusDisplay	true	Displays the input terminals as bus
Interrupt	false	Shows the interrupt terminal
MaskValue	0	Defines the value of the interrupt mask
NumInputs	8	Defines the number of status inputs (1-8)
User Comments		Instance-specific comments.

8.3.4 Instance RegMsbA

Description: The Status Register allows the firmware to read values from digital signals.
Instance type: CyStatusReg [v1.90]
Datasheet: online component datasheet for CyStatusReg

Table 19. Component Parameters for RegMsbA

Parameter Name	Value	Description
Bit0Mode	Transparent	Bit Mode for Bit 0 of the Status Register
Bit1Mode	Transparent	Bit Mode for Bit 1 of the Status Register
Bit2Mode	Transparent	Bit Mode for Bit 2 of the Status Register
Bit3Mode	Transparent	Bit Mode for Bit 3 of the Status Register

Parameter Name	Value	Description
Bit4Mode	Transparent	Bit Mode for Bit 4 of the Status Register
Bit5Mode	Transparent	Bit Mode for Bit 5 of the Status Register
Bit6Mode	Transparent	Bit Mode for Bit 6 of the Status Register
Bit7Mode	Transparent	Bit Mode for Bit 7 of the Status Register
BusDisplay	true	Displays the input terminals as bus
Interrupt	false	Shows the interrupt terminal
MaskValue	0	Defines the value of the interrupt mask
NumInputs	8	Defines the number of status inputs (1-8)
User Comments		Instance-specific comments.

8.4 Component type: mux [v1.10]

8.4.1 Instance ClkDivMux

Description: Multiplexer with configurable number of input terminals and terminal width.
Instance type: mux [v1.10]
Datasheet: online component datasheet for mux

Table 20. Component Parameters for ClkDivMux

Parameter Name	Value	Description
NumInputTerminals	8	Number of inputs required for the Multiplexer. Acceptable values are 2, 4, 8, and 16.
TerminalWidth	1	Width of each terminal
User Comments		Instance-specific comments.

8.4.2 Instance ClkSrcMux

Description: Multiplexer with configurable number of input terminals and terminal width.
Instance type: mux [v1.10]
Datasheet: online component datasheet for mux

Table 21. Component Parameters for ClkSrcMux

Parameter Name	Value	Description
NumInputTerminals	2	Number of inputs required for the Multiplexer. Acceptable values are 2, 4, 8, and 16.
TerminalWidth	1	Width of each terminal
User Comments		Instance-specific comments.

8.5 Component type: UART [v2.50]

8.5.1 Instance SysTerminal

Description: Universal Asynchronous Receiver Transmitter
Instance type: UART [v2.50]
Datasheet: online component datasheet for UART

Table 22. Component Parameters for SysTerminal

Parameter Name	Value	Description
Address1	0	This parameter specifies the RX Hardware Address #1.
Address2	0	This parameter specifies the RX Hardware Address #2.
BaudRate	115200	Sets the target baud rate.
BreakBitsRX	13	Specifies the break signal length for the RX (detection) channel.
BreakBitsTX	13	Specifies the break signal length for the TX channel.
BreakDetect	false	Enables the break detect hardware.
CRCoutputsEn	false	Enables the CRC outputs.
EnIntRXInterrupt	true	Enables the internal RX interrupt configuration and the ISR.
EnIntTXInterrupt	true	Enables the internal TX interrupt configuration and the ISR.
FlowControl	None	Enable the flow control signals.
HalfDuplexEn	false	Enables half duplex mode on the RX Half of the UART module.
HwTXEnSignal	false	Enables the external TX enable signal output.
InternalClock	true	Enables the internal clock. This parameter removes the clock input pin.
InterruptOnTXComplete	false	This is an Interrupt mask used to enable/disable the interrupt on 'TX complete' event.
InterruptOnTXFifoEmpty	true	This is an Interrupt mask used to enable/disable the interrupt on 'TX FIFO empty' event.
InterruptOnTXFifoFull	false	This is an Interrupt mask used to enable/disable the interrupt on 'TX FIFO full' event.
InterruptOnTXFifoNotFull	false	This is an Interrupt mask used to enable/disable the interrupt on 'TX FIFO not full' event.
IntOnAddressDetect	false	Enables the interrupt on hardware address detected event by default
IntOnAddressMatch	false	Enables the interrupt on hardware address match detected event by default
IntOnBreak	false	Enables the interrupt on break signal detected event by default
IntOnByteRcvd	true	Enables the interrupt on RX byte received event by default
IntOnOverrunError	false	Enables the interrupt on overrun error event by default
IntOnParityError	false	Enables the interrupt on parity error event by default
IntOnStopError	false	Enables the interrupt on stop error event by default

Parameter Name	Value	Description
NumDataBits	8	Defines the number of data bits. Values can be 5, 6, 7 or 8 bits.
NumStopBits	1	Defines the number of stop bits. Values can be 1 or 2 bits.
OverSamplingRate	8	This parameter defines the over sampling rate.
ParityType	None	Sets the parity type as Odd, Even or Mark/Space
ParityTypeSw	false	This parameter allows the parity type to be changed through software by using the WriteControlRegister API
RXAddressMode	None	Configures the RX hardware address detection mode
RXBufferSize	4096	The size of the RAM space allocated for the RX input buffer.
RXEnable	true	Enables the RX in the UART
TXBitClkGenDP	true	When enabled, this parameter enables the TX clock generation on DataPath resource. When disabled, TX clock is generated from Clock7.
TXBufferSize	128	The size of the RAM space allocated for the TX output buffer.
TXEnable	true	Enables the TX in the UART
Use23Polling	false	Allows the use of 2 out of 3 polling resources on the RX UART sampler.
User Comments		Instance-specific comments.

