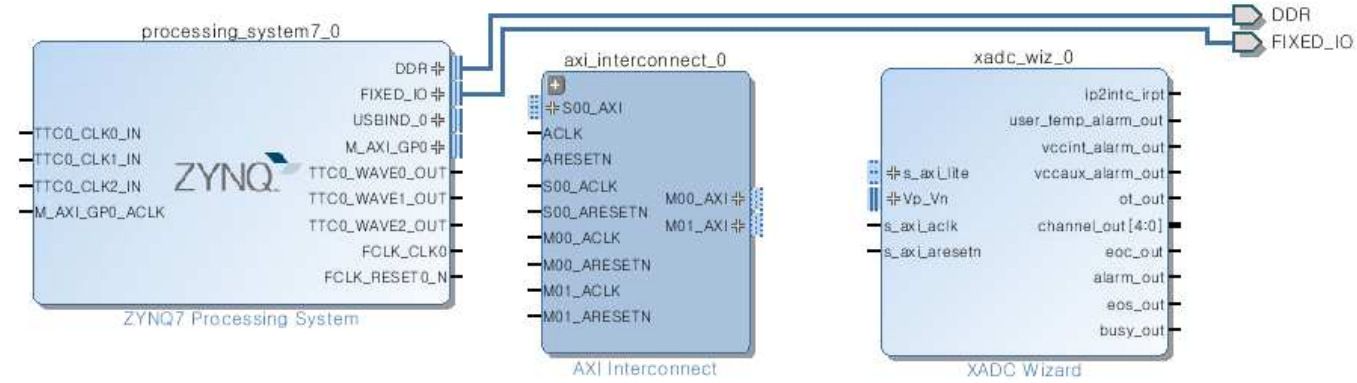
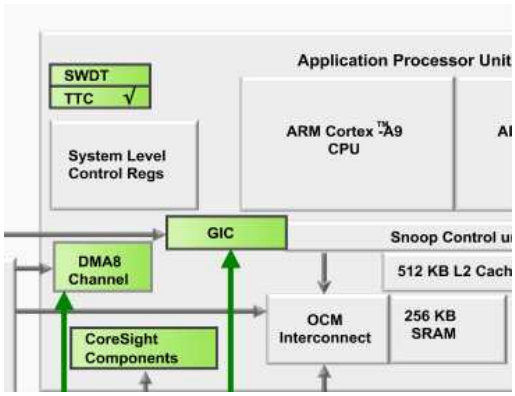
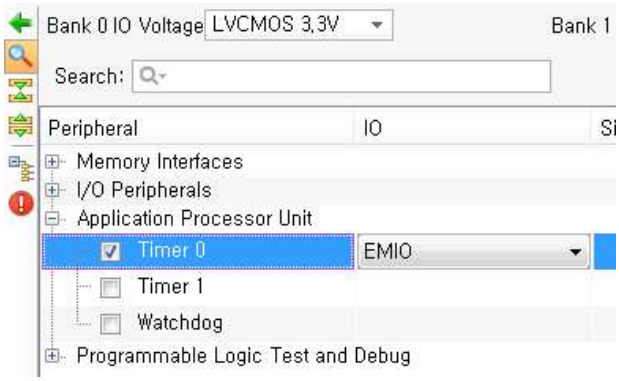
1. Make Project (XAdcTest1.xpr)
2. Create Block Design





