Comparator Datasheet COMPV 2.20

Resources	PSoC® Blocks			API Memory (Bytes)		Pins (per External I/O)
	Digital	Analog CT	Analog SC	Flash	RAM	
CY8C28x45, CY8C28x52, CY8C28x33, CY8C28x43,CY8C28x23, CY8C29x66,CY8C27x43, CY8C24x94,CY8C24x23A, CY8C24x33, CY8C23x33, CY8CLED0xD, CY8CLED0xG, CY8CLED04/08/16, CY8CTST/TMG/TMA120	0	1–2	0	104–205	0	0–2

Features and Overview

- Flexible input sources
- Output signal latching
- Flexible functionality configuration

The Comparator (COMP) User Module provides a digital output representation of the comparison of two signal levels. The input signals can be external signals multiplexed through the analog column mux, internal signals, and fixed or adjustable reference voltages. It provides a number of standard structural options with considerable flexibility in connection, threshold limits, and noise rejection.

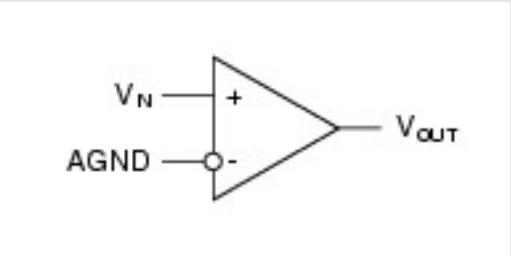
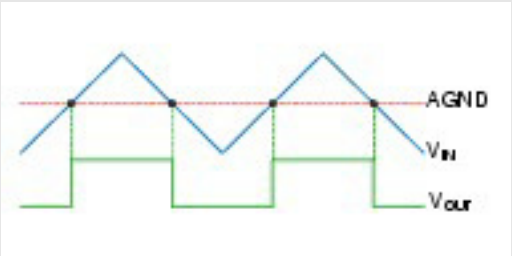
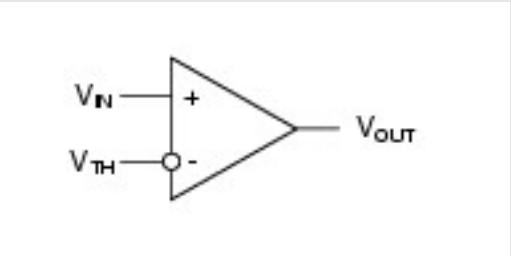
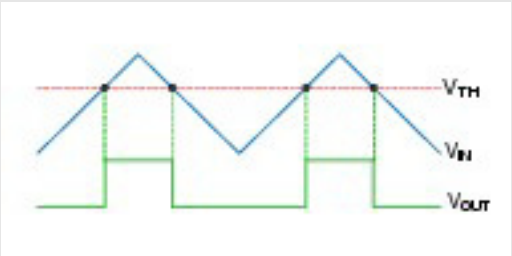
The COMP User Module is constructed as a multi user module (MUM). The MUM lists the name, brief description, simplified schematic, and input/output waveforms. The MUM schematic is at the ‘system’ level. It does not show physical interconnections.

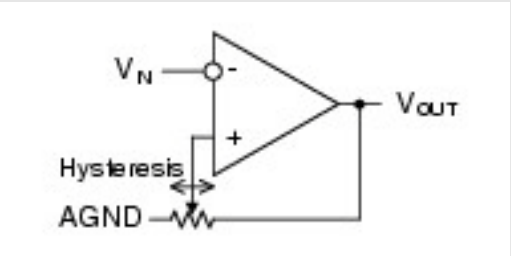
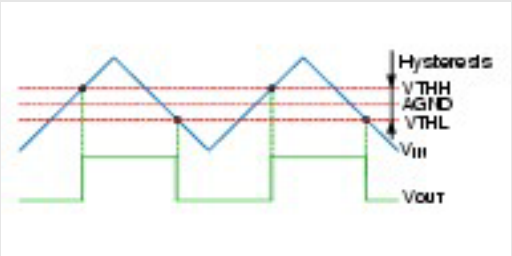
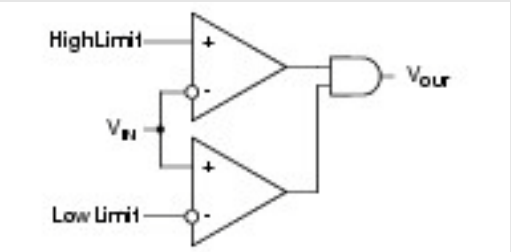
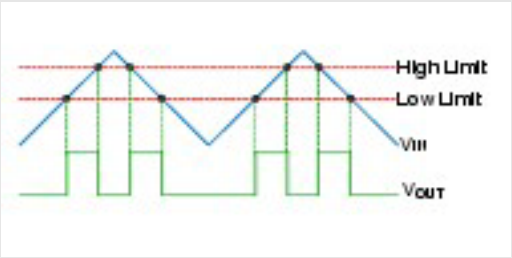
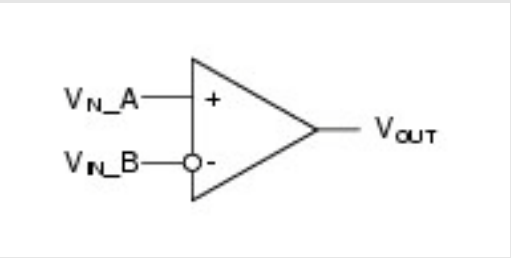
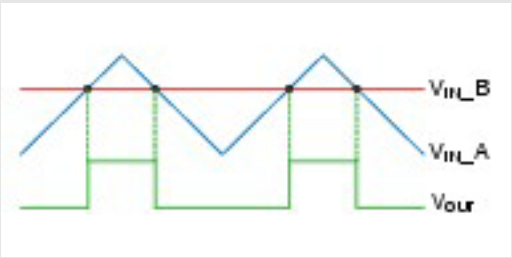
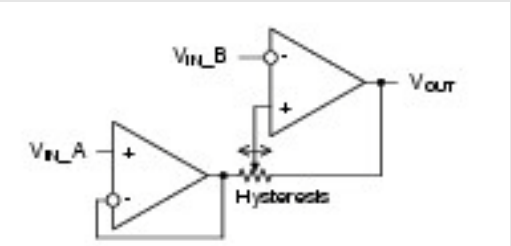
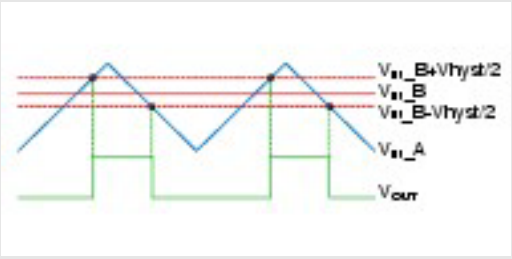
The power setting and column clock determines the comparator speed The analog output of the comparator drives a digital comparator that cleanly translates the analog output to system digital levels. The digital comparator drives a latch, which is clocked by the column clock or bypassed. Latch use depends upon the comparator input selection.

