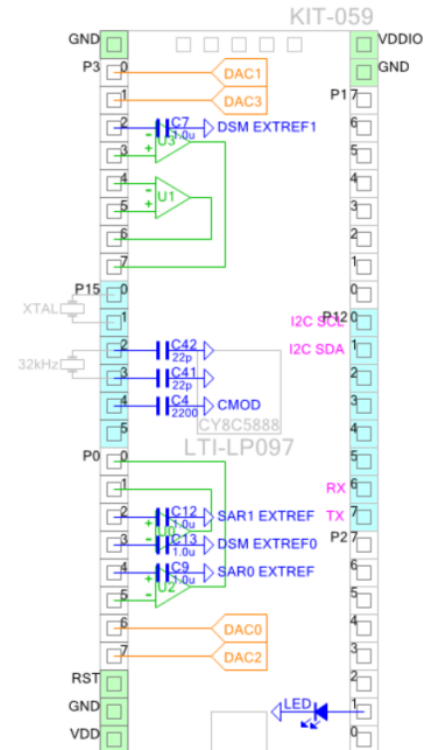


KIT-059: annotation for CY8CKIT-059 Prototyping Kit

1.0

Features

- Shows pins with direct access to PSoC hardware
- Shows on-board bypass capacitors, LED, switch
- Creates schematics using CY8CKIT-059 prototyping kit
- Doesn't consume system resources
- Doesn't affect run-time performance



General description

The KIT-059 is an external annotation stub for the Cypress CY8CKIT-059 PSoC 5LP Prototyping Kit. It identifies terminals with direct access to PSoC5 internal hardware (OpAmps, ADCs, DACs) and shows connections to the on-board parts (bypass capacitors, LED, switch button, USB, SWD, etc.). Component doesn't consume system resources, nor affects the run-time performance of the project.

When to use KIT-059

The component was developed to assist quick identification of the on-board components and pins on the CY8CKIT-059 PSoC 5LP Prototyping Kit. It is also useful for documenting basic projects built using CY8CKIT-059 Prototyping Kit and creating schematics using stock of-chip components and complimentary Annotation Library^(*) [1].