click 



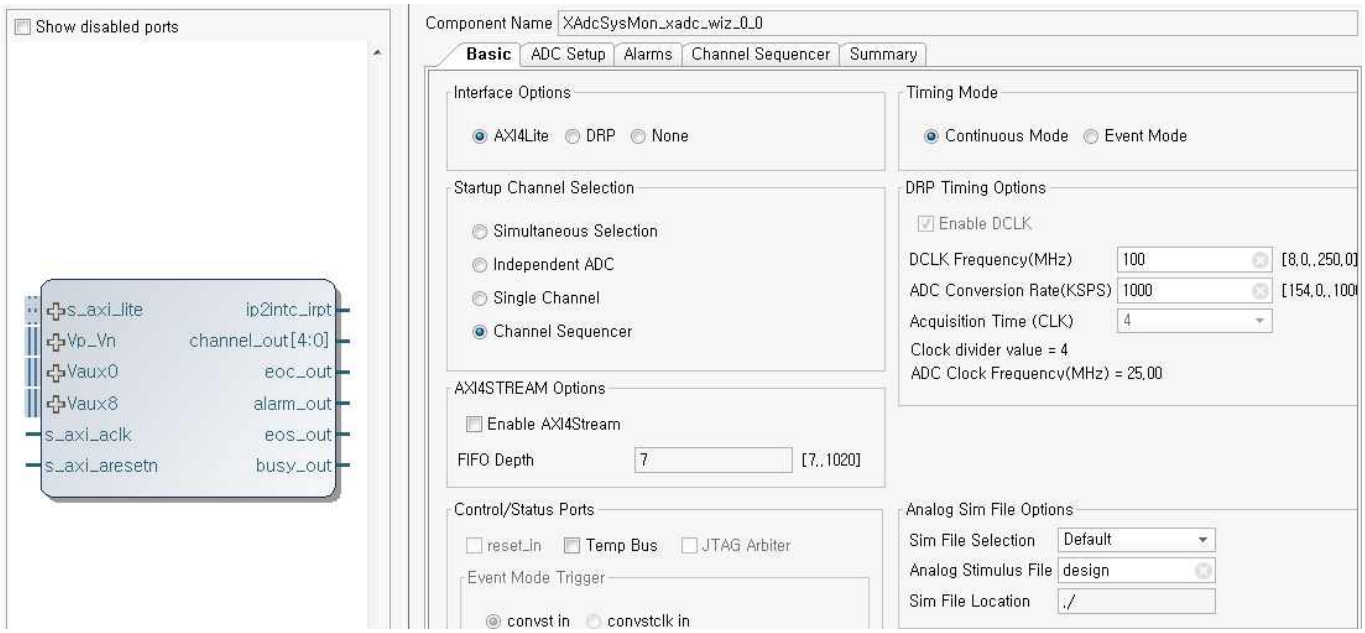
Unselect Timer0, *OK*

Deselect USB0 and Ethernet0
double click IP, axi_interconnec_t0

change Number of Master Interfaces to 1, *OK*

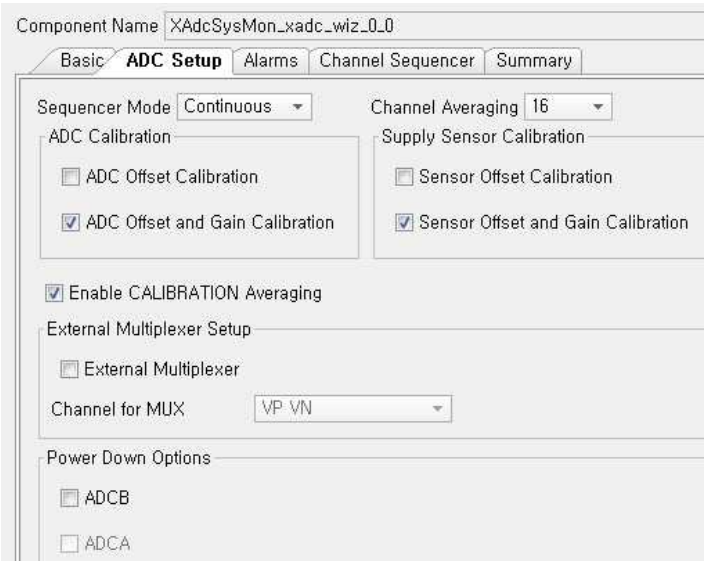
double click IP, xadc_wiz_0

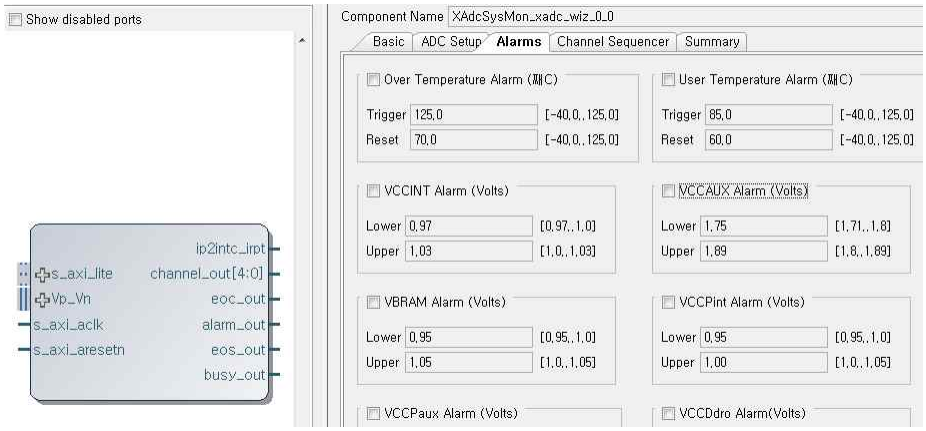
Select AXI4Lite Continuous Mode Channel Sequencer (Basic Tab)



Select Sequencer Mode Continuous Channel Averaging 16

ADC Offset and Gain Calibration Sensor Offset and Gain Calibration Enable CALIBRATION Averaging,

