



維基夥伴獎學金 成果報告書

專題題目：光學智慧血壓計

專題學生：林詩凱

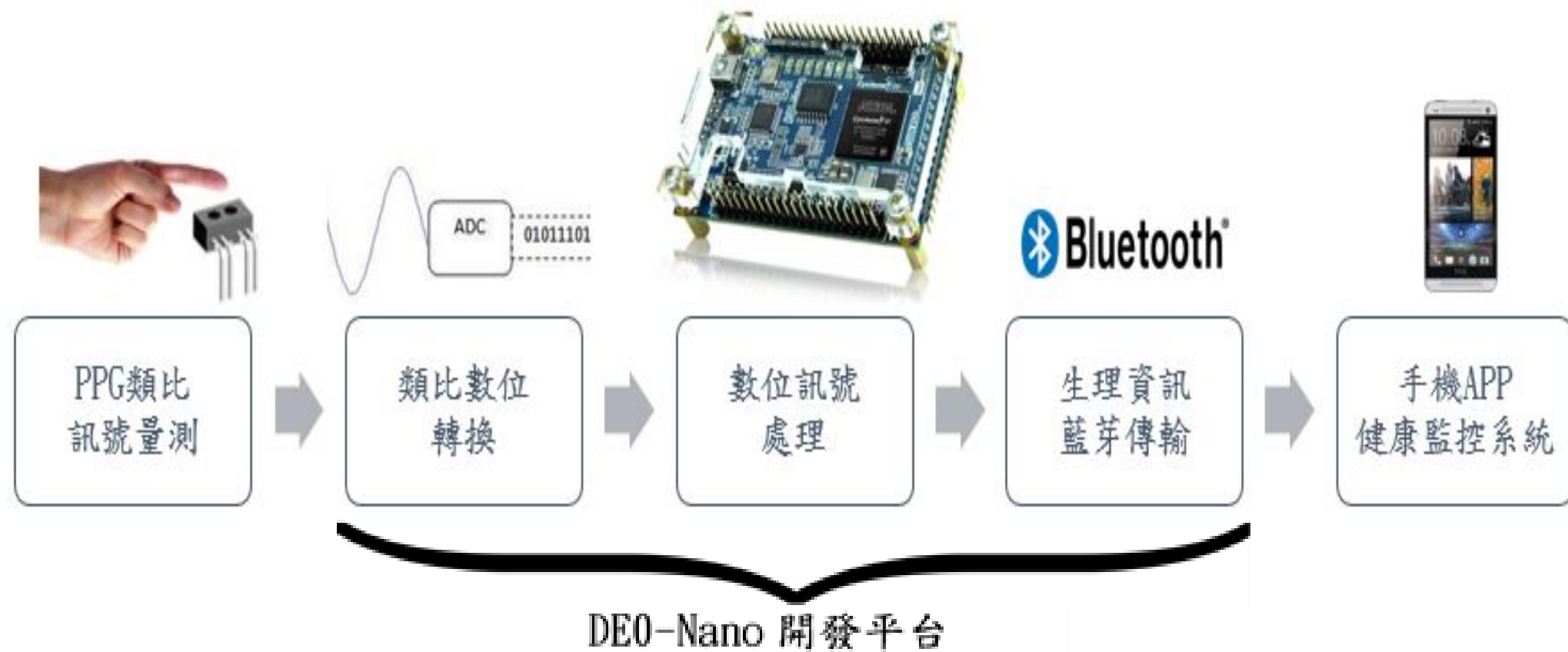
指導教授：闕河鳴 博士



Outline

- Design Structure
- PPG analog signal measurement
- Analog to Digital Conversion
- Digital Circuit design
- Reference