* Annotation Library is a collection of the off-chip annotation components

Functional Appearance

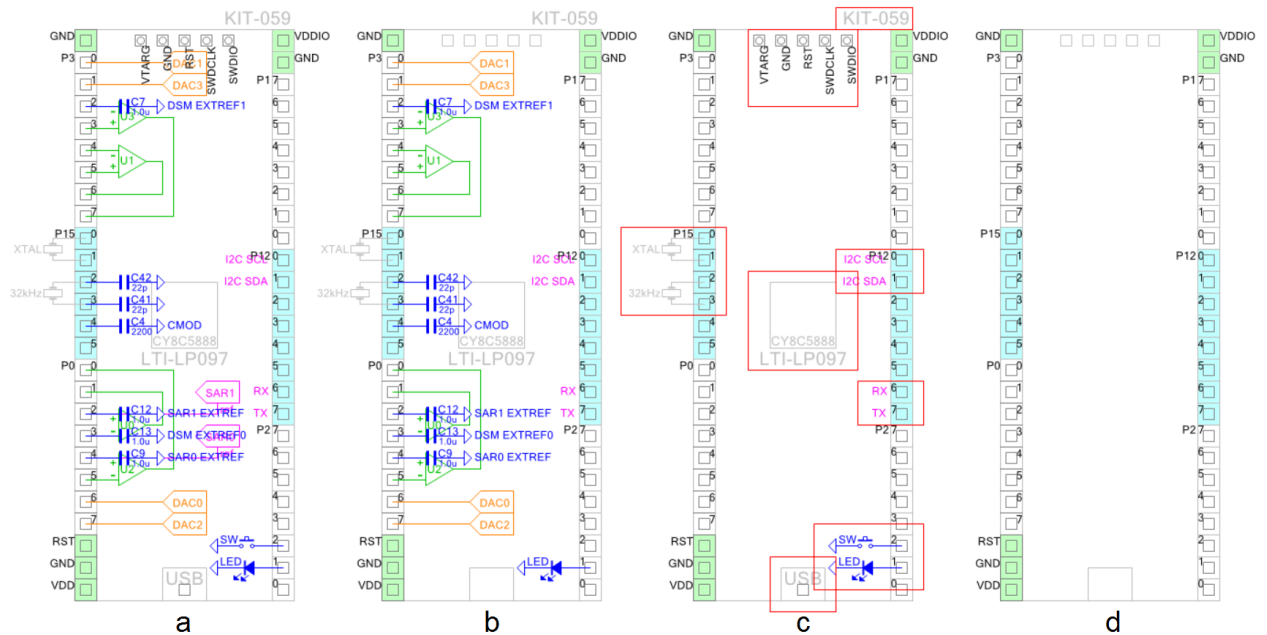


Figure 1. Component visual appearance by options selected: (a) all options enabled, (b) default appearance, (c) only misc. options enabled, (d) all options disabled.

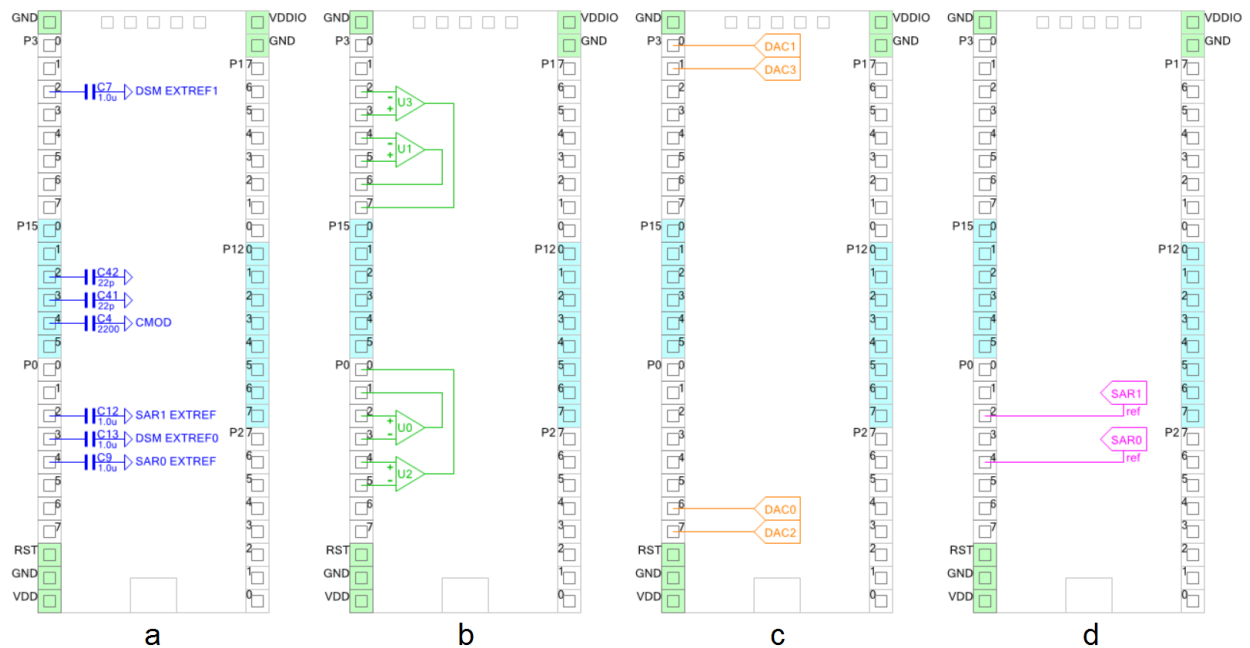


Figure 2. Default appearance by the group of options selected: (a) bypass capacitors only, (b) OpAmps only, (c) DACs only, (d) SAR_ADCs external reference only.