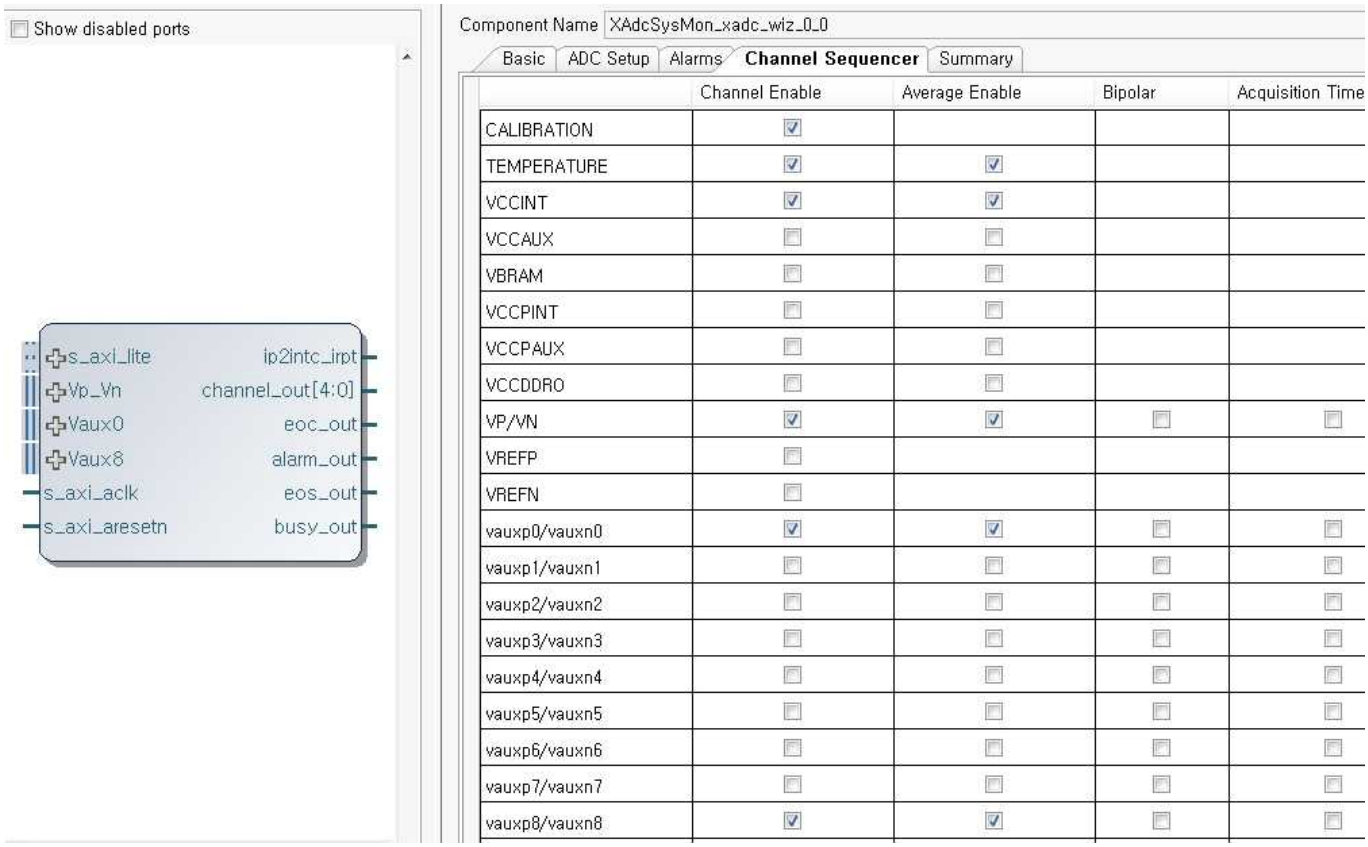




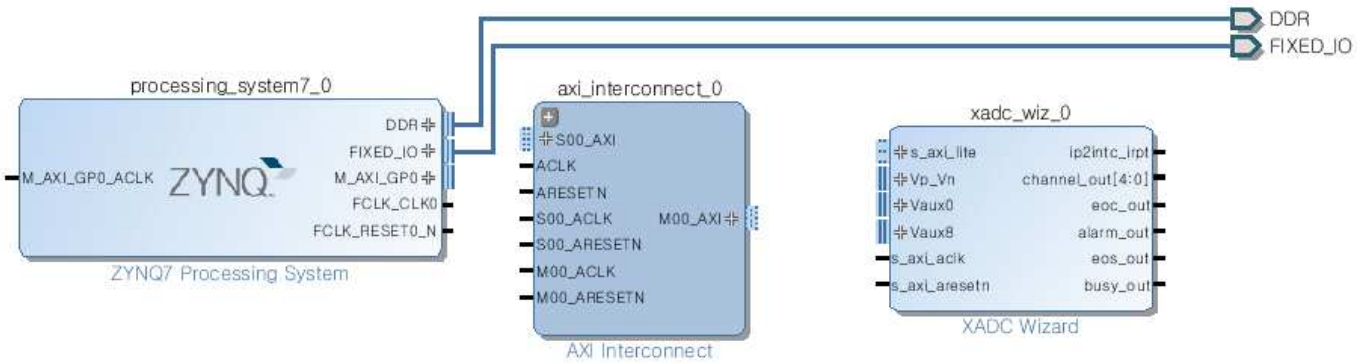
Deselect all alarms

Select TEMPERATURE, CALIBRATION, VP/VN ,VCCINT, vauxp0/vauxn0 ,vauxp8/vauxn8

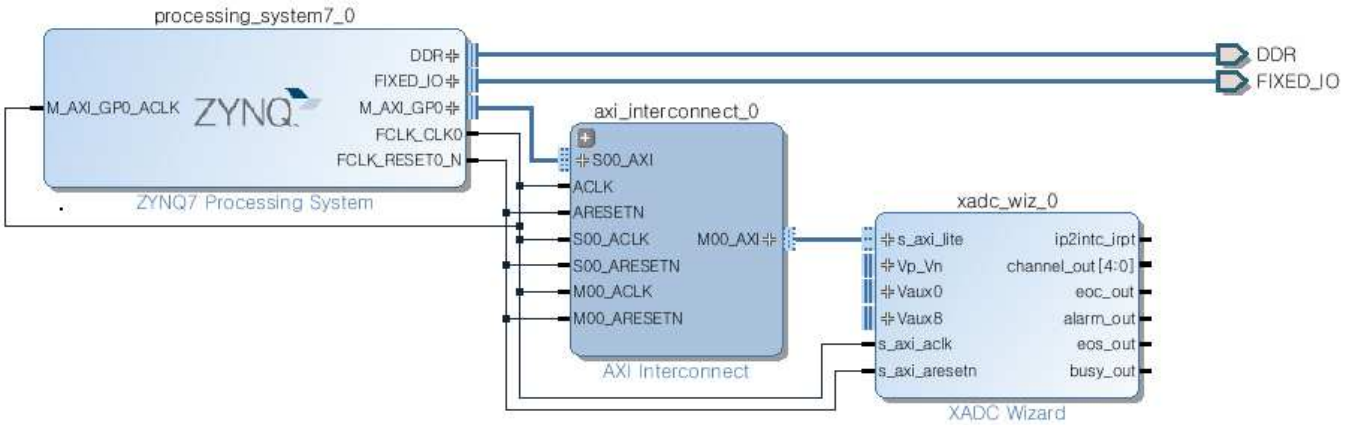
Check Average Enable



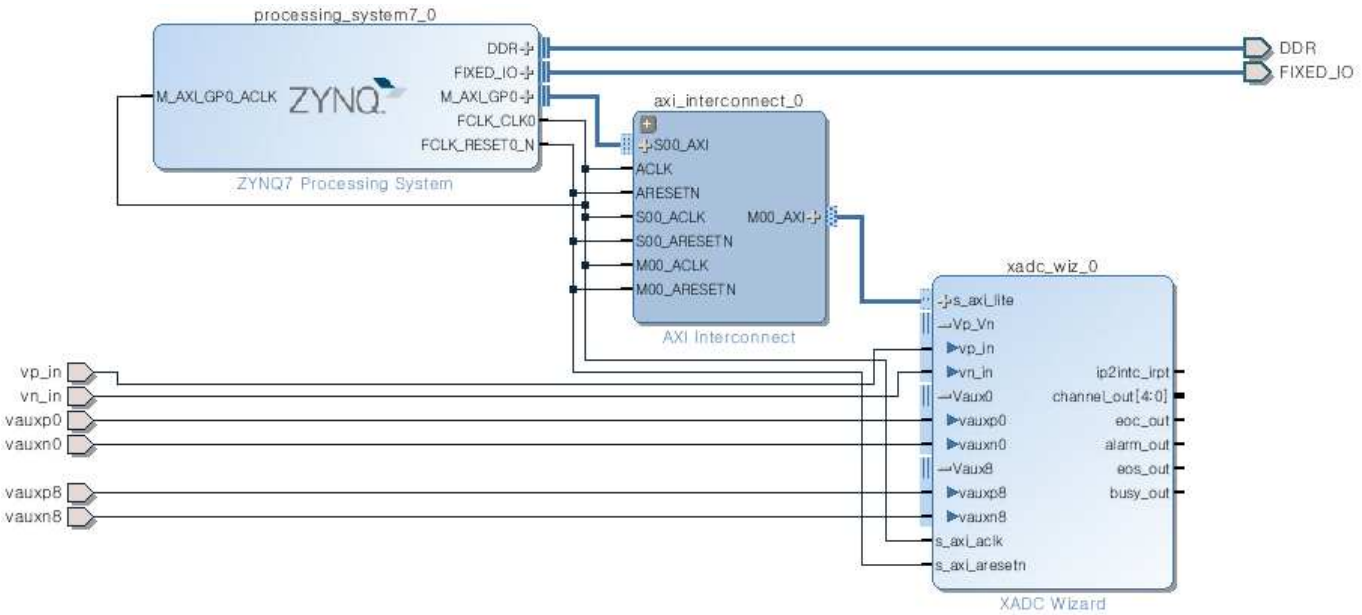
