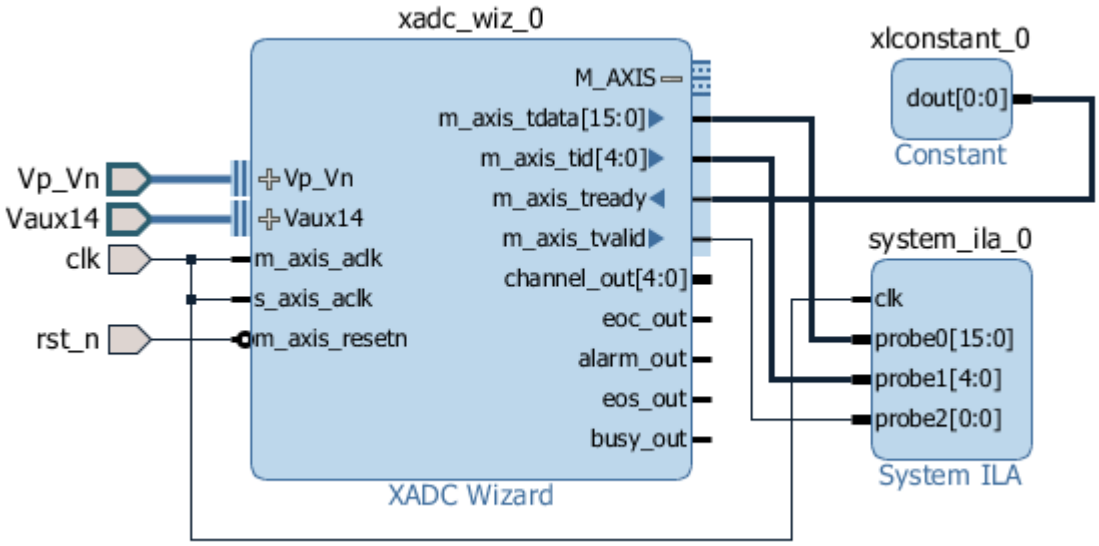
1. Block Design

Terdiri dari IP XADC dan system ILA untuk debugging melihat nilai output ADC.



2. Constraint

Menggunakan pin clk dan SW0 untuk reset.

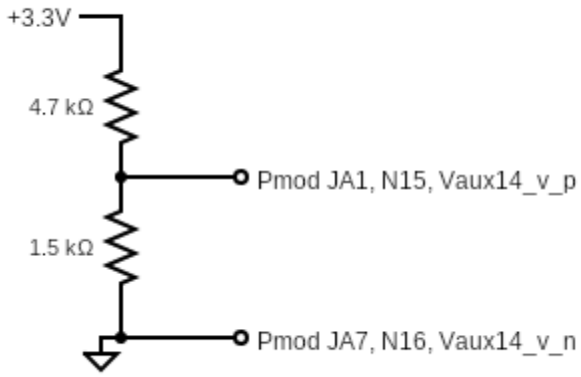
```
##Clock signal
set_property -dict { PACKAGE_PIN L16   IOSTANDARD LVCMOS33 } [get_ports { clk }]; #IO_L11P_T1_SRCC_35 Sch=sysclk
create_clock -add -name sys_clk_pin -period 10.00 -waveform {0 5} [get_ports { clk }]; #set

##Switches
set_property -dict { PACKAGE_PIN G15   IOSTANDARD LVCMOS33 } [get_ports { rst_n }]; #IO_L19N_T3_VREF_35 Sch=SW0

##Pmod Header JA (XADC)
set_property -dict { PACKAGE_PIN N15   IOSTANDARD LVCMOS33 } [get_ports { Vaux14_v_p }]; #IO_L21P_T3_DQS_AD14P_35 Sch=JA1_R_p
#set_property -dict { PACKAGE_PIN L14   IOSTANDARD LVCMOS33 } [get_ports { Vaux7_v_p }]; #IO_L22P_T3_AD7P_35 Sch=JA2_R_P
#set_property -dict { PACKAGE_PIN K16   IOSTANDARD LVCMOS33 } [get_ports { Vaux15_v_p }]; #IO_L24P_T3_AD15P_35 Sch=JA3_R_P
#set_property -dict { PACKAGE_PIN K14   IOSTANDARD LVCMOS33 } [get_ports { Vaux6_v_p }]; #IO_L20P_T3_AD6P_35 Sch=JA4_R_P
set_property -dict { PACKAGE_PIN N16   IOSTANDARD LVCMOS33 } [get_ports { Vaux14_v_n }]; #IO_L21N_T3_DQS_AD14N_35 Sch=JA1_R_N
#set_property -dict { PACKAGE_PIN L15   IOSTANDARD LVCMOS33 } [get_ports { Vaux7_v_n }]; #IO_L22N_T3_AD7N_35 Sch=JA2_R_N
#set_property -dict { PACKAGE_PIN J16   IOSTANDARD LVCMOS33 } [get_ports { Vaux15_v_n }]; #IO_L24N_T3_AD15N_35 Sch=JA3_R_N
#set_property -dict { PACKAGE_PIN J14   IOSTANDARD LVCMOS33 } [get_ports { Vaux6_v_n }]; #IO_L20N_T3_AD6N_35 Sch=JA4_R_N
```

