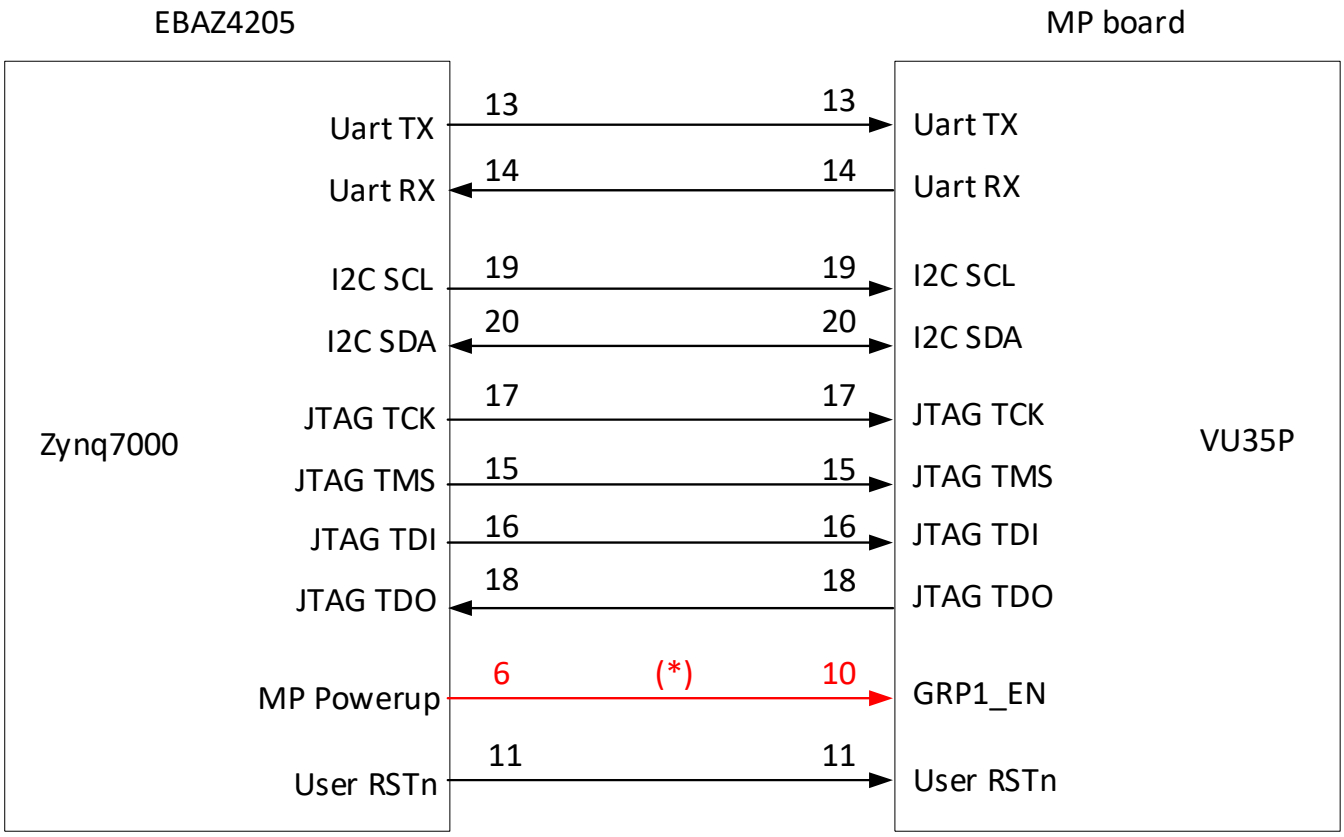
1. Zynq and MP board connection diagram

Zynq board has 3 identical data ports connecting to 3 MP boards. The diagram belows show connection for one board. The other 2 parts are the same.



(*): Pin 6 of Zynq side is connecting to pin 10 of MP side to powerup MP board. This connection is made in cable assignment.

About Zynq board:

- Product Family: Zynq 7000

- Part number: xc7z010clg400-1

About MP board:

- Product family: Virtex UltraScale+ HBM

- Part number: xcvu35p_CIV-fsvh2104-2-e

- Please use Vivado/Vivado Lab 2020.2.2 or newer version and install Virtex UltraScale+ HBM Device package.

2. Zynq Schematic

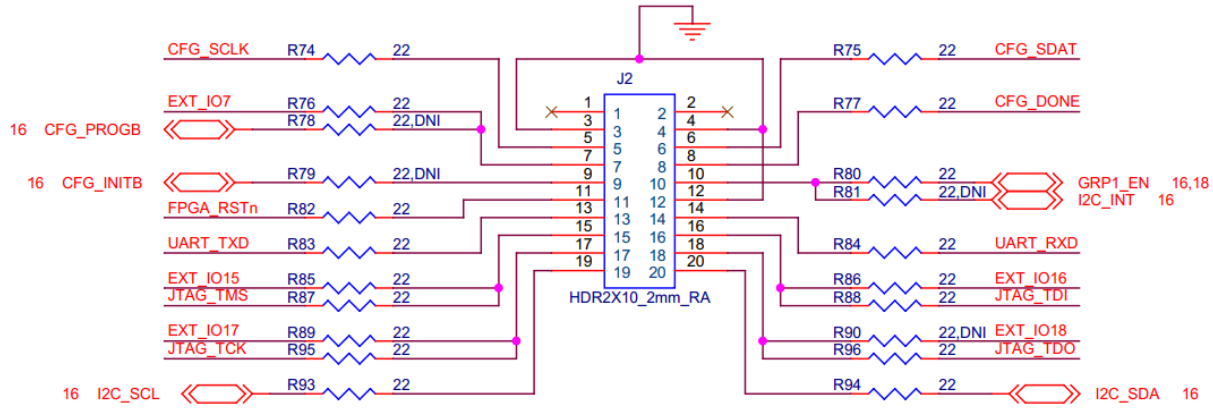
Zynq board is EBAZ4205. All public information could be found here: https://github.com/xjtuecho/EBAZ4205