Click Summary, ***OK***



Make Connections



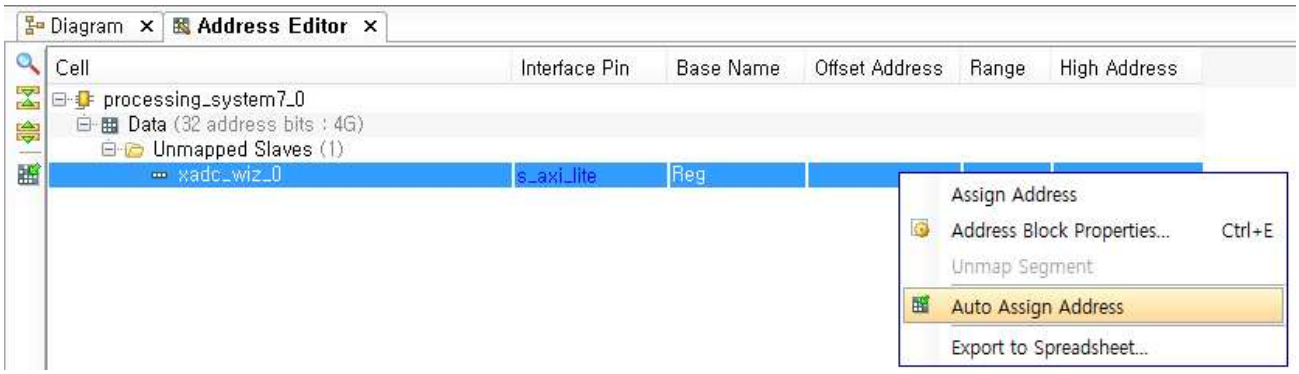
Make Xadc ports



Validate

OK

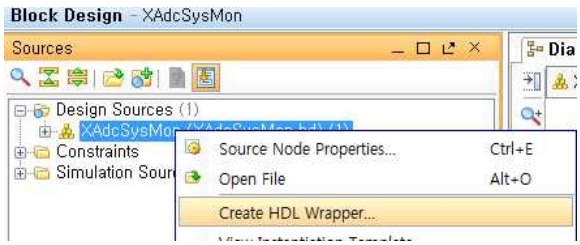
Click Address Editor tab. *select* Auto Assign Address



Check XAdc Base address (0x43C00000)