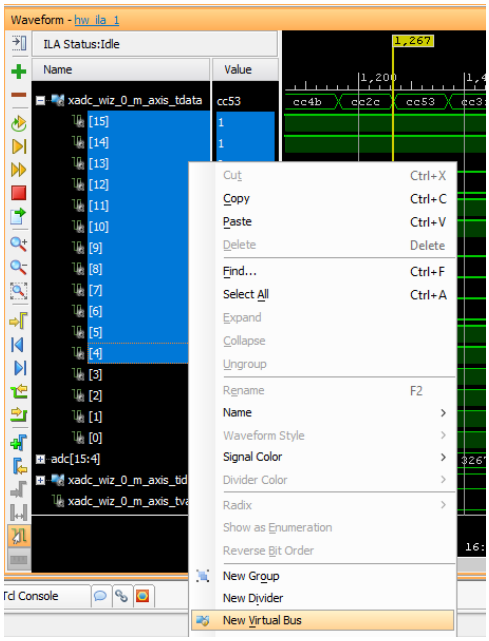
3. Rangkaian Input untuk Test ADC

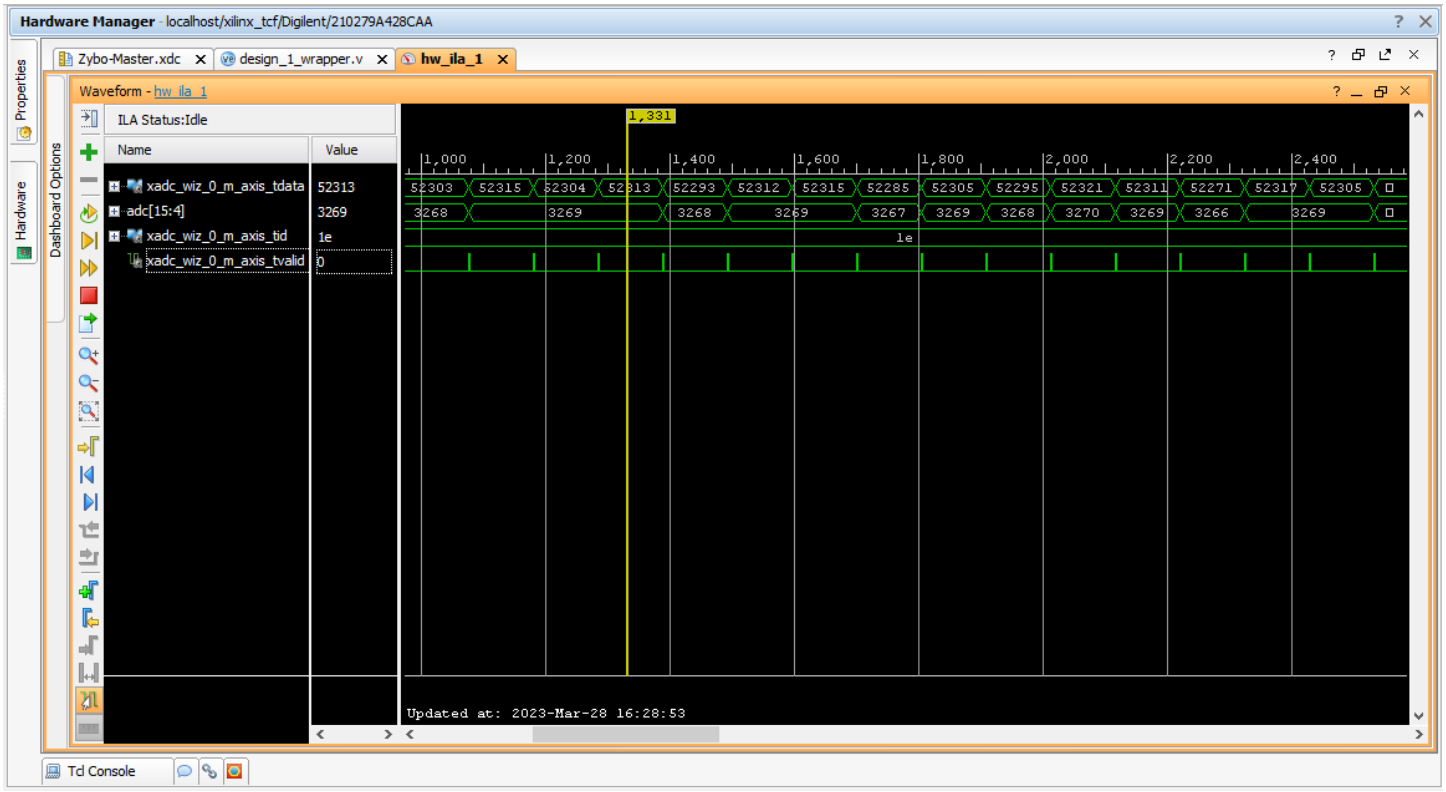
Maximum tegangan input XADC adalah **0V – 1V.** Jadi kita harus membuat pembagi tengangan untuk diinputkan sebagai sinyal input ke ADC. Pembagi berikut ini menghasilkan output 0.798V yang akan diinputkan ke ADC.