The input is normally from a continuous time input from the analog column mux but it can be the output of an adjacent continuous time (CT) block or switched capacitor (SC) block. For example, the SC block can be a filter or MDAC. If it is a filter, the output is static during the clock cycle; therefore, no change is required for comparator column clocking. If it is an MDAC or any other switched capacitor amplifier function, the output is only valid half of the time. In this case the comparator latch is used to latch the comparator output only when the input signal are valid.

The physical structure (block and resource connections) of each version of the user module is shown in the ‘Parameters and Resources’ section.

Table 1. COMP Block Diagrams

Name	Schematic	Waveform
COMPZ		
COMPA		

Name	Schematic	Waveform
COMPH		
COMPW		
COMPD		
COMPDH		

Functional Description

COMPZ (Zero Crossing Detector)

Provides a logic output when the input crosses AGND. AGND is selected in the global parameters window. Polarity is nominally positive but can be changed with the Polarity parameter; the inversion is implemented in the comparator column LUT.

COMPA (Adjustable Threshold Comparator)

Provides a logic output when the input crosses a preset threshold. The threshold is set at specific values that are a percentage of the difference between VDD and the selected low limit, either AGND or VSS. Select LowLimit in the UM parameter window and AGND in the global parameters window.

COMPH (Zero Crossing Detector with Adjustable Hysteresis)

Provides a nominal positive logic output when the input crosses a preset high threshold. The output stays high until the input crosses a preset low threshold. High and low thresholds are evenly spaced from the AGND. The hysteresis value, that is, the difference between high and low is a percentage of power supply set by a user-selected parameter. The hysteresis comparator input is limited to continuous time inputs or filter outputs. The feedback path for the hysteresis limits is "analog" and is not latched; therefore, non continuous inputs do not maintain the input state above the hysteresis High threshold.

COMPW (Window Comparator)

Provides a nominal positive logic output when the input is above a low threshold (VTHL) and below a high threshold (VTHH). Threshold voltages depend on low limit and supply voltage. Voltages are the same as COMPA. The VTHH value selected must be greater than the VTHL. Polarity is selected in the LUT.

COMPD (Differential Comparator)

Provides a logic level output when one input is greater than the other. While one input is direct, the other is through a CT block buffer (PGA with Gain = 1). Placement uses two adjacent CT blocks in the same pair column 0 and column 1 or column 2 and column 3. Polarity is adjusted by swapping inputs or in the output column’s LUT.

COMPDH (Differential Comparator with Adjustable Hysteresis)

Provides a nominal positive logic high output when the positive input exceeds the negative input by an amount equal to half of the selected hysteresis. When the positive input goes below the negative input by an amount equal to half of the hysteresis, the output state goes low. The hysteresis value, that is, the difference between high and low is a percentage of power supply set by user selected parameter. The hysteresis comparator input is limited to continuous time inputs or filter outputs. The feedback path for the hysteresis limits is analog and is not latched, so non continuous inputs do not maintain the input state above the hysteresis high threshold.

DC and AC Electrical Characteristics

The following values are indicative of expected performance and based on initial characterization data. Unless otherwise specified in the following tables, TA = 25 °C, Vdd = 5.0 V, LowLimit = Vss.

Table 2. 5.0 V COMP DC Electrical Characteristics[3]

Parameter	Typical	Limit	Units	Conditions and Notes
Input[4]				
Input Voltage Range	–	Vss to Vdd	V	
Leakage[1]	1	–	nA	
Input Capacitance	3	–	pF	
Output Swing	0.05 to Vdd-0.05	–	V	

The following values are indicative of expected performance and based on initial characterization data. Unless otherwise specified in the following tables, TA = 25 °C, Vdd = 3.3 V, LowLimit = Vss.

Table 3. 3.3 V COMP DC Electrical Characteristics[3]

Parameter	Typical	Limit	Units	Conditions and Notes
Input[4]				
Input Voltage Range	–	Vss to Vdd	V	
Leakage[1]	1	–	nA	
Input Capacitance	3	–	pF	
Output Swing	0.05 to Vdd-0.05	–	V	

The following values are indicative of expected performance and based on initial characterization data. Unless otherwise specified in the following tables, TA = 25 °C, Vdd = 2.7 V, LowLimit = Vss.

Table 4. 2.7 V COMP DC Electrical Characteristics[3]

Parameter	Typical	Limit	Units	Conditions and Notes
Input[4]				
Input Voltage Range	–	Vss to Vdd	V	
Leakage[1]	1	–	nA	
Input Capacitance	3	–	pF	
Output Swing	0.05 to Vdd-0.05	–	V	

Table 5. 3.3 V COMP AC Electrical Characteristics, CY8C29/27/24xxx Family of PSoC Devices[3]

Parameter	Typical	Limit	Units	Conditions and Notes
Response Time[2,5]				100 mV step at input
Low Power	5	–	µs	
Med Power	2	–	µs	
High Power	0.6	–	µs	

Electrical Characteristic Notes:

1. Includes I/O pin.
2. Based upon device simulation.
3. Typical values represent parametric norm at +25 °C. Limits are guaranteed by testing or statistical analysis.
4. Reference input offset voltage algebraically added to selected reference voltage low limit.
5. Response time on internal connection to digital blocks includes load of internal analog bus if enabled.