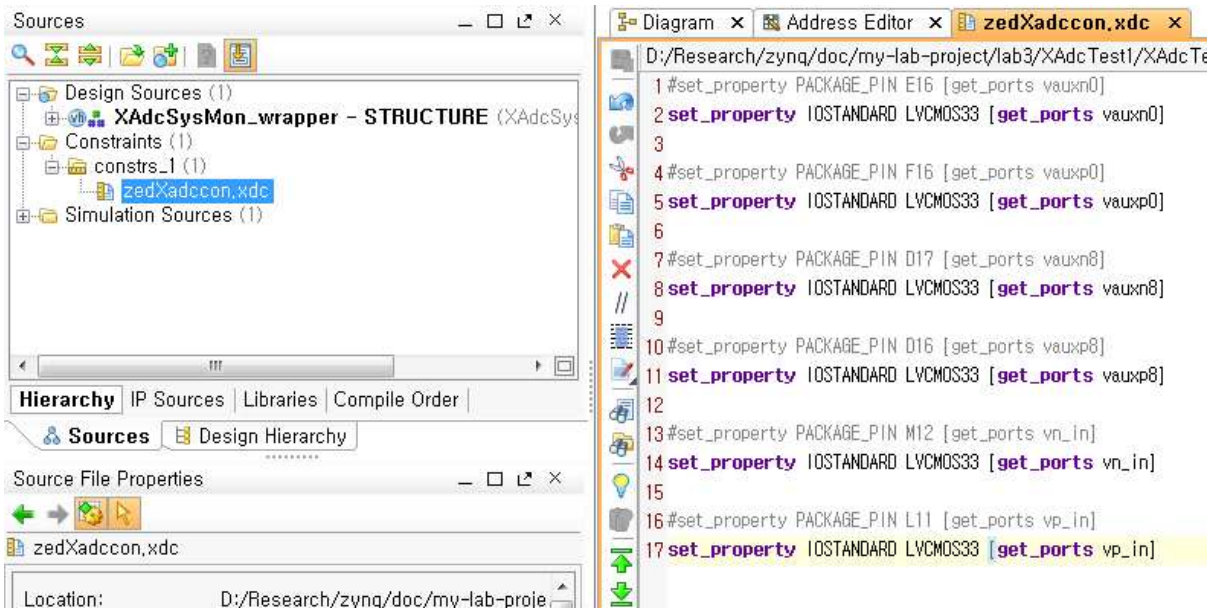
Validate again

Generate Block Design

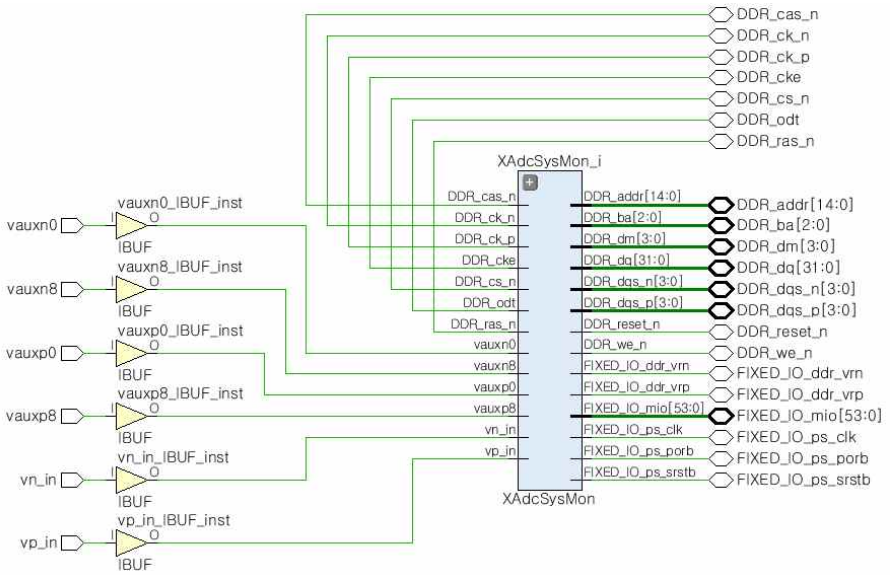


Create HDL Wrapper...