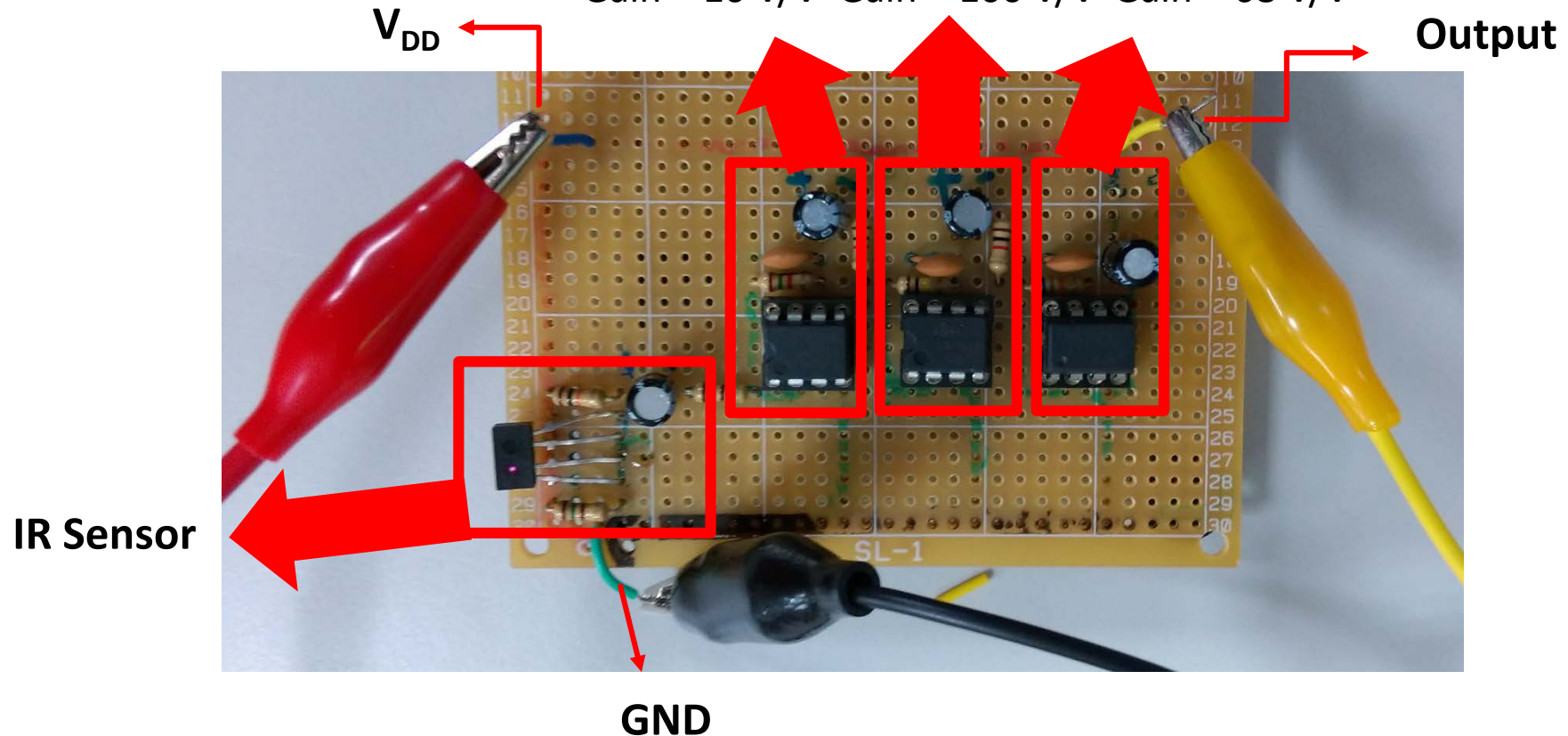
Design Structure



PPG analog signal measurement



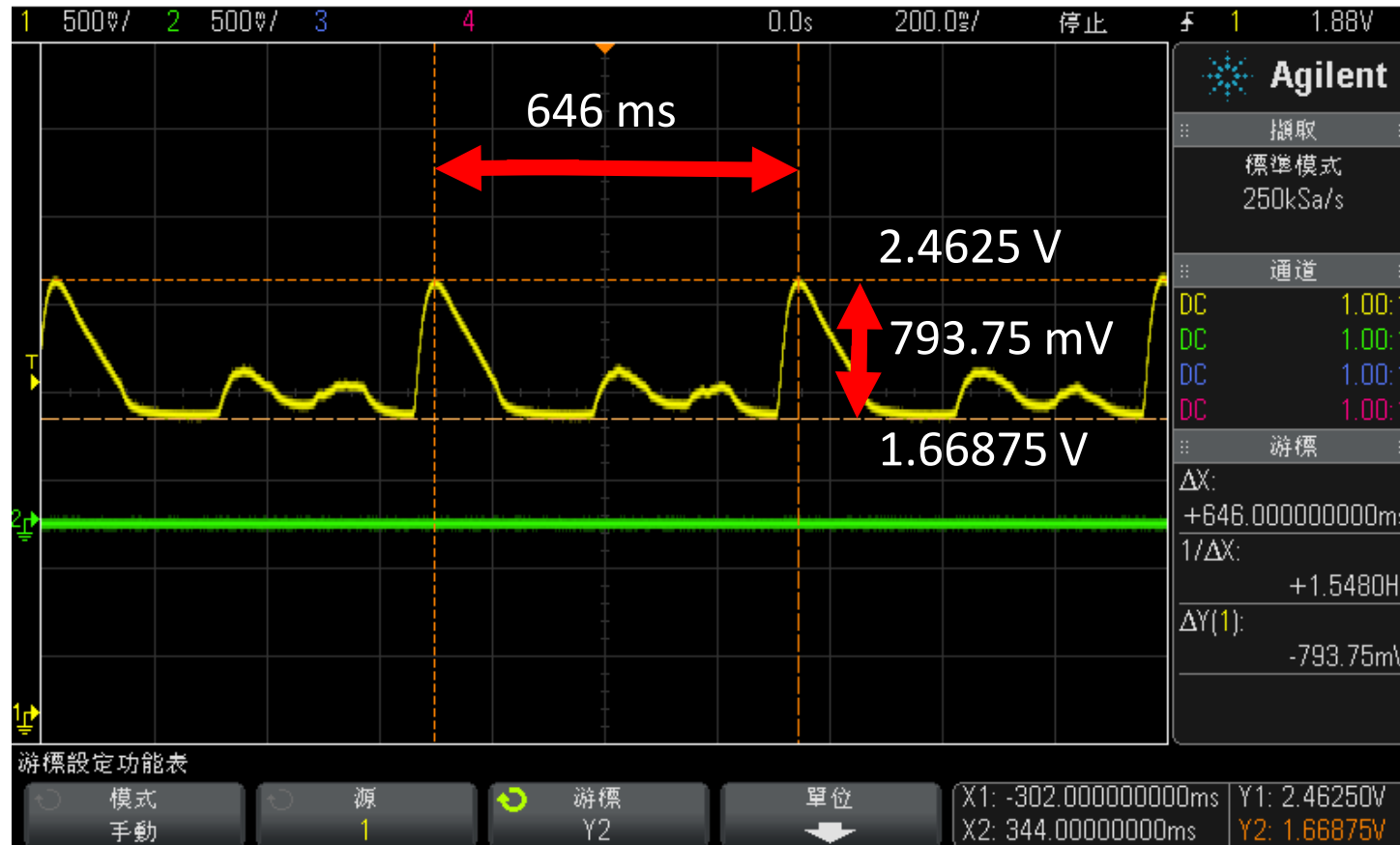
1st stage **2^{ed} stage** **3^{ed} stage**
low pass filter low pass filter low pass filter
Gain = 10 V/V Gain = 100 V/V Gain = 68 V/V



PPG analog signal measurement



使用DE0 Nano供應3.3V



Analog to Digital Conversion



時間計算：

使用CLOCK_50，提供50MHz的clock；

ADC使用wSPI_clk，提供2MHz的clock(除頻25)