Placement

The COMPZ, COMPA, and COMPH MUM configurations use one CT analog block. They also consume the comparator bus of the analog column they occupy and the LUT of the analog column they occupy.

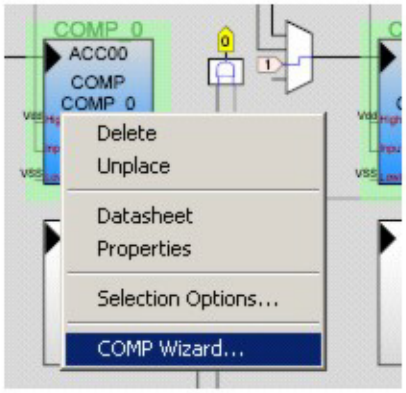
The COMPW MUM configuration uses two CT analog blocks. These two blocks must occupy column 0 and column 1, or column 2 and column 3. This configuration also consumes two analog column comparator buses and the two analog column LUTs.

The COMPD and COMPDH MUM configurations use two CT analog blocks. These two blocks must occupy column 0 and column 1, or column 2 and column 3. This configuration uses one analog column comparator bus and the LUT of the same column.

Wizard

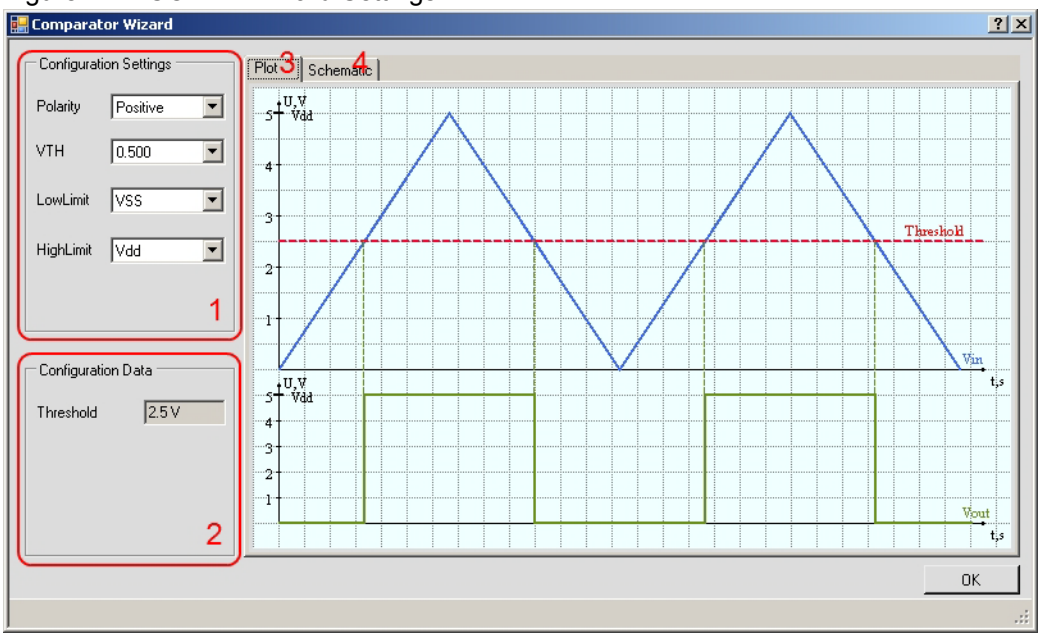
To access the UM Wizard, right click any block of the COMP UM in the Device Editor Interconnect View, then select the COMP Wizard with a left mouse click.

Figure 1. Accessing the COMP Wizard



COMPA Wizard Settings and Description

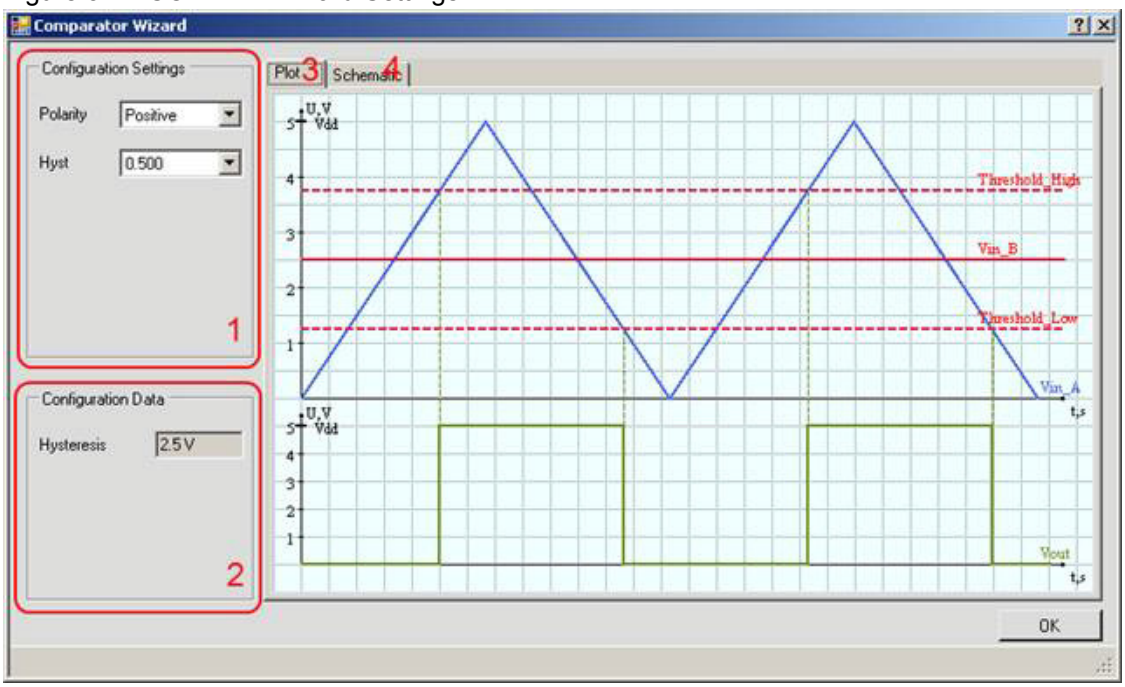
Figure 2. COMPA Wizard Settings



1. Configuration Settings: This is a duplication of the User Module Properties for comfortable tuning.
2. Configuration Data: This parameter is calculated depending on the User Module Properties and Global Resources. The Threshold value is determined by the following expression:
   Threshold = LowLimit + ((HighLimit - LowLimit) * VTH)
3. The Plot window shows the input and output comparator waveforms.
4. The Schematic window shows the internal comparator principle schematic.