Make constraints file

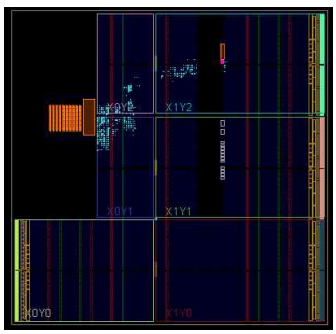


3. Run Synthesis



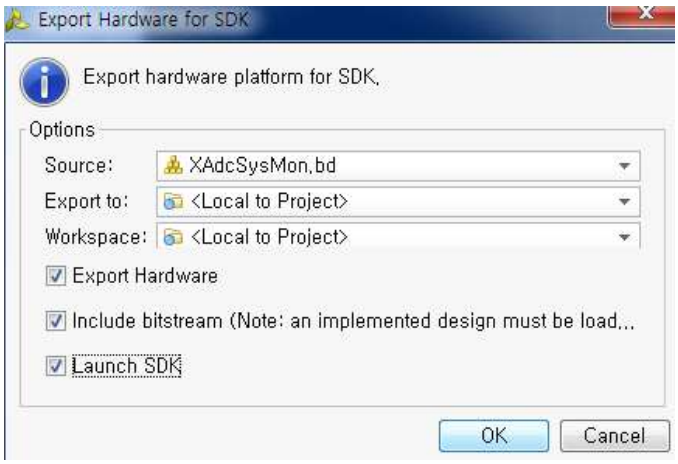
check schematic

4. Generate Bitstream



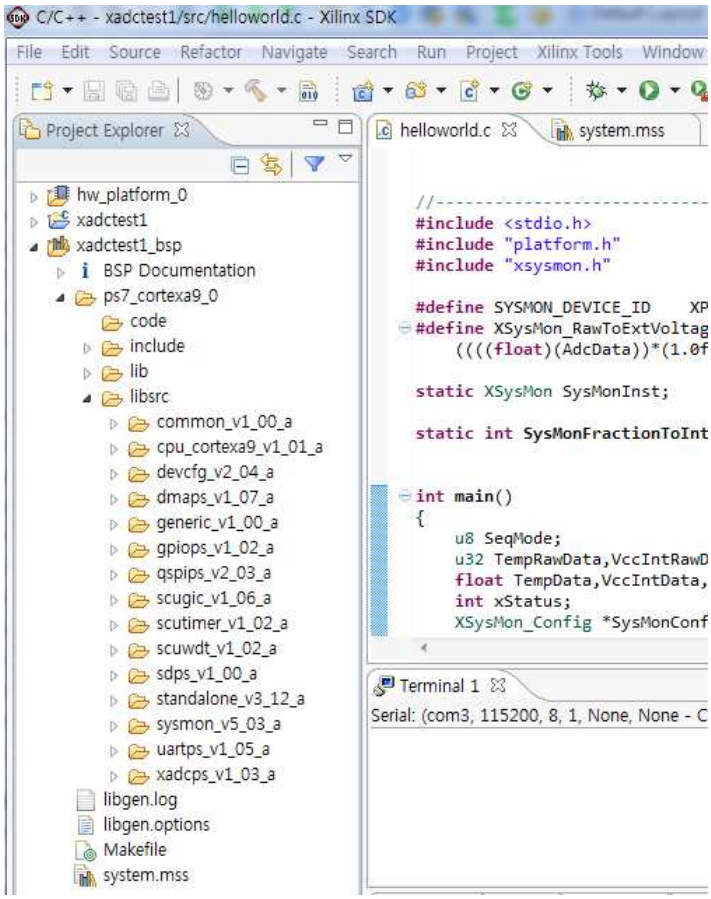
Implemented Design

5. Export to SDK

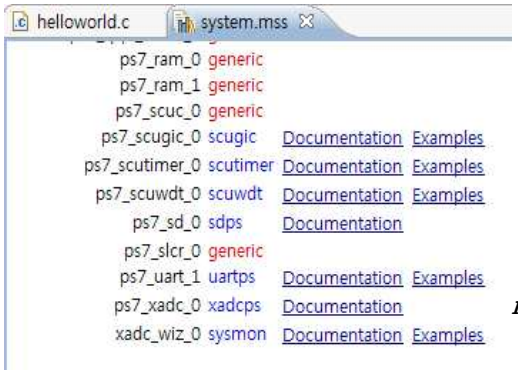


OK

6. Make an application project (xadctest1)



check if sysmon_v5_03_a is in the libsrc



refer to the example codes, xadc_wiz_0 sysmon Documentation Examples

Edit source code (helloworld.c)

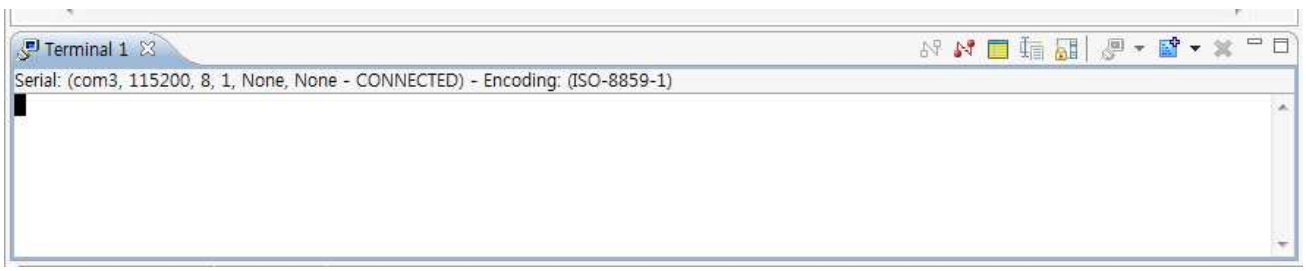
```
//---------------------------------------------------------------------
#include <stdio.h>
#include "platform.h"
#include "xsysmon.h"

#define SYSMON_DEVICE_ID        XPAR_SYSMON_0_DEVICE_ID  //ID of xadc_wiz_0
#define XSysMon_RawToExtVoltage(AdcData)                                    \
        ((((float)(AdcData))*(1.0f))/65536.0f)  //(ADC 16bit result)/16/4096 = (ADC 16bit result)/65536
                                                // voltage value =  (ADC 16bit result)/65536 * 1Volt
static XSysMon SysMonInst;  //a sysmon instance
static int SysMonFractionToInt(float FloatNum);


int main()
{
    u8 SeqMode;
    u32 TempRawData,VccIntRawData,ExtVolRawData,i;
    float TempData,VccIntData,ExtVolData;
    int xStatus;
    XSysMon_Config *SysMonConfigPtr;
    XSysMon *SysMonInstPtr = &SysMonInst;

    init_platform();
    print("Hello World\n\r");

    //-------------------------------------------------------------------- SysMon Initialize
    SysMonConfigPtr = XSysMon_LookupConfig(SYSMON_DEVICE_ID);
    if(SysMonConfigPtr == NULL)    printf("LookupConfig FAILURE\n\r");

    xStatus = XSysMon_CfgInitialize(SysMonInstPtr, SysMonConfigPtr,SysMonConfigPtr->BaseAddress);
    if(XST_SUCCESS != xStatus) printf("CfgInitialize FAILED\r\n");
    //-------------------------------------------------------------------------------------------
    XSysMon_GetStatus(SysMonInstPtr); // Clear the old status
    while(1)
    {                                                                   //wait until EOS activated
        while ((XSysMon_GetStatus(SysMonInstPtr) & XSM_SR_EOS_MASK) != XSM_SR_EOS_MASK);

TempRawData = XSysMon_GetAdcData(SysMonInstPtr, XSM_CH_TEMP);//Read the on-chip Temperature Data
        TempData = XSysMon_RawToTemperature(TempRawData);
        printf("\r\nThe Current Temperature is %0d.%03d Centigrades.\r\n",
                                        (int)(TempData), SysMonFractionToInt(TempData));
```

```
VccIntRawData = XSysMon_GetAdcData(SysMonInstPtr, XSM_CH_VCCINT); //Read the on-chip Vccint Data
        VccIntData = XSysMon_RawToVoltage(VccIntRawData);
        printf("The Current VCCINT is %0d.%03d Volts. \r\n",
                                (int)(VccIntData), SysMonFractionToInt(VccIntData));

        ExtVolRawData = XSysMon_GetAdcData(SysMonInstPtr,XSM_CH_VPVN); //Read the external Vpn Data
        ExtVolData = XSysMon_RawToExtVoltage(ExtVolRawData);
        printf("The Current VpVn is %0d.%03d Volts. \r\n",
                                (int)(ExtVolData), SysMonFractionToInt(ExtVolData));

ExtVolRawData = XSysMon_GetAdcData(SysMonInstPtr,XSM_CH_AUX_MIN); //Read the external Vaux0 Data
        ExtVolData = XSysMon_RawToExtVoltage(ExtVolRawData);
        printf("The Current Vaux0 is %0d.%03d Volts. \r\n",
                                (int)(ExtVolData), SysMonFractionToInt(ExtVolData));

ExtVolRawData = XSysMon_GetAdcData(SysMonInstPtr,XSM_CH_AUX_MIN+8);//Read the external Vaux8 Data
        ExtVolData = XSysMon_RawToExtVoltage(ExtVolRawData);
        printf("The Current Vaux8 is %0d.%03d Volts. \r\n",
                                (int)(ExtVolData), SysMonFractionToInt(ExtVolData));

        usleep(500000); //wait 500ms

    }

    return 0;
}

//------------------------------------------------------------------------------------------------
int SysMonFractionToInt(float FloatNum)
{
        float Temp;

        Temp = FloatNum;
        if (FloatNum < 0) {
                Temp = -(FloatNum);
        }

        return( ((int)((Temp -(float)((int)Temp)) * (1000.0f))));
}
//------------------------------------------------------------------------------------------------
```