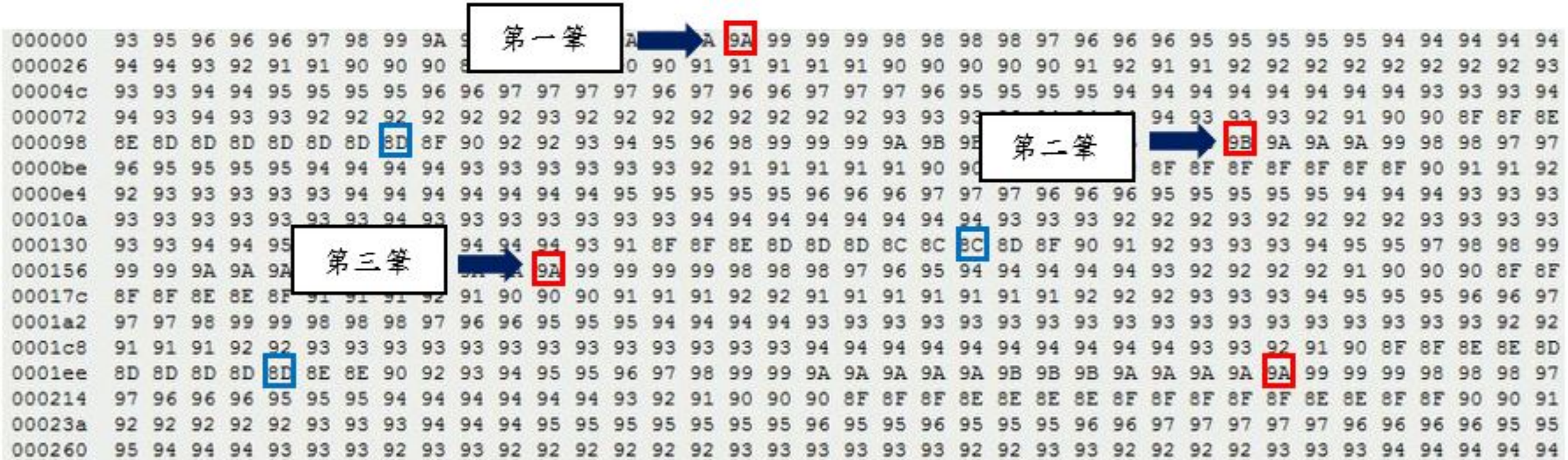
address存放使用975.5625Hz的clock(除頻2048)

使用1024 X 8的記憶體存放資料，故每兩筆資料建
隔時間約為0.001025 秒($1/975.5625$)，記憶體跑完
一次約為1.05秒。

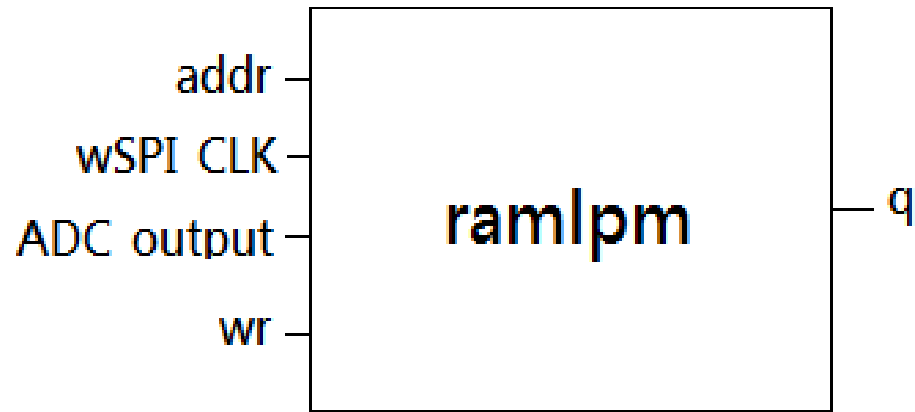
Analog to Digital Conversion



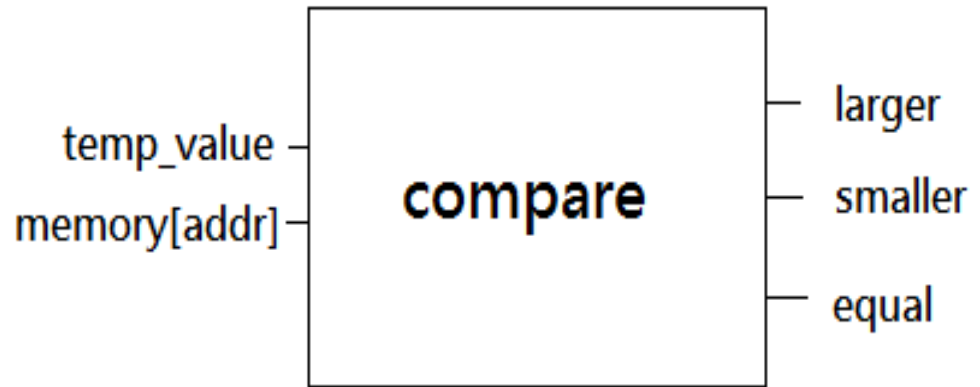
	Max	Min	Rising time	Rising time	Time difference	Time difference
第一筆	9A	8D	22	0.090112 s	175	0.7168 s
第二筆	9B	8C	27	0.110592 s	172	0.704512 s
第三筆	9A	8D	26	0.106496 s	171	0.700416 s