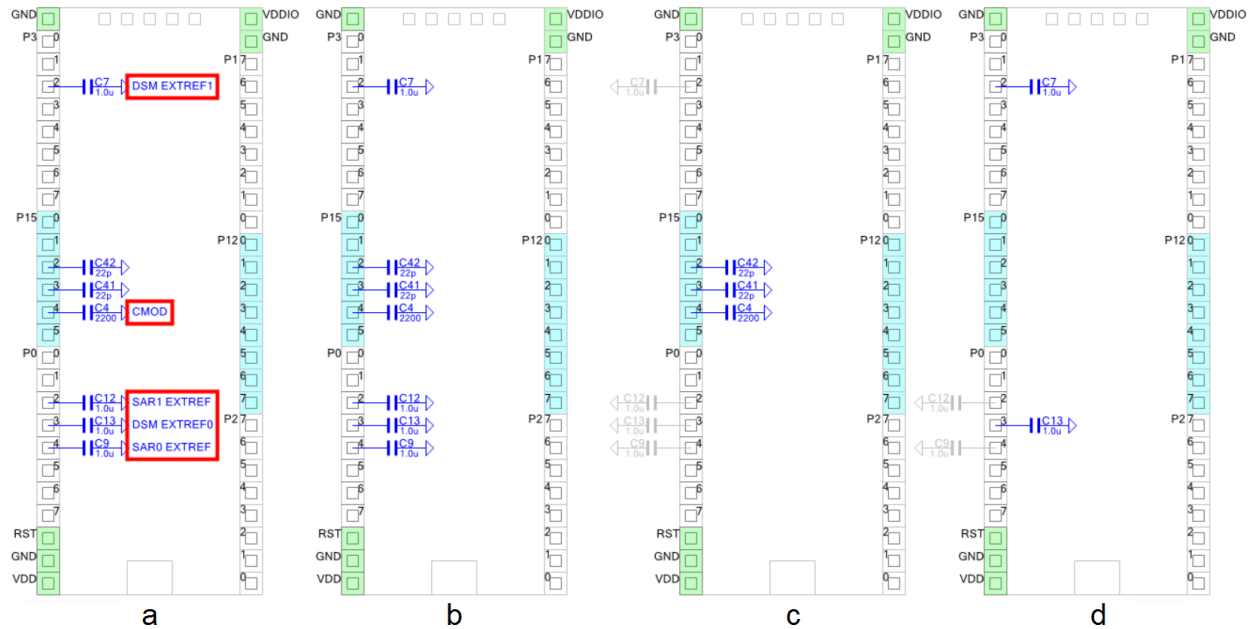


Figure 3. Component appearance with only Caps shown: (a) Caps Labels enabled; (b) Caps Labels disabled; (c) all Caps position is set to external; (d) Show_selected: C41_42 and C4 are hidden, C9, C12 position set to external, C7, C13 position set to internal.