COMPDH Wizard Settings and Description

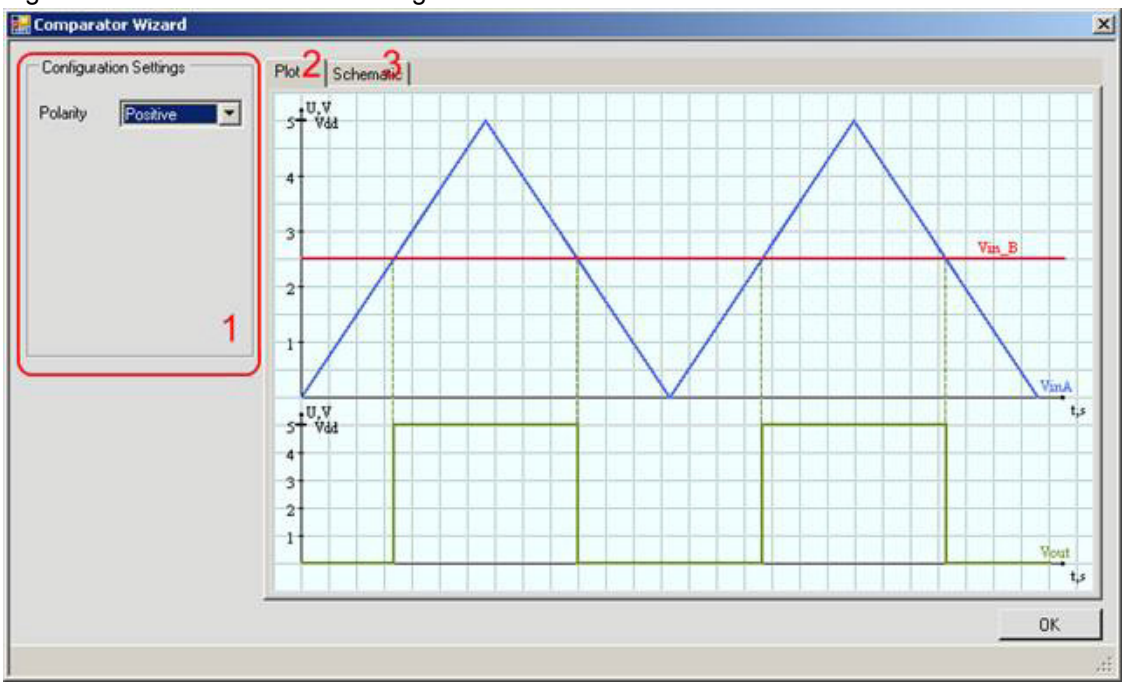
Figure 3. COMPDH Wizard Settings



1. Configuration Settings: This is a duplication of the User Module Properties for comfortable tuning.
2. Configuration Data: This parameter is calculated depending on the User Module Properties and Global Resources. The Hysteresis value is determined by the following expression:
   Hysteresis = Vdd * Hyst.
3. The Plot window shows the input and output comparator waveforms.
4. The Schematic window shows the internal comparator principle schematic.

COMPD Wizard Settings and Description

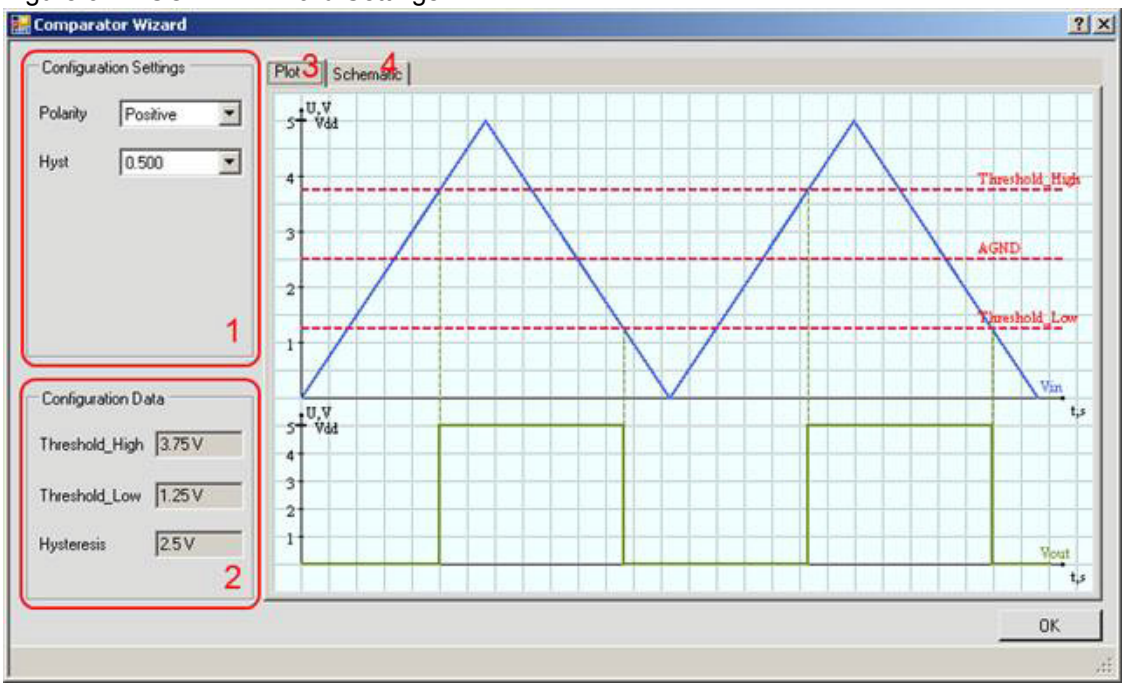
Figure 4. COMPD Wizard Settings



1. Configuration Settings: This is a duplication of the User Module Properties for comfortable tuning.
2. The Plot window shows the input and output comparator waveforms.
3. The Schematic window shows the internal comparator principle schematic.