4. Debugging dengan ILA

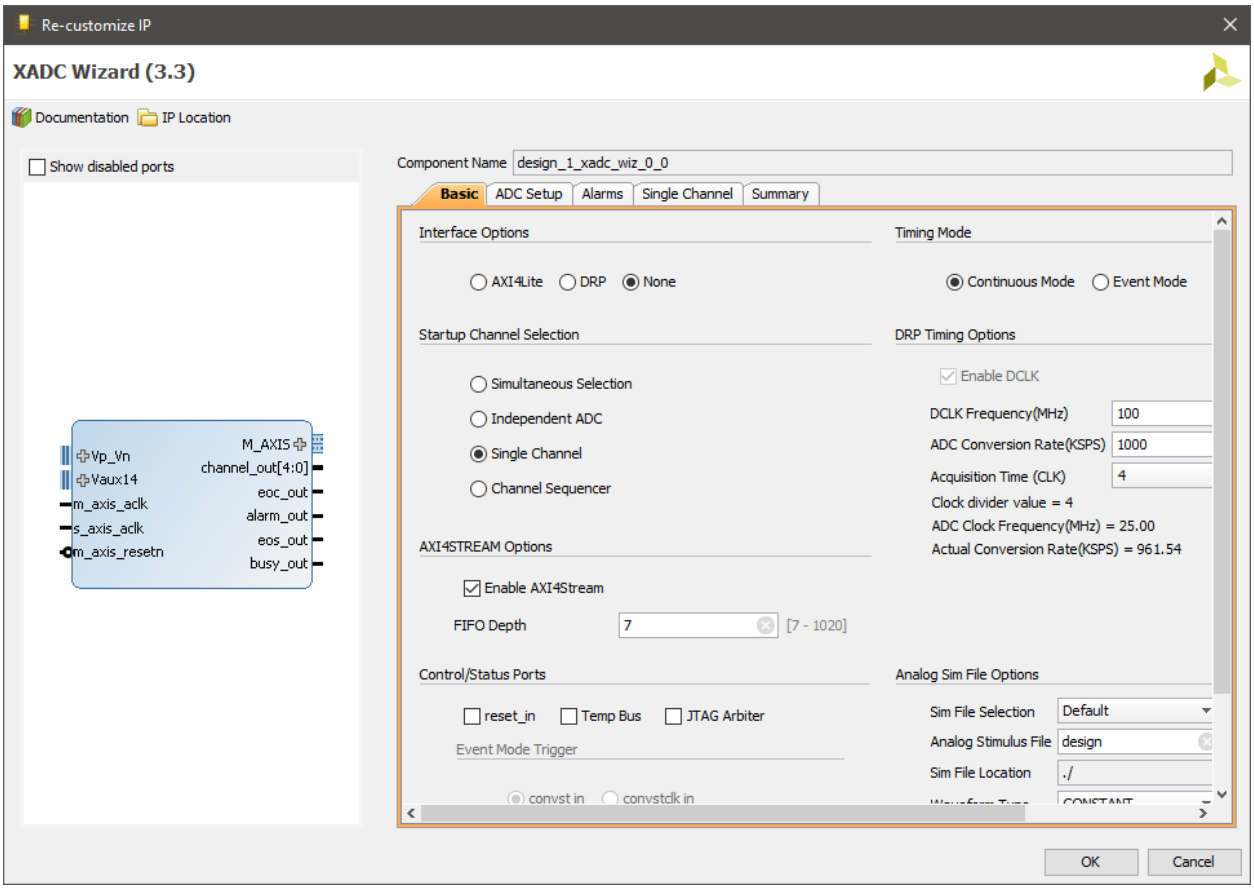
Program Zybo dengan Hardware Manager di Vivado, kemudian tampilan ILA akan keluar. Buat sinyal virtual yang berisi data dari **xadc_wiz_0_m_axis_tdata** mulai dari bit **15 sampai 4** menjadi **adc[15:4]**. Karena ADC memiliki spesifikasi 12-bit.