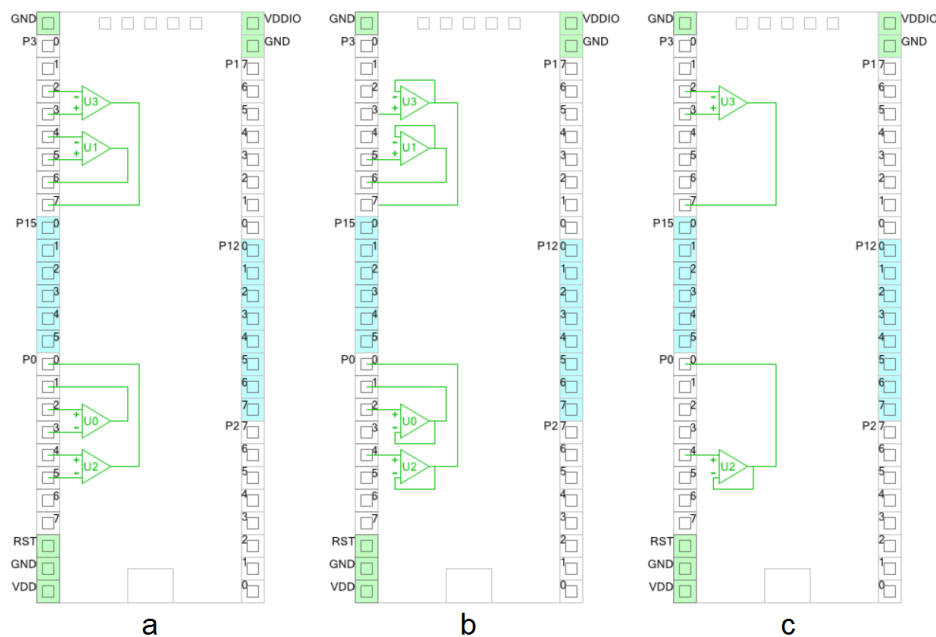


Figure 4. Example of the component appearance with only OpAmps shown: (a) default settings, (b) all OpAmps are set to followers, (c) Show_selected: U0 and U1 are disabled, U2 is set to follower.