COMPH Wizard Settings and Description

Figure 5. COMPH Wizard Settings

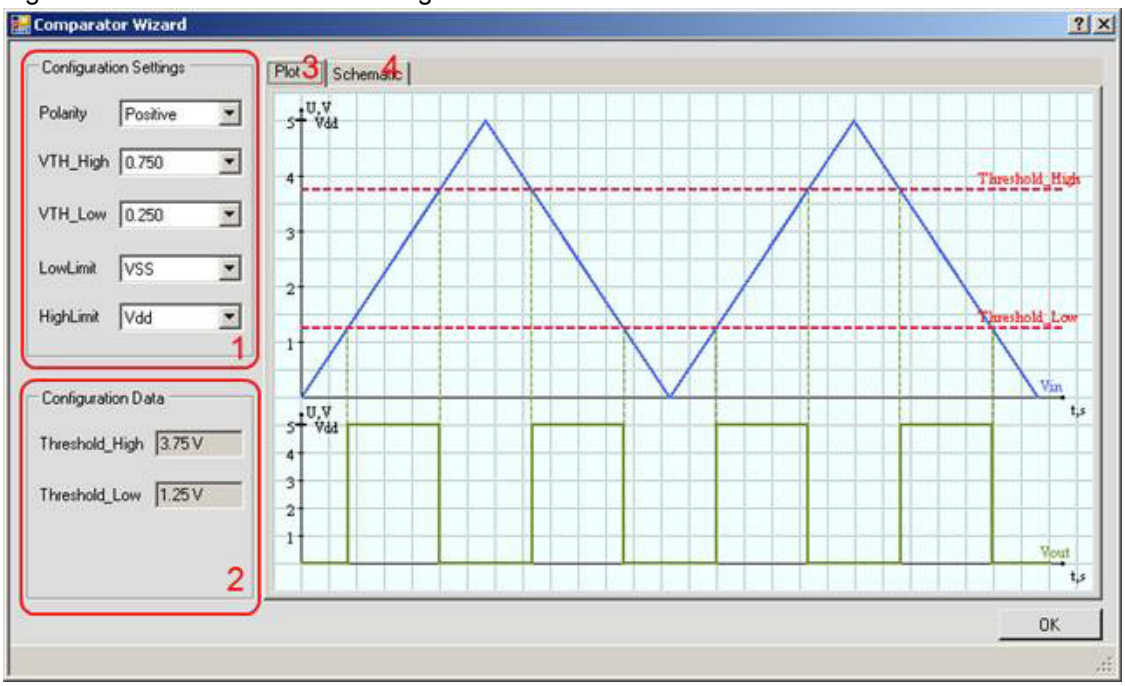


1. Configuration Settings: This is a duplication of the User Module Properties for comfortable tuning.

2. Configuration Data: The following parameters are calculated depending on User Module Properties and Global Resources:
    - The Threshold_High value is determined by the following expression:
      Threshold_High = AGND + (Vdd - AGND) * Hyst
    - The Threshold_Low value is determined by the following expression:
      Threshold_Low = AGND - (AGND - Vss) * Hyst
    - The Hysteresis value is determined by the following expression:
      Hysteresis = Vdd * Hyst
3. The Plot window shows the input and output comparator waveforms.
4. The Schematic window shows the internal comparator principle schematic.