7. Run application program

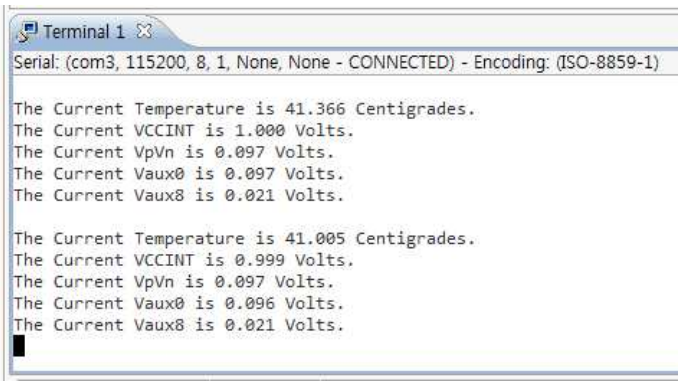
Turn-on and ***Program*** () the ZED board

Connect Terminal



Input voltages into Vpn, Vaux0, Vaux8 terminals.

Run program ( )



Check terminal display

---

8. Ploting ADC results on the Serial Oscilloscope

Modify source program (***separate*** Temperature, Vccint, Vpn by comma(,) in printf command) :

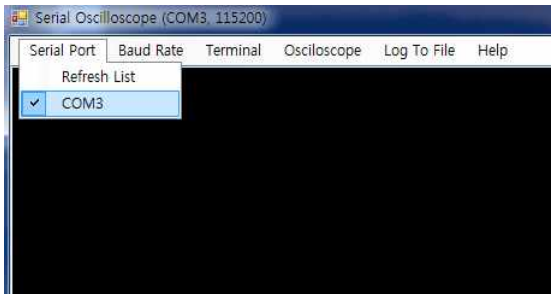
```
while(1)
{
    while ((XSysMon_GetStatus(SysMonInstPtr) & XSM_SR_EOS_MASK) != XSM_SR_EOS_MASK); //wait until EOS activated

    TempRawData = XSysMon_GetAdcData(SysMonInstPtr, XSM_CH_TEMP); //Read the on-chip Temperature Data
    TempData = XSysMon_RawToTemperature(TempRawData);

    VccIntRawData = XSysMon_GetAdcData(SysMonInstPtr, XSM_CH_VCCINT); //Read the on-chip Vccint Data
    VccIntData = XSysMon_RawToVoltage(VccIntRawData)*10;

    ExtVolRawData = XSysMon_GetAdcData(SysMonInstPtr,XSM_CH_VPVN); //Read the external Vpn Data
    ExtVolData = XSysMon_RawToExtVoltage(ExtVolRawData)*100;

    //printf("\r\nTemperature: %0d.%03d[deg], VCCINT: %0d.%03d[V], Vpn: %0d.%03d[V]",
    printf("\r\n%0d.%03d,%0d.%03d,%0d.%03d",
                (int)(TempData), SysMonFractionToInt(TempData),
                (int)(VccIntData), SysMonFractionToInt(VccIntData),
                (int)(ExtVolData), SysMonFractionToInt(ExtVolData)
    );

    //usleep(1000); //wait 1ms
```

Download serial oscilloscope program, Serial-Oscilloscope-v1.5 , ***unzip***

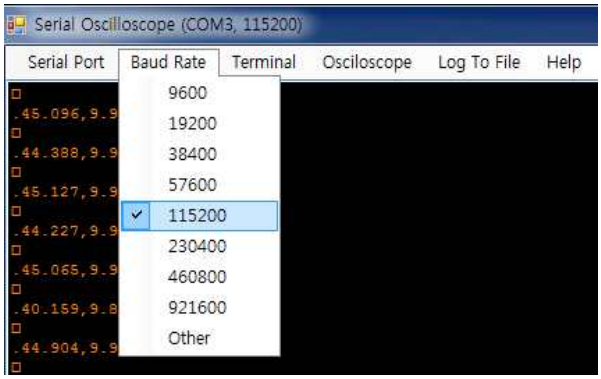
Open setting file, Oscilloscope_settings

Change the OscBeam2Color to yellow(0000FFFF), OscBeam2Color=0000FFFF, ***Save*** file