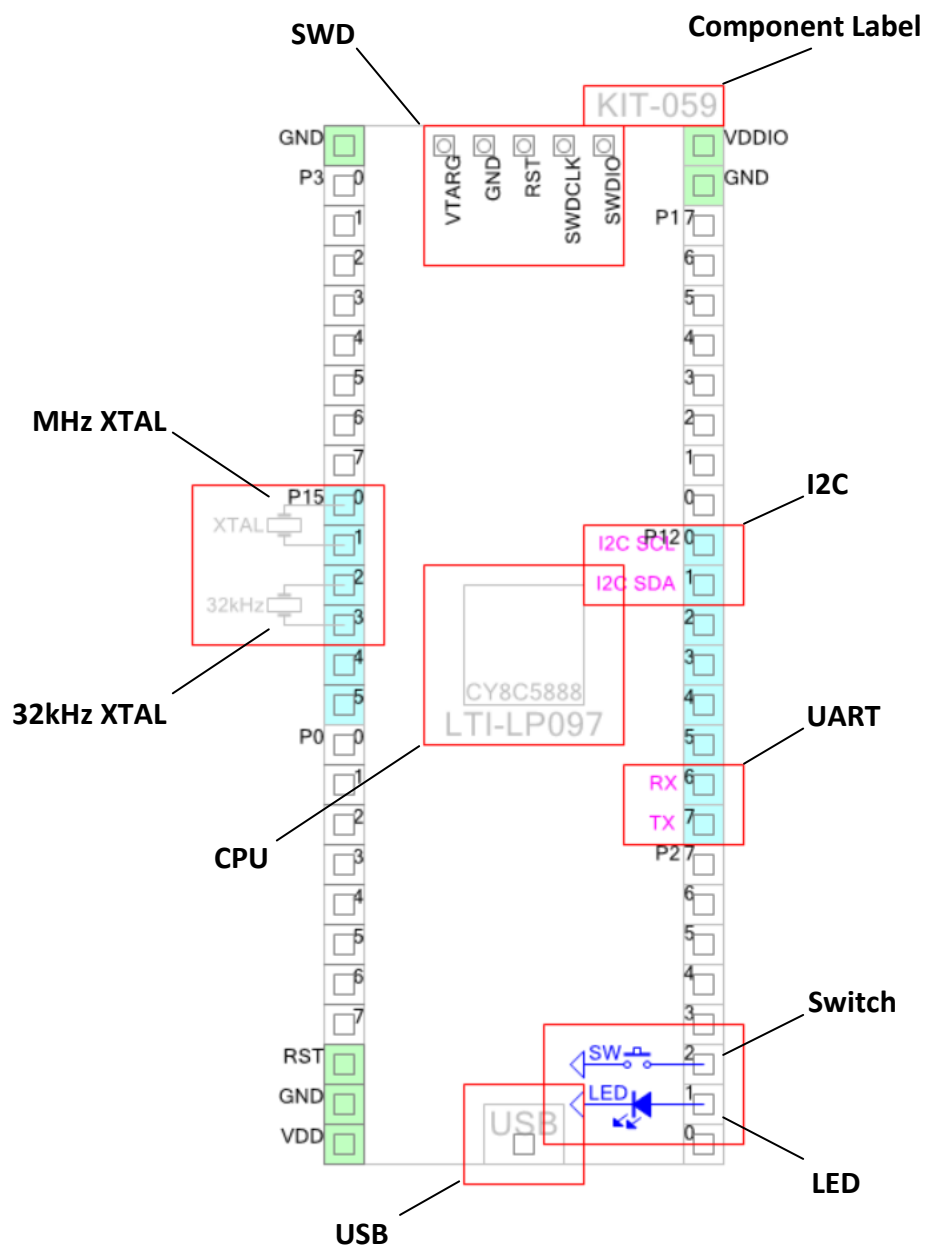


Figure 5. Component appearance with all miscellaneous options enabled (top-to-bottom): component Label, SWD connector, MHz XTAL, 32kHz XTAL, CPU, I2C-KitProg-USB bridge, UART-KitProg-USB bridge, on-board switch, on-board blue LED, micro-USB.

Parameters and Settings

Typical Basic dialog provides following parameters:

Parameter	Value
Display_Name	Net Name
Net_Name	KIT-059
Show_Caps	Show all
Show_Caps_labels	true
Show_CPU	true
Show_DACs	Show all
Show_I2C	true
Show_LED	true
Show_OpAmps	Show all
Show_SARs	Hide all
Show_SW	false
Show_SWD	false
Show_UART	true
Show_USB	false
Show_XTAL_32kHz	true
Show_XTAL_MHz	true

Parameter Information

Display_Name [Instance name / Net name / none]

Selects which name will be displayed by the top identification label on the component. Valid options are Instance Name, Net Name or none. Default is Net Name.

The Instance Name is the unique identifier of the component, automatically assigned by the Creator IDE; only a single instance of the component with that Instance Name can exist in the entire project. Certain rules apply to the instances naming convention, for example, “KIT-059” is not allowed, but “KIT_059” is.

The Net Name is user-defined, and can be any string of characters. The Net Name does not have to be unique – it is user responsibility to keep track of components labels.

If none is selected then component label is hidden.

Net_Name (string)

Component Net Name. Displays user-defined name of the component, which can be any string of characters (for example “KIT-059”). It is not auto-enumerated and may differ from the Instance Name. The Net names are not automatically checked for duplicate instances, it is user responsibility to keep track of them. The Net Name may coincide with the Instance Name of the component, for example a kit with Instance Name “KIT_1” can also be given a Net Name “KIT_1”. Visibility of this parameter is controlled by Display_Name option.

Show_Caps [Show all / Hide all / Show selected]

Sets visibility of the on-board bypass capacitors. Default setting is Show_all. When Hide_all option is selected, all capacitors are hidden. When Show_selected option used, visibility of each capacitor is controlled by the individual setting in the **Advanced** section (Figure 3).

Show_Caps_Labels (bool)

Sets visibility of the on-board bypass capacitors labels (Figure 3a). Default value is True.

Show_CPU (bool)

Sets visibility of the PSoC5 chip and part number (CY8C5888LTI-LP097). Default value is True.

Show_DACs [Show all / Hide all / Show selected]

Sets visibility of the on-chip Digital-to-Analog Converters. Default setting is Show_all. When Hide_all option is selected, all DACs are hidden. When Show_selected option used, visibility of each DAC is controlled by the individual setting in the **Advanced** section.

Show_I2C (bool)

Sets visibility of the pins for I2C-KitProg-USB bridge. Default value is True.

Show_LED (bool)

Sets visibility of the onboard (blue) LED. Default value is True.

Show_OpAmps [Show all / Hide all / Show selected]

Sets visibility of the on-chip OpAmps. Default setting is Show_all. When Hide_all option is selected, all OpAmps are hidden. When Show_selected option used, visibility of each OpAmp is controlled by the individual setting in the **Advanced** section.

Show_SARs [Show all / Hide all / Show selected]

Sets visibility of the SAR_ADCs external reference terminals. Default setting is Show_all. When Hide_all option is selected, all SAR_ADCs are hidden. When Show_selected option used, visibility of each SAR_ADC is controlled by the individual setting in the **Advanced** section.