COMPW Wizard Settings and Description

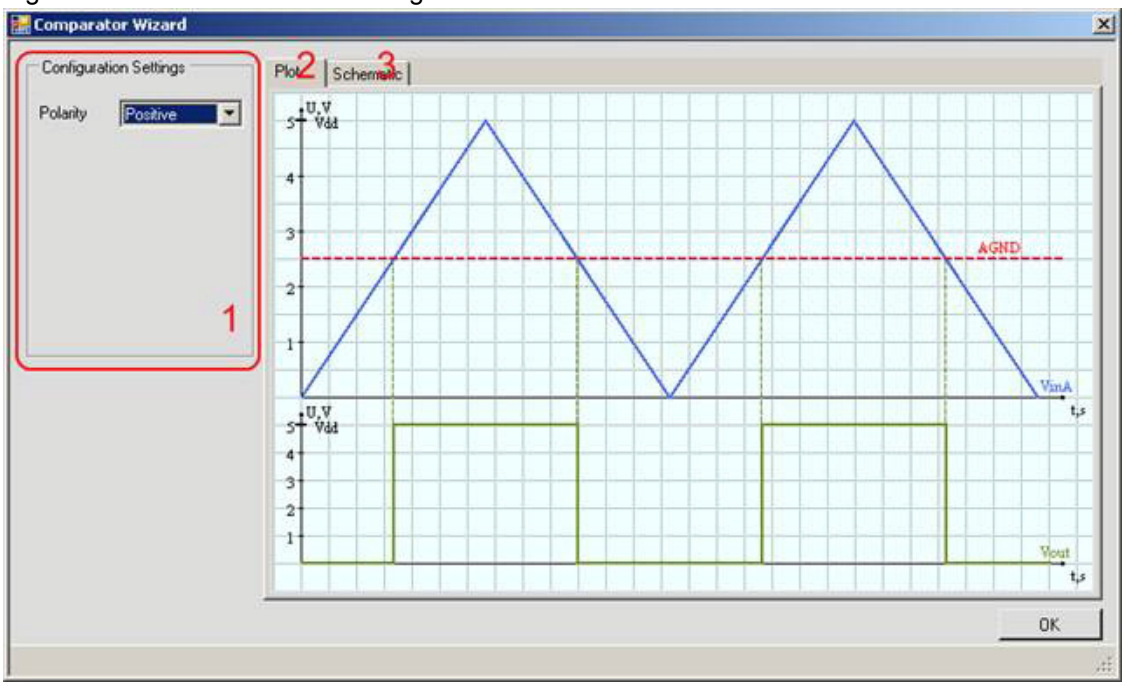
Figure 6. COMPW Wizard Settings



1. Configuration Settings: This is a duplication of the User Module Properties for comfortable tuning.
2. Configuration Data: The following parameters are calculated depending on the User Module Properties and Global Resources:
    - The Threshold_High value is determined by the following expression:
      Threshold_High = LowLimit + ((HighLimit - LowLimit) * VTH_High)
    - The Threshold_Low value is determined by the following expression:
      Threshold_Low = LowLimit + ((HighLimit - LowLimit) * VTH_Low)
3. The Plot window shows the input and output comparator waveforms.
4. The Schematic window shows the internal comparator principle schematic.

COMPZ Wizard Settings and Description

Figure 7. COMPZ Wizard Settings



1. Configuration Settings: This is a duplication of the User Module Properties for comfortable tuning.
2. The Plot window shows the input and output comparator waveforms.
3. The Schematic window shows the internal comparator principle schematic.

Parameters and Resources

The following parameters are available for this user module:

Input

Only available for COMPZ, COMPA, COMPH

Sets the positive input of the used CT analog block. Input is selectable from one of five sources, which depend on placement.

Input1

Only available for COMPW, COMPD, and COMPDH.

Sets the positive input of the first used CT analog block. Input is selectable from one of five sources, which depend on placement.

Only for COMPDH: The Input1 voltage should be greater than Vss + Hysteresis/2 and less than Vdd - Hysteresis/2 (at AGND = Vdd/2).

Polarity

This parameter sets the comparator LUT setting to implement a positive or negative polarity. There are two values available: Positive (default) or Negative.

OutputLatch

Controls the comparator's Output Latch. There are two values available: Enabled (default) and Disabled.

LatchClock

Sets the phase of comparator's Output Latch clock signal. There are two values available: Phi1 (default) and Phi2.

HighLimit

Only available for COMPA, COMPW

Only available devices with Type C CT blocks

High Reference Limit is selectable from one of two sources: Vdd (default) or RefHi.

LowLimit

Only available for COMPA, COMPW

Low Reference Limit is selectable from: Vss (default), AGND, adjacent CT or SC block (adjacent blocks are not available for COMPW).

If the adjacent CT block is used as a LowLimit source, this block should be used in Gain mode (Gain bit of CR0 register should be "1"). For example, the PGA UM gain should be equal to or greater than 1. Because the LowLimit input connects directly to the adjacent block's opamp output and if this block is in Loss mode, then the received LowLimit value is not correct (does not match the calculated value).

VTH

Only available for COMPA

The Threshold voltage is set by resistive divider tap at increments of (Vrefhi-Vreflo) *(1/48, 1/24, 1/16, 2/16, ..., n/16, ..., 15/16) + Vreflo. Vrefhi and Vreflo values is dependent on HighLimit, LowLimit settings and voltage setting (3.3 V or 5 V) in global resources window.

Hyst

Only available for COMPH, COMPDH

The Hysteresis voltage is set by resistive divider tap at increments of Vdd *(1/16, 2/16, ..., n/16, ..., 15/16). The Hysteresis amount is a function of the power supply setting (that is, 3.3 V, 5 V, 2.7 V, and so on).

VTH_High

Only available for COMPW

The High Threshold voltage is set by resistive divider tap at increments of (Vrefhi-Vreflo) *(1/48, 1/24, 1/16, 2/16, ..., n/16, ..., 1). The Vrefhi and Vreflo values depend on HighLimit and LowLimit settings, and voltage settings (3.3 V or 5 V) in the global resources window.

VTH_Low

Only available for COMPW

The Low Threshold voltage is set by resistive divider tap at increments of (Vrefhi-Vreflo) *(1/48, 1/24, 1/16, 2/16, ..., n/16, ..., 1). Vrefhi and Vreflo values depend on HighLimit and LowLimit settings, and voltage setting (3.3 V or 5 V) in global resources window.

Application Programming Interface

The Application Programming Interface (API) functions are provided as part of the user module to allow you to deal with the module at a higher level. This section specifies the interface to each function together with related constants provided by the include files.

Each time a user module is placed, it is assigned an instance name. By default, PSoC Designer assigns COMP_1 to the first instance of this user module in a given project. It can be changed to any unique value that follows the syntactic rules for identifiers. The assigned instance name becomes the prefix of every global function name, variable, and constant symbol. In the following descriptions, the instance name is shortened to COMP for simplicity.

Note

** In this, as in all user module APIs, the values of the A and X register may be altered by calling an API function. It is the responsibility of the calling function to preserve the values of A and X before the call if those values are required after the call. This "registers are volatile" policy was selected for efficiency reasons and has been in force since version 1.0 of PSoC Designer. The C compiler automatically takes care of this requirement. Assembly language programmers must also ensure their code observes the policy. Though some user module API functions may leave A and X unchanged, there is no guarantee they may do so in the future.

For Large Memory Model devices, it is also the caller's responsibility to preserve any value in the CUR_PP, IDX_PP, MVR_PP, and MVW_PP registers. Even though some of these registers may not be modified now, there is no guarantee that will remain the case in future releases.

COMP_Start

Description:

Initializes registers and starts the user module. The parameter is a symbolic name that selects the power setting for the user module.

C Prototype:

```
void  COMP_Start(BYTE bPower);
```

Assembly:

```
mov A, [bPower]
lcall  COMP_Start
```

Parameters:

bPower: Symbolic name that selects a power setting of HIGH, MEDIUM, or LOW.

Symbolic Name	Value	Description
COMP_LOWPOWER	0x01	Sets the low power.
COMP_MEDPOWER	0x02	Sets the medium power.
COMP_HIGHPOWER	0x03	Sets the high power.