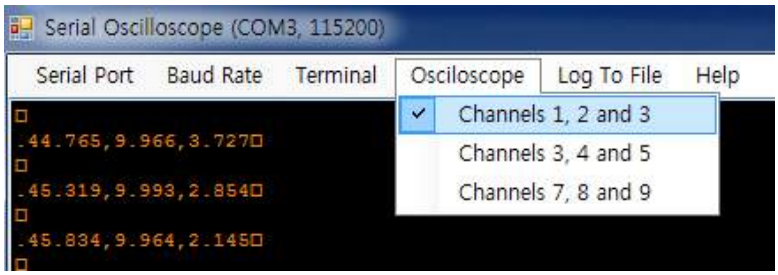
Run application Serial Oscilloscope



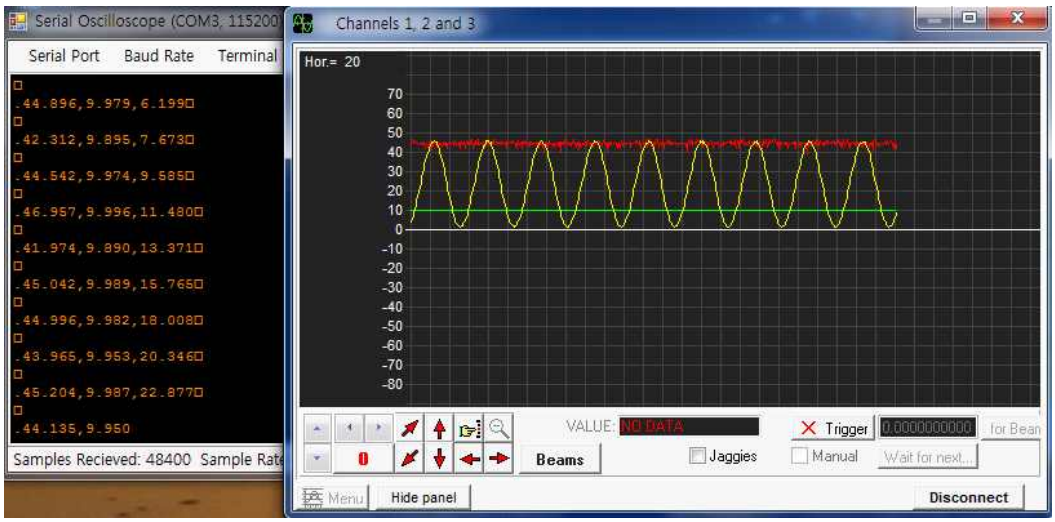
check COM3

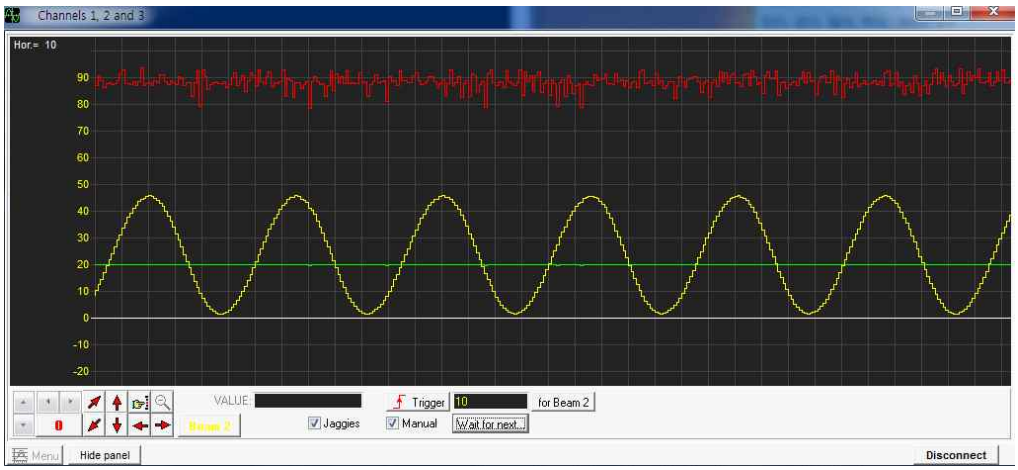


select baud rate



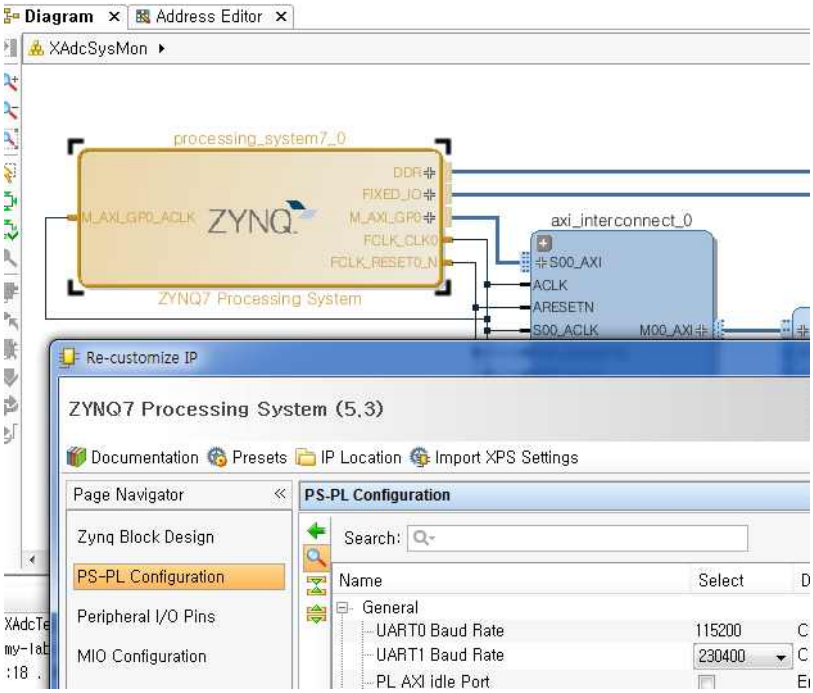
Select Channels 1, 2 and 3





tune scope parameters

Appendix. Setting other uart baudrate



See you next Lab4.