Digital Circuit design

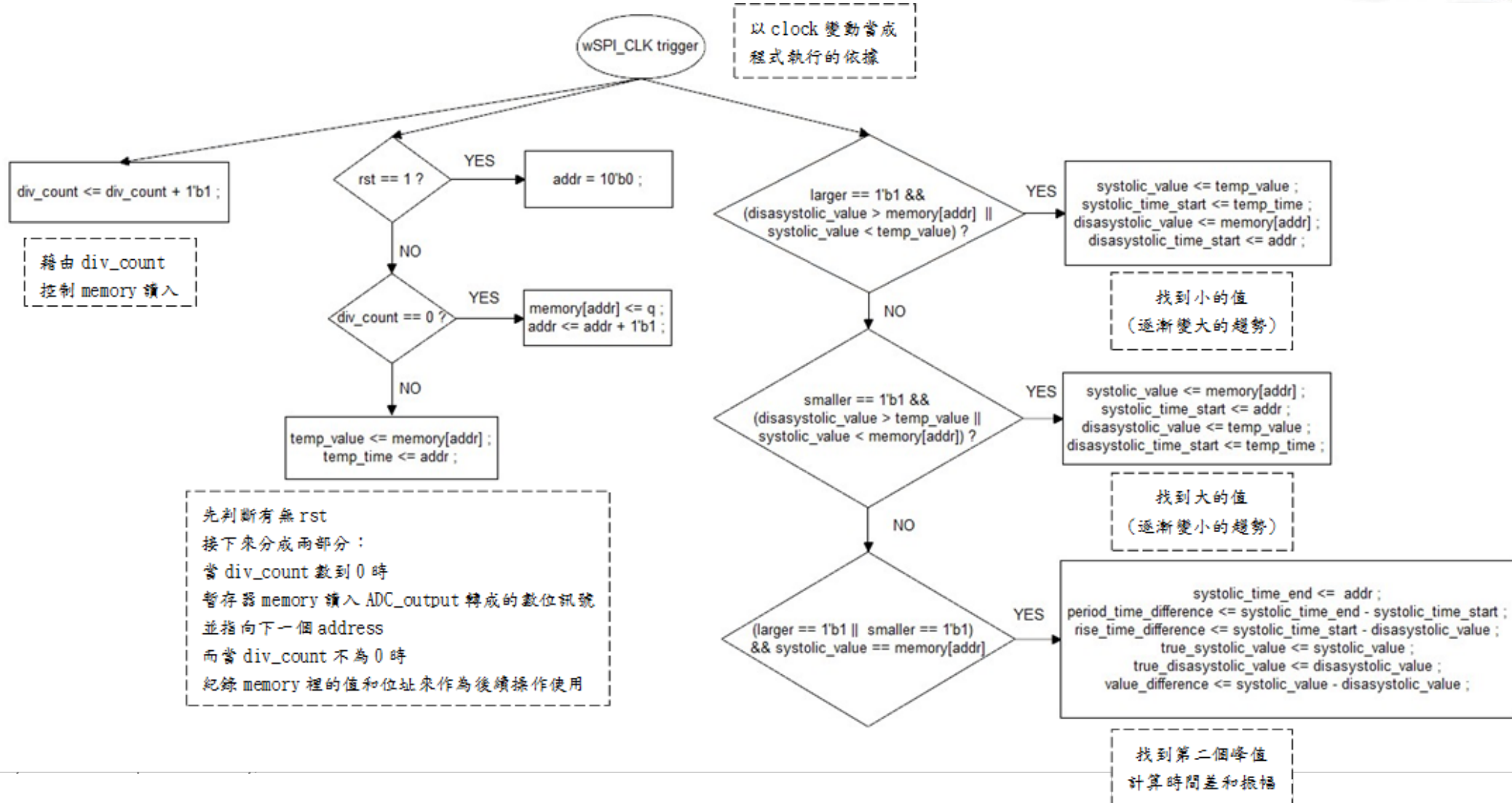


以Altera提供的1
port ram紀錄資料



比較前後輸
入值的大小

Digital Circuit design



Reference



- JuneYoung Kim: “ Design of Infrared Sensor Based Measurement System for Continuous Blood Pressure Monitoring Device” , Department of Electrical and Computer Engineering, University of Minnesota
- 高材： “用於評估心室儲備功能之光學式連續血壓測量裝置之研發” ，國立陽明大學醫學工程研究所