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

COMP_Stop

Description:

Stops the user module and powers it down.

C Prototype:

```
void  COMP_Stop(void);
```

Assembly:

```
lcall  COMP_Stop
```

Parameters:

None

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

COMP_EnableInt

Description:

Enables the COMP interrupt. The placement location of the COMP determines the specific interrupt vector and priority.

C Prototype:

```
void  COMP_EnableInt(void);
```

Assembly:

```
lcall  COMP_EnableInt
```

Parameters:

None

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

COMP_DisableInt

Description:

Disables the COMP interrupt.

C Prototype:

```
void  COMP_DisableInt(void);
```

Assembly:

```
lcall  COMP_DisableInt
```

Parameters:

None

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

COMP_ClearInt

Description:

Clears the posted COMP interrupt.

C Prototype:

```
void  COMP_ClearInt(void);
```

Assembly:

```
lcall  COMP_ClearInt
```

Parameters:

None

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

COMP_SetPower

Description:

This API sets the power of the analog blocks of the user module.

C Prototype:

```
void  COMP_SetPower(BYTE bPower);
```

Assembly:

```
mov A,  [bPower]
lcall COMP_SetPower
```

Parameters:

bPower: Symbolic name of a power setting which is HIGH, MEDIUM, and LOW.

Symbolic Name	Value	Description
COMP_LOWPOWER	0x01	Sets the low power.
COMP_MEDPOWER	0x02	Sets the medium power.
COMP_HIGHPOWER	0x03	Sets the high power.

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

COMP_SetPolarity

Description:

Sets the polarity of the digital output of the comparator.

C Prototype:

```
void  COMP_SetPolarity(BYTE bPolarity);
```

Assembly:

```
mov A,  [bPolarity]
lcall COMP_SetPolarity
```

Parameters:

bPolarity: This parameter is a symbolic name that represents positive or negative polarity.

Symbolic Name	Value	Description
COMP_POL_POS	0x01	Sets the positive polarity.
COMP_POL_NEG	0x00	Sets the negative polarity.

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

COMP_SetRef

Description:

Sets the adjustable reference for the COMPA configuration. This API is only available for the COMPA configuration of this user module.

C Prototype:

```
void  COMP_SetRef(BYTE bReference);
```

Assembly:

```
mov A,  [bReference]
lcall COMP_SetRef
```

Parameters:

bReference: This parameter is a symbolic name that represents the reference value.

Symbolic Name	Value	Description
COMP_REF1_000	0xf0	Sets the reference to 1.000 value.
COMP_REF0_937	0xe0	Sets the reference to 0.937 value.
COMP_REF0_875	0xd0	Sets the reference to 0.875 value.
COMP_REF0_812	0xc0	Sets the reference to 0.812 value.
COMP_REF0_750	0xb0	Sets the reference to 0.750 value.
COMP_REF0_688	0xa0	Sets the reference to 0.688 value.
COMP_REF0_625	0x90	Sets the reference to 0.625 value.
COMP_REF0_562	0x80	Sets the reference to 0.562 value.
COMP_REF0_500	0x70	Sets the reference to 0.500 value.
COMP_REF0_437	0x60	Sets the reference to 0.437 value.
COMP_REF0_375	0x50	Sets the reference to 0.375 value.
COMP_REF0_312	0x40	Sets the reference to 0.312 value.
COMP_REF0_250	0x30	Sets the reference to 0.250 value.
COMP_REF0_188	0x20	Sets the reference to 0.188 value.
COMP_REF0_125	0x10	Sets the reference to 0.125 value.
COMP_REF0_062	0x00	Sets the reference to 0.062 value.
COMP_REF0_042	0x14	Sets the reference to 0.042 value.
COMP_REF0_021	0x04	Sets the reference to 0.021 value.

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

COMP_SetHyst

Description:

Sets the adjustable hysteresis for the COMPH and COMPDH configurations. This API is only available for the COMPH and COMPDH configurations of this UM.

C Prototype:

```
void  COMP_SetHyst(BYTE bHyst);
```

Assembly:

```
mov A,  [bHyst]
lcall COMP_SetHyst
```

Parameters:

bHyst: This parameter is a symbolic name that represents the hysteresis value.

Symbolic Name	Value	Description
COMP_REF0_937	0xe0	Sets the reference to 0.937 value.
COMP_REF0_875	0xd0	Sets the reference to 0.875 value.
COMP_REF0_812	0xc0	Sets the reference to 0.812 value.
COMP_REF0_750	0xb0	Sets the reference to 0.750 value.
COMP_REF0_688	0xa0	Sets the reference to 0.688 value.
COMP_REF0_625	0x90	Sets the reference to 0.625 value.
COMP_REF0_562	0x80	Sets the reference to 0.562 value.
COMP_REF0_500	0x70	Sets the reference to 0.500 value.
COMP_REF0_437	0x60	Sets the reference to 0.437 value.
COMP_REF0_375	0x50	Sets the reference to 0.375 value.
COMP_REF0_312	0x40	Sets the reference to 0.312 value.
COMP_REF0_250	0x30	Sets the reference to 0.250 value.
COMP_REF0_188	0x20	Sets the reference to 0.188 value.
COMP_REF0_125	0x10	Sets the reference to 0.125 value.
COMP_REF0_062	0x00	Sets the reference to 0.062 value.
COMP_REF0_042	0x14	Sets the reference to 0.042 value.
COMP_REF0_021	0x04	Sets the reference to 0.021 value.

Note *COMP_REF1_000, COMP_REF0_042, and COMP_REF0_021 are not available for COMPDH.

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

COMP_SetVTHH

COMP_SetVTHL

Description:

Sets the adjustable higher or lower threshold voltage for the COMPW configuration. This API is only available for the COMPW configuration of this UM.

C Prototypes:

```
void  COMP_SetVTHH(BYTE bThreshold);
void  COMP_SetVTHL(BYTE bThreshold);
```

Assembly:

```
mov A,  [bThreshold]
lcall COMP_SetVTHH
- or -
mov A,  [bThreshold]
lcall COMP_SetVTHL
```

Parameters:

bThreshold: This parameter is a symbolic name that represents the upper or lower threshold value.