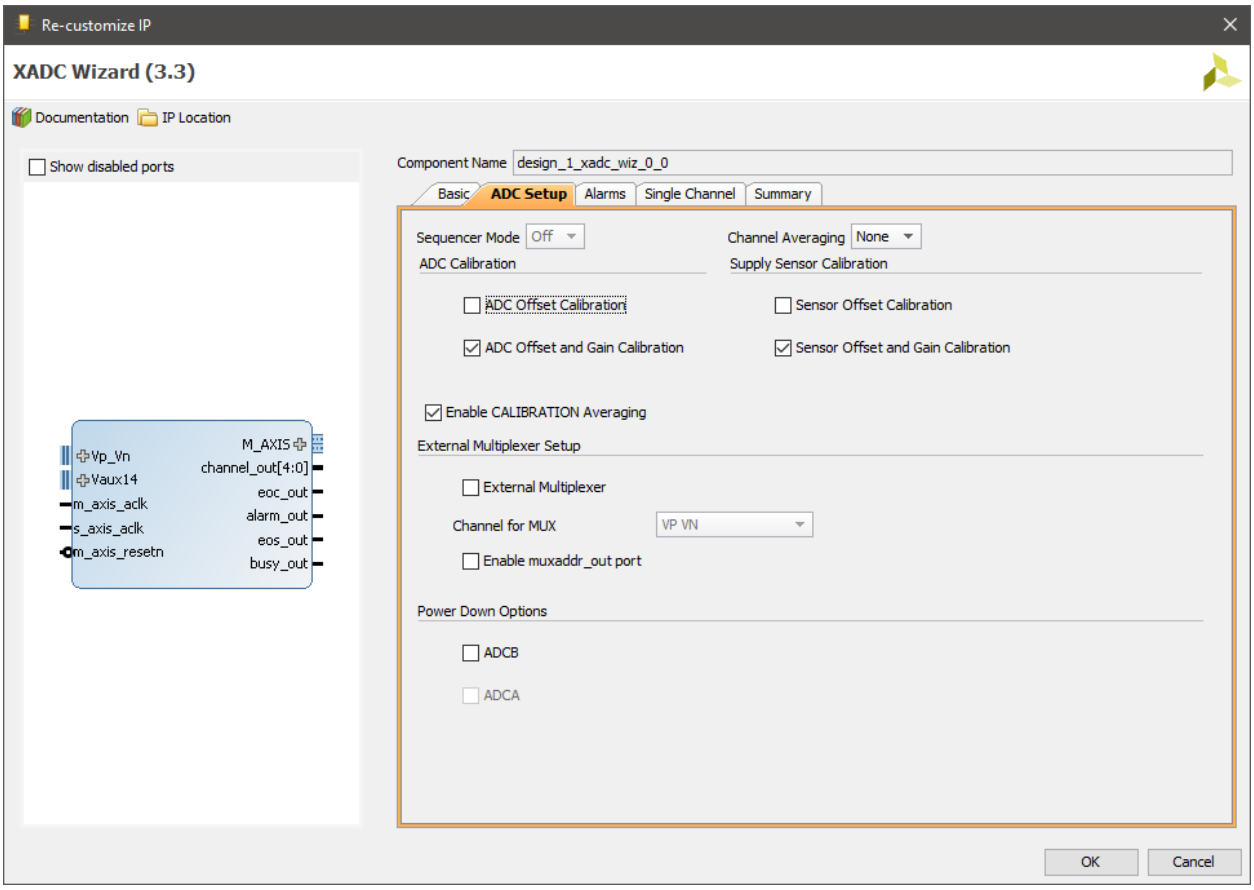


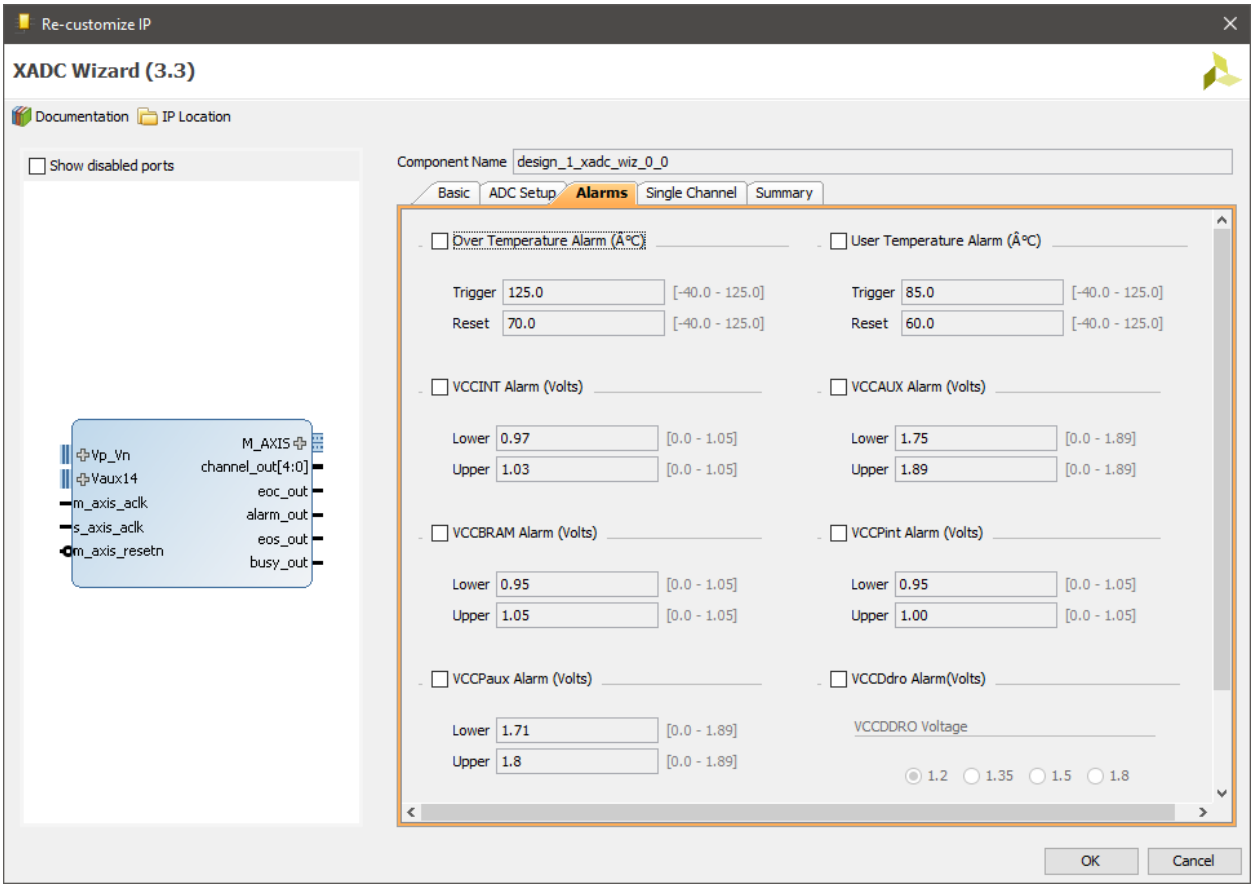


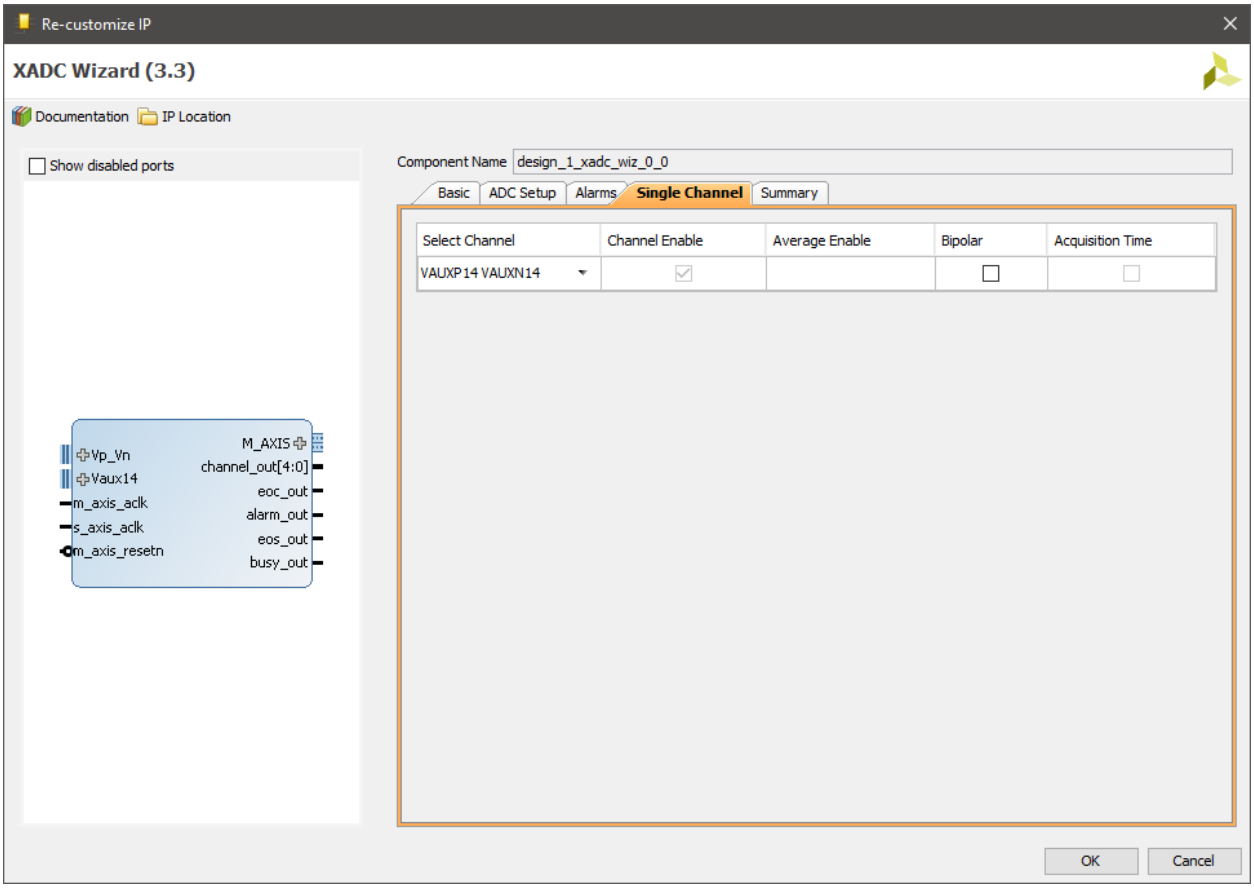
Sinyal output pada adc[15:4] adalah sekitar **3266-3270**. Data ADC valid ketika **xadc_wiz_0_m_axis_tvalid bernilai 1.** Nilai perhitungan ADC = 0.798V * 2^12 = 3268.608, sehingga hasil pembacaan ADC sudah benar.