Show_SW (bool)

Sets visibility of the kit onboard switch button (Figure 5). Default value is False.

Show_SWD (bool)

Sets visibility of the SWD programming pins (Figure 5). Default value is False.

Show_UART (bool)

Sets visibility of the pins for UART-KitProg-USB bridge (Figure 5). Default value is True.

Show_USB (bool)

Sets visibility of the micro-USB connector (Figure 5). Default value is False.

Show_XTAL (bool)

Sets visibility of the external MHz XTAL (Figure 5). Default value is True.

Show_XTAL_32kHz (bool)

Sets visibility of the external 32kHz XTAL (Figure 5). Default value is True.

Advanced dialog provides following parameters:

Configure 'KIT_059'

Name: KIT_059_1

Basic **Advanced** Built-in

Parameter	Value
Caps	
C12_position	inside
C12_show	true
C13_position	inside
C13_show	true
C4_show	true
C41_42_show	true
C7_position	inside
C7_show	true
C9_position	inside
C9_show	true
Dacs	
DAC0_show	true
DAC1_show	true
DAC2_show	true
DAC3_show	true
OpAmps	
OpAmp0_follower	false
OpAmp0_show	true
OpAmp1_follower	false
OpAmp1_show	true
OpAmp2_follower	false
OpAmp2_show	true
OpAmp3_follower	false
OpAmp3_show	true
SARs	
SAR0_show	true
SAR1_show	true
Parameter Information	
Type:	

Datasheet OK Apply Cancel

Capacitors:

- **Cxx_position [inside / outside]**

Select bypass capacitor display position. Default is inside. If outside option is selected, a capacitor displayed greyed. Capacitors C41, C42 and C4 do not have this option and always displayed inside.

- **Cxx_show (bool)**

Set visibility of the bypass capacitor. Default value is true. This option is active in Show_selected mode only. Caps settings Show_all and Hide_all override this setting.

DACs:

- **DACx_show (bool)**

Set visibility of the on-chip DAC. Default value is true. This option is active in Show_selected mode only. DACs settings Show_all and Hide_all override this setting.

OpAmps:

- **OpAmpX_follower (bool)**

Set OpAmp as a follower. Default is false.

- **OpAmpX_show (bool)**

Set visibility of the on-chip OpAmp. Default value is true. This option is active in Show_selected mode only. OpAmps settings Show_all and Hide_all override this setting.

SARs:

- **SARx_show (bool)**

Set visibility of the ADC_SAR voltage reference direct connection to external pin. Default value is true. This option is active in Show_selected mode only. SARs settings Show_all and Hide_all override this setting.

Application Programming Interface

The component does not have associated API.

Resources

The component doesn't consume any hardware resources.

Performance

The component doesn't affect project run-time performance.

Application examples

Typical application example of the KIT-059 component is provided in the **Appendix 1**.

Component Changes

Version	Description of changes	Reason for changes/impact
0.0	First beta release. Is a part of the KIT-059 Annotation Library [2].	
1.0	Mostly cosmetic changes. Added bypass caps values and labels. Capacitors can be optionally displayed outside of the kit dimensions. Component location path is changed. Datasheet is provided. KIT-059 is available as stand-alone component.	v1.0 is compatible with v0.0 and can be upgraded

References

1. PSoC Annotation Library v1.0, <https://community.cypress.com/thread/48049>
2. Annotation Library for CY8CKIT-059 prototyping kit, v0.0, <https://community.cypress.com/thread/12559>

Appendix 1

Example of the KIT-059 used in conjunction with complimentary Annotation Library v1.0 [1].