3. MP board dsecription

3.1. Pins name and assignment: please view the constrain file constr_e300.xdc

3.2. Pin assignment on 20-pin connector

Each MP board has a 20-pin connector for connection with Zynq board. Here is diagram of 20-pin connector:



Pin number	Pin name	Direction	Pin assignment on VU35P	Pin type on VU35P	Note
1	N/A		N/A	N/A	
2	N/A		N/A	N/A	
3	GND		N/A	N/A	
4	GND		N/A	N/A	
5	CFG_SCLK	in	BA6	CCLK	
6	CFG_SDAT	in	AV7	D01_DIN	
7	CFG_PROGB	in	AW9	PROGRAM_B	
	EXT_IO7	in	AW14	User IO	
8	CFG_DONE	out	BC6	DONE	
9	CFG_INITB	out	BA7	INIT_B	
10	GRP1_EN		n/a	n/a	Set high level to this pin to power-up the MP board
11	FPGA_RSTn	in	BE17	User IO	Could use this pin as resetn signal for design
12	GND		n/a	n/a	

13	UART TXD	in	C12	User IO	This pin is for receiving uart signal from outside. The direction is INPUT.
14	UART RXD	out	B9	User IO	This pin is for sending uart signal to outside. The direction is OUTPUT.
15	JTAG TMS	in	AY6	JTAG dedicated pins	
	EXT_IO15	in	AV20	User IO	
16	JTAG TDI	in	AV6	JTAG dedicated pins	
	EXT_IO16	in	AW19	User IO	
17	JTAG TCK	in	BB6	JTAG dedicated pins	
	EXT_IO17	in	AW18	User IO	
18	JTAG TDO	out	AY7	JTAG dedicated pins	
	EXT_IO18	out	AY17	User IO	
19	I2C SCL	inout	AY26	User IO	The I2C signals connect to vu35p and other slave devices on board. The pin AY26 and AY27 is used when fpga is a slave.
20	I2C SDA	Inout	AY27	User IO	

3.3. I2C slave devices

3.3.1. VU35P

The VU35P is one of i2c slave devices on board. When using vu35p as slave, developers have to implement i2c slave module and defined i2c addesss is 011_0010. The pin assigment in this case is AY26 for SCL and AY27 for SDA.

3.3.2. TMP411C

This is a TI temperature sensor. It has 2 channels: local channel for monitoring board temperature, remote channel for monitoring vu35p chip temperature. The i2c address is 0x4E. Refer to TMP411 Datasheet for more information.

3.3.3. CDCE6214

This is a TI clock generator. Currently it has 4 outputs differential clock, all are 100Mhz. There is 100Ohm termination resistor on each clock path. To make the clock working properly, add the termination property in constrain like this:

set_property PACKAGE_PIN BB18 [get_ports refclk_2_p]

set_property IOSTANDARD LVDS [get_ports refclk_2_p]

set_property DIFF_TERM_ADV TERM_100 [get_ports refclk_2_p]

set_property PACKAGE_PIN BC18 [get_ports refclk_2_n]

set_property IOSTANDARD LVDS [get_ports refclk_2_n]

set_property DIFF_TERM_ADV TERM_100 [get_ports refclk_2_n]

The i2c address is 110_0111 for Fallback mode and 110_1000 for Normal mode.

Refer to constrain file for clock pin assignment.

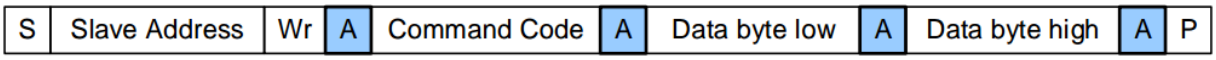
Refer to TI CDCE6214 Datasheet for more information.

3.3.4. MP2975GU

This is power management chip. User can read or change value of VccINT and VccHBM. The i2c address is 0x7C.

Here is i2c message structure:

- for writing:



- for reading:

S = Start **NA = Not Acknowledge Bit** **Wr = Write (Bit Value = 0)**

P = Stop **Master to Slave** **Rd = Read (Bit Value = 1)**

A = Acknowledge Bit **Slave to Master**

**** READ VOLTAGE *****

Step to read VccINT:

- Write command code 0x00 and one data byte 0x00

- Write command code 0x8B and read 2 data bytes. The first byte is low byte, the second byte is high byte.

- The returning voltage value is 850mV in default.

Step to read VccHBM:

- Write command code 0x00 and one data byte 0x01

- Write command code 0x8B and read 2 data bytes. The first byte is low byte, the second byte is high byte.

- The returning voltage value is 1265mV in default.

***** CHANGE VOLTAGE *****

The voltage can be changed between -128 → 127 steps, with each step at 5mV. The step to change voltage VccINT and VccHBM is below:

- Write command code 0x00 and one byte data 0x02

- Write command code 0x1E and two bytes data: byte 1 and byte 2, byte 1 is for VccINT, byte 2 is for VccHBM.

For example:

- to increase VccINT 20mV ↔ 4 steps ↔ byte 1 = 0x04

- to decrease VccHBM 20mV ↔ - 4 steps ↔ byte 2 = 0xFC

So the written sequence is: 0x1E 0x04 0xFC.