Symbolic Name	Value	Description
COMP_REF1_000	0xf0	Sets the reference to 1.000 value.
COMP_REF0_937	0xe0	Sets the reference to 0.937 value.
COMP_REF0_875	0xd0	Sets the reference to 0.875 value.
COMP_REF0_812	0xc0	Sets the reference to 0.812 value.
COMP_REF0_750	0xb0	Sets the reference to 0.750 value.
COMP_REF0_688	0xa0	Sets the reference to 0.688 value.
COMP_REF0_625	0x90	Sets the reference to 0.625 value.
COMP_REF0_562	0x80	Sets the reference to 0.562 value.
COMP_REF0_500	0x70	Sets the reference to 0.500 value.
COMP_REF0_437	0x60	Sets the reference to 0.437 value.
COMP_REF0_375	0x50	Sets the reference to 0.375 value.
COMP_REF0_312	0x40	Sets the reference to 0.312 value.
COMP_REF0_250	0x30	Sets the reference to 0.250 value.
COMP_REF0_188	0x20	Sets the reference to 0.188 value.

Symbolic Name	Value	Description
COMP_REF0_125	0x10	Sets the reference to 0.125 value.
COMP_REF0_062	0x00	Sets the reference to 0.062 value.
COMP_REF0_042	0x14	Sets the reference to 0.042 value.
COMP_REF0_021	0x04	Sets the reference to 0.021 value.

Return Value:

None

Side Effects:

See Note ** at the beginning of the API section.

Sample Firmware Source Code

The C code illustrated here shows you how to use the COMP User Module (COMPW UM configuration).

```
#include <m8c.h>        // part specific constants and macros
#include "PSoCAPI.h"    // PSoC API definitions for all User Modules

void main(void)
{

   COMP_SetPolarity(COMP_POL_POS); // Set initial polarity value
   COMP_SetVTHH(COMP_REF0_625); // Set initial High Threshold value
   COMP_SetVTHL(COMP_REF0_125); // Set initial Low Threshold value
   COMP_Start(COMP_MEDPOWER); // Start COMP block with power setting

while(1);
}
```

The same code in assembly is:

```
include "m8c.inc"       ; part specific constants and macros
include "memory.inc"    ; Constants & macros for SMM/LMM and Compiler
include "PSoCAPI.inc"   ; PSoC API definitions for all User Modules

export _main

_main:
mov A, COMP_POL_POS
call COMP_SetPolarity ;Set initial polarity value
mov A, COMP_REF0_625
call COMP_SetVTHH ;Set initial High Threshold value
mov A, COMP_REF0_125
call COMP_SetVTHL ;Set initial Low Threshold value
mov A, COMP_MEDPOWER
call COMP_Start ;Start block with power setting

M8C_EnableGInt ;Enable global interrupt

.MainLoop:
```

```
jmp .MainLoop
```

Configuration Registers

Table 6. COMP_CR0

Bit	7	6	5	4	3	2	1	0
Value	RTapMux				Gain	RTopMux	RBotMux	

This register configures the COMP Block.

RTapMux bitfield selects one of 18 resistor taps. The four bits of RTapMux[3:0] allow selection of 16 taps. The two additional tap selections are provided using COMP_CR3 bit 0, EXGAIN. The EXGAIN bit only affects the RTapMux values 0h and 1h.

Gain bitfield selects gain or loss configuration for output tap.

RTopMux bitfield connects the top side of resistor string.

RBotMux bitfield connects the bottom side of resistor string.

Table 7. COMP_CR1

Bit	7	6	5	4	3	2	1	0
Value	AnalogBus	CompBus	NMux			PMux		

This register is used to COMP Block configuring.

AnalogBus bitfield is used to enabling/disabling Comparator output to the Analog Bus connection.

CompBus bitfield is used to enabling/disabling Comparator output to the Comparator Bus connection.

NMux bitfield is used to select the negative input source.

PMux bitfield is used to select the positive input source.

Table 8. COMP_CR2

Bit	7	6	5	4	3	2	1	0
Value	CPhase	CLatch	CompCap	TMUXEN	TestMux		PWR	

This register is used to COMP Block configuring.

CPhase bitfield is used to select output signal latching phase.

CLatch bitfield is used to enabling/disabling output signal latching.

TMUXEN bitfield is used to enabling/disabling connection Test Mux output to the analog bus

TestMux bitfield is used to select the Test Mux input source.

PWR bitfield is used to block power controlling.

Table 9. COMP_CR3

Bit	7	6	5	4	3	2	1	0
Value	0	0	AGND_PD	RTopMux1	LPCMPEN	CMOUT	INSAMP	EXGAIN

This register is used to COMP Block configuring.

AGND_PD bitfield is used to power down AGND buffer.

RTopMux1 bitfield is used to selecting RTop to Vdd or opamp’s output (depending on COMP_CR0[2])/RTop to RefHi.

LPCMPEN bitfield is used to enabling/disabling low power comparator.

CMOUT bitfield is optional for the three-opamp instrumentation amplifier.

INSAMP bitfield is used to connect the resistors of two continuous time blocks as part of a three-opamp instrumentation amplifier.

EXGAIN bitfield is used to selecting Standard Gain Mode / High Gain Mode.

Version History

Version	Originator	Description
1.0	DHA	Removed RTapMux and ExGain values from values list for COMPH MUM configuration. Added support for changing polarity using the wizard.
2.0	DHA	Removed invalid HighLimit property "RefHi" for CY8C27xxx and CY8C29xxx.
2.0.b	DHA	Added help file to wizard.
2.10	DHA	Added Cancel button in the wizard.
2.20	MYKZ	1. Updated 'OutputLatch' parameter value range. 2. Corrected the method of clearing posted interrupts.

Note PSoC Designer 5.1 introduces a Version History in all user module datasheets to document high level descriptions of the differences between the current and previous user module versions.