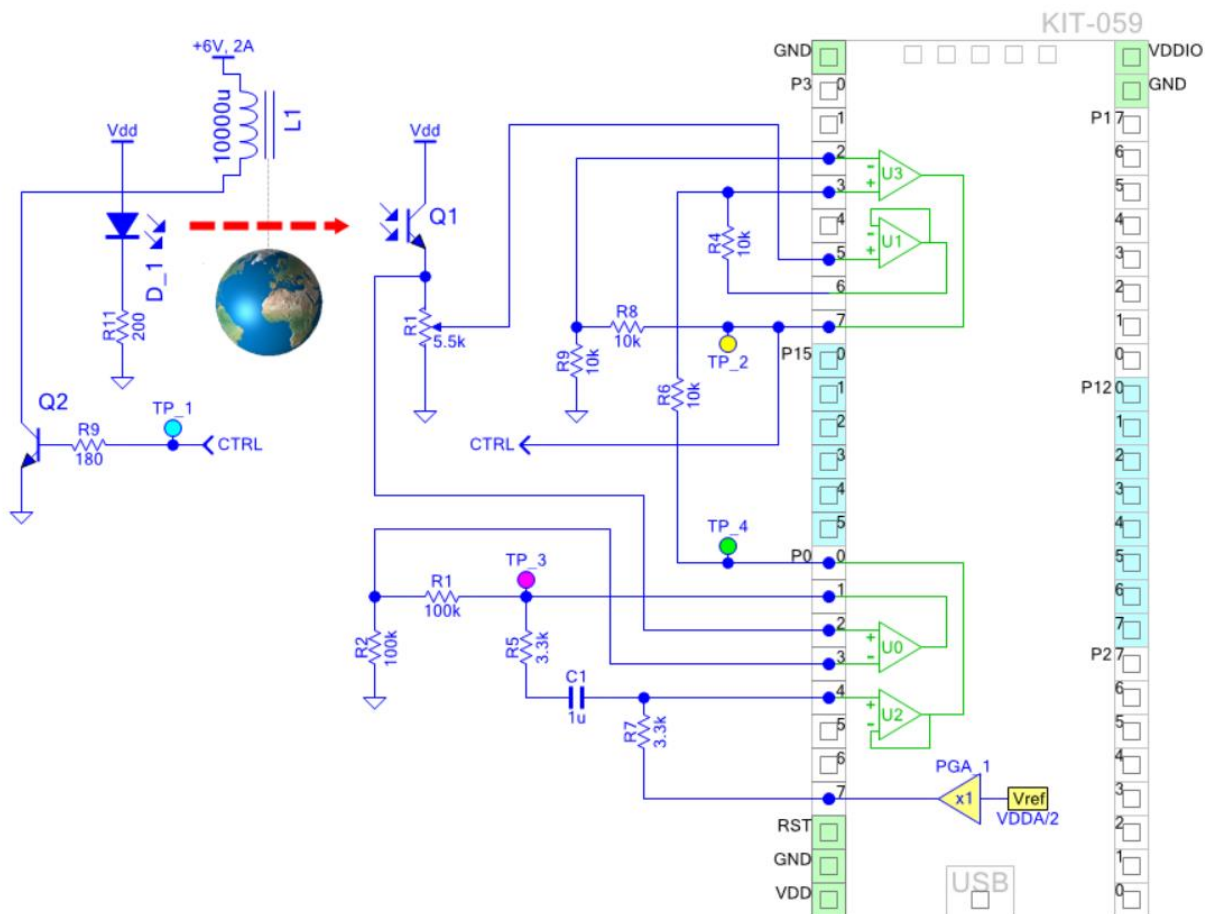


Figure 6. Annotation example of the all-analog PID-controlled levitation system^(*) using KIT-059 stub, and a mix of the Annotation Library and Creator stock annotation components. In this project, an optical sensor and a solenoid were used to levitate small plastic Globe with a magnetic core. The wiring diagram shows external connections to the CY8CKIT-059 prototyping board, while KIT-059 annotation stub shows board i/o pins to the PSoC5LP internal OpAmps. Test Points colors (TP_1-4) are set to match the scope display colors for easy identification of the signals. Note that for proper operation of the circuit, capacitors C7, C9, C12 and C13 has to be removed from the kit.

* All-analog PID control implemented using PSoC5LP prototyping kit CY8KIT-059. YouTube:
<https://www.youtube.com/watch?v=7FBw8-PBIb0>