5. Konfigurasi IP XADC






Re-customize IP
XADC Wizard (3.3)
Documentation
IP Location
Show disabled ports
Component Name
design_1_xadc_wiz_0_0
Basic
ADC Setup
Alarms
Single Channel
Summary
Over Temperature Alarm (Â°C)
Trigger 125.0 [-40.0 - 125.0]
Reset 70.0 [-40.0 - 125.0]
User Temperature Alarm (Â°C)
Trigger 85.0 [-40.0 - 125.0]
Reset 60.0 [-40.0 - 125.0]
VCCINT Alarm (Volts)
Lower 0.97 [0.0 - 1.05]
Upper 1.03 [0.0 - 1.05]
VCCAUX Alarm (Volts)
Lower 1.75 [0.0 - 1.89]
Upper 1.89 [0.0 - 1.89]
VCCBRAM Alarm (Volts)
Lower 0.95 [0.0 - 1.05]
Upper 1.05 [0.0 - 1.05]
VCCPint Alarm (Volts)
Lower 0.95 [0.0 - 1.05]
Upper 1.00 [0.0 - 1.05]
VCCPaux Alarm (Volts)
Lower 1.71 [0.0 - 1.89]
Upper 1.8 [0.0 - 1.89]
VCCDdro Alarm(Volts)
VCCDDRO Voltage
1.2 1.35 1.5 1.8
Vp_Vn
Vaux14
m_axis_aclk
s_axis_aclk
m_axis_resetn
M_AXIS
channel_out[4:0]
eoc_out
alarm_out
eos_out
busy_out
OK
Cancel


Re-customize IP
XADC Wizard (3.3)
Documentation
IP Location
Show disabled ports
Component Name
design_1_xadc_wiz_0_0
Basic
ADC Setup
Alarms
Single Channel
Summary
Select Channel
Channel Enable
Average Enable
Bipolar
Acquisition Time
VAUXP14 VAUXN14
Vp_Vn
Vaux14
m_axis_aclk
s_axis_aclk
m_axis_resetn
M_AXIS
channel_out[4:0]
eoc_out
alarm_out
eos_out
busy_out
OK
Cancel

6. Konfigurasi System ILA