8.6 Component type: USBFS [v3.20]

8.6.1 Instance USB

Description: USB 2.0 Full Speed Device Framework
Instance type: USBFS [v3.20]
Datasheet: online component datasheet for USBFS

Table 23. Component Parameters for USB

Parameter Name	Value	Description
EnableBatteryChargDetect	false	This parameter allows to detect a charging supported USB host port using the API function USBFS_DetectPortType().
EnableCDCApi	true	Enables additional high level API's that allow the CDC device to be used similar to a UART device.
EnableMidiApi	true	Enables additional high level MIDI API's.
endpointMA	MA_Static	Endpoint memory allocation
endpointMM	EP_DMAmanual	Endpoint memory management

Parameter Name	Value	Description
epDMAautoOptimization	false	This parameter enables resource optimization for DMA with Automatic Memory Management mode. Set this parameter value to true only when a single IN endpoint is present in the device. Enabling this parameter in a multi IN endpoint device configuration causes undesired effects.
extern_cls	false	This parameter allows for user or other component to implement his own handler for Class requests. USBFS_-DispatchClassRqst() function should be implemented if this parameter enabled.
extern_vbus	false	This parameter enables external VBUSDET input.
extern_vnd	false	This parameter allows for user or other component to implement his own handler for Vendor specific requests. USBFS_HandleVendorRqst() function should be implemented if this parameter enabled.
extJackCount	0	Max number of External MIDI IN Jack or OUT Jack descriptors
Gen16bitEpAccessApi	true	This parameter defines whether to generate APIs for the 16-bits endpoint access.
HandleMscRequests	true	This parameter is used to enable handling MSC requests and generate MSC APIs.
isrGroupArbiter	Low	This parameter defines the interrupt group of the Arbiter Interrupt.
isrGroupBusReset	Low	This parameter defines the interrupt group of the Bus Reset Interrupt.
isrGroupEp0	Low	This parameter defines the interrupt group of the Control Endpoint Interrupt (EP0).
isrGroupEp1	Low	This parameter defines the interrupt group of the Data Endpoint 1 Interrupt.
isrGroupEp2	Low	This parameter defines the interrupt group of the Data Endpoint 2 Interrupt.
isrGroupEp3	Medium	This parameter defines the interrupt group of the Data Endpoint 3 Interrupt.
isrGroupEp4	Medium	This parameter defines the interrupt group of the Data Endpoint 4 Interrupt.
isrGroupEp5	Medium	This parameter defines the interrupt group of the Data Endpoint 5 Interrupt.

Parameter Name	Value	Description
isrGroupEp6	Medium	This parameter defines the interrupt group of the Data Endpoint 6 Interrupt.
isrGroupEp7	Medium	This parameter defines the interrupt group of the Data Endpoint 7 Interrupt.
isrGroupEp8	Medium	This parameter defines the interrupt group of the Data Endpoint 8 Interrupt.
isrGroupLpm	High	This parameter defines the interrupt group of the LPM Interrupt.
isrGroupSof	Medium	This parameter defines the interrupt group of the Start of Frame Interrupt.
max_interfaces_num	1	Defines maximum interfaces number
Mode	false	Specifies whether the implementation will create API for interfacing to UART component(s) for a corresponding set of external MIDI connections.
mon_vbus	false	The mon_vbus parameter adds a single VBUS monitor pin to the design. This pin must be connected to VBUS and must be assigned in the pin editor.
MscLogicalUnitsNum	1	This parameter allows to specify the number of logical units that should be supported by the Mass Storage device.
out_sof	false	The out_sof parameter enables Start-of-Frame output.
Pid	F232	Product ID
powerpad_vbus	false	This parameter enables VBUS power pad
ProdactName		This string is displayed by the Operating System when it is installing the mass storage device as the Product Name.
ProdactRevision		This string is displayed by the Operating System when it is installing the mass storage device as the Product Revision.
rm_lpm_int	true	Removes LPM ISR
User Comments		Instance-specific comments.
VendorName		This string is displayed by the Operating System when it is installing the mass storage device as the Vendor Name.
Vid	04B4	Vendor ID

8.7 Component type: Z80Controller [v0.0]

8.7.1 Instance Z80Ctrl

Description: (custom component)
Instance type: Z80Controller [v0.0]
Datasheet: (not available)

Table 24. Component Parameters for Z80Ctrl

Parameter Name	Value	Description
User Comments		Instance-specific comments.

9 Other Resources

The following documents contain important information on Cypress software APIs that might be relevant to this design:

- Standard Types and Defines chapter in the System Reference Guide
  - Software base types
  - Hardware register types
  - Compiler defines
  - Cypress API return codes
  - Interrupt types and macros
- Registers
  - The full PSoC 5LP register map is covered in the PSoC 5LP Registers Technical Reference Manual
  - Register Access chapter in the System Reference Guide
    - CY_GET API routines
    - CY_SET API routines
- System Functions chapter in the System Reference Guide
  - General API routines
  - CyDelay API routines
  - CyVd Voltage Detect API routines
- Power Management
  - Power Supply and Monitoring chapter in the PSoC 5LP Technical Reference Manual
  - Low Power Modes chapter in the PSoC 5LP Technical Reference Manual
  - Power Management chapter in the System Reference Guide
    - CyPm API routines
- Watchdog Timer chapter in the System Reference Guide
  - CyWdt API routines
- Cache Management
  - Cache Controller chapter in the PSoC 5LP Technical Reference Manual
  - Cache chapter in the System Reference Guide
    - CyFlushCache() API routine